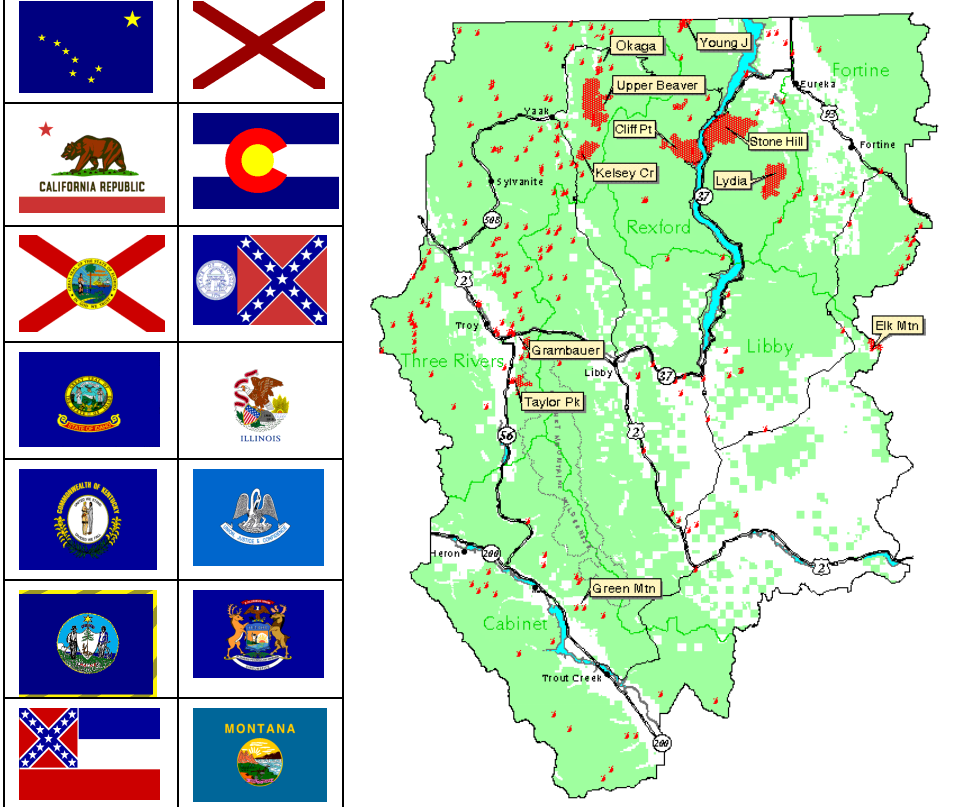

Forest Assessment of Major Fires 2000

USDA FOREST SERVICE
KOOTENAI NATIONAL FOREST
OCTOBER 2000

SOURCES OF INFORMATION

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Forestwide Assessment of
Kootenai National Forest
Fires of 2000

I. INTRODUCTION

The Kootenai National Forest's fire season increased significantly with lightning activity starting 14 fires on August 4. Initial attack firefighters extinguished all of these fires except the Elk Mountain fire that was finally controlled at 1,050 acres. Another round of lightning on August 10 set off 173 new fire starts. Forest personnel initial attacked 97 of these fires and caught 88. A third lightning storm hit on August 24 igniting 28 additional fires. These fires were initial attacked and put out immediately. In total, approximately 45,500 acres burned across the Forest with five major complexes: Kootenai (14,400 acres), Troy South (3,850 acres), Stone Young (25,330 acres), Elk Mountain (1,050 acres) and Green Mountain (865 acres). A map of the fires can be found on the previous pages of this assessment.

In order to efficiently implement rehabilitation and restoration efforts on the burned areas, the Forest Leadership Team tasked an Interdisciplinary Team to develop a framework upon which to base further recovery efforts. The objectives of the team were to:

- Summarize fire information such as burned acres and fire severity for various vegetative response units (VRUs) encompassed by the fires.
- Classify the fires relative to the historic range of important variables such as effects to age class distribution, patch size and fire severity.
- Identify Forest Plan management areas affected by the fires.
- Identify rehabilitation and restoration opportunities within and adjacent to burned areas.
- Identify considerations for future analyses.

The team analyzed 25 fires generally larger than 100 acres. There was an additional 200 smaller fires that were not analyzed as most of these fires were less 1-2 acres. These fires may be evaluated at a later time to determine if restoration activities are warranted.

This assessment is divided into the following sections: Forest Perspective, Summary of Analysis Procedures, Historical Perspective, Considerations, Fire Summaries. The appendices include additional supporting information.

The information in this report is based on the available information. Fire severity levels, fire perimeters, and effects to resources will need to be further validated through additional surveys and analyses.

Fire information, maps and pictures can be found on the Kootenai National Forest World Wide Web site: http://www.fs.fed.us/r1/kootenai/fire.

II. FOREST PERSPECTIVE

The purpose of this fire assessment is to summarize and characterize the burned areas for future planning and management activities. The framework that we use to validate these activities is important to share and discuss as we evaluate the effects of these fires. This section of the assessment defines this framework and provides the management perspectives in which the Kootenai National Forest operates.

The 1976 National Forest Management Act (NFMA) and subsequent Forest Plan provide the basis for managing the Kootenai National Forest. The Forest Plan provides goals and objectives as well as standards and guidelines for management activities that take place within forest boundaries. The Forest Plan allocates management areas across the forest to accomplish the goals and objectives.

NFMA and the Forest Plan have a goal of sustainability while providing goods and services for the American people. Ecosystem management is a tool for providing for sustainability. Ecological integrity, historical range of variability and vegetation response units are used in measuring sustainability. It is important to recognize that ecosystem management includes both biophysical elements and human considerations.

The summary of information provided for each fire in Section VI of this report provides information on important ecological variables related to each fire and a synopsis of Forest Plan guidance. Both perspectives will be important considerations in subsequent analyses.

Ecosystem Management

Ecosystem Management is a management practice and philosophy aimed at selecting, maintaining, and/or enhancing the ecological integrity of an ecosystem in order to ensure continued ecosystem health while providing resources, products, or non-consumptive values for humans. An integral part of ecosystem management is the maintenance of ecologically significant structure and processes within the ecosystem. The actions taken reflect the management goals and range from protection from human influence through to an increasing intensity of intervention to serve human needs (Dunster and Dunster 1996).

Ecological integrity is defined as the capability of supporting and maintaining a balanced, integrated, adaptive, community of organisms having species composition, diversity, and functional organization comparable to that of natural habitats of the region. (Karr and Dudley, 1981)

Historic range of variability (HRV) is the variation in spatial, structural, compositional, and temporal characteristics of ecosystem elements as affected by minor climatic fluctuations and disturbances. This range is measured during a reference period prior to intensive resource use and management. The range of historic variability is used as a baseline for comparison with current conditions to assess the degree of past change (USFS Great Lakes Assessment 1997). On the Kootenai, this period is considered to be prior to the 1880 and 1910 fire events to approximately 2500 years ago (Chatters and Leavell 1994).

HRV brings up the question "if the range of natural, historic variability is in a constant state of flux, and if the landscape is a constantly shifting mosaic, why should management be concerned at all?" Volcanic eruptions, glacial advances and retreats, and stand-replacing fires occurred historically at such time-spaced intervals that allowed organisms to migrate, adapt, and evolve. Present management has the capability to cause disturbances of great intensity more frequently and of a greater scale than any other disturbance agent. Nature has functional, historical, and evolutionary limits (limits relating to physiological characteristics evolved through time). We may lose species or ecosystem integrity and/or sustainability if we exceed these limits. Disturbance is a necessary function of these ecological systems. Not allowing disturbance to occur within forested ecological systems of the Kootenai can have negative results. Disturbance with the frequency and intensity of a reasonable, manageable historic range of variability can maintain species and habitats. There is room to produce a sustainable level of commodities from a forested ecological system on the Kootenai while maintaining biological diversity and ecological sustainability (Leavell 2000). Vegetation evolved and adapted within the shifting landscape influenced by fire and other disturbance events for the past 2500 years on the Kootenai National Forest which animals adapted to and evolved to occupy. The range of natural variability fluctuated, but over the past 2500 years became predictable enough to allow adaptations to occur (Figure 11, Chatters and Leavell 1994).

Management informed by an understanding of HRV will likely reduce ecologic uncertainty and surprise, because ecosystem management goals would be set within the ecological constraints (or limitations) of an area. (Leavell 2000)

Vegetation Response Units (VRUs) are used to describe an aggregation of land having similar capabilities and potentials for management. These ecological units have similar patterns in potential natural communities; soils; hydrologic function; landform and topography; lithology; climate; air quality; and natural processes (nutrient and biomass cycling, succession, productivity, and fire regimes).

The purpose of delineating VRU's is to provide a way to describe and define the components of ecosystems. The relative health of ecosystems is indicated by the structure and function of the component types that make up the ecosystem. By classifying and mapping these component types, it is possible to develop strategic approaches to land use that allow for biological diversity, biotic integrity and natural processes to be sustained.

Vegetation Response Units are the mapped polygons used for ecosystem analysis. Each one of these units is labeled with a generic classification termed VRU. A VRU is simply a label and an associated scientific description of the structure, composition, and functioning of all the polygons which have a given set of characteristics.

Forest Plan Management Area Direction

The Kootenai National Forest contains 2.2 million acres of national forest lands. The fires of 2000 affected approximately 2% of the forest.

Summarizing and characterizing the fire effects for future planning and restoration activities requires an understanding of the management area direction for these affected areas. The

National Forest land within the Kootenai National Forest has been divided into Management Areas (MA's), each with different management goals, resource potential and limitations. A brief summary of the management direction for each of the management areas with the corresponding number of acres that were affected are listed in the table below.

MA	Management Areas	Burned Acres	% of Total MA
2	MA 2: Large and small areas offering roadless recreation opportunities in a semi-primitive setting. Motorized vehicle use must be compatible with the roadless management goal. Timber harvest is not permitted.	5,314	12.4
5	Natural appearing areas containing highly sensitive viewsheds. Timber harvest must be compatible with the visual management goal.	1,087	2.5
7	Cabinet Mountains Wilderness.	447	1.0
8	Areas being recommended for additions to the National Wilderness System.	1,053	2.5
10	Areas generally below 4500' elevation on favorable solar exposures that are important for big game winter range. They are generally difficult to manage for timber because of low productivity or difficult environmental problems.	3,256	7.6
11	Same as Management Area 10 except that productive forest lands are involved, which can provide both wildlife and timber benefits.	1,278	3.0
12	Productive forest lands containing moist or wet habitat types at elevations above 4500'. Manage to provide forage, cover and security for big game by using compatible timber and road management prescriptions.	14,615	34.1
13	Areas generally below 5500' elevation providing special habitat needs for old growth timber dependent species. Timber harvest is not permitted.	2,134	5.0
og	Inclusions of old growth forest within other Ma's (includes MA 2, 8, 10, 18)	1,749	4.1
14	Productive forest lands identified as being essential for the recovery of the grizzly bear. Manage to provide forage, cover and security by using compatible timber and road management prescriptions.	1,165	2.7
15	Productive forest lands that will be managed for high timber yields while protecting watershed, soil, fisheries and visual resources.	7,299	17.0
16	Same as Management Area 15, but providing for a higher level of protection for the visual resource.	1,291	3.0
17	Productive forest lands located within sensitive viewsheds.	380	.9

	Timber harvest and visual resource management must be coordinated to provide a natural appearing landscape.		
MA	**Management Areas**	**Burned Acres**	**% of Total MA**
18	Small productive forest areas that contain habitat types that are difficult to regenerate. Timber harvest must be compatible with regeneration goals.	56	.1
19	Small productive forest areas that are on very steep slopes or in areas difficult and costly to road. Timber harvest must be compatible with soil and watershed protection goals.	929	2.2
21	Small areas containing both productive and non-productive forest land that are unique or special in some way, including Research Natural Areas. Manage to protect and retain these characteristics for public and scientific purposes.	195	.5
24	Small areas of nonproductive forest lands. Manage to protect soil, watershed, fisheries & vegetation.	86	.2
	Private Lands	574	

Inventoried Roadless Areas

The following table displays the roadless areas that were affected by fire. This will be an important consideration as further planning progresses. Another 493 acres of fire occurred within the Cabinet Mountains Wilderness Area.

Roadless Area	Fire Name	Fire Acres in IRA
#166 – Zulu	Kelsey Creek	56
#168 – Saddle Mountain	Prospect	224
#173 – Willard-Estelle	Survey Mountain	8
#666 – Mount Henry	Okaga	204
	Upper Beaver	1,564
#667 – Grizzly Peak	Lucky Point	429
#670 – Cabinet Face West	Taylor Peak	910
#671 – Cabinet Face East	Grambauer Face	487
#675 – McNeeley	McNeeley	73
#676 – McKay Creek	Engle	177
	Green Mountain	96
#684- Roderick	Sheepherder	90
#691 – Roberts	FrezKat West	166

Existing Contracts and Analyses

The fires affected a number of existing and proposed timber sale contracts. The Stone Hill Fire affected the Weaver Rehab Timber Sale, Flat Sutton timber sale as well as potentially affecting the Water Trough Gut T.S. scheduled to be offered for sale in Fiscal Year 2001. The Lydia Fire affected the Upper Pinkham TS as well as the Still Creek TS scheduled to be offered for sale in Fiscal Year 2001. In addition, the Workman Draw TS bid opening has been delayed due to the fire affecting conditions in the Pinkham Watershed. On the Three River Ranger District, the Upper Beaver Fire affected the Bunker Vinal TS as well as affected units proposed within the Clay Beaver analysis area. The Frezkat West Fire affected a portion of a planned prescribed burn, proposed as part of the Callahan EA, for the benefit of wildlife habitat.

The fires also potentially affected some of the baseline information used for planning purposes in the Gold Boulder EIS that was to be released as a Draft Environmental Impact Statement in fall of 2000.

III. SUMMARY OF ANALYSIS PROCESS

The objectives of the team were to:

- Summarize fire information such as burned acres and fire severity for various vegetative response units (VRUs) encompassed by the fires.
- Classify the fires relative to the historic range of important variables such as effects to age class distribution, patch size and fire severity.
- Identify Forest Plan guidance for management areas affected by the fires.
- Identify rehabilitation and restoration opportunities within and adjacent to burned areas.
- Identify considerations for future analyses.

To meet these objectives the IDT went through the following steps:

1. Reviewed 1994 Assessment.

The team reviewed the 1994 Fire Assessment and determined that the objectives remain essentially the same. However, the context for the assessment may have changed based upon current understanding and recent monitoring results. The 1994 Fire Assessment evaluated fire severity levels by defining categories where fire behavior resulted in: 1) 70-100 % tree mortality, 2) between 50-70% tree mortality, and 3) less than 50% tree mortality. In this assessment, Fire Severity Levels were redefined based upon the work of Agee, 1993. Increasing the levels of FSL 2 to 20-70% mortality enables a more accurate characterization of historic mixed-lethal fire regimes.

In order to better delineate Fire Severity Levels, the Kootenai National Forest established monitoring plots after the 1994 fires to increase the accuracy of field mortality estimates. Monitoring information collected from 1994 fires indicates that shade intolerant species such as ponderosa pine (especially >12" DBH) can survive high levels of bole scorch, hot surface fires, and moderate levels of crown scorch. High levels of crown scorch will cause mortality. Shade tolerant species such as western redcedar succumb to high intensities of ground fires even with lower levels of crown scorch. Deep char correlates highly with dead cambium, bole char does not - unless accompanied with moderate to high levels of crown scorch. Appendix B contains additional information reflecting 4 years of post-fire monitoring information.

2. Delineated Fire Severity Levels

The table below displays the acres of fire by Fire Severity Level (FSL). More detailed information of fire severity by individual fire can be found in section VI Summary of Fire Information. It should be recognized that few areas were exclusively one fire severity level. Within areas classified as one fire severity, inclusions of other levels can be found. This is especially true in the areas classified as low fire severity (Level 3). The aerial photo on the following page gives a visual display of different fire severity levels.

Fire Severity Level	Description	Acres
1 – High	70% plus Mortality	12,139
2 - Moderate	20-70% Mortality	21,150
3 – Low	0-20% Mortality	9,174 + 420 acres unburned islands

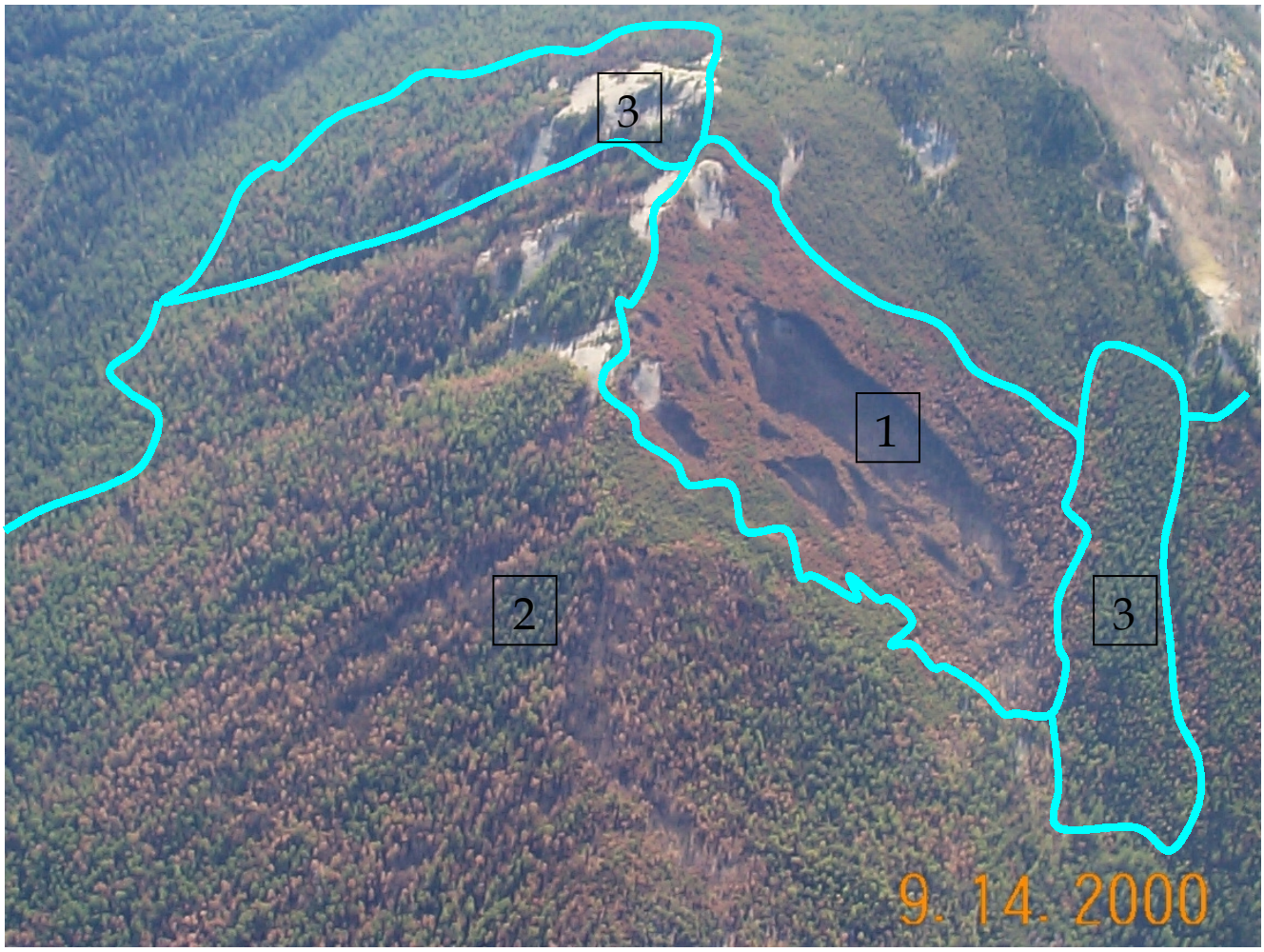
The fire effects were assessed and summarized by conducting field reconnaissance of fire affected areas to map and determine fire severity levels. Fire severity levels have been defined according to Agee, 1993.

High Severity (Lethal Fire, coded as a 1) A stand-replacing fire that burns through the overstory and understory consuming large woody surface fuels and potentially the entire duff layer. This disturbance can be expected to cause **70-100%** tree mortality occurring as either a running crown fire or as a hot ground fire. Some small residual patches and stringers of unaffected areas may be present as are scattered large diameter western larch and Douglas-fir.

Moderate Severity (Mixed Lethal Fire, coded as a 2) Patchy burning ground fires that generally consume litter, upper duff, understory plants and foliage on understory trees. Producing results characteristic of both high severity and low severity fires, this fire regime may result in anywhere from **20-70%** tree mortality depending on species tolerance to fire and topographic setting. These fires characteristically result in individual trees or groups of trees occasionally crowning out. A high percentage of large diameter western larch and Douglas-fir are expected to survive, as well as less fire-resistant species in areas of low fire intensity. Where Douglas-fir is present, this fire severity can produce stand conditions very susceptible to Douglas-fir beetle.

Low Severity (Non-lethal Fire, coded as a 3) A low intensity ground fire expected to result in an average of **20%** or less tree mortality in very patchy burn patterns. Some areas exhibit little to no damage from fire. Burning typically occurred in surface fuels consuming the litter, herbaceous fuels, foliage and small twigs on woody undergrowth. However, little heat travels through the duff.

Aerial photo interpretation was then used to refine the fire severity levels for the areas surveyed on the ground (See photo on following page for example of this Fire Severity mapping).



Fire Severity Levels Example: Kelsey Creek Fire

3. **Identified Forest Plan standards and guidelines for Management Areas affected by the fires.**

The assessment identified Forest Plan management areas affected by the fires as well as provides a brief discussion of Forest Plan standards and guidelines related to potential opportunities and how these opportunities compared to ecosystem management concepts and principles. An example of this would be how salvage opportunities in MA11 may be affected by cover requirements.

4. **Identified considerations to be included in future analyses.**

This assessment includes broad considerations to look at when more site-specific activities are analyzed. The opportunities for restoring landscapes to more historic ranges of variability or for conducting ecosystem management activities will need to consider various issues that may affect these opportunities. For example, the assessment may indicate that opportunities to

conduct timber harvest and salvage within a fire area, but watershed concerns and/or fisheries concerns may preclude these activities from being carried out.

RECOMMENDATIONS:

Fires were grouped by Planning Subunit (SU) in order to look at HRV on a meaningful scale. It is the recommendation of the assessment team that any future analyses consider doing the same in order to facilitate implementation of rehabilitation and restoration projects. Several fires burned across SU boundaries. Where this occurred, consideration should be given to combining subunits for analysis purposes.

