Entiat Valley Community Wildfire Protection Plan


Tyee Fire 1994

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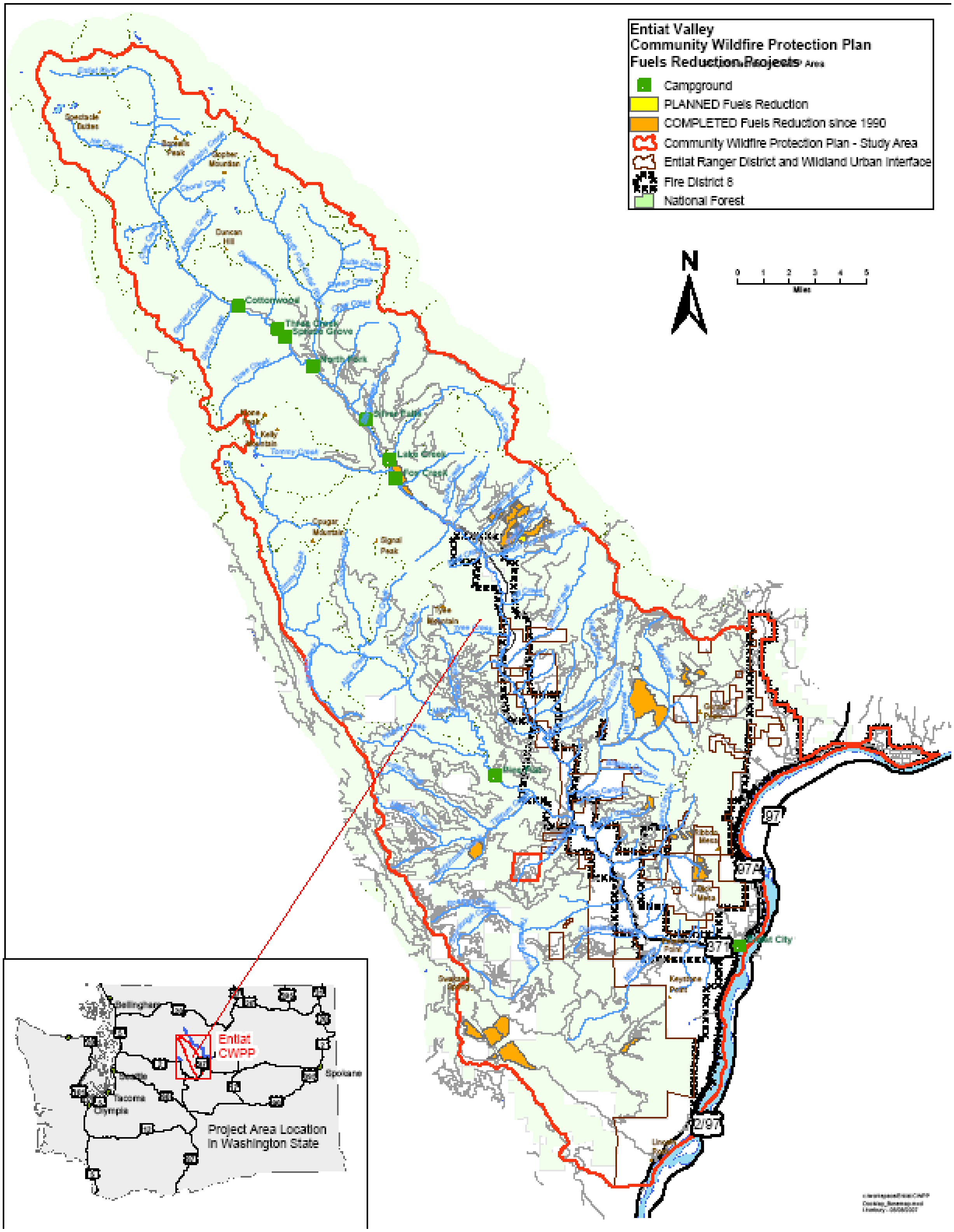
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1. INTRODUCTION

Citizens of the City of Entiat and the Entiat Valley have been greatly impacted from the effects of wildfire and related flash flooding, for the past 60 years. Long time residents are well aware of the large stand replacing fire history of the Entiat Valley and adjacent Columbia River breaks locales. Recent wildfires in the area have motivated local residents, government officials and Chelan County Fire District 8 Commissioners, to proactively implement actions to protect life and property, and reduce the risk of future wildfire disasters.

Purpose

Chelan County Fire District 8 received a grant from the Department of Interior – Bureau of Land Management to facilitate the development of a Community Wildfire Protection Plan, for the Entiat Valley, City of Entiat and surrounding areas. Diverse groups of valley residents met during 2005-2006 to brainstorm and prioritize potential actions to address the most pressing issues that affect the study areas ability to reduce the impacts associated with wildland fires. The strategy is a cooperative effort of the volunteer fire department, adjacent fire districts, county officials, City of Entiat officials, Entiat Watershed Planning Committee, Chelan County Conservation District along with federal and state land managers, business people and interested residents.

The purpose of this plan is to position Chelan County Fire District # 8, county leaders, rural communities, valley residents, City of Entiat residents and state and federal land management agencies to be better prepared to protect the greater Entiat Valley residents and its natural resources from the potentially devastating impacts of wildfire and promote the natural role of fire in the ecosystem.

The Community Wildfire Protection Plan (CWPP) identifies and serves the following at risk areas: City of Entiat, Navarre Coulee, Stayman Flats, Brief, Ardenvoir, front country residents along the Columbia Breaks, and other areas where numerous residents live in the Wildland Urban Interface adjacent to the Entiat River Valley. The resulting CWPP reflects consensus among those who participated in its development, and among those who, by signing, support the approaches outlined within.

Issues and actions fit into one or more of the primary areas of emphasis. These primary areas of emphasis are also the main emphasis items identified in the Healthy Forest Restoration Act of 2004:

> **Treatment of Structural Ignitability** – Recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.
>
> **Prioritized Fuel Reduction –** Identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure.

Collaboration – Must be developed by local and state government representatives, in consultation with federal agencies and other interested parties.

Our plan is founded on, and will guide the implementation of, the National Fire Plan and the related 10 Year Comprehensive Strategy and Implementation Plan as it applies to the Wildland Urban Interface, in the Entiat Valley. This plan is intended to be an adaptive document, one that will continue to be updated annually or as needed to reflect our accomplishments and the newly emerging needs, issues, and opportunities surrounding wildland fire management in the Entiat Valley. Chelan County Fire District 8 will have responsibility for annual updates.

Visions and Goals

Through the Community Wildfire Protection Planning Process the residents of the Entiat area aim to protect their community from the effects of wildfire and flooding disasters through outreach, strategic planning and an annual identification of current and future action items.

The primary goal of the Entiat Valley CWPP is to protect human life, private property, infrastructure and natural resources (including endangered species). Secondary goals include; risk and hazard assessments of all residents in the planning area, improved numbering of residences and wildland urban interface fuels reduction.

In an effort to make the best use of resources in the Entiat Valley and adjacent areas, all options for the utilization of biomass produced from fuels reduction projects will be pursued.

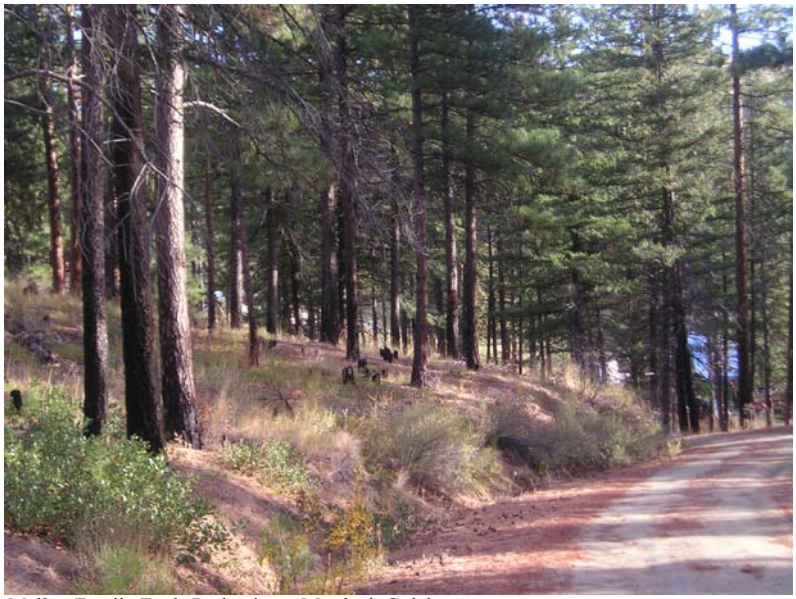
Community Awareness

The Entiat Valley and the City of Entiat are surrounded by public lands that are largely undeveloped and a source of untreated vegetative fuels. Entiat community members and businesses have been tremendously impacted by wildfires and the resulting flash floods. Since 1970 over 70% of the CWPP planning area has been burned over by large stand replacing wildfires and wildland fire use fires. The 1970 Entiat Zone, 1976 Crum Canyon, 1988 Dinkelman and 1994 Tyee Fires burned well over 235,000 acres in the Entiat Valley and along the Columbia River Breaks.

Residents are very aware of the need to develop a comprehensive wildfire protection plan. The energy of community members, guidance and input has played an essential role in the creation of this CWPP.

Values

The citizens of the Entiat area value their homes, privacy, clean water, and the beauty of surrounding shrub and forest habitats. They want to improve the safety of their community and many individuals have conducted fuels reduction projects on their lands. in conjunction with local, state and federal agencies, with no outside financial assistance Through the CWPP process they hope to play an active role in land management decisions affecting federal and state lands adjacent to and within the wildland urban interface.



Mallon Family Fuels Reduction – Murdoch Gulch

2. PLANNING AREA

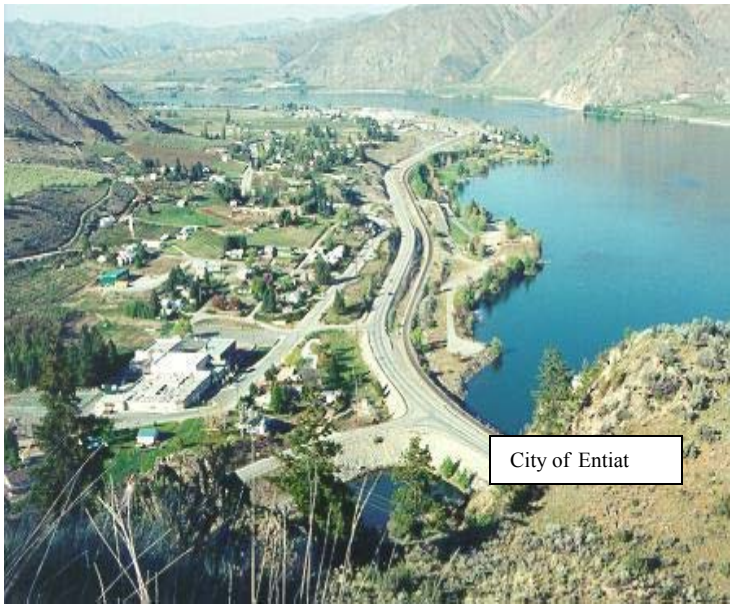
General Description of the Area

The planning area for the Entiat Valley Community Wildfire Protection Plan is located along the eastern slopes of the Cascade Mountains in north-central Washington State, Chelan County. The planning area is approximately 302,000 acres and is boarded on the northeast by the Chelan Mountains, to the southeast by the Entiat Mountains and to east by the Columbia River. Residential areas, outside the City of Entiat, are intermixed with orchard, open grass, sagebrush, bitterbrush, scattered Ponderosa Pine and Douglas fir forested areas. Because all large stand replacement wildfires occurring within the planning area have affected private property the wildland/urban interface (WUI) is defined as all areas within the planning area.

The City of Entiat lies north and west of the confluence of the Entiat and Columbia Rivers. The City is bisected by Washington State Route 97 Alternate and is located roughly midway between Wenatchee and Chelan. The City covers approximately 2 square miles that are situated in a long narrow alignment, running parallel to the Columbia River for a distance of almost 3 miles. The City has experienced rapid growth during the 2005-2007 periods, with numerous new housing areas under development. Vegetation within the city limits consist mostly of grasses and shrubs. The more level sites have been developed into irrigated crop land (orchards). The table below summarizes the existing land uses.

City of Entiat Land Use

Land Use	Acres	% of Total
Single family residential	185	16.1
Multi family residential	6	0.6
Mobile home parks	1	0.1
Orchards	306	26.5
Commercial	17	1.5
Parks	21	1.8
Manufacturing	16	1.4
Ag structure	9	0.8
Public	218	18.9
Vacant	374	32.4
Total	**1153**	**100%**


City of Entiat

The primary stream flowing through the area is the Entiat River. It flows 43 miles in a southeasterly direction from near the head of the Entiat Valley to its confluence with the Columbia River near the City of Entiat. The Entiat River has two major tributaries: the North Fork Entiat, which joins the main river at river mile 33, and the Mad River, which flows into the main river near Ardenvoir at river mile 10.5. The highest elevation in the planning area is the 9,249-foot summit of Mt. Fernow. The lowest elevation occurs at the Entiat River's mouth, at approximately 713 feet. Precipitation varies from 90 inches in the Alpine ecosystems to 10 inches in the shrub-steppe.

Washington State Highway 97A is the primary artery providing access through the eastern section of the planning area. This highway is a major north/south travel route and a high speed two-lane highway that travels along the edge of the Columbia River. Chelan County Highway 51 is the primary access to that part of the CWPP located in the Entiat Valley. This highway is a low speed two-lane highway that travels along the edge of the Entiat River for approximately 38 miles. Other main roads in the planning area are Chelan County Highway 151 serving the Navarre Coulee and Chelan County Highway 2

serving Stayman Flats. Many neighborhoods are served by a single access route providing residents with only one way in and one way out. Evacuation and defense of such areas have been and will be in the future difficult in the event of fast moving wildfire. Other critical evacuation routes in the planning area are primarily United States Forest Service and Chelan County roads as follows:

Mills Canyon (USFS Road 5200)	Crum Canyon (Chelan County Highway 301)
Mud Creek (USFS Road 5300)	Potato Creek (USFS Road 5380)
Shady Pass (USFS Road 5900)	Tillicum Creek (USFS 5800)

Outside the City of Entiat are loosely grouped communities/developments. Some of these developed areas are; Turtle Rock, Navarre Coulee, Stayman Flats, Crum Canyon, Roaring Creek, Ardenvoir, Brief, Preston Creek, McCrea Creek and Dill Creek. Residential development is largely rural in nature. Most homes are situated in the main Entiat River Valley drainage (some in the orchard green belt) and adjacent tributaries as well as along the Columbia River. Relatively few home sites include adequate defensible space. Fuel types include grass and bitterbrush beneath pine along the lower slopes moving into open pine stands, and finally mixed conifer types including Douglas fir and Grand Fir along the ridges and upper slopes in the northeast portion of the planning area.

The City of Entiat is served by a domestic water and sewage system. Most of the other residents in the planning area are served by private wells and septic systems. Power service is distributed via a mix of overhead and underground lines, provided by the Chelan County Public Utility District.

Ownership within the Entiat Valley CWPP is predominantly public, with approximately eight percent of the land in private ownership. Following are the landownership acreages within the planning area.

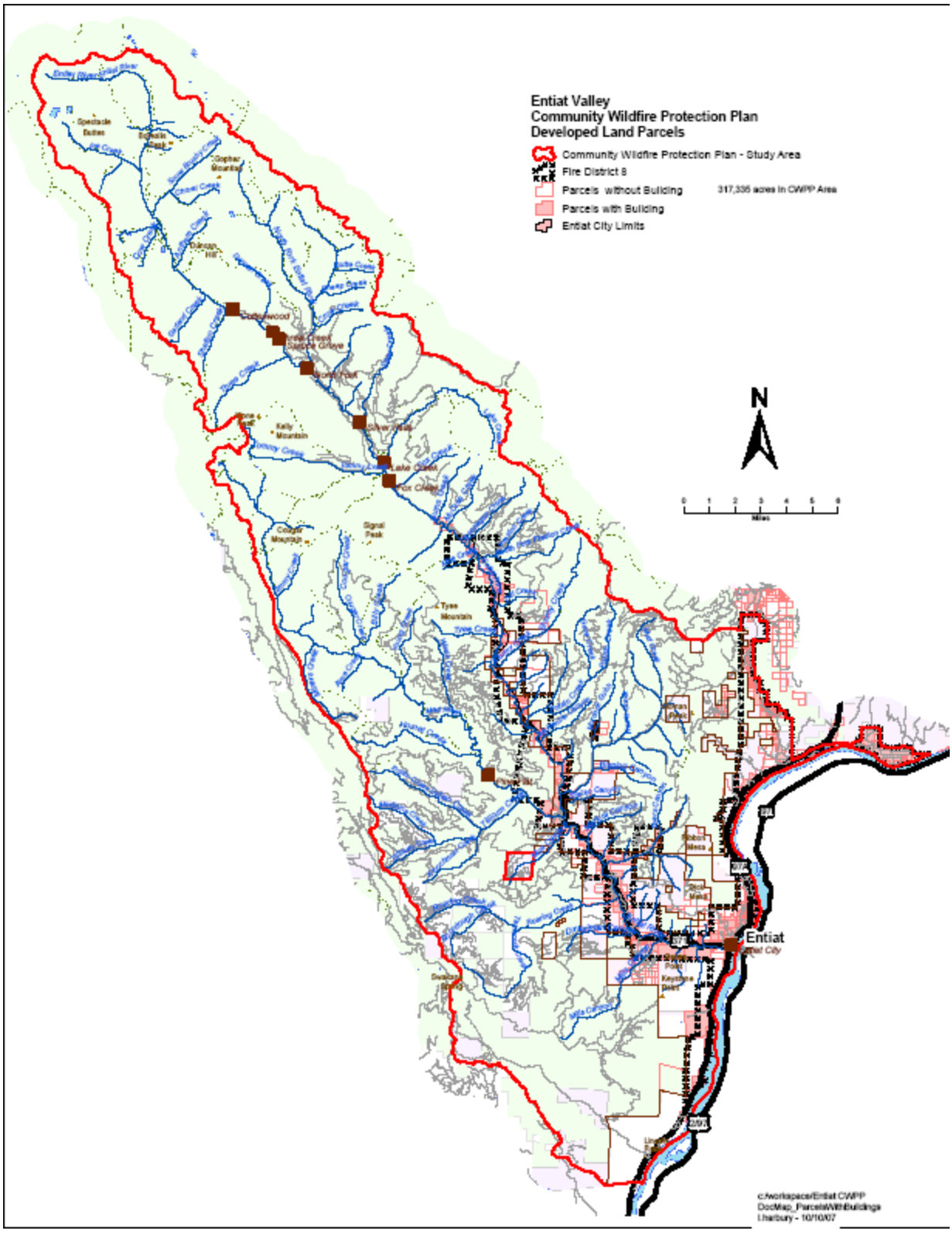
Entiat River Valley

CWPP Land Ownership Acreages

OWNER	APPROXIMATE ACRES	PERCENTAGE CWPP
Federal	**258,477**	**86%**
BLM	4424	
USFWS	798	
USFS	253,255	
State	**17,467**	**5%**
WDFW	7525	
WDNR	9930	
Other	12	
County/City/Local	**904**	**1%**
Chelan County	2	
City of Entiat	68	
City of Seattle	261	
Districts (Fire, Cemetery, Irrigation, School, Chelan County P.U.D.)	573	
Private	**26,141**	**8%**
Chelan-Douglas Land Trust	415	
Longview Fiber Company	9878	
Boat Club	32	
Other	15,816	
TOTAL	**302,989**	**100%**

Demography

The Entiat Valley CWPP area has experienced a fairly recent surge in urban population growth and rural part-time/vacation home construction. US Census data showed that the population within the city limits of Entiat remained relatively constant between 1981 and 1990; however between 1991 and 2000 it grew by 133%, from 449 to 957 people. Growth inside the city limits will continue, with 4 new subdivisions recently completing infrastructure construction and now selling home sites. Although recent year-round rural population growth occurred at a slower rate than urban population growth, 2000 Census data reported that the number of homes in the Entiat sub basin area of the CWPP grew by 41%, from 278 to 470 units. Of these, 160 (34%) were reported as part-time/vacation homes. The Entiat River drainage and along the Columbia River breaks have numerous other developments either currently being constructed or planned.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Community Wildfire Protection Plan
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Parcels with Building
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N
Miles
Entiat
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3. PLANNING PROCESS

Background

The enactment of the Healthy Forest Restoration Act (HFRA) of 2003 created opportunities for Counties to participate in community based forest planning and vegetation treatment project prioritization. This landmark legislation includes the first meaningful statutory incentives for the United States Department of Agriculture (USDA) United States Forest Service (USFS), and the United States Department of Interior (USDI) Bureau of Land Management (BLM) to give consideration to the priorities of local communities as they develop and implement forest management and hazardous fuels reduction projects.

Federal participation in watershed restoration and community development projects on non-federal lands has increased, resulting in more rapid and efficient achievement of ecosystem goals for the entire watershed. Federal policies supporting such coordinated actions are maintained (e.g. Rural Community Development Program, Wyden Amendment authorization, USFWS Partners Program, Farm Bill).

In order for communities to take full advantage of this opportunity, a Community Wildfire Protection Plan (CWPP) must first be prepared. The Entiat Valley CWPP is meant to conform to the intent and letter of HFRA. The wildfire history is a clear indicator that the Entiat Valley and the City of Entiat are at risk communities of catastrophic wildfire.

The process of developing a CWPP helps communities of Chelan County clarify and refine priorities for the protection of life, property and critical infrastructure in the wildland-urban interface (WUI). It can also lead community members through valuable discussions regarding management options and implications for surrounding watersheds.

The language of the HFRA provides maximum flexibility for communities to determine the substance and detail of CWPPs and the process used to develop them. Because the legislation is general in nature, Chelan County is providing assistance in the preparation of the Entiat Valley CWPP. Currently, CWPPs are being developed on the Chelan County Fire District scale in coordination with landowners of the county, and County Fire District staff. Representatives of the USFS and Washington State Department of Natural Resources (WDNR) are providing assistance in the effort. There are nine Fire Districts in Chelan County and the CWPPs being developed for them will form the basis of the Chelan County Wildfire Mitigation Plan.

Updates and edits to the CWPPs developed for Chelan County will be performed yearly and will be coordinated by Chelan County Fire District 8. It is expected that updates will be necessary in order to reflect recent work completed to address issues identified in the CWPPs. Another important aspect of these plans will be monitoring the effectiveness of projects implemented under these plans.