There is an opportunity to reconvene the task force that put together the Conifer Tree Mortality Guide following the 1994 fires. This group could incorporate results of the post-fire vegetation monitoring into an updated mortality guide for current use in areas where vegetation management is being considered.

IV. HISTORIC PERSECTIVE

FIRE

Historically on the Kootenai, fire was an important natural process that produced significant changes in vegetation and removed accumulations of forest fuels. By the early 1900's, changes were taking place that would alter the natural vegetation and fuel patterns of the Forest. Organized fire suppression became increasingly more efficient and effective following the 1910 fires in the Northern Rocky Mountains. The result of fire suppression was a distortion of fire regimes that stopped many fires of low, moderate, and mixed severity. This resulted in increased biomass and fuel loads that varied within different vegetation types. The more frequent the historic fire return interval within a specific vegetation type, the more biomass and fuel loading accumulated with fire suppression. Over time, the proportion and potential of large, high-severity fires inadvertently increased due to fire suppression. Fire suppression and an alteration of fire regime also resulted in a modification of nutrient cycling, carbon-nitrogen balance, and decomposition rates of downed woody material in addition to a change in biomass and fuel loads. In some landscapes and within some vegetation types, these changes have been significant enough that re-establishing the known historic balance of these factors in order to maintain and restore forest integrity could take many decades.

VEGETATION

Throughout history, fire intensity and frequency was the primary disturbance agent in northwest Montana. Insects and disease are also disturbance agents that with fire created a dynamic mosaic of vegetation succession throughout our forested landscapes. The mosaic was composed of varying proportions of age and size class distribution of trees and vegetative species composition. We do not know the precise amount of acres in early, middle, or late succession in pre-settlement time, but research indicates approximately 20-25% of the Kootenai Forest land base was in early successional and 35-45% in mature or old growth condition (Losensky 1994). The remaining 60% of the forested land was composed of 20-30% mid-seral, predominantly multi-story condition, and 10-15% non-stocked. All successional conditions shifted across these landscapes within variations of these proportions in response to disturbance processes.

Many of the attributes of historic vegetation patterns directly result from the effects of past fires. Both the frequency to which fires returned to the landscape and the intensity to which these fires burned related to climatic and topographic effects such as wind, temperature, humidity, elevation, and aspect. The combination and interaction of these relationships was important in creating historic and present mosaics of vegetation. Patch size and successional state describe these mosaics. For instance, ponderosa pine adapted to frequent, low intensity fires that killed the ingrowth of thinner-barked, small Douglas-fir on warm, dry sites. Lodgepole pine at high elevation, cold, dry sites typically experienced non-uniform stand replacing fires on an average frequency of 100 years, more or less. Western redcedar and western hemlock adapted to mixed lethal fires on an average frequency of 75 years and stand replacing fires every 150 to 250 years on warm, moist mid-elevation sites, killing these thinner-barked species and leaving a higher abundance of western larch. Therefore, old growth and early stage vegetation had a different structure and composition on low elevation, dry, south aspects as compared to that of high

elevation, cool, northerly aspects. Stand replacing fires left fire-tolerant species such as ponderosa pine and western larch as single-standing trees or in groups with an open canopy. These stands would then reproduce the same fire-tolerant species under the open canopy.

The following tables are from Losensky's (1994) publication and illustrate the historic condition and proportion of successional stage and species composition found on the area of what is now the Kootenai Forest. These tables are a compilation of historic maps and photos from the 1930's and from various fire scar analyses adjusted to meet 1900 conditions. Current vegetation conditions are determined in or out of a historic range of variability (HRV) based on comparisons with the proportions listed in the tables.

Historic Vegetation Types - Section M333B

The Section occupies the area between Flathead Lake in Montana westward to the Kootenai River in northern Idaho and from Missoula, Montana north to the Canadian border. Most of the Kootenai National Forest is contained within this Section. While the area is dominated by the maritime climatic influence it is subject to intrusions of cold arctic air in the winter. As a result west coast species such as western hemlock are confined to the northwest corner of the section in coves and sheltered areas. Forested cover types are found on 80 percent of the area with the largest non-forest area found in the southwest portion by Flathead Lake. The larch-Douglas-fir type represented about half of the forest cover type and represents the best development of this type in the Columbia River Basin.

In the valley bottoms these stands were commonly dominated by open-grown, mature to overmature larch with a second story of Douglas-fir, grand fir, lodgepole pine and other species found in the area. On steeper slopes larch tended to be younger in mixture with other species generally of the same age. While the more gentle terrain was maintained in a somewhat open condition by frequent underburns, upper slopes were much more brushy and dense. Ponderosa pine was confined to the lower dry slopes usually in mixture with Douglas-fir or other species. The white pine type was found primarily in the northwest corner of the Section commonly growing in mixture with western redcedar, western hemlock, grand fir and other mesic species. The lodgepole pine type was scattered throughout the section on upper slopes and it graded into the subalpine type on the ridge tops. As usual, the spruce-fir types was confined to riparian zones along streams or moist basins in the drainage heads.

The wheatgrass-fescue type was the major nonforest type and occurred in the large valleys. Rough fescue, bluebunch wheatgrass and Idaho fescue were the major components. Some scattered big sagebrush was present on some sites. Development in this area relatively late and significant timber harvest did not occur until the construction of the Great Northern Railroad in 1892. Large scale logging for export started about 1900.

Percent Acres by Cover Type for Section M333B

Cover Type	Percent Cover
2 - Ponderosa Pine	17
5 - L-DF	41.7
6 - White Pine	4
7 – Lodgepole Pine	10.4
8 – Spruce-fir	0.7
9 - Subalpine	6.7
14 – Wheat-fescue	17.0
26 - Water	2.5

Age Structure in 1900 for Major Forest Cover Types in Section M333B

Cover Type	Nonstocked	Seed-Sap 1-40	Poles 41-100	Mature 101-150	Overmature 151+
PP	5.9	11	11.9	7.1	64.1
DF	15.1	22	13	13.2	36.7
LP	27.3	44.7	19.2	6.8	2
WP	23.3	26	9.1	9.2	32.4
S-F	2.9	7.2	5.9	23.5	60.5

All of the types except the spruce-fir type show a considerable amount of area less than 40 years of age. Lodgepole pine and ponderosa pine contained twice as much as the average for the CRB. This structure could be the result of the widespread fires of 1890 which affected a major portion of this Section. Other than lodgepole pine the overmature portion for the types is about average. Lodgepole pine is significantly below average.

Percent Cover Type by Structural Development Stages

Cover Type	Forest Stand Structural Development Stages						
	ST INI	ST EXO	ST EXC	UN REI	YF-MST	OF-MST	OF-SS
PP	11.4	24.5				16	48.1
DF	26.1	18.6	18.6			18.4	18.3
LP	49.6		41.6	6.1	1.7	1	
WP	36.3		26.7	4.6		32.4	
S-F	6.5		9.5		23.5	60.5	
SUBALP	40	5	5	5	10	15	20

Historic Vegetation Types- Section M333D

This is a large area occupying the central portion of north Idaho and western Montana. The Section lies between the Lochsa River north to Coeur d'Alene Lake and from the Palouse Prairie east to the Clark Fork River in Montana. The Green Mountain Fire on the Cabinet Ranger District lies within this Section. The area is dominated by the maritime climatic influence with moderate temperatures and adequate moisture on most sites except high energy south and west slopes. Forested vegetation represents 97 percent of the area. The non-forest type was found on the western boundary and represents inclusions from the Palouse Prairie area. The core of the

area was dominated by the white pine type and probably represented some of the type's best development. Stands were generally not pure but mixtures of all the other species found in the area. Ponderosa pine was found mainly along the western boundary at low elevations or along the eastern boundary in the Clark Fork Valley. These stands ranged from savannas to pure ponderosa pine to mixtures with Douglas-fir, larch and grand fir. The larch-Douglas fir type was found in mixture with the white pine type on slightly warmer sites. Lodgepole pine was a minor type in the Section on upper slopes. Spruce-fir occupied the riparian and moist high basins. The subalpine type was a mixture of whitebark pine, subalpine fir, spruce and lodgepole pine with areas of scattered grass types.

Logging activity began on the Idaho portion in the 1860's in association with mining activity. In the early 1880's the construction of the Northern Pacific Railroad and the development of the Butte-Anaconda mining complex had a significant impact on all the valleys in Montana.

Percent Acres by Cover Type for Section M333D

Cover Type	Percent Cover
2 - Ponderosa Pine	20.8
3 – Douglas-fir	2.5
5 - L-DF	19.8
6 - White Pine	33.8
7 – Lodgepole Pine	9.2
8 – Spruce-fir	2.2
9 - Subalpine	8.2
14 – Wheat-fescue	1.7
26 - Water	0.5
37 – FES-Snow	1.3

The age structure of all the types was significantly different from the rest of the CRB for all the types. They all had about twice as many acres of young stands when compared to the averages for the CRB. Except for ponderosa pine, they had about half of the area in overmature types found elsewhere. Ponderosa pine stands still maintained a relatively high amount in the overmature class. This shift in age structure would suggest a more frequent occurrence of stand replacement fire. The young stands probably reflect the impact of the 1889 fire year in this Section.

Age Structure in 1900 for Major Forest Cover Types in Section M333D

Cover Type	Nonstocked	Seed-Sap 1-40	Poles 41-100	Mature 101-150	Overmature 151+
PP	8.9	11.1	12.5	9.3	58.2
DF	31	21.7	24	16.9	6.4
L-DF	27.7	21.1	15.3	12.8	23.1
LP	33	38.8	21.3	5.9	1
WP	18.8	23.2	19.1	12.1	26.8
S-F	23.8	4.4	13.4	24.7	33.7

Percent Cover Type by Structural Development Stages

Cover Type	Forest Stand Structural Development Stages						
	ST INI	ST EXO	ST EXC	UN REI	YF-MST	OF-MST	OF-SS
PP	14.5	27.4				14.6	43.6
DF	41.8	25.9	25.9			3.2	3.2
L-DF	38.2		32.2	6.4		17.4	5.8
LP	52.4		40.7	4.9	1.5	0.5	
WP	30.4		36.7	6.1		26.8	
S-F	26		15.6	12.3	12.4	33.7	
SUBALP	60		5	5	5	5	20

WATERSHED

Geomorphic disturbance, in response to physical and climatic conditions, determines the fundamental hydrologic conditions in a watershed. Historically, temporal variations in water yield and sedimentation occurred based on the frequency and intensity of fires that affected both riparian and upland sections of landscapes. For example, sedimentation and water yield increases occur in both dry and moist landscapes following disturbance, but the amount would be less for low intensity fires that occur on a frequent basis as compared to high intensity fires that occur less often. Watershed recovery rates differ based on vegetation recovery rates in the uplands as compared to riparian areas. Historically, disturbance events were relatively short duration even in response to stand replacing fires. These "pulse" disturbance events may have caused increased sedimentation loads and water yield, but recovery rates occurred shortly afterward. Fisheries and other aquatic life would adapt to these pulse events.

Present day disturbances of frequent regeneration timber harvests and accompanying road building create a higher level of sustained impact. Watershed recovery at historic rates cannot take place when intensive timber harvests with extensive road systems and larger, more intensive fires (due to fire suppression) occur.

WILDLIFE

Species of wildlife adapted to the habitats created by the shifting mosaic of vegetation and succession. Populations of wildlife adjusted to different patterns of vegetation to meet habitat preferences. Numbers of species would rise and fall, depending on specific habitat availability. Populations and species would migrate to refugia when large, stand replacing fire events eliminated habitat. For a more complete historic picture see the report "Temporal Ecological synthesis: for Kootenai National Forest Phase I (Ecological Planning and Toxicology Inc. 1995).

V. CONSIDERATIONS

The following are points to consider when designing activities for lands affected by the fires. Additional information is available in Appendices C-H.

Vegetation and Silviculture

- When conducting post-fire assessments and proposed actions, consult references such as: Case Studies in Silviculture-Post Wildfire Evaluation (USDA R-1, 1997), Vegetation Response Unit Characterizations and Target Landscape Prescriptions (USDA KNF, 1999), Post-fire Reforestation Assessment (USDA R-1, 2000), etc.

- Silvicultural prescriptions should be prepared which are consistent with the biological and physical conditions of the stands and that meet the resource objectives identified in a post-fire assessment and Forest Plan.

- The Kootenai National Forest continues to experience tree mortality as a result of the Douglas-fir beetle outbreak which originated following the winter of 1996-1997. There is a concern that the wildfires of 2000 now provide an additional means for this infestation to continue as fire-stressed Douglas-fir stands become a potential food source. There is a need to begin the process of addressing fire effects and how both short- and long-term management decisions might be affected; and how insect and disease interactions with fire-damaged trees and stands could influence those decisions.

- Where regeneration harvests are planned on suitable lands, assurance must be made that stands can be adequately restocked within 5 years of final harvest. If no harvest is planned in an area, regeneration will not be required. On lands classified as unsuitable, plan reforestation as needed, regardless of whether there is associated harvest (36 CFR 219.27). Do so in a manner that contributes to the intended resources objectives including time frames, species, and stocking levels.

- Reforestation is an integral part of any post-fire assessment and should be considered throughout the burned areas relative to the management objectives and restoration goals. Both planting and natural regeneration are an effective means for establishing desired forest cover of adequate and appropriate diversity to contribute to watershed stabilization, timber production recovery, wildlife habitat cover, seed source establishment, and other objectives. The delineation and evaluation of burned areas is critical in planning restoration efforts.

- Consider opportunities to restore western larch, western white pine, and ponderosa pine. Reforesting these species is a Regional priority based on the Regional Overview. Other reforestation priorities at the local level should also be determined. Also, consider opportunities for enhancement of aspen and whitebark pine communities during reforestation efforts.

- There is an opportunity to re-plant plantations and thinned sapling stands that are understocked as a result of fire. Species mix and structural diversity should be that considered appropriate for the habitat type group and VRU, within stocking levels prescribed by a certified silviculturist.

- Consider the fuel conditions in stands adjacent to treatment areas. Many fires burned in moist forest types that, by their very nature, are at risk of infrequent, high intensity stand-replacing fires. Consider reducing canopy density as a means of reducing future crown fire potential. Consider treatments that reduce potential fire intensity near existing regeneration units.

- Structural diversity is important. Retain trees of adequate age, species, and size class diversity (favor seral species) commensurate with the historic range of variability for each successional stage within each VRU.

- Where a Condition 3 watershed is entered for restoration without harvest, consider reforestation options. As it would not have to meet optimum stocking or species mix, reforestation can occur in the most efficient manner with minimal disturbance.

- Recommendations for the retention of coarse woody debris are project-specific, with consideration for the VRU's where management would take place. Where retention of CWD is prescribed in harvest units, consider the emphasis on leaving large diameter cull logs, long butts, etc. that have long term soil nutrient value, provide small mammal habitat, and are a reduced fire risk. It is advisable to reduce the amount and continuity of smaller diameter fuel remaining on site before planting conifers.

- Coordinate with other resource considerations (especially wildlife) to ensure stand-level prescriptions are written within a temporal and spatial perspective.

Fire and Fuels Management

Within regeneration units damaged or destroyed by fire:

- Consider the increase in fire risk associated with fuels from fire killed seedlings/saplings. In some cases it may be desirable to slash and pile these dead trees as a means of protecting the next crop of trees.

- Consider the fuel loadings in adjacent stands, especially those with heavy mortality, which could increase the risk of mortality within the regeneration unit. There may be an opportunity to treat the fuels in these adjacent stands as a means of protecting plantations.

- Consider the increased risk of loss of wildland fire from pre-commercial thinning slash. There may be an opportunity to reduce stocking levels to reduce the need for pre-commercial thinning.

- If maintenance burnings are prescribed for stands adjacent to regeneration units, protection needs to be considered.

Within previously thinned stands:

- Consider slashing and piling both fire-killed and live understory trees that provide ladder fuel that may damage the overstory.

- Consider treating the slash created through removal of fire killed/damaged trees. Consult soils considerations regarding the amount of retention of coarse woody debris.

- Consider leaving dead standing trees for woody debris recruitment. The increased fuel loading from these trees will be spaced out over time rather that all at once.

Within untreated stands:

- Consider reducing canopy cover to reduce the risk of subsequent crown fires.

- Select retained overstory trees of sufficient diameter, bark thickness and height to live-crown ratio to survive subsequent fire treatment.

- Try to avoid creating fuel conditions in the residual stands that are difficult to remedy by practical means.

- Consider an area-wide strategy for dealing with the future risk of wildland fire in areas of extensive mortality, especially where there is limited opportunity to directly treat these fuels. There may be an opportunity to provide a buffer around such problem areas by surrounding them with treated stands. Reducing stand density, removing ladder fuels and prescribed burning will result in stand conditions that will favor low intensity surface fires where control measures can be undertaken with a good probability of success.

- Consider treating dead fuels in stands where commercial removal is not practical by mechanical means followed by prescribed burning to reduce fuel risk and allow planting.

- Consider reducing live and dead fuels in stands bordering private property to reduce the risk of future intense surface or crown fires.

- Consider fuel reduction activities that are designed to break up the continuity of high-risk fuels. Existing roads, ridgelines or natural openings may provide control points for wildland fires if fuels are treated to reduce fire intensity during subsequent fires.

- Consider fuel treatments such as crushing, slashing and burning or piling to allow planting of desirable seral species in stands of fire-killed lodgepole.

- Coordinate with silviculture to ensure adequate implementation to meet fire and fuels management considerations.

Wildlife

- There is an opportunity to move toward providing cavity habitat (snags and down logs) within historic ranges by: 1) retaining snags, replacement snags and down logs in areas with low snag and down log densities and 2) removing smaller diameter snags in areas where snag numbers exceed historic ranges (especially on warm dry habitats). Remember that snags created by fire may persist for shorter times than snags created by other mortality agents (Harris 1999 pg. 14). Fires may also weaken existing snags to the point that they are more susceptible to windfall. These factors may initially require leaving additional replacement trees to provide a historic range of snag levels over time.

- In lynx habitat, consider retention, planting and natural regeneration of tree species favored by snowshoe hare (e.g. lodgepole pine, subapline fir). Analysis to assure compliance with LCAS objectives and guidelines for all projects in lynx habitat is required.

- Determine if opportunities exist to further reduce noxious weeds or prevent further spread, especially on big game winter ranges and in riparian areas.

- Provide for wildlife security by returning access levels to pre-fire conditions, or better.

- Patch size has been exceeded on many fires (stand-replacement fires) when compared to historic levels. Look for opportunities to re-vegetate these areas with historic stocking levels and species including appropriate structure and composition.

- Based on the current lawsuit regarding grizzly bear effects analysis, proposed restoration projects will need to conduct grizzly bear effects analysis using BOTH the current Forest Plan (as refined through USFWS consultations) and the Interim Access analysis methods.

- Old growth stands have that experienced stand replacing fires require evaluating to assure compliance with Forest Plan standards.

- Consider wildlife security and food sources when evaluating mushroom picking opportunities.

- On **VRU 1** (warm and dry) lands consider restoring ponderosa pine by reducing stocking levels of other species (low severity prescribed fire and timber harvest) and planting to restore flammulated owl habitat. Opportunity may exist to reduce stocking of smaller diameter trees killed by fire (snags). Restoration of native vegetation over noxious weeds is critical here.

- On **VRU 2N & 2S** (moderately warm and dry) opportunities may exist to restore flammulated owl habitat. Restoration activities may also focus on promoting the availability and palatability of many browse and forage species for elk, deer, bighorn sheep, and moose. Noxious weed control (especially spotted knapweed) is very important.

- On **VRU 3** (moderately warm and moderately dry) lands cover (hiding and thermal) is an important habitat component provided. Interior habitat is also present here. Protection of native vegetation through noxious weed control is important.

- On **VRU 4N & 4S** (moderately warm and moist) currently much of this land is in mid-seral condition and presents an opportunity to enhance the development of old forest character (larger diameter trees, structural diversity, and small openings) through intermediate treatments (prescribed fire, thinning from below).

- On **VRU 5N & 5S** (moderately cool and moist) currently much of this land is in mid-seral condition and presents an opportunity to enhance the development of old forest character (larger diameter trees, structural diversity, and small openings due to mixed severity burns) through intermediate treatments (prescribed fire, thinning from below).

- On **VRU 6** (moderately cool and wet) and **VRU 8** (cool and wet) lands consider retaining most, if not all snags and down woody material.

- On **VRU 7** (cool and moist) lands opportunity to restore lynx forage habitat may be present. Consider providing lynx denning habitat by leaving clumps (5 acres and larger) of larger diameter fire killed trees to either fall down naturally or felled and left to create high density down woody material den sites.

- On **VRU 9** (cool and moderately dry) lands lynx forage habitat should be a strong consideration for restoration activities. Retention of the largest snags should be a priority, especially where high quality species like larch exist.

- On **VRU 10** (cold and moderately dry) lands opportunity to restore whitebark pine vegetative communities may exist, which will benefit grizzly bear, Clark's nutcracker , whitebark pine, and many other species.

- On **VRU 11** (cold) lands opportunity to restore whitebark pine vegetative communities may exist, which will benefit grizzly bear, Clark's nutcracker, whitebark pine and many other species.

- Coordinate with silviculture to ensure adequate implementation to meet wildlife considerations.

Watershed Health

Items to "check" in subsequent analyses of the Reviewed Fires:

- Condition of the watershed, relative to the 1997 KNF Watershed Condition Evaluation by Bojonell (Appendix F-2)

- NEPA documents and field data collected and completed since the 1997 KNF Watershed Condition Evaluation by Bojonell

- How many acres burned in the watershed, and how many of the burned acres were of high intensity?

- How many acres of high intensity fires burned in proximity to stream channels?

- How many acres of high intensity fires burned above and near to roads, particularly ones that need BMP work?

- How far from any channels will our proposed units be?

- Is there an opportunity to repair or rehab an existing problem with funds generated from these activities?

- What is the *expected* overall watershed health *trend* of each drainage basin, given the history, condition and consequences of these fires?

- What is the potential for reduced fire interval, increased intensity of subsequent fires in the burned areas (re-burn)?

Sensitive Fish

- Watersheds supporting TE&S fish species should be treated to minimize effects to those species. As discussed in the 1994 assessment, activities planned in watersheds supporting TE&S species should limit ground-disturbing activities through treatment types and timing.

- BA/BEs will be prepared as appropriate for TE&S species.

- Ground disturbing activities in special emphasis bull trout watersheds occurring outside the time period July 15 to September 1 will probably require formal consultation with the USFWS.

- All construction activity in defined channels will require consultation with MFWP and 124 permits.

- BMP implementation, activities to reduce erosion, or improve channel function should be considered to reduce management effects.

- Riparian areas affected by stand replacing fire should be considered for reforestation. Consideration should be given to planting spruce, hemlock, cedar, black cottonwood, and other appropriate riparian vegetation.