The WUI is commonly considered the zone where structures and other human developments meet and intermingle with undeveloped wildland or vegetative fuels. The WUI poses tremendous risk to life, property, and infrastructure in associated communities and is one of the most dangerous and complicated situations firefighters face. Based on the large stand replacing fire history of the Entiat Valley all lands within the study area are considered within the WUI.

Both the National Fire Plan and the Ten-Year Comprehensive Strategy for Reducing Wildland Fire Risks to Communities and the Environment place a priority on working collaboratively with communities within the WUI to reduce risk from large-scale wildfire.

The HFRA builds on existing efforts to restore healthy forest conditions near communities and essential community infrastructure by authorizing expedited environmental assessments, administrative appeals, and legal review for hazardous fuels projects on federal land.

The act emphasizes the need for federal agencies to work collaboratively with communities in developing hazardous fuel reduction projects, and it places priority on treatments identified by communities themselves in a CWPP.

The HFRA provides communities a tremendous opportunity to influence where and how federal agencies implement fuels reduction projects on federal lands and how additional federal funds may be distributed for projects on non-federal lands. A CWPP is the only way to take advantage of this opportunity.

The HFRA requires that three entities must mutually agree to the final contents of a CWPP:

- The applicable local government (County or City),
- The local fire departments, and
- The state entity responsible for forest management.

In addition, these entities are directed to consult with and involve local representatives of the USFS and BLM and other interested parties in the development plan. The process is intended to be open and collaborative, as described in the Ten-Year-Strategy, involving local and state officials, federal land managers, and the broad range of interested stakeholders.

In the absence of a CWPP, the HFRA limits the WUI to within ½ mile of a community's boundary or within 1 ½ miles where mitigating circumstances exist, such as steep slopes or the presence of a critical evacuation route. At least 50 percent of all funds appropriated for projects under the HFRA must be used within the WUI as defined either by a CWPP or by the limited definition provided in the HFRA where no CWPP exists. As indicated earlier, based on the large stand replacing fire history of the Entiat Valley all lands within the study area are considered within the WUI.

Process and Partners

In 2006 the Entiat Valley community organized themselves to develop a plan to address and educate landowners about fuel loads and fire risks on private, federal and state lands.

A FireWise Workshop was presented by the WDNR, with over 50 interested Entiat Valley residents, public officials and stakeholders in attendance. Chelan County Fire District 8 members also accomplished educational efforts with landowners through one on one contact. During these contacts fire district personnel took the opportunity to discuss access, egress, landscaping and defensible space issues. Chelan County Fire District #8, officers and members, completed a NFPA Form 1144 Risk and Hazards Analysis on all residents in the plan study area outside the City of Entiat. Additionally, twelve WUI Assessment Zone Leaders solicited information from their neighbors through questionnaires and individual contacts. The CWPP planning group also accomplished outreach through three bulk mailings soliciting input from residents and stakeholders in planning area.

Landowners in the Entiat Valley area were not the only ones concerned about fire risk and fuel loads. In 2001 Chelan County received a grant to develop a County Fire Plan that would identify and prioritize fuel treatment efforts in the County. After a few years of inactivity on the grant, Chelan County contracted with the Conservation District to develop a County Fire Plan in 2004. The timing of the County Fire Plan dovetailed well with the efforts and awareness of citizens from throughout Chelan County.

The Entiat Valley Community Wildfire Protection Plan is the result of these locally led efforts and partnership between private, local, state and federal interests. The Entiat Valley CWPP serves as part of the foundation of countywide wildfire protection plan that is currently being developed. By basing the countywide plan on individual CWPP's such as the Entiat plan, the goals, objectives and recommended projects will be developed by and remain specific to each community.

4. ASSESSMENT

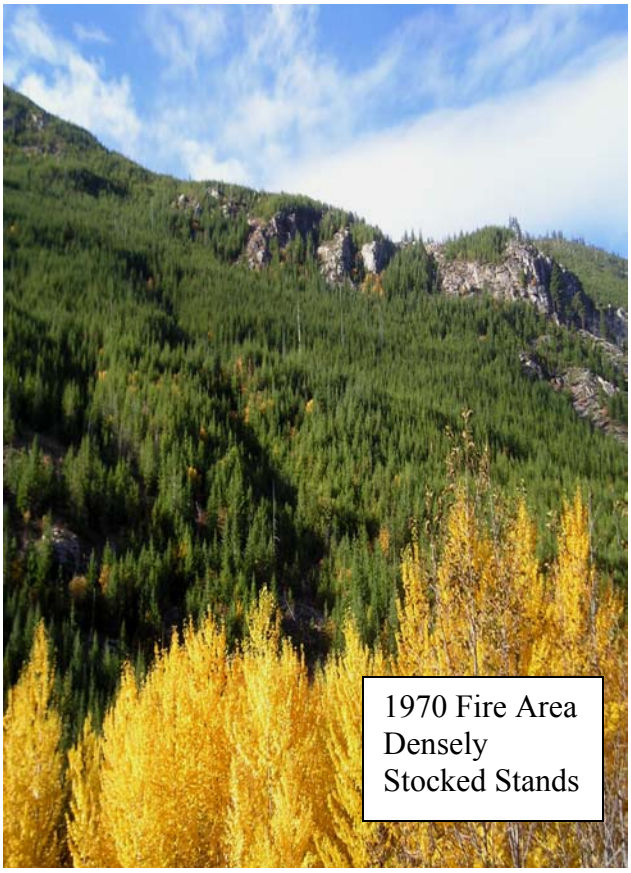
Existing Information

A substantial amount of data is already available from several resources. Primary information/GIS data used in this plan were provided by Chelan County Fire District 8 (structure protection plan, evacuation plan, structure risk analysis, etc.). United States Forest Service Entiat Ranger District (large fire history, fire cause statistics, vegetation stand structure, vegetation desired future condition, topography etc.), Washington State Department of Natural Resources (Washington State Fire Communities at Risk), Chelan County Assessors Office (ownership), City of Entiat (demographics).

Vegetation

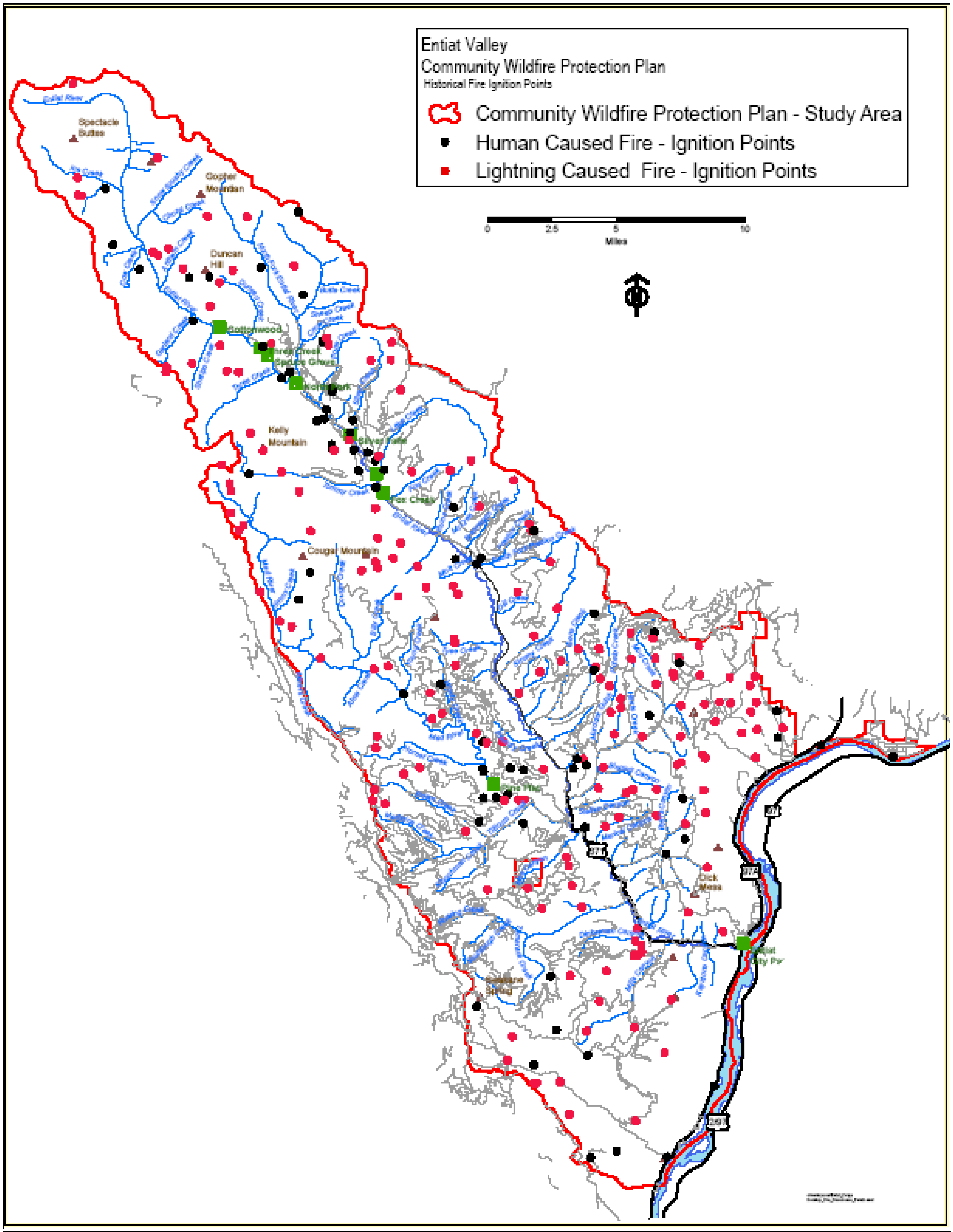
The existing vegetation conditions in the Entiat Valley and Columbia River Breaks are the result of a long history of large stand replacing wildfire. Given this history, over 70 percent of the project planning area is currently recovering from these wildfires. Fire regimes have not changed, but vegetation and fuel conditions have. Vegetation ranges from shrub steppe in the lower elevations to mixed conifer in the upper elevations located on lands administered by the United States Forest Service, Bureau of Land Management, Washington State Department of Fish and Wildlife and Washington State Department of Natural Resources.

Across the landscape of Chelan County Fire District 8 and adjacent United States Forest Service, Washington State Department of Natural Resources and Washington State Department of Fish and Wildlife lands, areas of grass, brush, densely stocked trees, and dead fuels contribute to the landscape vegetation pattern, when mixed with steep slopes that is conducive to rapid rates of spread and large stand replacing wildfires when weather conditions are extreme.



General Entiat Valley and Columbia River Breaks Fire Behavior:

Wildland fires and resulting flash flooding are the major natural disturbances to ecosystems in the Entiat Valley and Columbia River Breaks. These two natural occurrences fulfill an important role in ecosystem management and development across the landscape. When wildfires occur in these areas they typically burn rapidly down the Entiat Valley drainage and either up or down the Columbia River drainage, depending on wind direction. Once the winds subside, fires typically grow in an upslope direction. In almost all cases, large stand replacement wildfires have spread out of the Entiat Valley and into the Wenatchee River drainage and the Lake Chelan Basin. Previous studies (Barnes 1983) have shown this large fire spread has been consistent for several centuries. Most of the large fires and related flooding since 1970 have affected residential areas, resulting in the loss of residential structures.


Entiat Valley
Community Wildfire Protection Plan
Historical Fire Ignition Points
Community Wildfire Protection Plan - Study Area
Human Caused Fire - Ignition Points
Lightning Caused Fire - Ignition Points
0
2.5
5
10
Miles
Spectacle Buttes
Gopher Mountain
Duncan Hill
Kelly Mountain
Cougar Mountain
Cottonwood
Fox Creek

Historical Fire Regimes and Disturbances

Disturbance is an integral process in ecosystem development. The lands in the Entiat Valley Community Wildfire Protection Plan study area are the result of a variety of natural and introduced disturbances. Natural disturbances include fires, insects, pathogens, wind throw, floods, avalanches and earthquakes. Introduced disturbances include livestock grazing, mining, timber harvest, fire suppression and roads. Introduced management activities such as, fire exclusion, timber harvest and livestock grazing have altered the natural fire regimes in the Entiat Valley CWPP study area.

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse-scale definitions for natural (historical) fire regimes have been developed by Hardy et al. (2001) and Schmidt et al. (2001) and interpreted for fire and fuels management by Hann and Bunnell (2001). The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire dominant overstory vegetation. These five regimes include:

I 0-35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced).

II 0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory replaced).

III 35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced).

IV 35-100+ year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced).

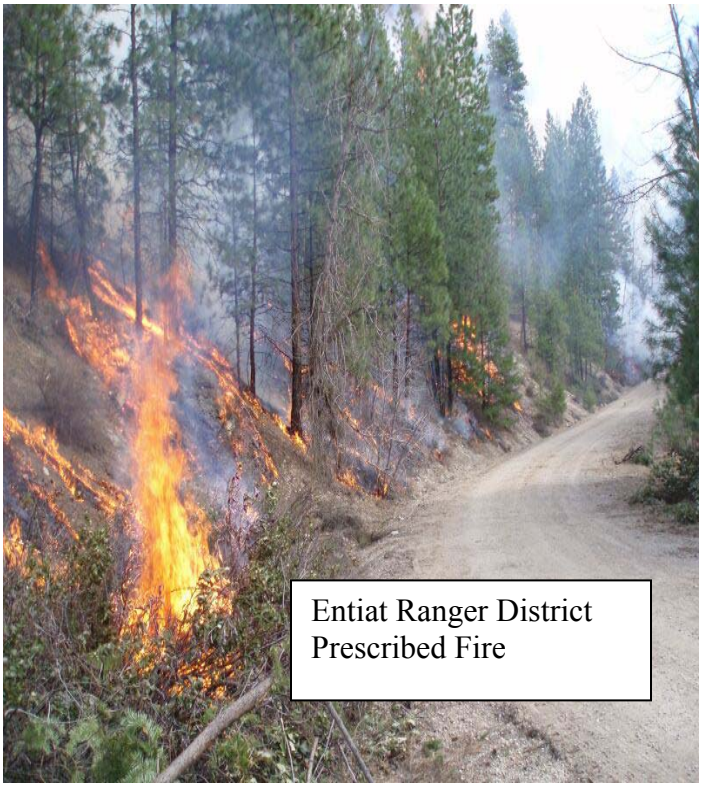
V 200+ year frequency and high (stand replacement) severity.

As scale of application becomes finer these five classes may be defined with more detail, or any one class may be split into finer classes, but the hierarchy to the coarse scale definitions should be retained.

A fire regime condition class (FRCC) is a classification of the amount of departure from the natural regime (Hann and Bunnell 2001). Coarse-scale FRCC classes have been defined and mapped by Hardy et al. (2001) and Schmidt et al. (2001) (FRCC). They include three condition classes for each fire regime. The classification is based on a relative measure describing the degree of departure from the historical natural fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age,

canopy closure and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g. insect and diseased mortality, grazing, and drought). There are no wildland vegetation and fuel conditions or wildland fire situations that do not fit within one of the three classes.

The three classes are based on low (FRCC1), moderate (FRCC2), and high (FRCC3) departure from the central tendency of the natural (historical) fire regime (Hann and Bunnell 2001, Hardy et al. 2001, Schmidt et al. 2002). The central tendency is a composite estimate of vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated natural disturbances. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside.



Entiat Ranger District
Prescribed Fire

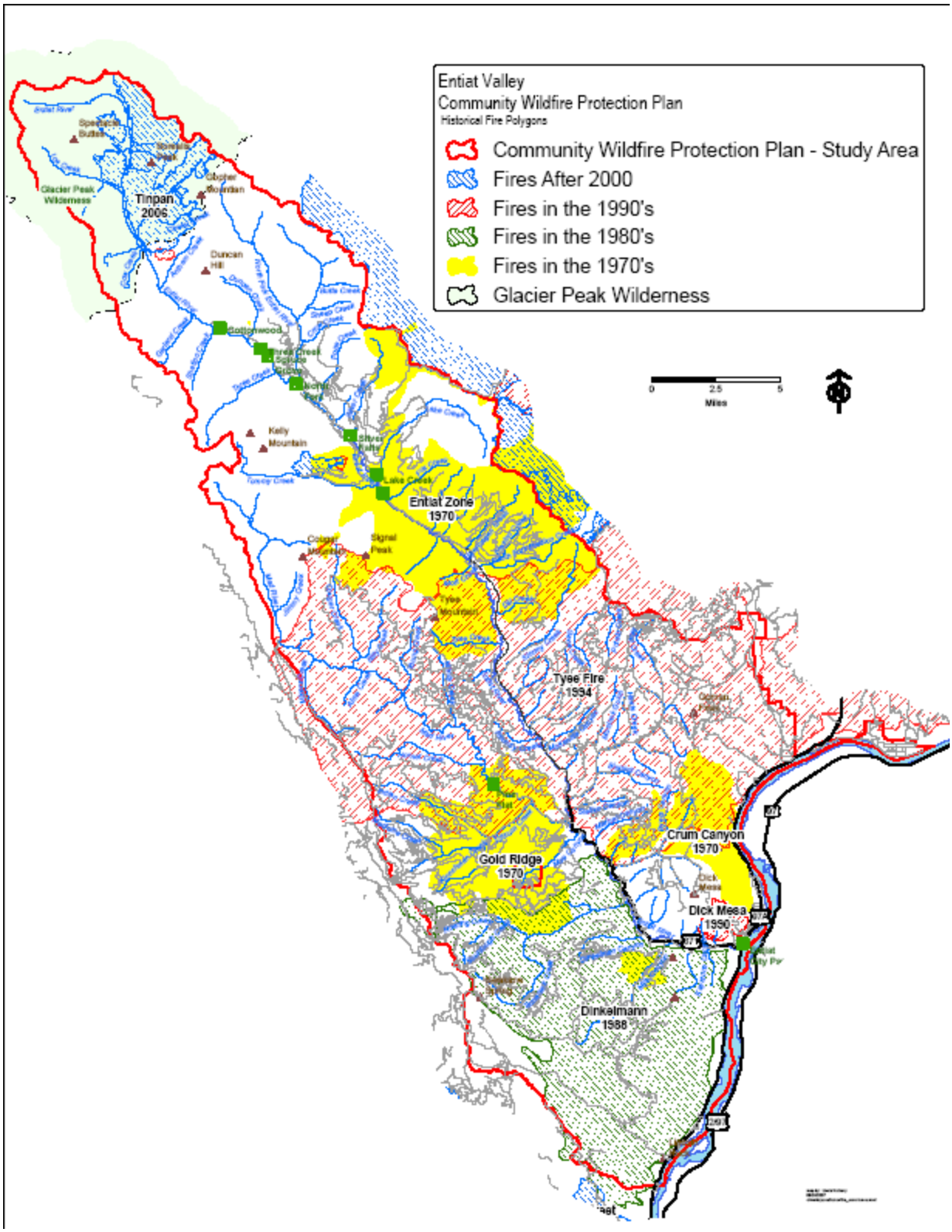
1994 Tyee Fire – Shamel Creek characteristic vegetation and fuel conditions are considered to be those that occurred within the natural (historical) fire regime. Uncharacteristic conditions are considered to be those that did not occur within the natural (historical) fire regime, such as invasive species (e.g. weeds, insects, and diseases), "high graded" forest composition and structure (e.g. large trees removed in a frequent surface fire regime), or repeated annual grazing that maintains grassy fuels across relatively large areas at levels that will not carry surface fire. Determination of amount of departure is based on comparison of a composite measure fire regime attributes (vegetation characteristics; fuel composition; fire frequency, severity and pattern) to the central tendency of the natural (historical) fire regime. The amount of departure is then classified to determine the fire regime condition class. A simplified description of the fire regime condition classes and associated potential risks follow.

Fire Regime Condition Class	Description	Potential Risks	Example Management Options
Condition Class 1	Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	Fire Behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics. Composition and structure of vegetation and fuels are similar to the natural (historical) regime. Risk of loss of key ecosystem components (e.g. native species, large trees, and soil) is low.	Where appropriate, these areas can be maintained within the natural (historical) fire regime by treatments such as fire use.
Condition Class 2	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe). Composition and structure of vegetation and fuel are moderately altered. Uncharacteristic conditions range from low to moderate. Risk of loss of key ecosystem components are moderate	Where appropriate these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to restore to the natural fire regime.
Condition Class 3	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	Fire behavior, effects and other associated disturbances are highly departed (more or less severe). Composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high. Risk of loss of key ecosystem components is high.	Where appropriate these areas may need high levels of restoration treatments, such as hand or mechanical treatments, before fire can be used to restore the natural fire regime.

Fire History

Large wildfires have always occurred within the Entiat Valley Community Wildfire Protection Plan analysis area. Dry, hot climate, low precipitation, summer and fall lightning storms, and steep slopes contribute to large wildfire occurrence. Over 70% of the analysis area has been affected by large, stand- replacing wildfires. Many of the largest, most intense wildfires occurred during the period from 1970 through 1994.

1994 Tyee Fire – Shamel Creek


Entiat Valley
Community Wildfire Protection Plan
Historical Fire Polygons
Community Wildfire Protection Plan - Study Area
Fires After 2000
Fires in the 1990's
Fires in the 1980's
Fires in the 1970's
Glacier Peak Wilderness
0
2.5
5
Miles
Tinpan
2006
Entiat Zone
1970
Tyee Fire
1994
Crum Canyon
1970
Gold Ridge
1970
Dick Meesa
1990
Dinkelmann
1988
Glacier Peak Wilderness
Kelly Mountain
Duncan Hill
Lake Creek

Natural fire events have had an important influence on vegetation types and patterns. Stand replacing fires have affected both wildlife and wildlife habitat. Some past and recent wildfires were followed by high intensity storms, resulting in mud and debris flows. In 1972 a mudflow originating in the 1970 Fire area resulted in the loss of life. As recently as 2006, mud flows have occurred within the 1994 Tyee Fire area. Historically floods and mud flows have been life threatening and extensively damaged residential property. The chart below shows a timeline of the larger wildfires that have occurred in the analysis area.