- Intact riparian areas within burn perimeters should be considered for regeneration where appropriate.

- A roads system analysis should be done to identify roads for obliteration.

- Abandoned roads within riparian areas should be obliterated wherever possible.

- Known pumping sites used in 2000 should be hardened and mapped for future use.

- Undersized pipes within the fire perimeters should be sized correctly or replaced to facilitate potential increased water yield and sediment production.

- Monitoring should include effectiveness monitoring to determine what works and what does not. This will require specific objectives and trigger points for restoration.

Soil Resources (Including Woody Debris)

The intent of these considerations is to prevent and/or minimize impacts to the soil resource and maintain long-term soil productivity.

- Historically, coarse woody debris (CWD, 3 "+) has occurred on all forested sites on the Kootenai in varying amounts. The amount and type are directly related to VRUs. CWD proportions should be retained in the ranges recommended by Graham et al. (1994).

- If there is evidence of past fire(s) in an area that has led to soil nutrient depletion conditions, consider leaving more woody debris material than is currently on site. Leave CWD amounts equivalent to those that would be recommended by Graham et al. (1994) for that vegetation type.

- Recognize that compaction is more probable because the soil buffer (surface organics) is gone.

- Recognize that there is a higher probability for erosion. Ensure timely erosion control and its effectiveness.

- Minimize soil disturbance via winter logging, minimizing roads, cable logging, skid trail design, forwarders, etc.

- Establish a native seed bank to use on heavily disturbed sites.

Heritage Resources and Tribal Relations

- Compliance with Section 106 of the National Historic Preservation Act is required prior to implementation for all projects.

- Coordination with the Salish and Kootenai Tribes will occur for all proposed projects.

Forest Plan and Management Areas

- In Inventoried Roadless Areas (IRA) an EIS will need to be conducted if significant effects to the roadless character are expected.

- Consider the need to amend forest plan objectives by comparing benefits that are associated with conducting the proposed activities versus not conducting the activities.

Social and Economic

- Rehabilitation and restoration activities can provide local employment and income opportunities. Emphasize the use of stewardship contracts and local employment in achieving rehabilitation and restoration activities.

- Wood products have value to our society. Provide for product recovery when ecologically and economically feasible.

- Emphasize restoration of cultural and social values, including visuals.

Safety

- Consider public safety in project design, particularly, driving/walking in areas with snags.

- Consider roadside salvage to remove hazard trees.

- Consult with the Montana Logging Association and OSHA regarding safety considerations.

Logging Systems

- In fire areas where commercial removal of wood products is being considered as part of the overall restoration and recovery effort, an experienced logging systems specialist should be a member of the interdisciplinary team. The following items should be considered when planning for timber removal:

- Plan and develop project activities including logging systems that achieve forest plan objectives, integrate resource requirements consistent with the forest plan, and meet forest plan standards and guidelines in the most cost efficient manner.

- Do not jump immediately to a required logging system based on preconceived ideas of what a system can and cannot do. Analyses should describe the desired end result instead of being prescriptive.

- Incorporate the considerations from the water and soils areas.

- Utilize helicopter logging as appropriate to meet project objectives **and** where economically feasible. Helicopters for logging will be in short supply and economically marginal offerings will not be successful in attracting bidders.

- Consider the trade offs in ground disturbance between conventional logging systems and the larger landings and associated impacts required by helicopter logging.

- Refer to "Helicopter Yarding Feasibilty Guide" dated 10/23/95 for further guidance related to helicopter logging.

- Refer to Regional Forester's letter of 6/14/00 clarifying intent for application of Supplement 2500-99-1 concerning soil quality standards and ground based harvesting systems.

- Refer to "Risk Assessment for Identifying Danger Trees" dated 3/8/95 when considering snag retention within treatment units.. OSHA has fairly strict requirements regarding work in proximity to danger trees. It is easier to meet OSHA guidelines when utilizing mechanical logging systems that reduce personnel exposure to hazard trees.

Sensitive Plants

- There is potential for disturbance from post-fire activities.

- Complete a probability analysis, and direct surveys toward moderate and high probability sites.

- While completing surveys, pay special attention to the presence of any sensitive geraniums that appear in burn areas. Although none have been found at this time, this year's fires have resulted in the desired conditions.

- Species such as Geyer's biscuitroot, fringed onion, and common Clarkia have adapted to certain fire intensities and frequencies. These species have a special consideration on burned over and unburned areas.

- Most moonworts have adapted to some level of disturbance. Take special note of moonwort presence on rehabilitated firelines.

- Complete Biological Evaluations.

VI. SUMMARY OF FIRES

This section contains information specific to individual fires or with groupings of smaller fires. Fire severity, patch size and age class distribution were compared to the Vegetative Response Unit(s) in which these fire occurred. This enabled us to make a determination as to whether or not the fires were inside or outside of what we expected to occur within a historic context.

Fire severities were also compared to the Forest Plan management areas. This information, combined with other resource considerations, was then used to develop a broad list of opportunities for rehabilitation and restoration of the areas within the vicinity of the fires.

Cliff Point Fire – Big and Boulder Planning Subunits

The Cliff Point Fire burned a total of 6,627 acres, with 2,163 acres in fire severity level (FSL) 1, another 4,150 acres in FSL2, 194 acres in FSL3 and 120 acres in FSL4. The fire is completely within the Boulder Planning Subunit. Approximately 177 acres of plantation were lost to stand replacing fire (FSL1).

Major Tree Species Affected and Age Classes- PP, DF, WL, ES, LP, 0-200+ year old stands affected.

Summary of HRV Effects:

VRU Acres by Fire Severity Level*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Cliff Point	VRU1	0	160	0	0	160
Cliff Point	VRU2	388	1,985	86	120	2,579
Cliff Point	VRU3	81	71	0	0	152
Cliff Point	VRU5	23	548	0	0	571
Cliff Point	VRU7	675	994	21	0	1,690
Cliff Point	VRU9	993	391	88	0	1,472
TOTALS		**2,160**	**4,149**	**195**	**120**	**6,624**

*Acres do not match those listed above due to rounding.

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU1	Y, if mortality is concentrated in the understory DF	Y, if mortality in understory DF	Y (minimally)	Many acres outside HRV due to inappropriate species composition, age class distribution and fuel arrangement
VRU2	FSL1 – N, too many acres FSL2 – Y, if mortality concentrated in the understory DF FSL3 - Y	FSL1 – N FSL2 – Y, if morality in understory DF FSL3 - Y	Y (minimally)	FSL1 is not characteristic of this VRU. Many acres outside HRV due to inappropriate species composition, age class distribution and fuel

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
				arrangement

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU3	N, more acres in FSL1 than FSL2	N, too small	N, partly due to past mgmt	FSL2 is characteristic of this VRU. Many acres outside HRV due to inappropriate species composition, age class distribution and fuel arrangement (especially in FSL2)
VRU5	Y, more acres in FSL2 than FSL1	Y	N, partly due to past mgmt	FSL2 is characteristic of this VRU. Many acres outside HRV due to inappropriate species composition, age class distribution and fuel arrangement (especially in FSL2)
VRU7	Y	Y for fire, but overall N due to past mgmt	N, due to fires in plantations and past mgmt	FSL1 was in early successional stages, which is not characteristic. Many acres outside HRV due to inappropriate species composition and age class distribution (especially in FSL2)
VRU9	Y	N, fire replaced younger stands and past mgmt	N, due to fires in plantations and past mgmt	

Age Class Distribution by VRU, Historic and Post-Fire* for Big and Boulder Subunits

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
Big Subunit								
VRU1	10-20%	0%	10-30%	77%	5-25%	14%	40-70%	8%
VRU2	15-25%	7%	15-35%	21%	10-30%	15%	20-50%	39%
VRU5	10-20%	9%	15-35%	24%	10-30%	11%	25-55%	33%
VRU7	15-25%	33%	20-40%	24%	15-30%	14%	15-45%	17%
VRU9	20-40%	20%	40-60%	31%	15-20%	17%	5-10%	20%
Boulder Subunit								
VRU1	10-20%	1%	10-30%	15%	5-25%	6%	40-70%	63%
VRU2	15-25%	20%	15-35%	14%	10-30%	14%	20-50%	48%
VRU3	15-25%	30%	20-40%	20%	15-35%	21%	15-40%	30%
VRU5	10-20%	31%	15-35%	7%	10-30%	29%	25-55%	28%
VRU7	15-25%	37%	20-40%	17%	15-30%	23%	15-45%	18%
VRU9	20-40%	40%	40-60%	16%	15-20%	34%	5-10%	10%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Acres by Management Area by Fire Severity Level

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Cliff Point	10	73	742	86	117	1,018
Cliff Point	10og	0	396	0	0	396
Cliff Point	12	839	432	47	0	1,318
Cliff Point	13	5	49	0	0	54
Cliff Point	16	238	778	0	0	1,016
Cliff Point	19	202	33	61	0	296
Cliff Point	2	405	585	0	4	994
Cliff Point	21	103	75	0	0	178
Cliff Point	2og	127	142	0	0	269
Cliff Point	5	173	914	0	0	1,087

Considerations

- Lynx Analysis Units 14103 and 14102 (concern with LCAS for >15% of Lynx habitat converted to unsuitable within last 10 years)
- Bald eagle nesting territory (Webb Mountain nest)
- Big Creek RNA
- Noxious weed potential
- Loss of seral species (i.e., seed source of desirable species)
- Increased fuel loadings from past fire suppression and mortality
- Visual landscape
- Existing occurrence of western pine beetle and mountain pine beetle in some areas
- Almost one-half of the fire was "yellow" in the 1997 KNF Watershed Condition Assessment (Bojonell1997), probably due to high road density.

Opportunities for Rehabilitation and Restoration

- Product recovery (harvest of burned timber, mushroom picking),
- Replanting of burned-over plantations,
- Visual landscape management combined with fire history and ecosystem management concept interpretation,
- Watershed restoration including road and skid trail obliteration in Big and Boulder Planning Subunits,
- Noxious weed prevention and treatment,
- Revalidation of old growth designations, replacement if necessary
- Revegetation of any riparian areas left short of LWD as a result of past management and/or fire
- Reducing fuel loading and restoring historical species composition in Big Creek RNA (MA21)
- Address fuel arrangement from combination of past fire suppression and current fire

Forest Plan Considerations:

- Harvest of dead trees in MA10 and MA10OG will require a forest plan amendment.
- The opportunities are potentially limited to implement ecosystem management objectives in MA2. The Forest Plan Standards and Guides for MA2 preclude timber harvest. Use of timber management (pre-commercial thinning or commercial timber harvest) to achieve EM objectives would require a forest plan amendment.
- Reducing fuel loading and restoring historical species composition in Big Creek RNA (MA21) may require a Forest Plan Amendment

Elk Mountain Fire – Wolf Planning Subunit

The Elk Mountain Fire is completely within the Wolf Planning Subunit. The fire encompassed 1,018 acres with 225 acres in fire severity level (FSL) 1, another 534 acres in FSL2, and 259 acres in FSL3. Of this total, approximately 245 acres of FSL3 occurred on the Flathead National Forest. The following summary does not include the acres on the Flathead NF.

Major Tree Species Affected and Age Classes- WL, ES, LP, 0-200+ year old stands affected

Summary of HRV Effects:

VRU Acres by Fire Severity Level*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Elk Mtn	VRU4	0	38	0	0	38
Elk Mtn	VRU7	53	215	0	0	268
Elk Mtn	VRU9	172	280	15	0	467
TOTALS		**225**	**533**	**15**	**0**	**773**

*Does not include acreage that burned on the Flathead National Forest.

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU4	Y	Y	N, due to past mgmt, particularly on pvt lands	Many acres outside HRV due to inappropriate species composition, age class distribution and fuel arrangement
VRU7	Y	Y for fire, but overall N due to past mgmt	N, due to past mgmt, particularly on pvt lands	Many acres outside HRV due to inappropriate species composition and age class distribution (especially in FSL2)
VRU9	Y	N, patch size much smaller than historic for this VRU	N, due small amount in the 41-100 year category	

Age Class Distribution by VRU, Historic and Post-Fire* for Wolf Subunit

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
VRU4	15-25%	46%	20-40%	14%	15-35%	31%	10-40%	8%
VRU7	15-25%	38%	20-40%	15%	15-30%	37%	15-45%	8%
VRU9	20-40%	23%	40-60%	21%	15-20%	43%	5-10%	9%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Acres by Management Area by Fire Severity Level

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Elk Mtn	12	4	0	0	0	4
Elk Mtn	2	196	169	15	0	380
Elk Mtn	2og	0	33	0	0	33
Elk Mtn	pvt	24	330	0	0	354

Considerations

- Lynx Analysis Unit 14513,
- Wildland urban interface considerations for areas within Flathead National Forest boundaries, high potential for tansy ragwort and other noxious weeds,
- National recreation trail (trail #252),
- Plum Creek lands,
- Loss of seral species (i.e., seed source of desirable species),
- Increased fuel loadings from past fire suppression and mortality,
- Ongoing Douglas-fir outbreak,
- Wolf Creek is water quality limited stream (FY 2000 Mt 303(d) List),
- Wolf Planning Unit is important wolf habitat.

Opportunities for Rehabilitation and Restoration

- Product recovery (harvest of burned timber, mushroom picking),
- Watershed restoration including road and skid trail obliteration in Wolf Planning Subunit,
- Strategic fuel reduction in and around wildland urban interface within Flathead National Forest boundaries,
- Rehabilitation of NRT #252.
- Noxious weed prevention and treatment,
- Revegetation of any riparian areas left short of LWD as a result of past management and/or fire mortality

Forest Plan Considerations

- The opportunities are potentially limited to implement ecosystem management objectives in MA2. The Forest Plan Standards and Guides for MA2 preclude timber harvest. Use of timber management (pre-commercial thinning or commercial timber harvest) to achieve EM objectives would require a forest plan amendment.

Engle Fire - Rock Planning Subunit

The Engle fire burned a total of 219 acres with 32 acres in fire severity level (FSL) 1, another 140 acres in FSL2, with 47 acres in FSL3.

Major Tree Species Affected and Age Classes- WL, SAF, LP, WBP 0-200+ year old stands affected.

Summary of HRV Effects:

VRU Acres by Fire Severity*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Engle	VRU5	0	1	0	0	1
Engle	VRU9	4	117	45	0	166
Engle	VRU10	28	21	1	0	50
TOTALS		**32**	**139**	**0**	**0**	**217**

*Acres do not match those listed above due to rounding.

Summary of Fire Characteristics and HRV

VRU	Intensity /Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU9	N, FSL2 greater than FSL1 as expected.	N, patch size much smaller than historic for this VRU	N, moderately outside due to most age classes being too low.	
VRU10	Y	N, patch size much smaller than historic for this VRU	N, due small amount in the 41-100 year category	

Age Class Distribution by VRU, Historic and Post-Fire* for Rock Planning Subunit

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
VRU5	10-20%	10%	15-35%	59%	10-30%	22%	25-55%	8%
VRU9	20-40%	11%	40-60%	48%	15-20%	25%	5-10%	16%
VRU10	20-40%	8%	40-60%	35%	15-20%	11%	5-10%	39%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Acres by Management Area by Fire Severity Level

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Engle	13	0	26	5	0	31
Engle	14	30	113	41	0	184
Engle	7	2	0	0	0	2

Considerations

- Lynx Analysis Unit 14702,
- Old growth potentially affected,
- Bull trout,
- Westslope cutthroat trout,
- Inventoried Roadless Area #676 (McKay)

Opportunities for Rehabilitation and Restoration

- Product recovery (harvest of burned timber, mushroom picking),
- Noxious weed prevention and treatment, including along trail # 926
- Revalidation of old growth designations, replacement if necessary

Forest Plan Considerations

- The opportunities are potentially limited to implement ecosystem management objectives in MA13. The Forest Plan Standards and Guides for MA13 preclude timber harvest. Use of timber management (pre-commercial thinning or commercial timber harvest) to achieve EM objectives would require a forest plan amendment

Fan Creek Fire – Boulder Planning Subunit

The Fan Creek Fire encompassed 731 acres with 394 acres in fire severity level (FSL) 1, another 337 acres in FSL2, and 0 acres in FSL3.

Major Tree Species Affected and Age Classes- WL, ES, LP, 0-200+ year old stands affected. Approximately 20 acres of plantation were lost to stand replacing fire (FSL1). An additional 40 acres of stand replacing fire occurred in MA13.

Summary of HRV Effects

VRU Acres by Fire Severity Level

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Fan Creek	VRU7	311	337	0	0	648
Fan Creek	VRU9	83	0	0	0	83
TOTALS		**394**	**337**	**0**	**0**	**731**

Summary of Fire Characteristics and HRV

VRU	Intensity /Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU7	Y	Y for fire, but overall N due to past mgmt (too small)	N, due to FSL 1 in plantations, past mgmt conversions to early success ional stages.	Many acres outside HRV due to inappropriate species composition and age class distribution (especially in FSL2)
VRU9	Y	N, patch size much smaller than historic for this VRU	N, due to FSL 1 in plantations, past mgmt conversions to early success ional stages.	Patch sizes created by past mgmt put this VRU at the limits of historic range

Age Class Distribution by VRU, Historic and Post-Fire* for Boulder Subunit

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
VRU7	15-25%	37%	20-40%	17%	15-30%	23%	15-45%	18%
VRU9	20-40%	40%	40-60%	16%	15-20%	34%	5-10%	10%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Acres by Management Area by Fire Severity Level

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Fan Creek	13	38	123	0	0	161
Fan Creek	15	343	206	0	0	549
Fan Creek	19	12	9	0	0	21

Considerations

- Lynx Analysis Unit 14102 concern with LCAS for >15% of Lynx habitat converted to unsuitable within last 10 years,
- Wildland urban interface considerations for Sullivan Creek,
- Noxious weed potential,
- Loss of seed source of desirable species,
- Increased fuel loadings from past fire suppression and mortality
- The entire fire area was "yellow or red" in the 1997 KNF Watershed Condition Assessment (Bojonell 1997).

Opportunities for Rehabilitation and Restoration (see *Section VI* for additional opportunities)

- Product recovery (harvest of burned timber, mushroom picking),
- Replanting of burned over plantations,
- Watershed restoration including road and skid trail obliteration in Boulder Planning Subunit,
- Strategic fuel reduction in and around Sullivan Creek drainage,
- Noxious weed prevention and treatment,
- Revalidation of old growth designations,
- Revegetation of any riparian areas left short of LWD because of past management and/or fire.

Forest Plan Considerations

- Approximately 550 acres were affected in MA15. There are opportunities to recover products and restore areas within the fire perimeter throughout MA15 towards the appropriate species and age mix reflected by HRV. The Forest Plan Standards and Guides for MA15 emphasize maximizing growth and yield. Use of timber management to achieve HRV goals may result in growth and yield values not being maximized. This may result in longer rotation lengths, more diverse age and size class structures, and more frequent intermediate silvicultural harvests than anticipated under the Forest Plan.

- The opportunities are potentially limited to implement ecosystem management objectives in MA13. The Forest Plan Standards and Guides for MA13 preclude timber harvest. Use of timber management (pre-commercial thinning or commercial timber harvest) to achieve EM objectives would require a forest plan amendment.

Frezkat West - Callahan Planning Subunit

The Frezkat West Fire burned a total of 166 acres, 145 acres in FSL2 and 21 acres in FSL3. The fire burned within a portion of proposed Callahan prescribed burn unit 73B.

Major Tree Species Affected and Age Classes- DF, WL, ES, LP, 0-200+ year old stands affected (Note: The TSMRS data is limited for the vegetation types represented within the Callahan Planning Subunit.)

Summary of HRV Effects:

VRU Acres by Fire Severity Level*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Frezkat	VRU5	0	138	21	0	159
Frezkat	VRU7	0	8	0	0	8
TOTALS		**0**	**146**	**21**	**0**	**167**

*Acres do not match those listed above due to rounding.

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU5	Y, FSL2 > FSL3	N, larger patches expected historically in FSL2, expected some FSL1	N, due to large amount of acres in the 0-40 and 41-100 year category	FSL2, mixed lethal, characteristic of this VU. Many acres outside HRV for species composition, age class distribution and fuel arrangement (especially in FSL2)

Age Class Distribution by VRU, Historic and Post-Fire* for Callahan Planning Subunit

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
VRU5	10-20%	22%	15-35%	40%	10-30%	24%	25-55%	14%
VRU7	15-25%	18%	20-40%	27%	15-30%	36%	15-45%	17%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Acres by Management Area by Fire Severity Level

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Frezkat	2	0	146	21	0	167

Considerations

- Lynx Analysis Unit 14408,
- Bear management Unit 9 core habitat,
- Bull trout,
- Redband trout,
- trail # 407,
- Inventoried Roadless Area #691 (Roberts)

Opportunities for Rehabilitation and Restoration

- Product recovery (harvest of burned timber, mushroom picking),
- Noxious weed prevention and treatment along trail #407,
- Revegetation of any riparian areas left short of LWD as a result of past management and/or fire.

Forest Plan Considerations

- The opportunities are potentially limited to implement ecosystem management objectives in MA2. The Forest Plan Standards and Guides for MA2 preclude timber harvest. Use of timber management (pre-commercial thinning or commercial timber harvest) to achieve EM objectives would require a forest plan amendment.

Grambauer Face Fire – Lake Planning Subunit

The Grambauer Face Fire encompassed 701 acres with 85 acres in fire severity level (FSL) 1, another 103 acres in FSL2, 510 acres in FSL3 and 3 acres in FSL4 (unburned).

Major Tree Species Affected and Age Classes - DF, WL, WBP, 0-150+ year old stands affected

Summary of HRV Effects

VRU Acres by Fire Severity Level*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Grambauer Face	VRU2	55	65	261	3	384
Grambauer Face	VRU5	14	38	119	0	171
Grambauer Face	VRU7	15	0	118	0	133
Grambauer Face	VRU9	0	0	11	0	11
TOTALS		**84**	**103**	**509**	**3**	**699**

*Acres do not match those listed above due to rounding.

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU2	Y	Y, FS3 extent recorded here was expected in this VRU	N, due to past mgmt, particularly on pvt lands	
VRU5	N, because of extent of FSL3 acres rather than FSL2	N, larger patches expected historically in FSL2	N, due to large amount of acres in the 41-100 year category	Many acres outside HRV due to inappropriate species composition, age class distribution and fuel arrangement (especially in FSL2)
VRU7	N, larger stand replacing and mixed lethal fire expected	N, patch size much smaller than historic for this VRU	N, due to past fire suppression activities	

Age Class Distribution by VRU, Historic and Post-Fire* for Lake Subunit

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
VRU2	15-25%	9%	15-35%	76%	10-30%	14%	20-50%	0%
VRU5	10-20%	8%	15-35%	63%	10-30%	25%	25-55%	4%
VRU7	15-25%	1%	20-40%	59%	15-30%	32%	15-45%	7%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Acres by Management Area by Fire Severity Level

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
GrambauerFace	2	0	9	5	0	14
GrambauerFace	7	45	28	130	3	206
GrambauerFace	8	38	58	374	0	470
GrambauerFace	pvt	0	8	0	0	8

Considerations

- LAU 14409,
- BMU1,
- Noxious weeds,
- Grambauer trail #319,
- Increasing fuel loadings from mortality,
- Wildland urban interface in Savage Lake area,
- Visual concerns,
- WQLS (Lake Creek),
- Bull and westslope cutthroat trout,
- Loss of whitebark pine,
- Large percentage of stands in age class 41-100.