Large Wildfires

Year	Fire Name	Estimated Size (acres
1888	**Mad River**	**unknown**
1910	**Signal Peak**	**2,560**
1914	**Burns Creek**	**600**
1925	**Mad River** **Spectacle Butte** **Borealis Ridge**	**1,500** **600** **500**
1928	**Coal Oil Fire**	**600**
1941	**Larch Lakes**	**400**
1958	**Entiat Fire**	**6,500**
1961	**Tenas George**	**3,750**
1962	**Forest Mountain**	**520**
1966	**Hornet Creek**	**1,520**
1968	**Harris Mill**	**1,210**
1970	**Mills Canyon** **Entiat/Slide Ridge** **Gold Ridge**	**933** **49,200** **16,100**
1976	**Crum Canyon**	**9,000**
1988	**Dinkelman**	**53,000**
1990	**Dick Mesa**	**1,151**
1994	**Tyee**	**135,170**
2001	**Tommy Creek**	**245**

Rational For Using Stand Structure Stages

The "Entiat Watershed Resource Inventory Management Plan (WRIA 46) uses the terms "shrub/steppe", "open forest" and "closed forest" to stratify and characterize vegetation within the Entiat River watershed. These terms are quite broad relative to structural conditions. For these reasons the Entiat Valley CWPP uses the seven structural stages described by O'Hara and others (1996) to classify structural conditions portrayed by satellite data. These stages are structurally explicit, impart some ecological meaning (successional stage) and allow inferences about fire behavior. To provide continuity with the"Watershed Analysis" a crosswalk chart and stand structure stage description chart follows.

WUI Assessment Zone	Forest Structure	Entiat Watershed Plan Vegetation Groups
Swakane/Breaks	Non-Forested Old Forest single-story	Shrub steppe Open forest
Upper Swakane	Young forest multi-story Non-forested	Shrub steppe Open forest
Mills/Roaring	Stand initiation Young forest multi-story	Shrub steppe Open forest
Tillicum	Stem exclusion closed-canopy Stem exclusion open-canopy	Closed forest Open forest
Mesa/Oklahoma Breaks	Young forest multi-story Non-forested	Shrub steppe Open forest
Crum	Non-forested Stem exclusion closed-canopy Stand initiation	Shrub steppe Open forest Closed forest
Mud/Potato	Stand initiation Young forest multi-story	Shrub steppe Open forest
Preston/Stormy	Stem exclusion open-canopy Young forest multi-story	Shrub steppe Open forest
Tyee/Hornet	Stand initiation Old forest-single story	Shrub steppe Open forest
Tommy	Stem exclusion open-canopy Stem exclusion closed-canopy	Close forest Open forest Closed sub-alpine
Upper Mad	Young forest multi-story Stem exclusion closed-canopy Stand initiation	Closed forest Open forest Closed sub-alpine Open sub-alpine
Silver/Lake	Stem exclusion open-canopy Stem exclusion closed-canopy Old forest multi-story	Closed forest Open forest Closed sub-alpine
Cottonwood/North Fork	Old forest multi-story Alpine non-forested	Closed forest Open sub-alpine
Upper Entiat	Young forest multi-story	Closed forest Open forest Closed sub-alpine Open sub-alpine

STRUCTURE DESCRIPTIONS

Stand Initiation

Stand Initiation
Definition: Growing space is reoccupied following a stand replacing disturbance.
Description: 1 canopy layer (may be broken or continuous); 1 generation of seedlings or saplings; grasses, forbs, shrubs may also be present.

Stem Exclusion Open Canopy

Stem Exclusion – Open Canopy
Definition: Underground competition limits establishment of new individuals.
Description: One broken canopy layer which includes poles or smaller trees; grasses, shrubs, or forbs may also be present.

Stem Exclusion Closed Canopy

Stem Exclusion – Closed Canopy
Definition: New individuals are excluded through light or underground competition.
Description: Continuous closed canopy, usually one generation; poles, small or medium trees present. Suppressed trees, grasses, shrubs, and forbs may be absent in some cover types.

Understory Re-initiation

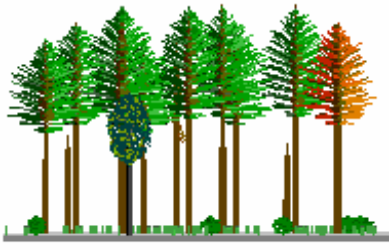
Understory Re-initiation
Definition: Initiation of new generation as older generation occupies less than full growing space.
Description: Broken overstory canopy with formation of understory layer; two or more generations. Overstory may be poles or larger trees; understory is seedlings, saplings, grasses, forbs, or shrubs.

Young-Forest Multistory

Young-Forest Multistory
Definition: Two or more generations present through establishment after periodic disturbances including harvest events.
Description: Multi-aged stand with assortment of trees sizes and canopy layers present but very large trees absent. Grasses, forbs, and shrubs may be present.

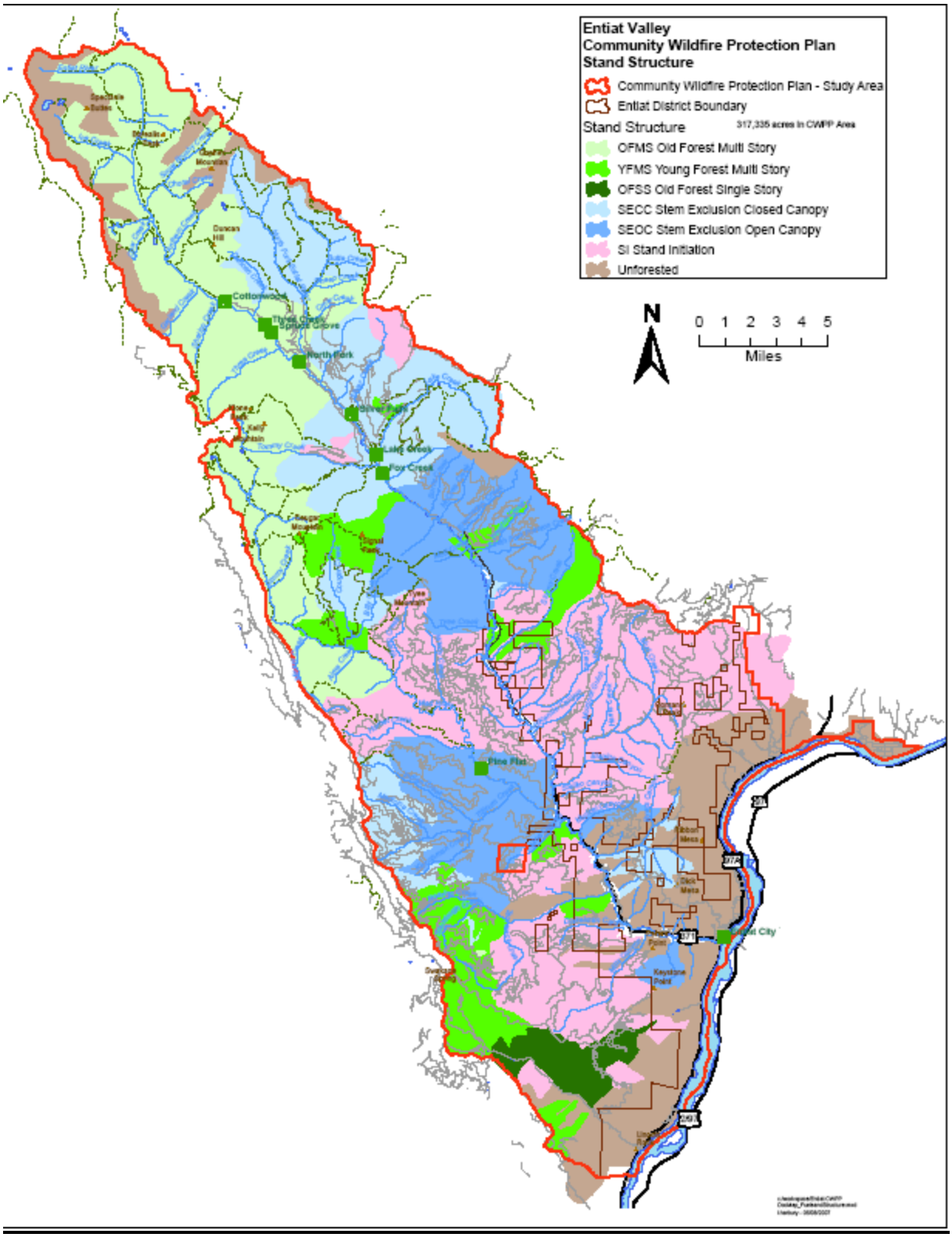
Old-Forest Multistory

Old-Forest Multistory
Definition: Two or more generations and layers present including large, old trees.
Description: Multi-aged stand with assortment of tree sizes and canopy layers present including large, old trees. Grasses, forbs, and shrubs may be present.



Old-Forest Single Story

Old-Forest Single Story
Definition: Single layer of medium to large, old trees of one or more generations. Structure maintained through nonlethal burning or management.
Description: Broken or continuous canopy of medium to large, old trees. Single or multi-generation. Understory absent or consisting of some seedlings, saplings, grasses, forbs, or shrubs.


Entiat Valley
Community Wildfire Protection Plan
Stand Structure
Community Wildfire Protection Plan - Study Area
Entiat District Boundary
Stand Structure
317,335 acres in CWPP Area
OFMS Old Forest Multi Story
YFMS Young Forest Multi Story
OFSS Old Forest Single Story
SECC Stem Exclusion Closed Canopy
SEOC Stem Exclusion Open Canopy
SI Stand Initiation
Unforested
N
0 1 2 3 4 5
Miles
Cottonwood
North Fork
Lake Creek
Fox Creek
Pine Flat
Mad City

Wildland Urban Interface Assessment Zones

Because of the vastness of the area, approximately 302,000 acres, within the Entiat Valley Community Wildfire Protection Plan, we have chosen to delineate the study area into fourteen wildland urban interface assessment zones Assessment zones were delineated by consideration of the following features:

- **Topography**: Ridge tops and valley bottoms, alignment of canyons and valleys, slopes and aspects, natural barriers to fire spread, steepness.

- **Stand structure/fuels:** Types of surface fuels, ladder fuels, canopy continuity, continuity of surface fuels, fire history.

- **Fire behavior/spread:** Rates of spread, probable direction of spread, crown fire potential, history of fire spread, spotting potential.

- **Suppression feasibility:** Can suppression tactics be implemented safely and effectively. Ingress and egress for emergency personnel and evacuation.

- **Community risks:** Risk of fire spread from wildland to urban residential development. Potential for community interest in surrounding landscape.

Swakane/Breaks

This zone includes most of Swakane Canyon and breaks draining into the Columbia River, from Burch Mountain north to the Entiat River.

- **Forest Structure:** Area is mostly non-forested along breaks into the Columbia River. There is a large area of old forest single story stands on the north side of Swakane Canyon and the head of Tenas George Canyon.

- **Fire History:** Most of the area has been burned by wildfire in the last 50 years. Most of the breaks from Tenas George Canyon to the City of Entiat were burned in 1958 and again in 1988. Tenas George Canyon was also burned in the 1940s. All of Swakane Canyon included in this zone was burned by the 1988 Dinkelman Fire. The lower parts of Swakane Canyon south to the City of Wenatchee were burned in the 1930s.

- **Fuels:** Mostly surface fuels, with the majority being grasses and shrubs. The shrub component is ceanothous. There is not enough continuous tree crowns present to support passive crown fires. Some stands of timber would exhibit torching where ladder fuels are present.

- **Fire Behavior:** General spread would be rapid in the herbaceous fuels. Most fire would be surface with little crowning, but some torching where ladder fuels

are present under the overstory. High spread rates would take a wind or slope influence. Winds are generally down slope and down valley once the sun sets in the Columbia Basin with the exception being when a frontal passage exists. Highest spread rates would be to the east with typical frontal passage winds funneling down Swakane Canyon. Spread to the west would be limited to backing and flanking action on slopes during frontal passages. When light up canyon winds are present spread would be rapid upslope with backing fire characteristics down slope. Light down valley winds will produce flanking and upslope runs once established in the draws.

- **Prominent Fire Containment Features:** Swakane Canyon Road (USFS 7415) and Rattlesnake Road (USFS 5215).

- **Communities at Risk:** Swakane Canyon residents and those residents along Washington State Highway 97A from Ohme Gardens north to the Entiat River. There is high probability of spread south to Burch Mountain, lower Sunnyslope and Warner Canyon. The probability of spread from these areas into Swakane Canyon is also high. There is a low risk of spread into Mills Canyon due to down slopes, aspects, present fuel structure and prevailing winds. It would take extreme weather conditions for fire spread from the top to the bottom of Mills Canyon.

- **Past Ecosystem Management:** Some prescribed under burning by the United States Forest Service (USFS), at the west end of this zone, has taken place on the north side of the canyon and at the head of Tenas George Canyon since 1988. Some timber salvage by the USFS and WDNR, after the 1988 Dinkelman Fire, has occurred on the western edge of the zone.

- **Future Ecosystem Management:** National Environmental Protection Act (NEPA) analysis by the USFS has been completed for prescribed under burning in overstory stands on the north side of Swakane Canyon into the head of Tenas George Canyon.

Upper Swakane

This zone includes the upper western reaches of Swakane Canyon that did not burn in the 1988 Dinkelman Fire.

- **Forest Structure:** Area is mostly young forest multi-story with breaks of herbs and shrub (non-forested) on the north side of Swakane Canyon.

- **Fire History:** Fire scar surveys indicate frequent pre-settlement wildfires. Analysis indicates a wildfire burned over some of the area during the 1920 to 1930 period. The United States Forest Service historical fire atlas has no recorded large wildfires.

- **Fuels:** Area has experienced very few management activities resulting in decades of fuels accumulation. Dense canopies (mid story) dominate the north facing slopes. South facing slopes have alternate stringers of dense canopy on the west aspects and more open shrub and herb under story on the east aspects.

- **Fire Behavior:** Fire will spread to the crowns because of heavy surface fuels and dense canopies. The homogenous canopy on north aspects will support crown fires and long range spotting during extreme fire and dry fuel conditions. Steep slopes in the area will contribute to high rates of spread with rolling material spreading fire down slope. The greatest rates of spread will be from west to east.

- **Prominent Fire Containment Features:** None

- **Communities at Risk:** There are no natural fuel breaks that would limit fire spread southwest into Nahahum Canyon. Under extreme weather conditions southeast fire spread is possible into Burch Mountain developments, north of the City of Wenatchee, and urban areas in Swakane Canyon.

- **Past Ecosystem Management:** Area was logged during the 1920s and 1930s. Some prescribed underburning by the USFS on the non-forested slopes since 2002.

- **Future Ecosystem Management:** NEPA analysis by the USFS has been completed for future commercial harvest, thinning, slash treatment and prescribed underburning, of non-harvested areas, on south facing slopes.

MillsRoaring

This area includes Mills Canyon, Dinkelman Canyon and Roaring Creek drainages from the Entiat River to Entiat Ridge.

- **Forest Structure:** Predominant stand structure in this zone is stand initiation interspersed with small stands of refugia resulting from the 1988 Dinkelman Fire. Stands in the upper reaches of Tamarack and Roaring Creeks are classified as young forest multistory. Some of these stands did not burn, while others burned with mixed severity, during the 1988 Dinkelman Fire. At the lower elevation east facing slopes, open non-forested areas are present in the canyons.

- **Fire History:** Most of this area burned in the 1988 Dinkelman Fire. Residential structures where destroyed by the fire in Mills Canyon.

- **Fuels:** Light fuels exist on lower non-forested aspects, consisting of mostly herbs and grasses. There are vast areas of shrubs and tree regeneration on the more mesic (wetter sites) aspects, with very little overstory canopy present. These tree

regeneration/shrub fields are continuous and have a high loading of downed poles that were not removed during timber sale fire salvage efforts. The upper reaches of the area have more of a forest component with heavier fuels, the result of less post burn timber salvage efforts.

- **Fire Behavior:** The lack of continuous canopy and high crown to base heights across the area would limit crown fires. Individual tree torching and some group torching would occur. Fires in the regenerated forest stands from the 1988 Dinkelman Fire would act like brush fires, taking extreme weather and fuels conditions to generate high rates of spread. Prevailing winds are from the west. Slopes with east aspects would accelerate fire spread if ignition occurs low to mid slope. The drier south and east aspects at lower elevations would have high rates of spread in the grass and brush fields.

- **Prominent Fire Containment Features:** None

- **Communities at Risk:** Residents on the south side of the Entiat River from Roaring Creek to the Columbia River, not surrounded by green belts, including Mills Canyon.

- **Past Ecosystem Management:** 1988 Dinkelman Fire timber sale salvage and reforestation. Post 1994 Tyee Fire sheep grazing and temporary cattle grazing.

- **Future Ecosystem Management:** NEPA analysis is scheduled for 2008-2009 for thinning of dense timber stands and fuels reduction by prescribed underburning.

Tillicum

This area includes the Indian Creek, Klouchman Creek, Tillicum Creek and Moe Creek drainages, from the Entiat River to Entiat Ridge and Sugarloaf Mountain.

- **Forest Structure:** The upper extents of the area are classified as stem exclusion-closed canopy. This area did not burn in the 1994 Tyee Fire or the 1970 Entiat Fire. The rest of the area was burned in 1970, resulting in a landscape classified as stem exclusion-open canopy.

- **Fire History:** Most of lower area burned during the 1970 Entiat Fire. Indian Creek, Gold Ridge and Medicine Ridge reburned in the 1994 Tyee Fire.

- **Fuels:** Upper extents of the area have a heavy fuel loading from lack of treatment, after past management activities, or lack of wildfire. There are continuous canopies with ladder fuels present in the timber stands. The lower extents of the area were burned in the 1970 Entiat Fire, with extensive timber sale

fire salvage occurring post burn. Most of this lower area has a continuous sapling/pole canopy with a shrub understory. Some non-forested herb and shrub fuels are present on the less productive sites.

- **Fire Behavior:** The upper extent of the area has the potential for active crown fire, although there are canopy breaks that could result in more passive crown fires with intermittent group torching. Intensities would be high due to the lack of past treatment of fuels. Spotting in this area would be long distance. The areas that have young regeneration from the 1970 Entiat Fire would have high rates of spread when extreme weather conditions are present. Light fuel loadings on the surface and past sheep grazing activities would slow rates of spread under the canopies. South facing marginal growing sites with a grass/shrub fuel component would have high rates of spread with either a wind or slope influence. Generally large fire spread should occur from west to east with prevailing winds.

- **Prominent Fire Containment Features:** Lower Tillicum Creek Road (USFS 5800), Gold Ridge Road System (USFS 5808) and Roaring Ridge Road System (USFS 5801).

- **Communities at Risk:** Communities of Ardenvoir and Roaring Creek.

- **Past Ecosystem Management:** Timber sales in the upper areas. Timber sale fire salvage after the 1970 Entiat Fire and 1994 Tyee Fire. Prescribed underburning in the Tillicum Creek drainage. Sheep grazing continues within the entire area and cattle formerly grazed.

- **Future Ecosystem Management:** NEPA analysis in 2007 for thinning and fuels reduction by prescribed underburning in the portion of the zone that meets HFRA default definition of WUI. Additional areas were deferred pending approval of this document.

Mesa/Oklahoma Breaks

This area includes the Entiat and Columbia River breaks from Dick Mesa to Navaree Coulee and Stayman Flats. The City of Entiat is located in this area.

- **Forest Structure:** This area is mostly non-forested along the breaks into both the Entiat and Columbia Rivers. Small areas of young forest multi-story stands exist on the more mesic north facing slopes in the side drainages.

- **Fire History:** The Crum Canyon Fire in 1976 burned the area from Ribbon Cliff, north of the City of Entiat, to Oklahoma Gulch. The 1990 Dick Mesa Fire burned the breaks west of the City of Entiat and threatened residences and federal facilities within the city limits. The 1994 Tyee Fire burned much of the same areas from the above mentioned fires, as well as the Navaree Coulee.

- **Fuels:** This area has mostly surface fuels of herbs and shrubs. Herbs are the prevalent fuel with a few slopes of shrubs, primarily ceanothous. There are not enough continuous canopies to support passive crown fires. A few stands are present that will exhibit group torching, with ladder fuels present. This area has a very light fuel loading, because of past wildfires.

- **Fire Behavior:** Under wind and slope influences high rates of spread will occur in the grass/herbaceous fuels. Wildfires will spread on the surface with little crowning. Some torching of individual trees will occur when ladder fuels connect with the overstory. Winds are generally down slope and down valley after the sun sets in the Columbia Basin. Easterly rates of spread will increase, with frontal passage and associated wind increases funneling down the Entiat Valley and Columbia River drainages. Light winds will produce down slope backing fires with some upslope runs in the draws and ravines.

- **Prominent Fire Containment Features:** Washington State Highway 97A and Oklahoma Gulch Road (County Road 63).

- **Communities at Risk:** All residential areas on the north side of the Entiat River from the four mile post to the mouth. Those parts of the City of Entiat that abut the wildland urban interface. All residential areas, businesses, industry and federal facilities from the City of Entiat to Navaree Coulee and Stayman Flats.

- **Past Ecosystem Management:** Post wildfire salvage timber sales in the upper reaches of Byrd Canyon and Oklahoma Gulch. Formerly cattle grazing.

- **Future Ecosystem Management:** None by the United States Forest Service, however, other federal and state agencies may propose future projects. Residential development continues in the area of Dick Mesa.

Crum

This area includes all lands that drain into Crum Canyon and north along the Entiat River to Steliko Ridge including Morical Canyon.

- **Forest Structure:** Most of the area is classified as non-forested. Crum, Sunshine and Tiny Canyons are classified as stem exclusion-closed canopy. Morical Canyon is classified as stand initiation.

- **Fire History:** The 1976 Crum Canyon Fire burned the north side of Crum Canyon. No recent fires have burned south of Crum Canyon. The 1994 Tyee Fire burned much of the same area.

- **Fuels:** Most of the area has a grass/herb and brush component. The Crum, Sunshine and Tiny Canyons have a heavier fuel loading and denser vegetation due to the absence of wildfire and untreated fuels from past management activities.

- **Fire Behavior:** High rates of spread are probable in the grass/herbaceous fuels, when under a wind or slope influence. There is the possibility of active crown fire in the Tiny and Sunshine Canyon areas, with associated long range spotting. Wildfire spread will be from west to east and increasing with frontal passages, funneling down the Entiat River valley drainages.

- **Prominent Fire Containment Features:** Crum Canyon Road (Chelan County 301), Steliko Ridge Road (USFS 5310).

- **Communities at Risk**: Residential areas in Crum Canyon and all along the north side of the Entiat River from Steliko Canyon to the rivers mouth. Residential area on the west side of the City of Entiat.