Opportunities for Rehabilitation and Restoration

- Rehabilitation of Grambauer trail #319,
- Noxious weed prevention and treatment,
- Surveys for determining extent of whitebark pine, current status of blister rust infection, and opportunities for restoration
- Cooperative fuels reduction with Plum Creek,
- Complete the prescribed fire plan for the Cabinet divide,

Forest Plan Considerations

- MA7 and MA8 allow for prescribed fire to reduce fuel loading.

Green Mountain Fire – Green Planning Subunit

The fire encompassed 543 acres with 167 acres in fire severity level (FSL) 1, another 338 acres in FSL2 and 38 acres in FSL3.

Major Tree Species Affected and Age Classes - DF, LP, WL, 0-200+ year old stands affected.

Summary of HRV Effects:

VRU Acres by Fire Severity Level*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Green Mtn	VRU2	66	102	0	0	168
Green Mtn	VRU4	100	203	38	0	341
Green Mtn	VRU5	0	28	0	0	28
Green Mtn	VRU7	0	6	0	0	6
TOTALS		**166**	**339**	**38**		**543**

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU2	N, FSL1 and FSL2 are not characteristic of this VRU	N, FSL1 and FSL2 not expected in this VRU	N	FSL3 is characteristic, but the fire burned with only FSL1 and FSL2 in this VRU. Many acres outside HRV due to inappropriate species composition, age class distribution and fuel arrangement (especially in FSL2)
VRU4	Y	N, larger patches expected historically in FSL1 and FSL3	N, due to large amount of acres in the 41-100 year category	Many acres outside HRV due to inappropriate species composition, age class distribution and fuel arrangement (especially in FSL2)

Age Class Distribution by VRU, Historic and Post-Fire* for Green Subunit

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
VRU2	15-25%	8%	15-35%	81%	10-30%	1%	20-50%	0%
VRU4	15-25%	11%	15-35%	75%	10-30%	1%	20-50%	14%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Acres by Management Area by Fire Severity Level

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Green Mtn	10	166	273	38	0	477
Green Mtn	13	0	8	0	0	8
Green Mtn	14	0	41	0	0	41
Green Mtn	18	0	1	0	0	1
Green Mtn	18og	0	1	0	0	1
Green Mtn	19	0	14	0	0	14

Considerations

- Lynx Analysis Units 14702,
- Noxious weeds,
- Green Mountain Recreation Trail (#921),
- Electronic site,
- Increased fuel loadings from past fire suppression and mortality,
- Bull trout stream.

Opportunities for Rehabilitation and Restoration

- Rehabilitation of NRT #252.
- Noxious weed prevention and treatment,

Forest Plan Considerations

- Harvest of dead trees in MA10 will require a forest plan amendment

Kelsey Creek and Roderick South Fires – SF Yaak Planning Subunit

The Kelsey Creek fire encompassed 2,769 acres with 391 acres in fire severity level (FSL) 1, another 1,916 acres in FSL2, and 462 acres in FSL3. The Roderick South fire encompassed 318 acres with 62 acres in FSL1, another 113 acres in FSL2, and 143 acres in FSL3.

Major Tree Species Affected and Age Classes - DF, LP, WL, 0-200+ year old stands affected.

Summary of HRV Effects:

VRU Acres by Fire Severity Level*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Kelsey Creek	VRU5	236	1,541	316	0	2,093
Kelsey Creek	VRU7	39	82	98	0	219
Kelsey Creek	VRU9	116	293	47	0	456
Roderick South	VRU5	62	111	143	0	316
TOTALS		**453**	**2,027**	**604**	**0**	**3,084**

*Acres do not match those listed above due to rounding.

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU5	Y, due to majority of acres burned in FSL2	FSL2 – Y FSL1 and FSL3 – N, too small	N, due in part to past mgmt	FSL2 is characteristic of this VRU. Many acres outside HRV due to inappropriate species composition, age class distribution and fuel arrangement (especially in FSL2)
VRU7	N, acres should have burned as FSL1 and FSL2.	N, much larger patch size expected historically; patch size from past mgmt also too small	N, due in part to past mgmt and stand replacing fires in the 0-40 age class	Many acres outside HRV due to inappropriate species composition and age class distribution (especially in FSL2 and FSL3)
VRU9	Y, due to majority of acres burned in FSL1 and FSL2.	N, much larger patch size expected historically	Y – minimally within, due to past mgmt	FSL1 and FSL2 with large patch sizes are characteristic of this VRU.

Age Class Distribution by VRU, Historic and Post-Fire* for SF Yaak Subunit

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
VRU5	10-20%	27%	15-35%	35%	10-30%	21%	25-55%	16%
VRU7	15-25%	35%	20-40%	28%	15-30%	19%	15-45%	17%
VRU9	20-40%	39%	40-60%	31%	15-20%	24%	5-10%	7%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Acres by Management Area by Fire Severity Level

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Kelsey Creek	11	0	5	0	0	5
Kelsey Creek	12	315	1477	198	0	1,990
Kelsey Creek	13	25	124	107	0	256
Kelsey Creek	14	0	142	80	0	222
Kelsey Creek	16	51	151	73	0	275
Kelsey Creek	21	0	17	0	0	17
Roderick South	11	8	0	4	0	12
Roderick South	12	6	29	15	0	50
Roderick South	15	41	63	84	0	188
Roderick South	19	8	20	40	0	68

Considerations

- Lynx Analysis Units 14404 (Kelsey) (concern with LCAS for >15% of Lynx habitat converted to unsuitable within last 10 years, and having greater than 30% of lynx habitat in the LAU in an unsuitable condition) and 14405 (Roderick South),
- Potential impact to core habitat in BMUs 11 (Roderick South) and 17 (Kelsey),
- Douglas-fir beetle outbreak,
- Westslope cutthroat and redband trout concerns in Kelsey Creek,
- Wildland urban interface in South Fork Yaak community,
- Noxious weed potential,
- Loss of plantations and seral species (i.e., seed source of desirable species),
- Loss of old growth in MA13,
- Increased fuel loadings from past fire suppression and mortality,
- Steep slopes and erodible soils in MA19 for Roderick South
- Majority of Kelsey Creek Fire area was within "red" watersheds in the 1997 KNF Watershed Condition Assessment (Bojonell 1997).

Opportunities for Rehabilitation and Restoration

- Product recovery (harvest of burned timber, mushroom picking)
- Planting for species diversity including White Pine
- Watershed restoration including road obliteration in SF Yaak Planning Subunit
- Strategic fuel reduction in and around South Fork Yaak community
- Noxious weed prevention and treatment,
- Revegetation of any riparian areas left short of LWD as a result of past management and/or fire
- Replant burned-over plantations.
- Assess and/or monitor for extent of Douglas-fir bark infestations.
- Enhance and rehabilitate redband and westslope cutthroat trout habitat
- Assess and/or monitor success of natural regeneration in managed seedling/sapling stands impacted by fires.

Forest Plan Considerations

- The opportunities are potentially limited to implement ecosystem management objectives on the approximately 256 acres burned in MA13. The Forest Plan Standards and Guides for this MA preclude timber harvest. Use of timber management (precommercial thinning or commercial timber harvest) to achieve EM objectives would require a forest plan amendment.

- Approximately 1,990 acres were affected in MA12. There are opportunities to recover products and restore areas within the fire perimeter throughout these management areas towards the appropriate species and age mix reflected by HRV. The Forest Plan Standards and Guides for MA12 emphasize meeting big game requirements. There may be a need for a Forest Plan Amendment for ORD.

- There are opportunities to recover products and restore areas within the fire perimeter throughout MA15 towards the appropriate species and age mix reflected by HRV. The Forest Plan Standards and Guides for MA15 emphasize maximizing growth and yield. Use of timber management to achieve HRV goals may result in growth and yield values not being maximized. This may result in longer rotation lengths, more diverse age and size class structures, and more frequent intermediate silvicultural harvests than anticipated under the Forest Plan.

Lucky Point Fire – Grizzly Planning Subunit

The fire encompassed 430 acres with 125 acres in fire severity level (FSL) 1, another 281 acres in FSL2, and 24 acres in FSL3.

Major Tree Species Affected and Age Classes- DF, WL, LP, ES**,** 0-200+ year old stands affected.

Summary of HRV Effects

VRU Acres by Fire Severity Level*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Lucky Point	VRU10	33	44	0	0	77
Lucky Point	VRU7	83	175	24	0	282
Lucky Point	VRU9	8	62	0	0	70
TOTALS		**124**	**281**	**24**	**0**	**429**

*Acres do not match those listed above due to rounding.

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU7	Y	N, much larger patch size expected historically	N, due to large stand replacing fires in the past	Many acres outside HRV due to inappropriate species composition, age class distribution and fuels arrangement (especially in FSL2 and FSL3)
VRU9 and 10	Y, frequent FSL2 and infrequent FSL1 are characteristic	N, much larger patch size expected historically	N, due to large stand replacing fires in the past	Many acres outside HRV due to inappropriate species composition, age class distribution and fuels arrangement (especially in FSL2)

Age Class Distribution by VRU, Historic and Post-Fire* for Grizzly Subunit

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
VRU7	15-25%	11%	20-40%	56%	15-30%	25%	15-45%	8%
VRU9	20-40%	4%	40-60%	63%	15-20%	32%	5-10%	1%
VRU10	10-20%	11%	10-30%	60%	10-20%	28%	40-60%	0%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Summary of Management Area by Burn Severity

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Lucky Point	14	40	167	13	0	220
Lucky Point	2	85	112	11	0	208

Considerations

- Lynx Analysis Unit 14405,
- Potential impact to core habitat in BMU 11,
- Westslope cutthroat trout concerns,
- ORD, noxious weed potential,
- Fire was totally within the Grizzly Peak IRA.

Opportunities for Rehabilitation and Restoration

- Bear management, road obliteration
- Noxious weed prevention and treatment
- Enhance and rehabilitate westslope cutthroat trout habitat

Lydia Mountain Fire – Pinkham and McSutten Planning Subunits

The fire encompassed 5,203 acres with 2,509 acres in fire severity level (FSL) 1, another 1,916 acres in FSL2, 611 acres in FSL3 and 167 acres in FSL4. Approximately 185 acres of plantation were lost to stand replacing fire (FSL1). Approximately 87 acres of stand replacing fire occurred in MA13. The Lydia fire posed an immediate threat to the private property within the Pinkham Creek drainage. The Lydia fire also affected units under contract within the Upper Pinkham Timber sale.

Major Tree Species Affected and Age Classes-SAF, DF, LLP, WL, 0-200+ year old stands affected.

Summary of HRV Effects:

VRU Acres by Fire Severity Level*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Lydia Mtn	VRU7	1,351	1,406	533	129	3,419
Lydia Mtn	VRU9	1,156	509	77	39	1,781
TOTALS		**2,507**	**1,915**	**610**	**168**	**5,200**

*Acres do not match those listed above due to rounding.

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU7	Y	Y for fire, but overall N due to past mgmt (units too small)	N, due to stand replacing fire and past mgmt conversion to early succesional stages	Many acres outside HRV due to inappropriate species composition, age class distribution (especially in FSL2, FSL3 and FSL4)
VRU9	Y	Y for fire, but overall N due to past mgmt (units too small)	N, due to large stand replacing fires in the past	Many acres outside HRV due to inappropriate species composition, age class distribution (especially in FSL2, FSL3 and FSL4)

Age Class Distribution by VRU, Historic and Post-Fire* for McSutten and Pinkham Subunits

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
McSutten Subunit								
VRU7	15-25%	39%	20-40%	16%	15-30%	33%	15-45%	10%
VRU9	20-40%	32%	40-60%	30%	15-20%	30%	5-10%	9%
Pinkham Subunit								
VRU7	15-25%	39%	20-40%	20%	15-30%	14%	15-45%	26%
VRU9	20-40%	49%	40-60%	21%	15-20%	15%	5-10%	13%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Acres by Management Area by Fire Severity Level

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Lydia Mtn	12	36	0	0	0	36
Lydia Mtn	13	87	82	29	95	293
Lydia Mtn	15	1755	1832	566	73	4,226
Lydia Mtn	2	563	0	15	0	578
Lydia Mtn	24	68	0	0	0	68

Considerations

- Upper Pinkham Timber Sale,
- Two Lynx Analysis Units (14109: concern with LCAS for >15% of Lynx habitat converted to unsuitable within last 10 years) and 14110 (concern due to having greater than 30% of lynx habitat in the LAU in an unsuitable condition),
- Active populations of western balsam bark beetle and Engelmann spruce beetle in some areas, downstream bull trout concerns in Sutton Creek in McSutten Planning Subunit,
- Grazing allotment,
- Wildland urban interface in Pinkham creek drainage,
- Noxious weed potential,
- Trail 446 runs along ridge between Sutten and Pinkham drainage,
- Loss of seral species (i.e., seed source of desirable species),
- Loss of old growth in MA13,
- Increased fuel loadings from past fire suppression and mortality
- Several sub-basins were "yellow" in the 1997 KNF Watershed Condition Assessment (Bojonell 1997).

Opportunities for Rehabilitation and Restoration

- Product recovery (harvest of burned timber, mushroom picking),
- Planting,
- Watershed restoration including road obliteration in Pinkham Planning Subunit,
- Strategic fuel reduction in and around Pinkham Creek drainage,
- Noxious weed prevention and treatment,
- Revalidation of old growth designations,
- Revegetation of any riparian areas left short of LWD as a result of past management and/or fire

Forest Plan considerations

- The opportunities are potentially limited to implement ecosystem management objectives in VRU9 because the majority of VRU9 is located in MA2. The Forest Plan Standards and Guides for MA2 preclude timber harvest. Use of timber management (pre-commercial thinning or commercial timber harvest) to achieve EM objectives would require a forest plan amendment.

- Approximately 4,225 acres were affected in MA15. There are opportunities to recover products and restore areas within the fire perimeter throughout MA15 towards the appropriate species and age mix reflected by HRV. The Forest Plan Standards and Guides for MA15 emphasize maximizing growth and yield. Use of timber management to achieve HRV goals may result in growth and yield values not being maximized. This may result in longer rotation lengths, more diverse age and size class structures, and more frequent intermediate silvicultural harvests than anticipated under the Forest Plan.

O'Brien Fires (6) – O'Brien Planning Subunit

The Feeder Mountain 2 fire encompassed 252 acres with 4 acres in fire severity level (FSL) 1, another 224 acres in FSL2, and 24 acres in FSL3. Approximately 12 acres of seedling size and 24 acres of sapling size managed plantations were severely impacted by this wildfire. The Kedzie Creek fire encompassed 218 acres with 61 acres in FSL1, another 108 acres in FSL2 and 49 acres in FSL3. Approximately 13 acres of sapling size managed plantations were severely impacted by this wildfire. The Noseeum Creek fire encompassed 215 acres with 71 acres in FSL1, another 135 acres in FSL2 and 9 acres in FSL3. The O'Brien fire encompassed 167 acres with 8 acres in FSL1, another 131 acres in FSL2 and 28 acres in FSL3. Approximately 34 acres of seedling size managed plantations were severely impacted by this wildfire. The Pulpit Mtn fire encompassed 215 acres with 131 acres in FSL1 and 84 acres in FSL2. Approximately 136 acres of seedling-size managed plantations were severely impacted by this wildfire. The Studebaker Draw fire encompassed 99 acres with 1 acre in FSL1, another 87 acres in FSL2 and 11 acres in FSL3.

Major Tree Species Affected and Age Classes - DF, WL, WRC, WH, WP, LP in 0-300+ year old stands.

Summary of HRV Effects

VRU Acres by Fire Severity Level*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Feeder Mtn 2	VRU2	0	11	3	0	14
Feeder Mtn 2	VRU5	0	23	0	0	23
Feeder Mtn 2	VRU7	3	26	3	0	32
Feeder Mtn 2	VRU9	1	164	18	0	183
Kedzie Cr	VRU5	56	99	43	0	198
Kedzie Cr	VRU7	6	8	7	0	21
Noseeum Creek	VRU5	71	135	9	0	215
O'Brien	VRU5	7	131	23	0	161
O'Brien	VRU7	0	0	5	0	5
Pulpit Mtn	VRU2	0	11	0	0	11
Pulpit Mtn	VRU5	19	46	0	0	65
Pulpit Mtn	VRU6	66	0	0	0	66
Pulpit Mtn	VRU7	40	10	0	0	50
Pulpit Mtn	VRU9	7	17	0	0	24
Studebaker Draw	VRU4	1	33	3	0	37
Studebaker Draw	VRU5	0	53	8	0	61
TOTALS		277	767	122	0	1166

*Acres do not match those listed above due to rounding.

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU5	Y, due to majority of acres burned in FSL2and FSL3. **Exception**: Studebaker Fire = N, too much FSL1	N, should have been larger patches of FSL1 and FSL2	N, due in part to past mgmt; and 1994 fires creating 0-40 year bulge	FSL1 and 2 are characteristic of this VRU. Many acres outside HRV for species composition, age class distribution and fuel arrangement
VRU7	Conclusions difficult due to only 108 acres burned, but trend suggests N	Conclusions difficult due to only 108 acres burned	Conclusions difficult due to only 108 acres burned	
VRU9	N, due to small number of acres burned in FSL1.	N, much larger patch size expected historically#	N: Too many 101-150, not enough 41-100 year age class	FSL1 and FSL2 with large patch sizes are characteristic of this VRU. #- The KNF does not have large contiguous blocks of this VRU in the appropriate topography (only runs to the top of ridges) to create the expected larger patch size.

Age Class Distribution by VRU, Historic and Post-Fire* for O'Brien Subunit

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
VRU5	10-20%	35%	15-35%	17%	10-30%	19%	25-55%	30%
VRU7	15-25%	42%	20-40%	18%	15-30%	21%	15-45%	19%
VRU9	20-40%	36%	40-60%	15%	15-20%	41%	5-10%	9%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Summary of Management Area by Fire Severity Level

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Feeder Mtn 2	12	4	222	24	0	250
Feeder Mtn 2	13	0	2	0	0	2
Kedzie Cr	12	62	107	50	0	219
Noseeum Creek	12	71	134	9	0	214
O'Brien	12	6	87	11	0	104
O'Brien	13	1	44	17	0	62
O'Brien	18	0	0	1	0	1
Pulpit Mtn	13	0	48	0	0	48
Pulpit Mtn	14	93	0	0	0	93
Pulpit Mtn	18	33	21	0	0	54
Pulpit Mtn	2	6	14	0	0	20
Studebaker Draw	12	1	86	11	0	98

Considerations

- Lynx Analysis Units 14404 and 14407 (concern with LCAS for >15% of Lynx habitat converted to unsuitable within last 10 years, and having greater than 30% of lynx habitat in the LAU in an unsuitable condition),
- Bear management Unit 10 core habitat,
- Wildland urban interface considerations for the O'Brien watershed,
- Municipal watershed concerns (O'Brien Creek),
- Noxious weed potential,
- Loss of plantations and seral species (i.e., seed source of desirable species),
- Increased fuel loadings from expected mortality due to the fires,
- Bull trout,
- Existing Douglas-fir beetle outbreak (particularly in Studebaker Draw) expected to expand in severity 2 areas,
- Active watershed restoration contracts in the O'Brien watershed,
- Watershed cumulative effects from past management activities, including the 1994 and 2000 fires and post-fire activities,
- Loss of old growth potential resulting from the fires,
- Some cool and wet (VRU6) riparian settings in Pulpit fire.
- There is an active watershed restoration contract underway in the Kedzie Fire area.

Opportunities for Rehabilitation and Restoration

- Product recovery (harvest of burned timber, mushroom picking)
- Planting for species diversity including western larch (overstory component was lost) and white pine
- Address watershed cumulative effects from all past activities, including fires of 2000 (work not covered by other means and sources)
- Watershed restoration including road obliteration
- Strategic fuel reduction in and around the O'Brien area
- Noxious weed prevention and treatment
- Revegetation of any riparian areas left short of LWD as a result of past management and/or fire
- Replant burned-over plantations
- Assess and/or monitor for extent of Douglas-fir bark beetle infestations (particularly in Studebaker Draw and the south side of Pulpit Mtn)
- Assess and/or monitor success of natural regeneration in managed seedling/sapling stands impacted by fires.
- Enhance and rehabilitate bull trout habitat
- Revalidate old growth affected by fires

Forest Plan Considerations

- Approximately 885 acres were affected in MA12. There are opportunities to recover products and restore areas within the fire perimeter throughout these management areas towards the appropriate species and age mix reflected by HRV. Timber management would have increased patch size, more intermediate thins, and the leaving of more structure. The Forest Plan Standards and Guides for MA12 emphasize meeting big game requirements. There may be a need for a Forest Plan Amendment for ORD an increased opening size.

Prospect Fire – Lower Yaak Planning Subunit

The fire encompassed 233 acres with 4 acres in FSL1, another 185 acres in FSL2 and 44 acres in FSL3.

Major Tree Species Affected and Age Classes - DF, LP, WL, in 0-200+ year old stands

Summary of HRV Effects

VRU Acres by Fire Severity Level*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Prospect	VRU5	1	162	43	0	206
Prospect	VRU7	3	22	1	0	26
TOTALS		**4**	**184**	**44**	**0**	**232**

*Acres do not match those listed above due to rounding.

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU5	Y	N, historically would have had larger patches of FSL 2.	N, due to high proportion in 41-100 age class, low % of age 151+	FSL 2 mixed lethal fires characteristic of this VRU. Especially in areas affected by FSL3, many acres outside HRV for species composition, age class distribution, and fuel arrangement

Age Class Distribution by VRU, Historic and Post-Fire* for Lower Yaak Subunit

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
VRU5	10-20%	22%	15-35%	45%	10-30%	26%	25-55%	4%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Acres by Management Area by Fire Severity Level

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Prospect	12	1	76	38	0	115
Prospect	13	0	25	1	0	26
Prospect	2	1	37	3	0	41
Prospect	2og	2	46	1	0	49

Considerations

- Within Saddle Mtn IRA,
- Lynx Analysis Unit 14407 (concern with LCAS for >15% of Lynx habitat converted to unsuitable within last 10 years) and (30% issue),
- Bear Management Unit 10 core habitat,
- Bull trout concerns,
- ORD,
- Loss of seed source of desirable species
- Entire Fire was "yellow" in the 1997 KNF Watershed Condition Assessment (Bojonell 1997).