- **Past Ecosystem Management**: Wildfire timber sale salvage after the 1976 Crum Canyon Fire and 1994 Tyee Fires in Morical and Byers Canyons. Tree planting reforestation has taken place in these areas. Commercial tree harvest and slash treatment by the United States Forest Service has taken place in Crum Canyon. The Washington State Department of Natural Resources has done Commercial tree harvest in Crum Canyon. USFS prescribed underburning has been accomplished in Crum Canyon. Pre-commercial thinning of timber stands has been accomplished in Osborn, Tiny and Crum Canyons.

- **Future Ecosystem Management**: Washington Department of Natural Resources has timber harvest planned. Thinning and treatment of fuels is planned by the Bureau of Land Management and United States Forest Service. Prescribed underburning of natural fuels in planned by the USFS along with future NEPA analysis.

Mud/Potato

This area covers all of the Potato, Mud and Johnson Creek drainages.

- **Forest Structure:** Most of the area is classified as stand initiation. Bisping, Wilkinson and Palmich Canyons of the Mud Creek drainage are classified as young forest-multi story. There are small areas of non-forested stands on lower elevation and south aspects.

- **Fire History:** The 1994 Tyee Fire burned all of the area with mixed severity.

- **Fuels:** Most of the area has a grass/herb and shrub component with regeneration of trees in the more mesic sites. In the timbered areas there is a low fuel loading

of fine fuels (<3 inches). These same areas have a moderated loading of pole sized fuels from the Tyee Fire and resulting timber sale salvage effort.

- **Fire Behavior:** High rates of spread are probable in the grass/herbaceous fuels with wind or slope influences. There is the possibility of individual and group tree torching in the timbered areas, but no active crowning. Spread from west to east would be the greatest during frontal passages, typical frontal winds aligned with canyons and valleys.

- **Prominent Fire Containment Features:** Mud Creek Road (USFS 5300), Potato Creek Road (USFS 5380), Johnson Creek Road (Chelan County 63), Entiat Valley Road (Chelan County 51) and Navarre Coulee Road (Chelan County 151).

- **Communities at Risk:** Residential areas in Mud Creek, Bisping Canyon and Johnson Creek. Residential areas on the east side of the Entiat River from Stormy Creek down the Entiat River drainage to the mouth of Steliko Canyon.

- **Past Ecosystem Management:** 1994 Tyee Fire timber sale salvages in most of the timbered stands, by the United States Forest Service and private land owners. Reforestation (tree planting) followed the timber sales activities. USFS prescribed underburning has occurred in Harris, Gray and Murdoch Canyons.

- **Future Ecosystem Management:** NEPA analysis has been completed and implementation planned for prescribed underburning of natural fuels, by the United States Forest Service, in most of the timbered areas. Thinning of dense regeneration in the more prolific growing sites will also occur under this NEPA analysis. Potentially sheep grazing may occur.

Preston/Stormy

This area includes the Stormy, Preston and Fox Creek drainages east of the Entiat River.

- **Forest Structure:** Most of the area is classified as stem exclusion-open canopy. The south side and upper reaches of Stormy Creek that did not burn in the 1994 Tyee Fire, and/or low severity burns, are classified as young forest-multi-story.

- **Fire History:** The entire area was burned in the 1970 Entiat Fires, except for the very upper reaches of Stormy Creek. The Stormy and Dill Creek drainages burned again in the 1994 Tyee Fire.

- **Fuels:** The area is characterized by a young, homogenous stand of regeneration from the 1970 Entiat Fires. There is a dying shrub component under the 20-30 foot tree canopy. This shrub component will act as ladder fuel during a wildfire. The area was intensively harvested after the 1970 Entiat Fires resulting in light loadings of coarse woody debris. Heavy loadings of pole sized fuels remain on the more mesic slopes. The landscape is broken by small un-forested scab rock,

containing a scattered shrub component. In the Stormy Creek drainage there are open, poorer growing sites, with scattered old trees and light fuels. Portions of the 1970 Entiat Fires that re-burned in the 1994 Tyee Fire consist of ceanothous and willow shrubs with limited regeneration above the shrub layer.

- **Fire Behavior:** With higher wind speeds there is a high probability of active crown fire in the homogenous regeneration during high and extreme weather conditions. At lower wind speeds there will be group torching as a result of steeper lopes and continuity of the canopies. The rock/shrub vegetation breaks on the landscape will return the fire to the surface, but they are not barren enough to act as a barrier. The open country in Stormy Creek will carry a mostly surface fire with some individual tree torching. Relatively high rates of spread of backing fires will be evident because of the continuous fuel beds and steep slopes (rolling fire brands and spotting).

- **Prominent Fire Containment Features:** Preston Creek Road (USFS 5501)) and Dill Creek Road (USFS 5503) on the mid-slope contour, if the fire start is above these roads. Entiat River Road (Chelan County 51).

- **Communities at Risk:** Residential developments on the east side of the Entiat River from Fox Creek down valley to Stormy Creek, including the communities of Brief and Mile 24.

- **Past Ecosystem Management:** 1970 Entiat Fires timber salvage, with intensive reforestation (tree planting). NEPA analysis completed and implementation started on landscape prescribed underburning and tree thinning in Preston, Brennegan Creeks and areas adjacent to the Entiat River Road (County 51).
- **Future Ecosystem Management:** Continued implementation of planned landscape prescribed underburning.

Tyee/Hornet

This area includes those parts of Tyee Mountain and Mad River burned in the 1994 Tyee Fire. It includes Cougar, Windy and Hornet Creeks. Plus, lower Tyee ridge and the canyons that drain into the Entiat River from Tyee Mountain to Mad River.

- **Forest Structure:** Most of the area is classified as stand initiation, the result of disturbance from the 1994 Tyee Fire. There are some areas (lower Tyee Mountain and Hornet Ridge) that exhibit characteristics of old forest-single story.

- **Fire History:** The ridge from Tyee Mountain to Signal Peak and the slopes east of Tyee Mountain were burned in the 1970 Entiat Fires. The entire area was re-burned in the 1994 Tyee Fire with varying levels of severity.

- **Fuels:** There exists a vast shrub and natural regeneration fuel component, with slopes of grass/herb located in the harsher growing sites (south slopes at lower elevations). There is an intermittent canopy with crowns 30-40 feet above the surface. On the more mesic sites there is a downed pole size fuel component, which was not removed during restoration activities, intermixed with continuous, closely spaced tree regeneration. Many sites were severely burned and still have not recovered with a vegetation layer that would sustain fire spread. Areas that were not timber sale salvaged exhibit heavy fuels loads of coarse woody debris.

- **Fire Behavior:** Most wildfire will have low rates of spread except in the most extreme weather conditions, mainly due to the lack of a continuous tree canopy. The lower elevation grass/herb slopes would have high rates of spread with moderate winds and/or steep slopes. Sustained backing fire will be present in all dry fuel conditions. The potential for crown fire and spotting will be very low due to the lack of ladder fuels and discontinuous canopies. The potential for extreme fire behavior, exhibited in the 1994 Tyee Fire, will be substantially lower.

- **Prominent Fire Containment Features:** Tyee Ridge Road (USFS 5700) and Mad River.

- **Communities at Risk:** Residential developments on the west side of the Entiat River from the community of Brief down the drainage to Mad River, including the community of Ardenvoir.

- **Past Ecosystem Management:** Wildfire timber sale salvage after the 1994 Tyee Fire, with intensive reforestation. Some fuels reduction projects on small lots of private lands.

- **Future Ecosystem Management:** NEPA analysis is scheduled for 2009-2010 for fuels reduction and stand maintenance by prescribed underburning and thinning.

Tommy

This area includes the Tommy Creek drainage and all slopes from Signal Peak to Tyee Mountain.

- **Forest Structure:** The down valley portion of this area exhibits characteristics of stem exclusion open-canopy (burned in 1970 Entiat Fires). The Tommy Creek drainage is mostly an older stand of stem exclusion closed-canopy. There is a small stand, classified stand initiation, inside of the 2001 Tommy Creek Fire perimeter.

- **Fire History:** South Tommy Creek down drainage to Mott Creek burned in the 1970 Entiat Fires. The Tommy Creek fire burned some of the area in 2001.

- **Fuels:** The 1970 Entiat Fires area is a homogeneous stand of young regeneration of mostly Douglas fir and Lodgepole pine with a heavy loading of dead and down poles. Large diameter wood loadings are light due to restoration efforts post fire. There is very little grass/herb surface fuels. There is a shrub component present. The area of the 2001 Tommy Creek Fire had no post wildfire salvage and as a result, many snags are starting to fall and accumulate on the surface. The rest of the area is mostly stands of Lodgepole pine with heavier loads of large down decayed wood. There is some rock and marginal growing sites that are less vegetated interspersed throughout the upper reaches of the drainage.

- **Fire Behavior:** Potential for active crown fire is high within the area except for the 2001 Tommy Creek burned area. Initiation of group tree torching would be evident during drier fuel conditions (late summer). Fire weather conditions would have to be high to extreme (high wind speeds) for fire to sustain itself in the crowns. Spotting potential will be high under these weather conditions. Surface fire would have slow rates of spread due to the absence of fine fuels.

- **Prominent Fire Containment Features:** Tommy Creek Road (USFS 5605).

- **Communities at Risk:** Residential developments on the west side of the Entiat River near the community of Brief.

- **Past Ecosystem Management:** Wildfire timber sale salvage after the 1970 Entiat Fires. Some timber harvest occurred in the lower Tommy Creek area in the 1980s.

- **Future Ecosystem Management:** None planned.

Upper Mad

This area includes the lands up stream from Miners Ridge that drain into upper Mad River, including Cougar Creek.

- **Forest Structure:** Most of the area is classified as Young Forest Multi-Storied. Cougar Creek basin is classified as Stem Exclusion Closed-Canopy and the upper portion of Cougar Creek that burned in the 1994 Tyee Fire is classified as Stand Initiation.

- **Fire History:** The upper portion of Cougar and Billy Creeks burned in the 1994 Tyee Fire.

- **Fuels:** The young multi-storied stands typically have a tight canopy with ladder fuels. There is a moderate dead and downed fuel loading from self thinning. The understory vegetation is light due to shading. There is some open meadow areas that are grass covered. There is some young regeneration in the Cougar and Billy Basin areas, as result of the 1994 Tyee Fire, with heavy large fuels and abundant snags. There are some timber harvested areas in Cougar Basin that have light fuels with some regeneration present.

- **Fire Behavior:** Potential for active crown fire is high within the area. Initiation of group tree torching would be evident in drier fuel conditions (late summer). High winds would sustain crown fire and move quite rapidly once established. High rates of spread would be from West to East as a result of the valley's alignment with frontal passage winds. Spotting distances would be long. Surface wildfires would have slow rates of spread due to the absence of fine fuels. There are some meadows in the Blue Creek area that would provide a break in the canopy and force crown fire back to the surface until the next continuous canopy is encountered. Spotting distance would likely be greater than the meadow widths. The flatter terrain that exists in the Mad Lakes and Cougar Meadow areas would eliminate slope influence on rates of spread. The Cougar and Billy Basin areas have numerous breaks in the canopy because of past timber harvest activities. Low rates of wildfire spread would take place in these areas as well as those burned by the 1994 Tyee Fire.

- **Prominent Fire Containment Features:** Mad River.

- **Communities at Risk:** None

- **Past Ecosystem Management:** Commercial timber harvest in the Cougar and Billy basin areas during the 1990s.

- **Future Ecosystem Management:** None planned.

Silver Lake

This area includes the drainages of Pope, Silver and Lake Creeks.