Opportunities for Rehabilitation and Restoration

- Watershed restoration including road obliteration
- Enhance bull trout habitat

Runt Fire – Northwest Yaak and Buckhorn Planning Subunits

The fire encompassed 424 acres with 194 acres in FSL1, another 190 acres in FSL2 and 40 acres in FSL3.

Summary of HRV Effects

VRU Acres by Fire Severity Level*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Runt	VRU5	0	4	0	0	4
Runt	VRU7	194	186	39	0	419
TOTALS		**194**	**190**	**39**	**0**	**423**

*Acres do not match those listed above due to rounding.

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU7	Y, lethal and mixed lethal characteristic	N, historically would have had larger patches. Mgmt patches also too small	N, due to high % in 41-100 age class, low % of age 151+	Lethal and mixed lethal fires characteristic of this VRU.

Age Class Distribution by VRU, Historic and Post-Fire* for Buckhorn and NWYaak Subunits

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
Buckhorn Subunit								
VRU7	15-25%	19%	20-40%	63%	15-30%	12%	15-45%	4%
NWYaak Subunit								
VRU7	15-25%	24%	20-40%	47%	15-30%	18%	15-45%	8%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Acres by Management Area by Fire Severity Level

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Runt	12	0	39	9	0	48
Runt	14	194	150	30	0	374

Considerations

- Lynx Analysis Units 14403,
- Bear Management Unit 14 core habitat,
- Westslope cutthroat trout concerns,
- WQLS in Spread Creek,
- Noxious weed potential,
- Loss of seral species (i.e., seed source of desirable species), increased fuel loadings from expected fire mortality (particularly southeast aspect).

Opportunities for Rehabilitation and Restoration

- Product recovery (harvest of burned timber, mushroom picking)
- Watershed restoration including road obliteration
- Noxious weed prevention and treatment
- Enhance westslope cutthroat trout habitat

Stone Hill Fire – McSutten and Pinkham Planning Subunits

The fire encompassed 10,908 acres with 3,577 acres in FSL1, another 4,852 acres in FSL2, 2,395 acres in FSL3 and 84 acres in FSL4. The Stone Hill fire also affected units under contract within the Weaver Rehab. Approximately 266 acres of plantation were lost to stand replacing fire (FSL1).

Major Tree Species Affected and Age Classes - PP, DF, LP, WL, 0-200+ year old stands

Summary of HRV Effects

VRU Acres by Fire Severity Level*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Stone Hill	VRU2	646	1,620	1,406	0	3,672
Stone Hill	VRU3	56	928	271	34	1,289
Stone Hill	VRU7	553	1,567	491	50	2,661
Stone Hill	VRU9	2,317	738	238	0	3,293
TOTALS		**3,572**	**4,853**	**2,406**	**84**	**10,915**

*Acres do not match those listed above due to rounding.

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU2	FSL1 – N, too many acres FSL2 – Y, if mortality concentrated in the understory DF FSL3 - Y	FSL1 – N FSL2 – Y, if mortality in understory DF FSL3 - Y	Y (minimally)	FSL3 historically typical on south aspects, FSL2 on north aspects. Many acres, especially in FSL2, 3 and 4, outside HRV for species composition, age class distribution and fuel arrangement
VRU3	N, more acres in FSL1 than FSL3, contrary to HRV	Y to FIL2, N to FIL3 (too small)	Y for McSutten portion, N for Pinkham, due in part to past mgmt creating adundance in early successional stages, minimal % in 41-100 category.	FSL2 is characteristic of this VRU. Many acres, especially in FSL2, 3 and 4, outside HRV for species composition, age class distribution and fuel arrangement
VRU7	Y	Y	N, due to fires in plantations, past	FSL1 was in early successional stages,

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
			mgmt that created def in 101-150 year class within Pinkham	which is not characteristic. Many acres outside HRV for species composition and age class distribution (especially in FSL2) Historical Species mix does not include western white pine, virtually eliminated by blister rust.
VRU9	Y	N, fire replaced younger stands and past mgmt	N, due to fires in mid-successional stand.	Too many acres burned in the 41-100 year age class prematurely (should have been FIL2 or FIL3) in stand replacing fire intensities than would have occurred historically

Age Class Distribution by VRU, Historic and Post-Fire* for McSutten and Pinkham Subunits

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
McSutten Subunit								
VRU2	15-25%	32%	15-35%	18%	10-30%	9%	20-50%	38%
VRU3	15-25%	19%	20-40%	43%	15-35%	13%	15-40%	24%
VRU7	15-25%	39%	20-40%	16%	15-30%	33%	15-45%	10%
VRU9	20-40%	32%	40-60%	30%	15-20%	30%	5-10%	9%
Pinkham Subunit								
VRU2	15-25%	13%	15-35%	50%	10-30%	19%	20-50%	16%
VRU3	15-25%	32%	20-40%	14%	15-35%	23%	15-40%	32%
VRU7	15-25%	39%	20-40%	20%	15-30%	14%	15-45%	26%
VRU9	20-40%	49%	40-60%	21%	15-20%	15%	5-10%	13%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Acres by Management Area by Fire Severity Level

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Stone Hill	10	379	782	495	0	1,656
Stone Hill	10og	22	228	381	0	631
Stone Hill	11	0	0	152	0	152
Stone Hill	12	1850	2976	1004	84	5,914
Stone Hill	13	9	121	90	0	220
Stone Hill	15	230	142	47	0	419
Stone Hill	2	1080	604	235	0	1,919

Considerations

- Weaver timber sale,
- Two Lynx Analysis Units 14109 (concern with LCAS for >15% of Lynx habitat converted to unsuitable within last 10 years) and 14110(30% issue),
- Active Douglas-fir bark beetle outbreak,
- Downstream bull trout concerns in Sutton Creek in McSutten Planning Subunit,
- Big horn sheep winter range,
- Grazing allotment,
- Wildland urban interface in Pinkham creek subunit,
- Noxious weed potential,
- Loss of seed source of desirable species, increased fuel loadings from past fire suppression and mortality
- Large part of the fire was "yellow" in the 1997 KNF Watershed Condition Assessment (Bojonell1997), probably due to high road density.

Opportunities for Rehabilitation and Restoration

- Product recovery (harvest of burned timber, mushroom picking),
- Planting,
- Watershed restoration including road obliteration in Pinkham and McSutten Planning Subunits,
- Strategic fuel reduction in and around the Pinkham Creek subunit,
- Noxious weed prevention and treatment,
- Revalidation of old growth designations,
- Revegetation of any riparian areas left short of LWD as a result of past management and/or fire
- Replant burned-over plantations.
- Assess and/or monitor for extent of Doug-fir bark infestations.
- Enhance Big Horn Sheep Winter Range.

Forest Plan Considerations

- The opportunities are potentially limited to implement ecosystem management objectives in MA2 and MA13. The Forest Plan Standards and Guides for MA2 and MA13 preclude timber harvest. Use of timber management (pre-commercial thinning or commercial timber harvest) to achieve EM objectives would require a forest plan amendment.

- Approximately 5,914 acres were affected in MA12. There are opportunities to recover products and restore areas within the fire perimeter throughout MA12 towards the appropriate species and age mix reflected by HRV. The Forest Plan Standards and Guides for MA12 emphasize growth and yield while meeting big game requirements. Use of timber management to achieve HRV goals may result in growth and yield values not being maximized. This may result in longer rotation lengths, more diverse age and size class structures, and more frequent intermediate silvicultural harvests than anticipated under the Forest Plan.

Taylor Peak Fire – Lake Planning Subunit

The fire encompassed 1,310 acres with 78 acres in FSL1, another 146 acres in FSL2, and 1,086 acres in FSL3.

Major Tree Species Affected and Age Classes - WL, ES, DF, LP in 0-200+ year old stands

Summary of HRV Effects

VRU Acres by Fire Severity Level

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Taylor Peak	VRU4	44	42	579	0	665
Taylor Peak	VRU5	1	16	283	0	300
Taylor Peak	VRU7	1	85	87	0	173
Taylor Peak	VRU9	32	4	136	0	172
TOTALS		**78**	**147**	**1085**	**0**	**1310**

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU4	Y for FSL1 and FSL2.	N for FSL 2 and FSL3	N	Many acres outside HRV for species composition, age class distribution and fuel arrangement (especially in FSL2
VRU5	N, because of extent of FSL3 acres rather than FSL2. FSL char for VRU, esp on N slopes.	N, larger patches expected historically in FSL2	N, due to large amount of acres in the 41-100 year category	Many acres outside HRV due to inappropriate species composition, age class distribution and fuel arrangement (especially in FSL3)
VRU7	N, larger stand replacing and mixed lethal fire expected	N, patch size much smaller than historic for this VRU	N, due to past fire suppression activities	
VRU9	Y	Y	N, due bulge in 41-100 age class	Larger patch sizes possible in this VRU but depend on fire and weather behavior more than VRU characteristics.

Age Class Distribution by VRU, Historic and Post-Fire for Lake Subunit

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
VRU4	15-25%	3%	15-35%	84%	10-30%	0%	20-50%	13%
VRU5	10-20%	8%	15-35%	63%	10-30%	25%	25-55%	4%
VRU7	15-25%	1%	20-40%	59%	15-30%	32%	15-45%	7%
VRU9	20-40%	7%	40-60%	65%	15-20%	26%	5-10%	2%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Summary of Management Area by Burn Severity

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Taylor Peak	7	5	85	149	0	239
Taylor Peak	8	40	38	505	0	583
Taylor Peak	8og	33	22	272	0	327
Taylor Peak	pvt	0	4	157	0	161

Considerations

- Lynx Analysis Unit 14409,
- Bear Management Unit 1 core habitat,
- Noxious weeds,
- Taylor Peak Trail #320,
- Increasing fuel loadings from mortality,
- Wildland urban interface in Savage Lake area, visual concerns,
- WQLS (Lake Creek),
- Bull and westslope cutthroat trout, ORD,
- High percentage of 41-100 age class,
- Loss of whitebark pine

Opportunities for Rehabilitation and Restoration

- Rehabilitation of Taylor Peak trail #320,
- Surveys for determining extent of whitebark pine, current status of blister rust infection, and opportunities for restoration
- Noxious weed prevention and treatment
- Cooperative fuels reduction with Plum Creek
- Complete the prescribed fire plan for the Cabinet divide

Forest Plan Considerations

- MA7 and MA8 allow for prescribed fire to reduce fuel loading.

Upper Beaver Fires (Upper Beaver, Okaga and Grubstake)
NE Yaak and SF Yaak Planning Subunits

Upper Beaver -- approximately 887 acres of seedling plantations and another 367 acres of sapling plantations were lost to stand replacing fire (FSL1). The Upper Beaver fire encompassed 9,017 acres with 1,317 acres in FSL1, another 4,685 acres in FSL2 and 3,015 acres in FSL3. The fire also affected units under contract within the Bunker Vinal Timber Sale (Upper Beaver) and Wood Rat Timber Sale (Grubstake).

The Grubstake fire encompassed 110 acres with 6 acres in FSL1, 8 acres in FSL2, and 96 acres in FSL3. The Okaga fire encompassed 455 acres with 71 acres in FSL1, 34 acres in FSL2, and 350 acres in FSL3.

Major Tree Species Affected and Age Classes - LP, WL, ES, DF in 0-200+ year old stands**.**

Summary of HRV Effects

VRU Acres by Fire Severity Level*

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Grubstake	VRU2	6	8	94	0	108
Grubstake	VRU7	0	0	2	0	2
Okaga	VRU5	35	34	201	0	270
Okaga	VRU7	37	0	148	0	185
Upper Beaver	VRU2	50	533	375	0	958
Upper Beaver	VRU5	1,094	3,646	1,982	0	6,722
Upper Beaver	VRU7	141	223	390	0	754
Upper Beaver	VRU9	31	255	269	0	555
TOTALS		**1,394**	**4,699**	**3,461**	**0**	**9,554**

*Acres do not match those listed above due to rounding.

Summary of Fire Characteristics and HRV

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU2	FSL 1 and 2 = N. FSL 2 would be characteristic if mortality occurred in understory DF, not overstory PP. FSL3 = Y.	FSL1 – N, FSL2 – Y, if mortality occurred in understory DF, not overstory PP. FSL3- N, too small	Y	FSL2, mixed lethal expected, historically typical on south aspects, Many acres, especially in FSL3, outside HRV for species composition, age class distribution and fuel arrangement

VRU	Intensity/Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU5	Y, with exception of part of Okaga where FSL3 was larger than expected historically	FSL2 = Y, N for FSL3 (too small).	N, partly due to past mgmt creating too much early successional stage	FSL2, mixed lethal expected, historically typical on north aspects, Many acres, especially in FSL2, outside HRV for species composition, age class distribution and fuel arrangement
VRU7	N, FSL1 andFSL2 typical, not FSL3.	N, larger patch sizes anticipated. Past mgmt patch sizes also too small	N, partly due to past mgmt creating high amts of early successional stages	Many acres, especially in FSL2, outside HRV for species composition and age class distribution
VRU9	N, FSL1 andFSL2 typical, not FSL3	N, larger patch sizes expected	NE Yaak- N, due to past fire suppression, mgmt acts; SF Yaak- N, moderately	Too many acres burned in the 41-100 year age class prematurely (should have been FIL2 or FIL3) in stand replacing fire intensities than would have occurred historically

Age Class Distribution by VRU, Historic and Post-Fire* for NEYaak and SFYaak Subunits

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
NEYaak Subunit								
VRU2	15-25%	27%	15-35%	26%	10-30%	36%	20-50%	11%
VRU5	10-20%	35%	15-35%	9%	10-30%	37%	25-55%	18%
VRU7	15-25%	27%	20-40%	11%	15-30%	46%	15-45%	10%
VRU9	20-40%	8%	40-60%	8%	15-20%	75%	5-10%	7%
SFYaak Subunit								
VRU2	15-25%	22%	15-35%	16%	10-30%	28%	20-50%	34%
VRU5	10-20%	27%	15-35%	35%	10-30%	22%	25-55%	16%
VRU7	15-25%	35%	20-40%	28%	15-30%	20%	15-45%	17%
VRU9	20-40%	36%	40-60%	31%	15-20%	24%	5-10%	7%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Acres by Management Area by Fire Severity

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Grubstake	11	4	8	67	0	79
Grubstake	14	2	0	30	0	32
Okaga	12	66	30	271	0	367
Okaga	13	0	0	3	0	3
Okaga	2	0	1	33	0	34
Okaga	pvt	5	3	43	0	51
Upper Beaver	10	3	94	8	0	105
Upper Beaver	11	89	615	326	0	1,030
Upper Beaver	12	464	994	1600	0	3,058
Upper Beaver	13	181	668	122	0	971
Upper Beaver	15	489	1187	241	0	1,917
Upper Beaver	17	0	212	168	0	380
Upper Beaver	19	58	327	145	0	530
Upper Beaver	2	34	540	385	0	959
Upper Beaver	24	0	1	17	0	18
Upper Beaver	2og	0	44	0	0	44

Considerations

- Lynx Analysis Units 14401 and 14404 (concern with LCAS for >15% of Lynx habitat converted to unsuitable within last 10 years, and having greater than 30% of lynx habitat in the LAU in an unsuitable condition),
- Bear management Units 15 and 16 core habitat,
- Wildland urban interface considerations for the Yaak community and the private land within the Okaga fire,
- Noxious weed potential,
- Loss of plantations and seral species (i.e., seed source of desirable species),
- Increased fuel loadings from past fire suppression and mortality,
- Watershed condition problems in Fowler Creek and Yodkin Creek in the 1997 KNF Forest Assessment (Bojonell, 1997),
- Redband and westslope cutthroat trout (downstream),
- Existing Douglas-fir beetle outbreak expected to expand in severity 2 areas in Upper Beaver fire, trail rehabilitation,
- Loss of old growth potential resulting from the fires.

Opportunities for Rehabilitation and Restoration

- Revalidate old growth affected by fires
- Product recovery (harvest of burned timber, mushroom picking),
- Planting for species diversity including White Pine and western larch
- Watershed restoration including road obliteration in SFYaak and NEYaak Planning Subunits,
- Strategic fuel reduction in and around the Yaak community and with the private property in the Okaga fire,
- Noxious weed prevention and treatment,
- Revegetation of any riparian areas left short of LWD as a result of past management and/or fire
- Replant burned-over plantations.
- Assess and/or monitor for extent of Douglas-fir bark infestations.
- Assess and/or monitor success of natural regeneration in managed seedling/sapling stands impacted by fires.
- Enhance and rehabilitate redband and westslope cutthroat trout habitat
- Rehabilitation of the Bunker Creek Trail #51, Turner Creek Trail #161, Okaga Lake Trail #397; bridge replace, bridge repair and trail rehabilitation on Vinal Creek Trail #9
- Consider opportunities for vegetation management under existing Wood Rat timber sale contract within the Grubstake fire.

Forest Plan Considerations

- The opportunities are potentially limited to implement ecosystem management objectives on the approximately 2000 acres burned in MA13 and MA2. The Forest Plan Standards and Guides for these MA's preclude timber harvest. Use of timber management (pre-commercial thinning or commercial timber harvest) to achieve EM objectives would require a forest plan amendment.

- Approximately 3,058 and 1,019 acres were affected in MA12 and MA11, respectively. There are opportunities to recover products and restore areas within the fire perimeter throughout these management areas towards the appropriate species and age mix reflected by HRV. The Forest Plan Standards and Guides for MA11 and MA12 emphasize meeting big game requirements. There may be a need for a Forest Plan Amendment for ORD.

- Approximately 1,917 acres were affected in MA15. There are opportunities to recover products and restore areas within the fire perimeter throughout MA15 towards the appropriate species and age mix reflected by HRV. The Forest Plan Standards and Guides for MA15 emphasize maximizing growth and yield. Use of timber management to achieve HRV goals may result in growth and yield values not being maximized. This may result in longer rotation lengths, more diverse age and size class structures, and more frequent intermediate silvicultural harvests than anticipated under the Forest Plan.

Young Jay Fire – Dodge Planning Subunit

The fire encompassed 830 acres with 475 acres in FSL1, another 350 acres in FSL2 and 5 acres in FSL4. Approximately 10 acres of plantation were lost to stand replacing fire (FSL1).

Major Tree Species Affected and Age Classes – LP and WL in 0-200+ year old stands

Summary of HRV Effects :

VRU Acres by Fire Severity Level

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
YoungJay	VRU5	200	78	0	0	278
YoungJay	VRU7	141	137	0	5	283
YoungJay	VRU9	134	135	0	0	269
TOTALS		**475**	**350**	**0**	**5**	**830**

Summary of Fire Characteristics and HRV

VRU	Intensity /Severity Within HRV?	Patch Size Within HRV?	Age Class Distribution W/in HRV?	Discussion
VRU5	N, because of extent of FSL1 acres rather than FSL2. FSL2 char for VRU, esp on N slopes.	Y for FSL1 and FSL2.	N, due to past mgmt creating early successional state, def in 41-100 year class.	Many acres outside for species composition, age class distribution and fuel arrangement (especially in FSL2)
VRU7	Y	N, patch size much smaller than historic for this VRU. Past mgmt patch size too small also.	N, due to amount of FSL1 and past mgmt creating early succ. stages	Many acres outside for species composition and age class (especially in FSL2)
VRU9	Y	N, patch size much smaller than historic for this VRU. Past mgmt patch size too small also	N, due to amount of FSL1 and past mgmt creating early succ. stages	

Age Class Distribution by VRU, Historic and Post-Fire* for Dodge Subunit

VRU	0 – 40 yr Age Class		41 – 100 yr Age Class		101 – 150 yr Age Class		151+ yr Age Class	
	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire	Historic	Post-Fire
VRU5	10-20%	32%	15-35%	5%	10-30%	38%	25-55%	25%
VRU7	15-25%	50%	20-40%	8%	15-30%	29%	15-45%	11%
VRU9	20-40%	54%	40-60%	7%	15-20%	23%	5-10%	15%

* Post-fire percentages are based on Planning Subunit Age Class acreages

Summary of Management Area by Burn Severity

Fire Name	Mgt Area	FSL1	FSL2	FSL3	FSL4	Total Acres
Young Jay	12	475	350	0	5	830

Considerations

- Lynx Analysis Units (14101),
- Wildland urban interface in West Kootenai community,
- Noxious weed potential,
- Loss of seral species (i.e., seed source of desirable species),
- Increased fuel loadings from past fire suppression and mortality,
- Bull trout and westslope cutthroat in Young Creek,
- Provide for wildlife security in MA12
- Majority of the fire was "yellow" in the 1997 KNF Watershed Condition Assessment (Bojonell 1997), probably due to high road density

Opportunities for Rehabilitation and Restoration

- Product recovery (harvest of burned timber, mushroom picking),
- Planting for species diversity,
- Watershed restoration including road obliteration in Dodge Planning Subunits,
- Strategic fuel reduction in and around the West Kootenai community,
- Noxious weed prevention and treatment,
- Revegetation of any riparian areas left short of LWD as a result of past management and/or fire
- Replant burned-over plantations.

Forest Plan Considerations

- Approximately 830 acres were affected in MA12. There are opportunities to recover products and restore areas within the fire perimeter throughout MA12 towards the appropriate species and age mix reflected by HRV. The Forest Plan Standards and Guides for MA12 emphasize growth and yield while meeting big game requirements. Use of timber management to achieve HRV goals may result in growth and yield values not being maximized. This may result in longer rotation lengths, more diverse age and size class structures, and more frequent intermediate silvicultural harvests than

anticipated under the Forest Plan. There may be a need for a Forest Plan Amendment for ORD.

Summary Comparison of VRU for Fires

Below is a summary of the VRUs and how they were affected by fire on the Kootenai National Forest. Eleven primary VRUs were originally defined; four of these were further divided by northerly and southerly aspects, making a total of 15 VRUs that were mapped across the Forest. The fires of 2000 affected twelve of these VRUs. For ease of discussion in this summary, the northerly and southerly portions of the divided VRUs were combined. The three tables below reflect the names of the fires, the severity level of each fire, the acres by severity level, and the VRUs that burned within each fire.

For this summary, the fires were grouped by "ecoregion" (Leavell, 2000). The **Cliff Point, Elk Mountain., Lydia,** and **Stone Hill** fires are within the *Northeast Ecoregion*. The **Fan, Feeder Mountain., Grubstake, Kedzie Creek, Kelsey Creek, Lucky Point, Noseeum Creek, O'Brien, Okaga, Prospect, Pulpit, Roderick South, Runt,** and **Studebaker Draw** fires are within the *Northwest Ecoregion*. The **Engle, Frezkat, Grambauer Face, Green Mountain.**, and **Taylor Peak** fires are within the *West Central Ecoregion*. The Elk Mountain Fire is within the *Southeast Ecoregion* but is very close to the boundary with the *Northeast Ecoregion*. For purposes of this summary it was included with the fires within the *Northeast Ecoregion*. Portions of the Cliff Point Fire are within the *Northwest Ecoregion*. Again, for purposes of this summary, all of the fire will be included with the fires within the *Northeast Ecoregion*.

Summary of VRU by Fire Severity by Fire by Ecoregion

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Northeast Ecoregion						
Cliff Point	VRU1	0	160	0	0	160
Cliff Point	VRU2	388	1,985	86	120	2,579
Cliff Point	VRU3	81	71	0	0	152
Cliff Point	VRU5	23	548	0	0	571
Cliff Point	VRU7	675	994	21	0	1,690
Cliff Point	VRU9	993	391	88	0	1,472
Elk Mtn	VRU4	0	38	0	0	38
Elk Mtn	VRU7	53	215	0	0	268
Elk Mtn	VRU9	172	280	15	0	467
Lydia	VRU7	1351	1406	533	129	3419
Lydia	VRU9	1,156	509	77	39	1,781
Stone Hill	VRU2	646	1620	1406	0	3672
Stone Hill	VRU3	56	928	271	34	1,289
Stone Hill	VRU7	553	1,567	491	50	2,661
Stone Hill	VRU9	2,317	738	238	0	3,293
Northwest Ecoregion						
Fan	VRU7	311	337	0	0	648

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Fan	VRU9	83	0	0	0	83
Feeder Mtn	VRU2	0	11	3	0	14
Feeder Mtn	VRU5	0	23	0	0	23
Feeder Mtn	VRU7	3	26	3	0	32
Feeder Mtn	VRU9	1	164	18	0	183
Grubstake	VRU2	6	8	94	0	108
Grubstake	VRU7	0	0	2	0	2
Kedzie Creek	VRU5	56	99	43	0	198
Kedzie Creek	VRU7	6	8	7	0	21
Kelsey Creek	VRU5	236	1541	316	0	2093
Kelsey Creek	VRU7	39	82	98	0	219
Kelsey Creek	VRU9	116	293	47	0	456
Lucky Point	VRU7	83	175	24	0	282
Lucky Point	VRU9	8	62	0	0	70
Lucky Point	VRU10	33	44	0	0	77
Noseeum Creek	VRU5	71	135	9	0	215
O'Brien	VRU5	7	131	23	0	161
O'Brien	VRU7	0	0	5	0	5
Okaga	VRU5	35	34	202	0	271
Okaga	VRU7	37	0	148	0	185
Prospect	VRU5	1	162	43	0	206
Prospect	VRU7	3	22	1	0	26
Pulpit	VRU2	0	11	0	0	11
Pulpit	VRU5	19	46	0	0	65
Pulpit	VRU6	66	0	0	0	66
Pulpit	VRU7	40	10	0	0	50
Pulpit	VRU9	7	17	0	0	24
Roderick South	VRU5	62	72	143	40	317
Runt	VRU5	0	4	0	0	4
Runt	VRU7	194	186	39	0	419
Studebaker Draw	VRU4	1	33	3	0	37
Studebaker Draw	VRU5	0	53	8	0	61
Upper Beaver	VRU2	50	533	375	0	958
Upper Beaver	VRU5	1,094	3,698	1,982	0	6,774
Upper Beaver	VRU7	141	223	390	0	754
Upper Beaver	VRU9	31	255	269	0	555

Fire Name	VRU	FSL1	FSL2	FSL3	FSL4	Total Acres
Young Jay	VRU5	200	78	0	0	278
Young Jay	VRU7	141	137	0	5	283
Young Jay	VRU9	134	135	0	0	269
West Central Ecoregion						
Engle	VRU5	0	1	0	0	1
Engle	VRU9	4	106	0	0	110
Engle	VRU10	28	10	0	0	38
Frezkat West	VRU5	0	138	21	0	159
Frezkat West	VRU7	0	8	0	0	8
Grambauer Face	VRU2	55	65	261	3	384
Grambauer Face	VRU5	14	38	119	0	171
Grambauer Face	VRU7	15	0	118	0	133
Grambauer Face	VRU9	0	0	11	0	11
Green Mtn	VRU2	66	102	0	0	168
Green Mtn	VRU4	100	203	38	0	341
Green Mtn	VRU5	0	28	0	0	28
Green Mtn	VRU7	0	6	0	0	6
Taylor Peak	VRU4	44	42	579	0	665
Taylor Peak	VRU5	1	16	283	0	300
Taylor Peak	VRU7	1	85	87	0	173
Taylor Peak	VRU9	32	4	136	0	172
TOTALS		**12,139**	**21,150**	**9,174**	**420**	**42,883**

Summary of Acres and Percent of Acres by Burn Severity by VRU

VRU	FSL1	%	FSL2	%	FSL3	%	FSL4	%	TOTAL
VRU1	0	0	160	100	0	0	0	0	160
VRU2	1,211	15	4,335	55	2,225	28	123	2	7,894
VRU3	137	10	999	69	271	19	34	2	1,441
VRU4	145	13	316	29	620	57	0	0	1,081
VRU5	1,819	15	6,845	58	3,192	27	40	<1	11,896
VRU6	66	100	0	0	0	0	0	0	66
VRU7	3,646	32	5,487	49	1,967	17	184	2	11,284
VRU9	5,054	56	2,954	33	899	10	39	1	8,946
VRU10	61	53	54	47	0	0	0	0	115
TOTAL	**12,139**		**21,150**		**9,174**		**420**		**42,883**

Percent of each VRU within each Fire

FIRE NAME	VRU 1	%	VRU 2	%	VRU 3	%	VRU 4	%	VRU 5	%	VRU 6	%	VRU 7	%	VRU 9	%	VRU 10	%	Total Acres
Northeast Ecoregion																			
Cliff Point	160	2	2579	39	152	2			571	9			1690	25	1472	22			6624
Elk Mtn.							38	5					268	35	467	60			773
Lydia													3419	55	1781	45			5200
Stone Hill			3672	34	1289	12							2661	24	3293	30			10915
Subtotal	160	1	6,251	25	1,441	6	38	0	849	3			8,045	36	7,022	29			23,512
Northwest Ecoregion																			
Fan													648	89	83	11			731
Feeder Mtn.			14	6					23	9			32	13	183	72			252
Grubstake			108	99									2	1					110
Kedzie									198	90			21	10					219
Kelsey Creek									2093	76			219	8	456	16			2768
Lucky Point													282	66	70	16	77	18	429
Noseeum Creek									215	100									215
O'Brien									161	97			5	3					166
Okaga									271	59			185	41					456
Prospect									206	89			26	11					232
Pulpit Mtn.			11	5					65	30	66	30	50	24	24	11			216
Roderick South									317	100									317
Runt									4	1			419	99					423
Studebaker Draw							37	38	61	62									98
Upper Beaver			958	11					6774	75			754	8	555	6			9041
Young Jay									278	34			283	34	269	32			830
Subtotal			1091	7	0	0	37	0	10,640	70	66	1	2,926	13	1,640	8	77	1	16,503
West Central Ecoregion																			
Engle									1	1					110	74	38	25	149
Frezkat West									159	95			8	5					167
Grambauer Face			384	55					171	24			133	19	11	2			699
Green Mtn.			168	31			341	63	28	5			6	1					543
Taylor Peak							665	51	300	23			173	13	172	13			1310
Subtotal			552	21	0	0	665	25	659	30	0	0	322	12	299	11	38	1	2,868
Grand Total	160		7,894		1,441		1,081		11,896		66		11,284		8,946		115		42,883

OBSERVATIONS:

- A larger percentage of FSL1 occurred in VRU9 than any other VRU.
- For VRUs 2, 3, 5, and 7 more area burned within FSL 2 than FSL1 and FSL3.
- For VRU4 more acres burned in FSL3 than FSL1 and FSL2.
- Even though the acreage burned within VRU10 is low, those that did burn, burned within the expected Fire Severity Level.

- The acreage burned within VRUs 1 and 6 is too low to make a determination.
- A higher percentage of FSL1 occurred within the warmer and drier VRUs than would be expected within HRV due to increased fuel loadings and ladder fuels.
- More FSL2 than either FSL1 or FSL3 occurred in VRU5.
- More FSL2 than FSL1 and much more than FSL3 occurred in VRU7.
- Two times more FSL 1 than FSL3 occurred in VRU7.
- Over all of the VRUs, twice as much FSL2 than FSL1 and 2.5 times more FSL2 than FSL3.
- FSL1 and FSL3 are comparable in acreage.

DRIER vs WETTER PORTION OF FOREST: Using as a reference a line extending north-south through Libby, generally more than 40 inches of precipitation occurs west of that line and less than 40 inches occurs east of that line. This of course is reflected in the VRU distribution on the Forest.

- Much more VRU 7 and VRU 9 burned in the Northeast Ecoregion (64%) than in the Northwest (28%)and West Central Ecoregions (21%).
- VRU 5 is a minor component of the vegetative types in the drier portion, while 70 percent of the acres that burned in the wetter burned in VRU 5.
- VRUs 2, 3, 4 are more prevalent in the drier than the wetter. Thirty-two percent of the acres in the drier burned in VRU 2, while only 7 percent burned in the wetter.

RECOMMENDATIONS

We recommend working with the Fires of 2000 and the relationship to landscapes via the VRU concept in order to arrive at a better understanding of patch size, patch shape, and relationship with the environmental gradient of the Kootenai (Leavell 2000). It is advisable to link these relationships with fire behavior concepts to come up with a better understanding of disturbance dynamics on these landscapes. This would aid in defining the historic range of variability and modifying (if applicable) to our site-specific conditions. Questions we still have after this assessment include:

1. Does VRU7 have a similar fire frequency and intensity as VRU5 on the northeast portion of the Kootenai?
2. Is FSL2 more within the historic range of variability than FSL1 for VRU7?
3. What are the patch size and shape dynamics for these VRUs for these landscapes? How does this tie in with a fragmentation analysis that is strongly recommended for the Kootenai?

Management Attributes for Larger Fires

Fire Name	Subunit	Acres	VRU	MA	BMU	LAU	Fisheries	Watershed Condition*	IRA
Cliff Point	Big, Boulder	6,627	1, 2, 3, 5, 7, 9, other	2, 2og, 5, 10, 10og, 12, 13, 16, 19, 21	17	14102, 14103	westslope	green, yellow	-
Elk Mountain	Wolf, Flathead NF	1,018	4, 7, 9	2, 2og, 12, FNF	-	14513	westslope, redbands	green	-
Engle	Rock	219	5, 9, 10	7, 13, 14	5,6	14702	bulltrout, westslope	yellow	McKay Cr #676
Fan	Boulder	731	7, 9	13, 15, 16		14102	westslope	yellow, red	-
Feeder Mountain 2	LYaak, OBrien	252	2, 5, 7, 9	12, 13	10	14407	bulltrout, westslope, redbands	yellow	-
Frezkat West	Callahan	166	5, 7, 9	2	9	14408	bulltrout, westslope, redbands	yellow	Roberts #691
Grambauer	Lake	701	2, 5, 7, 9	2, 7, 8, pvt	1	14409	westslope	green	Cabinet Face E #671
Green Mtn	green	543	2, 3, 4, 5, 7	10, 13, 14, 18, 18og, 19	6	14702	bulltrout, westslope	green	McKay Creek #676
Grubstake	NEYaak	110	2, 7	11, 14	15	14401	westslope	red	
Kedzie Cr	OBrien	218	5, 7	12	10	14407	bulltrout, westslope, redbands	yellow	
Kelsey Cr	SFYaak	2,769	5, 7, 9	11, 12, 13, 14, 16, 21	17	14404	westslope, redbands	yellow, red	Zulu #166
Lucky Point	Grizzly	430	7, 9, 10	2, 14	11	14405	westslope	green, red	Grizzly Peak #667
Lydia	McSutten, Pinkham	5,214	7, 9	2, 12, 13, 15, 24	-	14109, 14110	westslope	green, yellow	-
Noseeum Creek	OBrien	215	5	12	10	14407	bulltrout, westslope, redbands	yellow	-
OBrien	OBrien	167	5, 7	12, 13, 18	10	14407	bulltrout, westslope, redbands	yellow, red	-
Okaga	NEYaak	455	5, 7, other	2, 12, 13, pvt	16	14401, 14404	westslope	yellow	Mt Henry #666
Prospect	LYaak	233	5,7	2, 2og, 12, 13	10	14407	westslope, redbands	yellow	Saddle Mtn #168
Pulpit	OBrien	215	2, 5, 6, 7, 9	2, 13, 14, 18	10	14407	bulltrout, westslope	red	-
Roderick South	Grizzly, SFYaak	318	5	11, 12, 15, 19	11	14405	westslope	green, yellow	-
Runt	NWYaak	424	5, 7	12, 14	14	14402, 14403	westslope, redbands	green, yellow	-
Stone Hill	McSutten	10,908	2, 3, 7, 9	2, 10, 10og, 11, 12 13, 15	-	14109, 14110	bulltrout, westslope	green, yellow	-
Studebaker Draw	OBrien	99	4, 5	12	10	14407	bulltrout, westslope, redbands	yellow	-
Taylor Peak	Lake	1,310	4, 5, 7, 9	7, 8, 8og, pvt	1	14409	bulltrout, westslope	green, yellow	Cabinet Face W #670
Upper Beaver	NEYaak, SFYaak	9,017	2, 5, 7, 9, other	2, 2og, 10, 11, 12, 13, 15, 17, 19, 24	16, 17	14404	westslope, redbands	green, yellow, red	-
Young J	Dodge	830	5, 7, 9	12	16	14101	bulltrout, westslope	yellow	-

*Watershed Condition red: condition constraining management, yellow: borderline condition-further analysis needed, green: not constraining management. Bojonell, 1997.

Management Attributes for Smaller Fires

(There were many other small fires during the summer of 2000 that were tracked by the Districts)

Fire Name	Subunit	Acres	VRU	MA	BMU	LAU	Fisheries	Watershed Condition*	IRA
Basin Creek	Rock	29	5, 7	19	4	14702	westslope, bulltrout	green	-
Bonnet Top	NEYaak	78	5	14	15	14402	westslope	green	-
Cool Creek	Grizzly	6	5	12	11	-	westslope	green	-
Frezkat East	Callahan	5	7	2	9	14408	bulltrout, westslope, redbands	green	Roberts #691
Grizzly North	Grizzly	27	5, 7	14	11	14405	Westslopes	green	Grizzly Peak #667
Grizzly West	Grizzly	25	5	2, 2og	11	14405	Westslopes	green	Grizzly Peak #667
KooKoo	NEYaak	46	5	11	15	-	Westslopes	green	-
Lang Creek	Grizzly	9	5	12	11	-	Westslopes	green	-
McNeeley	Marten	73	2, 5	13, 18, 18og		14705	bulltrout, westslope	green	-
Mt Baldy	Buckhorn	81	5	12, 13, 14	13	14403	Westslopes	green	-
Purdy Mtn	Callahan	7	5	13, 14	9	14408	bulltrout, westslope, redband	yellow	-
Queen Mtn	Sheep	8	2, 7	10, 11	10	14407	westslope	green	-
Rat Creek	NEYaak	29	5	13, 14	15	14401	Westslopes	red	-
Roberts	Callahan	22	4	2	9	14408	bulltrout, westslope, redband	yellow	Roberts #691
Sheepherder	SFYaak	90	7, 9, 10	2, 14	11	14405	Westslopes	green	Roderick #684
Smith Mtn	Callahan	10	7	14	9	14408	bulltrout, westslope, redband	yellow	Willard Estelle #173
Smith South	Callahan	12	5	13, 14	9	14408	bulltrout, westslope, redband	green	Willard Estelle #173
Smith West	Callahan	4	5, 7	2	9	14408	bulltrout, westslope, redband	yellow	Willard Estelle #173
Survey Mtn	Callahan	50	5, 7	2, 12	9	14408	bulltrout, westslope, redband	red	Willard Estelle #173
Sweasey East	Callahan	16	5	2	9	14408	bulltrout, westslope, redband	yellow	Roberts #691
Upper Roberts	Callahan	4	5	2	9, 16, 17	14408	bulltrout, westslope, redband	yellow	Roberts #691
Warland		80*	2	11	-	-	westslope	green	-
Zulu	SFYaak	10	5	15	17	14404	westslope	yellow	Zulu #166

*Watershed Condition red: condition constraining management, yellow: borderline condition-further analysis needed, green: not constraining management. Bojonell, 1997.

Patch Size by Burn Intensity by Subunit by VRU

Firename	VRU	Fire Severity Level	Minimum Patch Size	Maximum Patch Size	Average Patch Size	Count of Patches
Cliff Point	VRU1	2	160	160	160	1
Cliff Point	VRU2	1	2	111	32	12
Cliff Point	VRU2	2	1	778	397	5
Cliff Point	VRU2	3	86	86	86	1
Cliff Point	VRU2	4	120	120	120	1
Cliff Point	VRU3	1	81	81	81	1
Cliff Point	VRU3	2	3	68	36	2
Cliff Point	VRU5	1	23	23	23	1
Cliff Point	VRU5	2	6	225	78	7
Cliff Point	VRU7	1	2	376	113	6
Cliff Point	VRU7	2	70	535	249	4
Cliff Point	VRU7	3	21	21	21	1
Cliff Point	VRU9	1	184	511	331	3
Cliff Point	VRU9	2	6	250	65	6
Cliff Point	VRU9	3	17	50	29	3
Elk Mtn	VRU4	2	38	38	38	1
Elk Mtn	VRU7	1	53	53	53	1
Elk Mtn	VRU7	2	20	195	108	2
Elk Mtn	VRU9	1	172	172	172	1
Elk Mtn	VRU9	2	49	231	140	2
Elk Mtn	VRU9	3	4	11	8	2
Engle	VRU10	1	28	28	28	1
Engle	VRU10	2	10	11	11	2
Engle	VRU10	3	1	1	1	1
Engle	VRU5	2	1	1	1	1

Engle	VRU9	1	4	4	4	1
Engle	VRU9	2	11	78	39	3
Engle	VRU9	3	45	45	45	1
Fan	VRU7	1	311	311	311	1
Fan	VRU7	2	24	180	112	3
Fan	VRU9	1	83	83	83	1
Feeder Mtn	VRU2	2	1	10	6	2
Feeder Mtn	VRU2	3	3	3	3	1
Feeder Mtn	VRU5	2	23	23	23	1
Feeder Mtn	VRU7	1	3	3	3	1
Feeder Mtn	VRU7	2	4	15	9	3
Feeder Mtn	VRU7	3	3	3	3	1
Feeder Mtn	VRU9	1	1	1	1	1
Feeder Mtn	VRU9	2	164	164	164	1
Feeder Mtn	VRU9	3	2	9	6	3
Frezkat	VRU5	2	138	138	138	1
Frezkat	VRU5	3	21	21	21	1
Frezkat	VRU7	2	8	8	8	1
Grambauer Face	VRU2	1	6	41	18	3
Grambauer Face	VRU2	2	7	21	16	4
Grambauer Face	VRU2	3	261	261	261	1
Grambauer Face	VRU2	4	3	3	3	1
Grambauer Face	VRU5	1	3	11	7	2
Grambauer Face	VRU5	2	1	20	8	5
Grambauer Face	VRU5	3	1	115	30	4
Grambauer Face	VRU7	1	3	7	5	3
Grambauer Face	VRU7	3	1	117	59	2
Grambauer Face	VRU9	3	5	6	6	2

Green Mtn	VRU2	1	2	64	33	2
Green Mtn	VRU2	2	33	69	51	2
Green Mtn	VRU4	1	33	67	50	2
Green Mtn	VRU4	2	3	200	102	2
Green Mtn	VRU4	3	3	20	13	3
Green Mtn	VRU5	2	4	24	14	2
Green Mtn	VRU7	2	6	6	6	1
Grubstake	VRU2	1	1	2	2	4
Grubstake	VRU2	2	2	6	4	2
Grubstake	VRU2	3	94	94	94	1
Grubstake	VRU7	3	2	2	2	1
Kedzie Cr	VRU5	1	2	38	14	4
Kedzie Cr	VRU5	2	2	36	17	6
Kedzie Cr	VRU5	3	1	16	5	9
Kedzie Cr	VRU7	1	6	6	6	1
Kedzie Cr	VRU7	2	8	8	8	1
Kedzie Cr	VRU7	3	7	7	7	1
Kelsey Creek	VRU5	1	2	50	20	12
Kelsey Creek	VRU5	2	6	424	140	11
Kelsey Creek	VRU5	3	2	88	32	10
Kelsey Creek	VRU7	1	39	39	39	1
Kelsey Creek	VRU7	2	14	68	41	2
Kelsey Creek	VRU7	3	37	61	49	2
Kelsey Creek	VRU9	1	5	82	39	3
Kelsey Creek	VRU9	2	2	165	73	4
Kelsey Creek	VRU9	3	1	24	12	4
Lucky Point	VRU10	1	33	33	33	1
Lucky Point	VRU10	2	44	44	44	1

Lucky Point	VRU7	1	4	33	21	4
Lucky Point	VRU7	2	5	155	58	3
Lucky Point	VRU7	3	2	10	6	4
Lucky Point	VRU9	1	8	8	8	1
Lucky Point	VRU9	2	62	62	62	1
Lydia	VRU7	1	1	656	75	18
Lydia	VRU7	2	1	706	74	19
Lydia	VRU7	3	3	152	44	12
Lydia	VRU7	4	27	102	65	2
Lydia	VRU9	1	1	774	128	9
Lydia	VRU9	2	2	455	85	6
Lydia	VRU9	3	31	46	39	2
Lydia	VRU9	4	15	24	20	2
Noseeum Creek	VRU5	1	2	69	36	2
Noseeum Creek	VRU5	2	1	74	23	6
Noseeum Creek	VRU5	3	2	7	5	2
Obrien	VRU5	1	1	3	2	3
Obrien	VRU5	2	12	80	44	3
Obrien	VRU5	3	1	9	4	6
Obrien	VRU7	3	5	5	5	1
Okaga	VRU5	1	10	13	12	3
Okaga	VRU5	2	34	34	34	1
Okaga	VRU5	3	1	114	67	3
Okaga	VRU7	1	37	37	37	1
Okaga	VRU7	3	12	136	74	2
Prospect	VRU5	1	1	1	1	1
Prospect	VRU5	2	1	161	81	2
Prospect	VRU5	3	1	11	6	7

Prospect	VRU7	1	1	2	2	2
Prospect	VRU7	2	1	21	11	2
Prospect	VRU7	3	1	1	1	1
Pulpit Mtn	VRU2	2	11	11	11	1
Pulpit Mtn	VRU5	1	6	7	6	3
Pulpit Mtn	VRU5	2	46	46	46	1
Pulpit Mtn	VRU6	1	66	66	66	1
Pulpit Mtn	VRU7	1	40	40	40	1
Pulpit Mtn	VRU7	2	2	8	5	2
Pulpit Mtn	VRU9	1	3	4	4	2
Pulpit Mtn	VRU9	2	2	15	9	2
Roderick South	VRU5	1	2	35	9	7
Roderick South	VRU5	2	1	39	12	9
Roderick South	VRU5	3	2	42	18	8
Runt	VRU5	2	4	4	4	1
Runt	VRU7	1	1	142	32	6
Runt	VRU7	2	1	185	93	2
Runt	VRU7	3	3	18	10	4
Stone Hill	VRU2	1	28	179	81	8
Stone Hill	VRU2	2	16	1,090	405	4
Stone Hill	VRU2	3	19	1,387	703	2
Stone Hill	VRU3	1	1	23	5	11
Stone Hill	VRU3	2	27	901	464	2
Stone Hill	VRU3	3	2	187	54	5
Stone Hill	VRU3	4	34	34	34	1
Stone Hill	VRU7	1	1	166	33	17
Stone Hill	VRU7	2	4	511	131	12
Stone Hill	VRU7	3	2	215	49	10

Stone Hill	VRU7	4	7	43	25	2
Stone Hill	VRU9	1	4	1,354	463	5
Stone Hill	VRU9	2	3	187	49	15
Stone Hill	VRU9	3	3	139	40	6
Studebaker Draw	VRU4	1	1	1	1	1
Studebaker Draw	VRU4	2	33	33	33	1
Studebaker Draw	VRU4	3	1	1	1	3
Studebaker Draw	VRU5	2	1	47	18	3
Studebaker Draw	VRU5	3	1	6	3	3
Taylor Peak	VRU4	1	2	42	22	2
Taylor Peak	VRU4	2	2	34	14	3
Taylor Peak	VRU4	3	3	576	290	2
Taylor Peak	VRU5	1	1	1	1	1
Taylor Peak	VRU5	2	2	8	4	4
Taylor Peak	VRU5	3	283	283	283	1
Taylor Peak	VRU7	1	1	1	1	1
Taylor Peak	VRU7	2	5	72	28	3
Taylor Peak	VRU7	3	87	87	87	1
Taylor Peak	VRU9	1	14	18	16	2
Taylor Peak	VRU9	2	1	3	2	2
Taylor Peak	VRU9	3	136	136	136	1
Upper Beaver	VRU2	1	3	31	17	3
Upper Beaver	VRU2	2	5	263	67	8
Upper Beaver	VRU2	3	4	163	63	6
Upper Beaver	VRU5	1	1	240	39	28
Upper Beaver	VRU5	2	1	762	122	30
Upper Beaver	VRU5	3	2	421	132	15
Upper Beaver	VRU7	1	1	70	18	8

Upper Beaver	VRU7	2	1	194	32	7
Upper Beaver	VRU7	3	1	175	65	6
Upper Beaver	VRU9	1	4	11	8	4
Upper Beaver	VRU9	2	35	127	64	4
Upper Beaver	VRU9	3	1	128	54	5
Youngj	VRU5	1	9	191	100	2
Youngj	VRU5	2	1	40	13	6
Youngj	VRU7	1	7	126	47	3
Youngj	VRU7	2	12	53	27	5
Youngj	VRU7	4	5	5	5	1
Youngj	VRU9	1	3	80	34	4
Youngj	VRU9	2	1	113	45	3

APPENDIX F
Fire Effects on Watershed Health

Appendix F1

Fires 2000 Assessment
WATERSHED HEALTH CONSIDERATIONS
October 2000
Steve Johnson

Introduction: Improving watershed health should be a "given" in any rehab or value recovery activities. Fires burned within watersheds that were near or even out of watershed equilibrium before the fires, within a municipal watershed and within watersheds containing both threatened and sensitive fish species. Several of the fires occurred within watersheds that were extensively burned and salvage-logged following the 1994 fire-year. In addition, a topic that we know will come up in subsequent analyses is the potential for reduced fire interval, increased intensity of subsequent fires in the burned areas (re-burn)?

.

The intent of all fire-recovery activities is to be responsive to watershed concerns, to "make things better", not add to the existing degraded condition. Considerations relating to watershed health were developed because of the sensitive nature of some of these watersheds impacted by fire. However, these considerations need to be taken into perspective:

- How many acres burned in the watershed, and how many of the burned acres were of high intensity?
- How many acres of high intensity fires burned in proximity to stream channels?
- How many acres of high intensity fires burned above and near to roads, particularly ones that need BMP work?
- How far from any channels will our proposed units be?
- Is there an opportunity to repair or rehab an existing problem with funds generated from these activities?
- What is the expected overall watershed health ***trend*** of each drainage basin, given the history, condition and consequences of these fires?

The Process: The process begins with a **channel review** of stream segments that would be expected to indicate overall watershed health. The channel condition-type is determined by using the channel review and other information such as the percent of the watershed that burned; extent of past harvest in the basin, particularly riparian harvest; and the severity of burning which occurred in and along the channel.

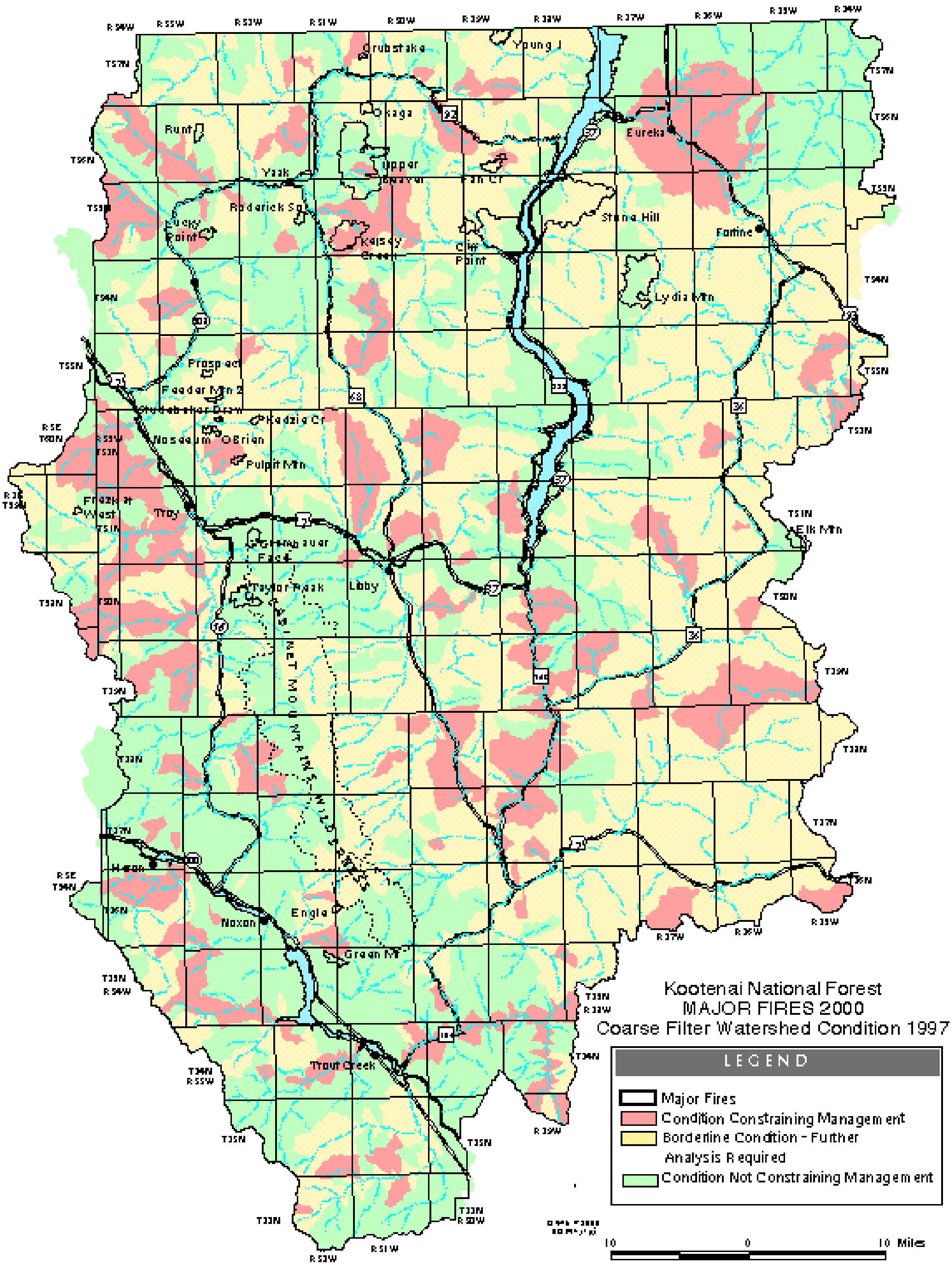
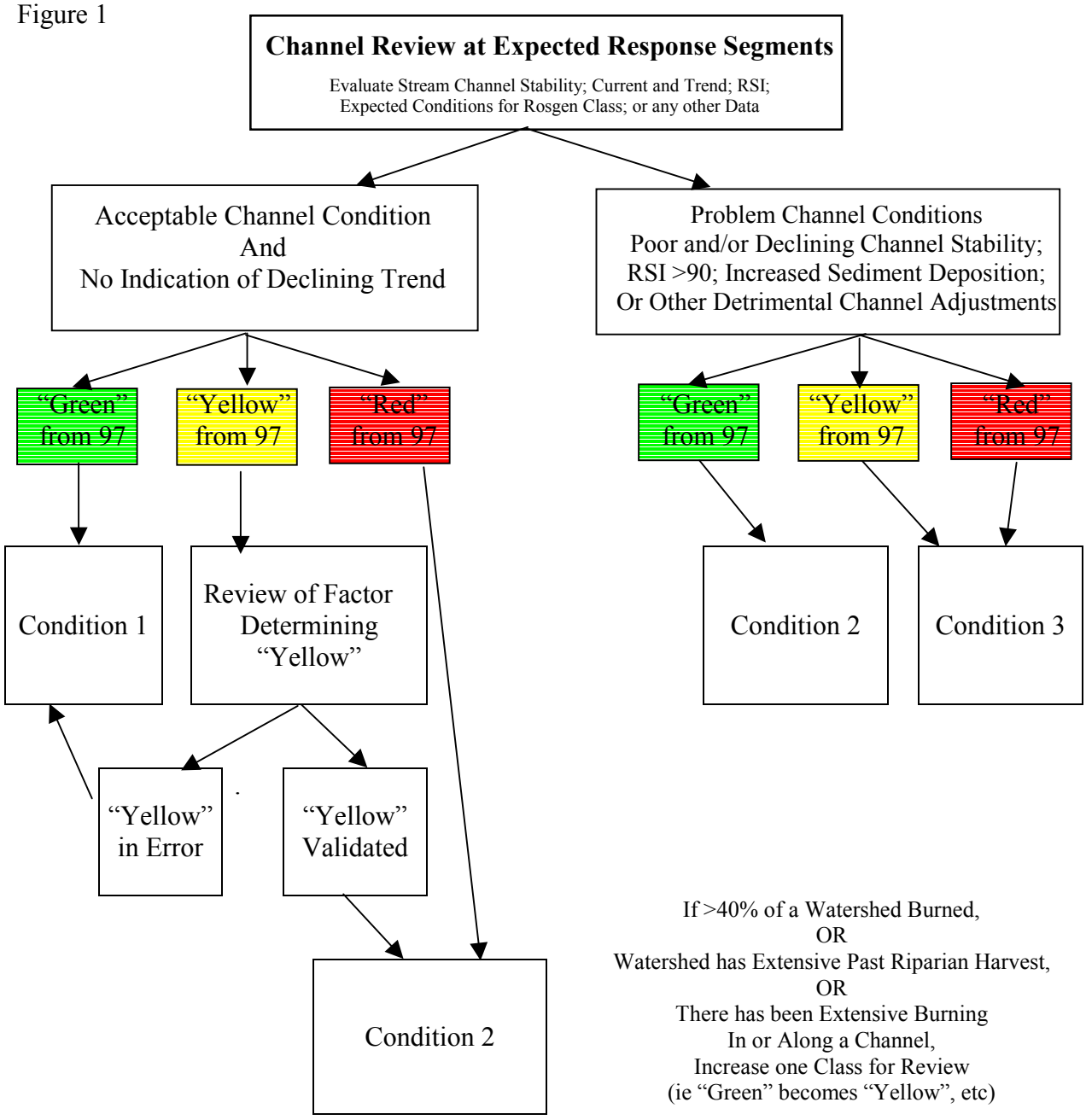

Kootenai National Forest
MAJOR FIRES 2000
Coarse Filter Watershed Condition 1997
LEGEND
Major Fires
Condition Constraining Management
Borderline Condition - Further Analysis Required
Condition Not Constraining Management
10
0
10 Miles
Eureka
Fortine
Yaak
Libby
Troy
Noxon
Trout Creek
Stone Hill
Lydia Mtn
Young J
Crubstake
Upper Fan Cr
Kelsey Creek
Cliff Point
Prospect
Kedzie Cr
Pulpit Mtn
Taylor Peak
Engle
Green Mt
Elk Mtn

Figure 1



1997 Color Coding was taken from 1997
KNF Watershed Condition Assessment. (Bojonell, 1997

The flow chart (figure 1) explains the process used to determine condition-type. The conditions-types are defined below:

CONDITION 1: Watersheds in dynamic equilibrium where channel condition is acceptable, the hydrologic condition is not limiting, and no other factors are present that could push it beyond thresholds.

CONDITION 2: Watersheds showing signs of stress or are expected to show signs of stress in the near future. Channel conditions are acceptable at the present time, but at least one criteria of concern has been exceeded (1997 Watershed Condition Assessment, Bojonell).

CONDITION 3: Watersheds out of dynamic equilibrium, where channels have been found to be in a degraded condition or are expected to be in a degraded condition as a result of fire.

Condition 1 – Considerations

- In all recovery activities, provide for large woody debris (LWD) recruitment both in and along stream channels. LWD availability will determine the rate of channel recovery from these fires;
- Look for opportunities to improve watershed condition, including rehabilitation of existing problems, particularly road drainage problems;
- Use the Forest Plan Riparian Area Guidelines, as amended by INFS, for streamside management zones (SMZ), unless a positive benefit can result from the use of an alternative practice in the SMZ.

Condition 2 – Considerations

- In addition to Condition 1 considerations**, minimize** ground-disturbing activities. As appropriate, use winter logging, temporary roads, temporary bridges, forwarders, and FMC's.

Condition 3 – Considerations

The emphasis in these types of watersheds is to be very "light on the land" and to aggressively look for opportunities to improve watershed conditions. Activities should not be automatically precluded in these watersheds, but extreme care is needed. Based on the channel condition, in conjunction with the fire and fire suppression actions, the following should be considered:

- **Preclude** *ground-disturbing* activities. Do nothing to the soil surface which will: 1) increase the amount of runoff or reroute surface runoff, or intercept subsurface flow; 2) cause rutting in wet areas; or 3) cause compaction. This does NOT mean that all surface activities are precluded. It means that activities will not contribute to the degraded condition. Examples of acceptable activities included winter logging, helicopter logging or other methods that do not disturb the ground;

- Reduce road effects. Examples include road restoration (obliteration, seeding…) and repairing existing problems (adding relief culverts, drain dips…);

- Include a 100' SMZ on all KNF Class I, II, IIIA or IIIB stream channels;

- Consider risk of activities or magnitude of effects by reviewing factors such as routing time, sediment delivery potential, and distance from major channels (large downstream fisheries);

- Note that Hydrologic Zone I (from KNF Hydrologic Guide) has a much greater chance of rain-on-snow events than does Zone III;

- If activities are planned in a Condition 3 watershed, monitor the watershed conditions to determine effectiveness of mitigation and improvement of the watershed.

Some of the potential rehabilitation and restoration areas are within watersheds identified in the 2000 303(d) list: Wolf Creek, Lake Creek and West Fork Yaak River. Proposed activities in these areas will need to coordinate and share information with the MDEQ-Planning and Prevention Bureau. We have to demonstrate that our post-fire activities will overall improve or at least not cause additional deterioration of watershed conditions, particularly in the existing poor condition watersheds.

S.Johnson
10/19/2000
Attachments:1997 Watershed condition Documentation (Bojonell 1997)

Appendix F2

1997 Watershed Condition Documentation

Hilaire Bojonell
Hydrologist
1/22/98

Purpose: This project was designed to update the 1992 Watershed Condition Assessment. The analysis attempted to make a preliminary review of all watersheds on the forest, evaluating their current condition based on information that was readily available as of FY 97. We attempted to duplicate the methodology used for the 1992 assessment as much as possible. The same watershed boundaries were used to determine the watershed condition.

Use: The data contained in the watershed condition database should only be used for coarse filter analysis. The data should be verified with more detailed analysis for project work.

The analysis placed the watersheds into one of the following three categories:

1) **Functioning** - Watersheds where the hydrologic condition is not limiting. This means that none of the evaluated factors are outside of the estimated threshold of concern, and none of the reports or existing analysis suggest an immediate problem. There is a high probability (but not certainty) that these watersheds are below critical thresholds with opportunity for additional management activities utilizing BMPs and other Forest Plan guidance.

2) **Functioning at Risk** - Watersheds where at least one of the criteria of concern has been exceeded (RIF; percent harvested; or identified by districts as "red flags"). In these watersheds, the threshold level of acceptable hydrologic condition may have been reached. This suggests that further detailed analysis, including ground review, will be necessary to confirm the condition and to define what management options are available, if any.

3) **Not Functioning** - Watersheds where the existing condition is unacceptable because at least one of the evaluating factors is double the threshold condition, or where a field review has documented an existing watershed problem, or where threshold conditions for this class were nearly reached and local information suggests damage.

Methods:
Criteria for determining watershed condition:

General Rosgen Stream Type	WS Sensitivity Condition	Historical % of WS harvested	Road Impact Factor (RIF) >38" precip	<38" precip
	Functioning	<35	<15	<20
A	Functioning at Risk	>=35 OR	>=15 OR	>=20
	Not Functioning	>=70 OR	>=30 OR	>=40
	Functioning	<30	<12	<15
B	Functioning at Risk	>=30 OR	>=12 OR	>=15
	Not Functioning	>=60 OR	>=24 OR	>=30
	Functioning	<25	<10	<10
C or E	Functioning at Risk	>=25 OR	>=10 OR	>=10
	Not Functioning	>=50 OR	>=20 OR	>=20

Queries were run in Arcview based on the above criteria which resulted in a first approximation of watershed condition. A map of the first approximation was generated and sent to the districts. The districts then edited the watershed condition based on field knowledge and/or analysis of the watersheds. Please note that the map will continue to be updated as more specific watershed analyses are completed by the districts.

The general Rosgen stream type was based on a modeled Rosgen type for the lower 1/3 of channel, the lower 1/3 of the channel was assumed to be the most sensitive to disturbance. Field verified Rosgen data was used where possible.

Rather than using all harvest only harvest within the past 40 years was included in the historical harvest factor. The 40 year-old harvest date was used because it tiered to the Columbia River Basin Assessment that assumed early seral was younger than 40 years old. This is one difference between the 1992 and 1997 criteria.

For the road impact factor, precipitation was used rather than hydrologic regions because precipitation information was available and more detailed than hydrologic regions previously used. This is another difference between the 1992 and 1997 criteria. The average precipitation for all the watersheds was 38 inches. This was used as the split between the high and low precipitation areas.

Sample queries based on the above criteria:

1) To determine a Rosgen 'A' FUNCTIONING AT RISK watershed in the <38" precip zone the following query was run in Arcview:
First select all watersheds with less than an average precip of 38": ([Avg_ppt]<38)
Click on New Set
Then query for all Rosgen 'A' watersheds with 35 to 69% of the watersheds harvested OR a Road Impact Factor greater than or equal to 20 but less than 40:
((([Ros]=A) and ([Vegcls10-20]>=35)) and (([Ros]=A) and ([Vegcls10-20]<70)) or (([Ros]=A) and ([Rif]>=20)) and (([Ros]=A) and ([Rif]<40)))
Click on Select from Set
The selected watersheds were then coded FUNCTIONING AT RISK.

2) To determine a Rosgen 'B' NON-FUNCTIONING watershed in the >=38" precip zone the following query was run in Arcview:
First select all watersheds with greater than an average precip of 38": ([Avg_ppt]>=38)
Click on New Set
Then query for all Rosgen 'B' watersheds with 60% or more of the watershed harvested OR a Road Impact Factor greater than or equal to 24:
((([Ros]=B) and ([Vegcls10-20]>=60)) or (([Ros]=B) and ([Rif]>=24)))
Click on Select from Set
The selected watersheds were then coded NON-FUNCTIONING.

3) To determine a Rosgen 'C' or 'E' FUNCTIONING AT RISK watershed in the >=38" precip zone the following query was run in Arcview:
First select all watersheds with greater than an average precip of 38": ([Avg_ppt]>=38)
Click on New Set
Then query for all Rosgen 'C' and 'E' watersheds with 25 to 49% of the watershed harvested OR a Road Impact Factor greater than or equal to 10 but less than 20:
((([Ros]=C) or ([Ros]=E) and ([Vegcls10-20]>=25)) and (([Ros]=C) or ([Ros]=E) and (Vegcls10-20]<50)) or (([Ros]=C) or ([Ros]=E) and ([Rif]>=10)) and (([Ros]=C) or ([Ros]=E) and ([Rif]<20)))
Click on Select from Set
The selected watersheds were then coded FUNCTIONING AT RISK.

Code 6 Data Table Definitions:
*These fields were used as part of the criteria for determining watershed condition.

Shape: Arc generated field, ignore.
Area: Area of the watershed in square meters.
Perimeter: Perimeter of the watershed in meters.
Code6data#: Arc generated field, ignore.
Code6data-id: Arc generated field, ignore.
Code6: The last 7 digits of the KNF 6th code watershed number.
Position: This column was added to indicate a "duplicate" face drainages. These were drainages that, at the 6th code, were lumped into one drainage even though they are individual watersheds at the 7th code. They are located along major rivers (i.e. Yaak, Kootenai, Koocanusa, and Clark Fork). Please note that the values generated for face drainages are inaccurate because they represent values for all the face drainages within a drainage added together.
Region: A random number given to each watershed polygon. It can be used as a substitute for the watershed number in looking for information in Arcview.
Region_acres: The number of acres in the region polygon. These are grid (raster) generated acres and differ from the "Areaacres-st" and "Areaacres-rd" acres (+/- 15%). These acres are roughly equivalent to

watershed acres, however, it is recommended that "Areaacres-st" or "Areaacres-rd" be used for watershed acres.
Min_precip: The minimum precipitation in the watershed in inches. Derived from the Kootenai revised Prism model.
Max_precip: The maximum precipitation in the watershed in inches. Derived from the Kootenai revised Prism model.
Avg_precip: The weighted average precipitation in the watershed in inches. Derived from the Kootenai revised Prism model.
Sum-dist-st: Total miles of stream in the watershed, based on the CFF layer.
Areaacres-st: The number of acres in the watershed. These are polygon generated acres and are considered to be more accurate than the "Region_acres". Note that in some cases zero acres were computed because there were no streams in that polygon. In those instances refer to either the "Areaacres-rd" or "Region_acres" to obtain the acres for that watershed.
Areasqmile-st: The area of the watershed in square miles. These were derived from "Areaacres-st".
Milepersqmile-st: Miles of stream per square mile in the watershed.
Sum-dist-rd: Total miles of road in the watershed.
Areaacres-rd: The number of acres in the watershed. These are polygon generated acres and are considered to be more accurate than the "Region_acres". Note that in some cases zero acres were computed because there were no roads in that polygon. In those instances refer to either the "Areaacres-st" or "Region_acres" to obtain the acres for that watershed.
Areasqmile-rd: The area of the watershed in square miles. These were derived from "Areaacres-rd".
Milepersqmile-rd: Miles of road per square mile in the watershed, equivalent to road density.
Rd-st-intersects: Total number of stream crossings.
Inter_dens: Stream crossing density (number of crossings per square mile of watershed).
*Rif: Road Impact Factor. RIF = (road density (mi/mi2)) * (crossing density (#/mi2)). This field was used as part of the criteria for determining watershed condition.
Polynum_lb: Arc generated field, ignore.
*Vegcls10-20: Percent of the watershed with harvest that was approximately 0 to 40 years old as of June 1997. This percentage was used in determining the watershed condition. This field is the sum of "Percent-cls10" and "Percent-cls20". This field was used as part of the criteria for determining watershed condition.
Veg-cls-10: A label, ignore.
Acres-cls10: The number of acres of harvest in the watershed that was 0 to 20 years old as of June 1997. This was derived from TSMRS data and SILC data.
Percent-cls10: The percentage of the watershed with harvest that was 0 to 20 years old as of June 1997.
Veg-cls-20: A label, ignore.
Acres-cls20: The number of acres of harvest in the watershed that was 21 to 40 years old as of June 1997. This was derived from TSMRS data and SILC data.
Percent-cls20: The percentage of the watershed with harvest that was 21 to 40 years old as of June 1997.
Rosnum: A 3 digit number indicating the stream order and Rosgen class for approximately the lower 1/3 of the channel. The first digit indicates the stream order and the third digit indicates the Rosgen class. The second digit has no meaning but was used in the modeling process. Examples: 101 = first order stream, Rosgen "A"; 202 = second order stream, Rosgen "B"; 302 = third order stream, Rosgen "B"; 403 = fourth order stream, Rosgen "C"; 503 = fifth order stream, Rosgen "C".
Frequency: Number of stream segments making up the lower channel. This was used for modeling purposes.
Sum-length: The length in meters of "Rosnum".
Class_percent: The percent of the total stream distance (from "Sum-dist-st") used to calculate "Rosnum". This indicates what percentage of the total channel miles was considered to be the lower 1/3 of the channel. Note that in some cases 100% of the channel was used.
Ros_ord_num: Same as "Rosnum".
List: Arc generated field, ignore.
St-order: The stream order at the mouth of the watershed. This was generated by ArcInfo from a stream-order routine. 1 = 1st order; 2 = 2nd order; 3 = 3rd order; etc.

Wscond: 1997 Watershed condition. 0 = functioning; 1 = not functioning; 2 = functioning at risk. The final rating was generated by the modelling process and then edited according to professional interpretations by the district hydrologists.
*Avg_ppt: The whole number average precipitation in the watershed in inches. This column was added manually because Arcview was inconsistent in how it rounded off. This field was used as part of the criteria for determining watershed condition.
Rostemp: Temporary Rosgen class. A number indicating the Rosgen class. 1 = "A"; 2 = "B"; 3 = "C"; etc. The number was converted to a letter in the "Ros" column.
*Ros: The Rosgen class for the first third of the stream beginning at the confluence. Real data was used where possible otherwise the Rosgen class was modeled. This field was used as part of the criteria for determining watershed condition.
Ordtemp: Temporary stream order. A number indicating the stream order, same as "St-order". 1 = first order; 2 = second order; 3 = third order; etc.
Level: Arc generated field, ignore

APPENDIX G
Fire Effects on Fisheries

Appendix G

Fires of 2000 Assessment
FISHERIES
October 2000
John W. Carlson

Preface

The fires of 2000 affected roughly 2% of the lands within the Kootenai National Forest boundary. There was approximately 28% of that ground affected by stand replacing fire. The remainder was mixed lethal fire with moderate to low burn intensity. There were small isolated areas that burned within riparian areas, but for the most part, riparian areas were not affected by stand replacing fire.

Historically, fish persisted through large stand replacing events. Stochastic events such as fire, or the subsequent floods that commonly follow fire, are natural events that are much more common in a geologic context. This is analogous to the pulse disturbance that occurs one time with no further direct effects to the environment.

Fish populations have functioned quite successfully under this disturbance pattern. However, with increased management in the last 50, years the disturbance pattern is better described as a press pattern where there are continual direct effects to the aquatic environment and its associated fish species. It is this chronic disturbance pattern that is responsible for the downward trend in the numbers of fish populations and individuals, not the large-scale environmental events that occur so infrequently.

The real difference between pulse and press disturbance patterns is the much longer timeframe between events under the pulse pattern. The interim period allows affected populations to recover to pre-disturbance levels. Press disturbance patterns produce chronic effects that preclude total recovery through the duration of the disturbance. The task at hand will be to implement restoration and rehabilitation without creating a chronic disturbance pattern in the areas to be treated.

Threatened, Endangered & Sensitive Species (TE&S)

Threatened, endangered & sensitive fish species on the Kootenai National Forest include the Kootenai River white sturgeon *Acipenser transmontanus*, burbot *Lota lota*, torrent sculpin *Cottus rhotheus,* bull trout *Salvelinus confluentus*, westslope cutthroat trout *Oncorhynchus clarki lewisi*, and interior redband trout *Oncorhynchus mykiss gairdneri*. Effects to the white sturgeon are likely discountable for several reasons. The Recovery Plan for sturgeon identifies the primary factor affecting sturgeon is an altered hydrograph caused by operations at Libby Dam (USFWS 1999, pages 7-10). The size, distance to sturgeon habitat, and wide distribution of the 2000 fires is such that their effects to sturgeon are negligible. Effects from the larger fires in the upper Kootenai watershed will be buffered by the reservoir and dam operations.

Similarly, effects to burbot would be negligible as well. These fish inhabit the mainstem Kootenai and Koocanusa Reservoir, both of which are large enough to dilute the effects from fires that occurred in tributaries to the Kootenai River.

The species most likely to be affected by the fires themselves and any post fire activity would be bull trout, westslope cutthroat, redband trout, and sculpins. These species are most likely to occur in the smaller tributaries impacted by fire or directly downstream. Resident fishes would potentially be most affected. They are dependent on available habitat, which, if greatly altered, would not provide adequate habitat. Stochastic events like fires have been identified as a threat to small resident populations (Rieman and Macintyre 1993). Figure G-1 shows the location of the 2000 fires in relation to known bull trout and redband trout distributions. Westslope cutthroat trout are distributed across the Kootenai National Forest and would be affected by all the fires, either directly or indirectly.

Migratory bull trout and westslope trout are more resilient to environmental effects as they have access to the Kootenai River and Koocanusa Reservoir for rearing habitat. There is the potential to weaken or eliminate certain year classes should the indirect impacts of the fires create unsuitable conditions, but this would be mitigated by multiple spawnings by older individuals. The impacts that could affect the 2001+ year classes would be loss of suitable spawning areas, pools, and instream cover through excessive sedimentation. The duration of these effects would be short term as the riparian and upper slope vegetation recovered through reforestation.

Consistency with INFS standards and guidelines

The Inland Native Fish Strategy (1995) provides Forest Plan direction for management activities conducted in and adjacent to riparian areas. It is important that all restoration actions be consistent with INFS direction to insure legal consistency as well as protecting riparian qualities. INFS does provide flexibility for management inside riparian areas.

Riparian Habitat Conservation Areas (RHCA)

Default RHCA widths are provided in INFS for priority and non-priority watersheds (Table 1). Watersheds supporting bull trout populations within the boundaries of the KNF are considered special emphasis watersheds and treated as INFS priority watersheds (Table 2). These special emphasis watersheds have been identified through consultation with the US Fish and Wildlife Service (USFWS) and Montana Fish Wildlife & Parks (MFWP).

In some cases it will be appropriate to modify RHCA widths either by increasing or decreasing them as compared to the default widths stated in INFS. This decision will be validated with field data in concert with comparison to the historic range of variability. Certain drainages within the areas affected by fire need vegetative management to occur within the RHCAs. These sites presently support tree species, which are more commonly associated with drier upslope VRUs because the original riparian canopy was removed either through fire or historical riparian harvest. Site-specific analysis will identify sites where restoration by vegetation treatment is appropriate inside RHCAs.

Some silvicultural treatment followed by planting would be used to accelerate the vegetation community toward a desired future condition. An example would be the removal of existing trees, i.e., lodgepole pine, Douglas fir and converting the stand to cedar, cottonwood, and aspen. This is consistent with INFS guidelines TM-1 (a & b).

Riparian Management Objectives (RMO)

The Forest Plan, as modified by INFS, has standards by which aquatic habitat can be compared to determine whether it currently meets minimum qualities of good fisheries habitat. The Plan directs that project implementation will not retard the attaining or exceeding these standards for aquatic habitat. Unless otherwise noted, default RHCA widths should be implemented to protect riparian habitat qualities. Where there is sufficient data, RHCA widths should be modified to potentially permit restoration activities within the RHCA.

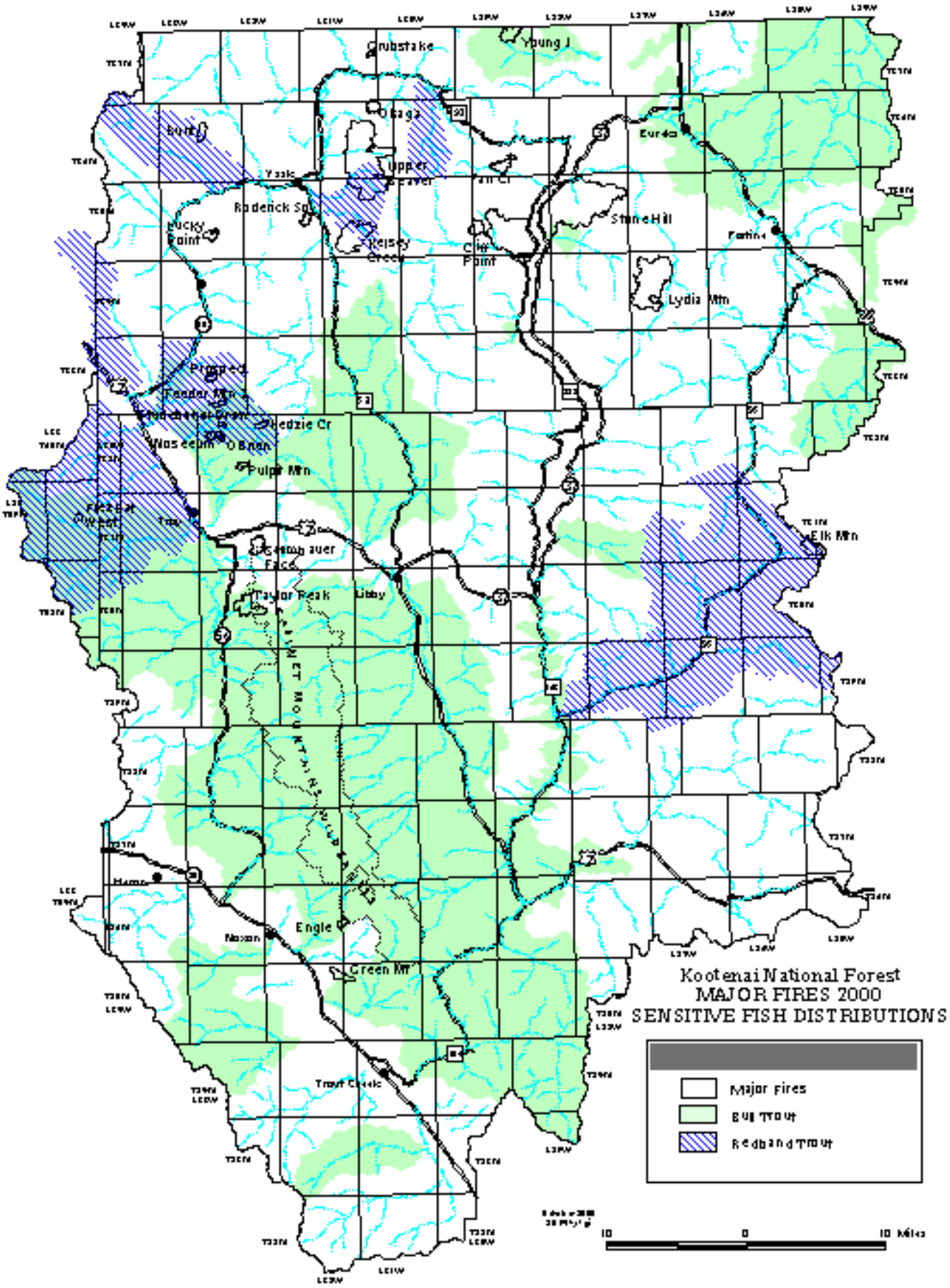
Table 1 – Default INFS RHCA widths

	Category 1	**Category 2**	**Category 3**	**Category 4**
	Fish-bearing	*Perennial Non-fish-bearing*	*Ponds, Lakes, Reservoirs, >1ac*	*Intermittent streams, wetlands, <1 ac*
Priority	Extends to the top of the inner gorge, 100 yr floodplain or 300′ either side, whichever is greater	Extends to the top of the inner gorge, 100 yr floodplain or 150′ either side, whichever is greater	Extends to the outer edge of riparian veg extent of seasonally saturated soils, over unstable soils, or 150′, whichever is greater	Extent of landslide prone areas, area to top of gorge, edge of riparian veg, or 100′ either side, whichever is greater
Non-priority	Same	Same	Same	Extent of landslide prone areas, area to top of gorge, edge of riparian veg, or 100′ either side, whichever is greater

Table 2 – Special Emphasis Watersheds on the Kootenai National Forest by District

Eureka	**Murphy Lakes**	**Three Rivers**	**Libby**	**Cabinet**
Young Cr.	Wigwam River*	O'Brien Cr.*	Canyon	Bull River*
Sophie Cr.*	Grave Cr.*	Callahan Cr.*	Libby Cr.*	Marten Cr.
Phillips Cr.*		Lake Cr.*	West Fisher*	Rock Cr.*
Parsnip Cr.		Lower Yaak R*.	Silver Butte*	Pilgrim Cr.
Sutton Cr.		Keeler Cr.	Quartz Cr.*	Swamp Cr.
			Pipe Cr.*	Vermilion R. *
			Bear Cr	Whitepine Cr.
			Fisher River	
			Bobtail Cr.	
			Parmenter Cr.	
			Flower Cr.	

* Priority bull trout watershed identified in INFS


Grubstake
Young J
Olaga
Eureka
Upper Fever
Yaak
Roderick Sp
Lucky Point
Kelsey Creek
Clif Point
Stone Hill
Lydia Mtn
Fortine
Prospect
Feeder Mtn
Pledzie Cr
Wasdeem
O'Brien
Pulpit Mtn
Elk Mtn
Taylor Peak
Libby
Engle
Noxon
Green Mt
Trout Creek
Kootenai National Forest
MAJOR FIRES 2000
SENSITIVE FISH DISTRIBUTIONS
Major Fires
Bull Trout
Redband Trout
10
0
10 Miles

Large Woody Debris (LWD)

Large woody debris is one structural component that is lacking in most managed watersheds on the Kootenai National Forest. The fires of 2000 increased LWD recruitment by burning trees and snags in RHCAs that then fell or will fall into the stream channels. INFS requires certain frequencies of LWD dependent on stream size. RHCAs affected by stand replacing events during the 2000 fires will have a short term increase in LWD recruitment; however, long-term recruitment will be greatly reduced. Areas affected by mixed lethal fire should experience a more tempered response in LWD recruitment rates.

Stream segments that were not directly impacted by fire, but are downstream of affected reaches, will see a lag in recruitment, as LWD is washed downstream or recruited through mass wasting upstream.

Long term LWD recruitment needs to be addressed, particularly in areas where much of the riparian overstory has been removed either by previous harvest or by fire. For the purposes of this assessment, 20 years is considered long term. Large wood recruited into streams as a result of the 2000 fires will likely begin to diminish during that time either by way of transport or decay. Sites identified as having stand replacing fire or identified for harvest in riparian could be revegetated with cedar and cottonwood. Areas that are currently below INFS standards for wood could be enhanced by adding large wood to the stream channel. The bulk of the affected sites do not support fish populations directly; however, the wood acts as velocity dissipaters and sediment traps.

Thermal Regime

There is the potential for a shift in thermal regime for some smaller tributaries affected by fire. This may in turn affect larger watersheds downstream. Those areas that have had a reduction in riparian vegetation should be considered for reforestation with the long-term goal of maintaining thermal stability during periods of low flow. These areas would be prime candidates for reestablishing cedar and cottonwood. Planting red osier dogwood, willows and other appropriate species would provide quick canopy and stabilize streambanks while larger overstory species became established.

Pool Frequency

Pools are a critical component of quality fish habitat. They provide rearing habitat throughout the year with larger, deeper pools critical for survival during periods of low flow. Generally, pools in smaller Kootenai Forest tributaries are associated with LWD. The LWD either forms the pool or adds complexity of cover, which enhances the quality of the pool. Pools in excess of 1.5 ft in depth are extremely valuable in the winter when streams often freeze, particularly where they do not have the insulating cover of an intact riparian area to help prevent freezing.

The Forest Plan, as modified by INFS, sets standards for pool frequency based on stream size. Special consideration should be given to the relationship between long-term LWD recruitment and the formation of large, deep pools

Width to Depth

This standard reflects stream function. An increase in this metric is usually indicative of inefficient sediment transport. The potential exists, particularly in unstable landtypes affected by stand replacing fire, for erosion and slope failures to increase sediment delivery to adjacent stream segments. This would be reflected by an increase in this metric.

Streamside Management Zones (SMZ)

The guidelines in INFS are generally more restrictive than State SMZ law especially in special emphasis watersheds. State SMZ standards can be more restrictive on non-fish bearing, intermittent tributaries outside special emphasis watersheds. One specific exception is the SMZ direction for Class III streams in steep topography. State SMZ law calls for a 100-foot buffer, which would exceed the default INFS RHCA width. State SMZ law and KNF riparian guidelines prohibit the use of equipment inside the SMZ.

124 Permit

Restoration will be coordinated with MFWP. Restoration requiring instream excavation will be submitted for 124 Permit approval from MFWP. This will include culvert replacements, culvert removals, channel stabilization, adding LWD and similar projects

Section 7 Consultation

The listing of white sturgeon as endangered, September 1994, and bull trout as a threatened species, June 1998, requires that projects with potential effects to these species go through the consultation process with the USFWS. There is no potential for effects to white sturgeon or its habitat. Therefore, the level of effects to listed species will be determined based on project scale, scope of activities and proximity to bull trout habitat.

Emergency

Suppression and rehabilitation efforts associated with initial attack are to be covered under a Region wide emergency consultation with USFWS. These activities as a whole were determined to have adversely affected bull trout and their habitat, which requires formal consultation.

Project

There are two ways consultation could be accomplished for the restoration efforts. The first would be the more traditional process by which a biological assessment is prepared for each project. Concurrence or formal consultation would then be requested on each project as they are proposed. Another option would be to put together a programmatic BA to cover all the potential restoration opportunities identified through this assessment and subsequent analysis. The latter option would require knowledge of the extent of work to be proposed in conjunction with sideboards developed to reduce the potential for take to bull trout.

Effects

The effect of fire on aquatic ecosystems is well documented in the literature. Specific effects analysis should be developed with respect to each restoration proposal. Common direct effects will vary from decreased riparian vegetation to actual fish mortality. There were no instances of actual fish mortality reported with the fires of 2000 on the KNF. Indirect effects will be more prevalent in the analysis of our recent fires. These types of effects are most commonly manifested as altered habitat through changes in thermal regime, increased sediment, reduced complexity, etc. The level of effects will be dependent on several factors and will vary across the Forest depending on landtypes, VRUs, and burn intensity. Indirect effects are not immediately obvious on the landscape

but instead will require one or two high water events before they are noticed. A similar lag but more extended would occur in fish populations negatively affected by gross changes in the habitat quality. Again, it is not apparent at this point that any of the fires caused this kind of shift.

Post fire restoration planning will need to consider this lag in effects to the aquatic environment and organisms so as not to exacerbate conditions established by the actual fires. The mosaic pattern left by the fires of 2000 are likely to impact most watersheds to a very limited extent which should allow a large degree of flexibility on most sites. The limiting factor continues to be overall watershed condition that was possibly confounded by the recent burns. This is most true in watersheds with native fish populations either within fire perimeters or directly downstream.

Considerations

Watersheds supporting TE&S fish species should be treated to minimize effects to those species. As discussed in the 1994 assessment, activities planned in watersheds supporting TE&S species should limit ground-disturbing activities through treatment types and timing.

BA/BEs will be prepared as appropriate for TE&S species.

Ground disturbing activities in special emphasis bull trout watersheds occurring outside the time period July 15 to September 1 will probably require formal consultation with the USFWS.

All construction activity in defined channels will require consultation with MFWP and 124 permits.

BMP implementation, activities to reduce erosion, or improve channel function should be considered to reduce management effects.

Riparian areas affected by stand replacing fire should be considered for reforestation. Consideration should be given to planting spruce, hemlock, cedar, black cottonwood, and other appropriate riparian vegetation.

Intact riparian areas within burn perimeters should be considered for regeneration where appropriate.

A road system analysis should be done to identify roads for obliteration.

Abandoned roads within riparian areas should be obliterated wherever possible.

Known pumping sites used in 2000 should be hardened and mapped for future use.

Undersized pipes within the fire perimeters should be replaced to facilitate potential increased water yield and sediment production.

Monitoring should include effectiveness monitoring to determine what works and what does not. This will require specific objectives and trigger points for restoration.

References

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