- **Forest Structure:** Predominate structure is Stem Exclusion Closed–Canopy, mostly in the Lake Creek Basin and middle elevations of Silver and Pope Creeks. There is a small area of Stem Exclusion Open- Canopy in the upper Silver Basin

that was burned in the 1970 Entiat Fires. There is an area of Old Forest Multi-Storied stand near the bottom of the Entiat Valley that has been unmanaged.

- **Fire History:** The 1970 Entiat Fires burned portions of Silver basin.

- **Fuels:** The 1970 Entiat Fires area, in Silver Basin, has a homogeneous stand of young regeneration Lodgepole pine with a heavy loading of dead and down poles. The Lake Creek Basin area is mostly mature Lodgepole pine with very little surface vegetation. The lower portions have some breaks in the mature stand from past tree harvest with fuel treatments that have very light fuel loadings with a regeneration component of mostly Lodgepole pine. The old forest off the valley bottom has heavy fuel loadings and associated ladder fuels. The remainder of the area is a mix of managed stands with 20-30 foot tall regeneration and adjacent un-management stands. All stands have a tight canopy with very few breaks. The shading from closed canopy has limited surface vegetation.

- **Fire Behavior:** Potential for active crown fire is high within the area in all stand structures. Initiation of group tree torching would be evident in drier fuel conditions (late summer). Conditions would have to be very high to extreme (high winds) for fire to sustain itself in the crowns. Once established wildfires will move rapidly. Spotting potential will be high. Surface wildfire will have slow rates of spread, due to an absence of fine fuels.

- **Prominent Fire Containment Features:** Shady Pass Road (USFS 5900).

- **Communities at Risk:** Summer home residences and United States Forest Service campgrounds along the Entiat River.

- **Past Ecosystem Management:** Timber harvest and subsequent broadcast burning in Pope and Silver Creek areas in the 1960s-1970s. Timber harvest, along with salvage of wind throw areas in the lower Lake Creek Basin, Silver Basin and the Four Mile Ridge area in the 1990s.

- **Future Ecosystem Management:** None planned.

Cottonwood/North Fork

This area includes both sides of the Entiat River down drainage (east) from the wilderness boundary to North Tommy Ridge. It also includes the North Fork of the Entiat River.

- **Forest Structure:** The entire area is characterized as Old Forest Multi-Storied with some high elevation rock and alpine non-forested areas.

- **Fire History:** No large fires. One small wildfire (157 acres) occurred on the north side of the Entiat River near Myrtle Lake in 1996.

- **Fuels:** On the south side of the Entiat River there is a multistoried stand with ladder fuels leading to a dense canopy. There are heavy fuel loadings of large fuels with abundant rotten material in this area. There is very little surface vegetation due to shading. This stand is currently experiencing insect mortality with many snags. On the north side and bottom of the Entiat River drainage exists a more open stand with large old growth and both a mid and understory layer. Higher areas on the slopes the stands are more open. This area also has a large down wood loading containing large amounts of rotten material. There is a managed area in the lower Duncan Ridge area on the slopes above the Entiat and North Fork Rivers. The managed units in this area are regenerated with Douglas fir and Lodgepole pine, with light down fuel loadings from previous timber harvest activities.

- **Fire Behavior:** Potential for active crown fire is high within this area. Initiation of group tree torching would be evident during dry fuel conditions (late summer). High winds would sustain crown fire and move rapidly once established. High rates of spread would be from West to East (down valley) as a result of the valleys alignment with frontal passage winds. Spotting distances would be long. Surface wildfires would have slow rates of spread due to the absence of fine fuels. There are some breaks in the canopy on the North side of the river that may force the crown fire back to the surface until the next continuous canopy is encountered.

- **Prominent Fire Containment Features:** Duncan Ridge Road (USFS 5606).

- **Communities at Risk:** Summer residences and United States Forest Service Campgrounds along the Entiat River.

- **Past Ecosystem Management:** Some timber harvest and fuel treatments in the Duncan Ridge area in the 1970s.

- **Future Ecosystem Management:** None planned.

Upper Entiat

This area includes lands from the Glacier Peak Wilderness Boundary west to the headwaters of the Entiat River.

- **Forest Structure:** Most of this area is classified as Young Forest Multi-Storied. There are non-forested areas of rock along most of the high ridges.

- **Fire History:** The 2006 Tin Pan Wildland Fire Use fire.

- **Fuels:** The young forest multi-storied stands typically have a tight canopy with ladder fuels. There are heavy fuel loadings of larger fuels with an abundant component of rotten material. There is very little surface vegetation in the timber stands due to shading. This stand is currently experiencing insect mortality with many snags. There are numerous rock areas on the higher ridges. The scattered open meadow area adjacent to the Entiat River from Ice Creek to the Entiat Glacier is vegetated with grass and herbs. At higher elevations, the vegetation changes to a more alpine type (grass/shrub/scattered pockets of timber) as the growing sites are not conducive for dense stands.

- **Fire Behavior:** Potential for active crown fire is high within the timbered portions of this area, excluding the Tin Pan Fire area. Initiation of group tree torching will be prevalent in drier fuel conditions (late summer). High winds will sustain crown fire and move rapidly once established. High rates of spread will be from west to east as a result of the valley's alignment with frontal passage winds. Spotting distances will be long down range. Surface fires will have slow rates of spread due to the absence of fine fuels. The natural breaks from alpine and rock sites will halt or slow the spread to adjacent valley timbered areas. Rolling materials could ignite valley bottoms resulting in rapid upslope spread.

- **Prominent Fire Containment Features:** Entiat River

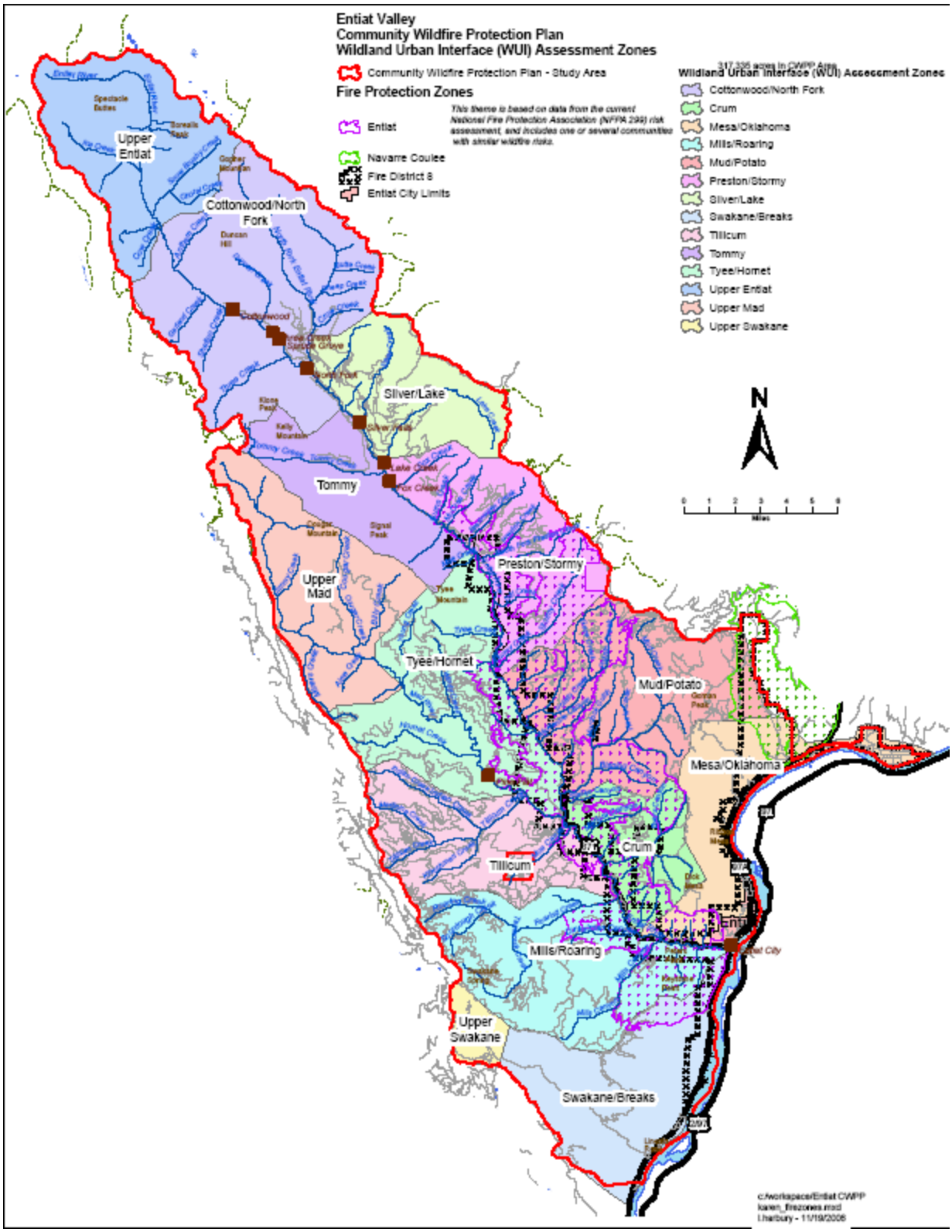
- **Communities at Risk:** United States Forest Service facilities.

- **Past Ecosystem Management:** 2006 Tin Pan Wildland Fire Use Fire.

- **Future Ecosystem Management:** None planned. Glacier Peak Wilderness Area has been identified as suitable for Wildland Fire Use.

Summary

Vegetation patterns, topographic features and the geology tell a story of how disturbance historically has shaped the Entiat Valley CWPP landscape. The large stand replacing wildfires of the recent past tells us how fire behaves on this landscape and the devastating impacts on the citizens of the Entiat Valley. Weather, topography and fuels interact to create a recent history of large fires that move rapidly and with great intensity across the landscape. These recent fires are likely to be outside the range of normal intensity in the "typical disturbance regimes". However, large fast moving fires, with lower intensity, have always occurred in the Entiat Valley.


Entiat Valley
Community Wildfire Protection Plan
Wildland Urban Interface (WUI) Assessment Zones
Community Wildfire Protection Plan - Study Area
Fire Protection Zones
Entiat
Navarre Coulee
Fire District 8
Entiat City Limits
This theme is based on data from the current National Fire Protection Association (NFPA 299) risk assessment, and includes one or several communities with similar wildfire risks.
317,326 acres in CWPP Area
Wildland Urban Interface (WUI) Assessment Zones
Cottonwood/North Fork
Crum
Mesa/Oklahoma
Mills/Roaring
Mud/Potato
Preston/Stormy
Silver/Lake
Swakane/Breaks
Tillicum
Tommy
Tyee/Hornet
Upper Entiat
Upper Mad
Upper Swakane
N
Miles
Upper Entiat
Cottonwood/North Fork
Silver/Lake
Tommy
Upper Mad
Preston/Stormy
Tyee/Hornet
Mud/Potato
Mesa/Oklahoma
Crum
Tillicum
Mills/Roaring
Upper Swakane
Swakane/Breaks
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karen_firezones.mxd
Lharbury - 11/19/2008

Fuels/Hazards

The Washington State Department of Natural Resources has classified the Entiat CWPP area as a "high risk" Wildland/Urban Interface community. The steep grass and brush slopes along the breaks to the Columbia River are conducive to fast wind driven fires that can be an immediate threat to homes and improvements in the area. The mid to lower Entiat Valley once had a majority of the properties protected by a buffer of agricultural land. This buffer, which was primarily orchards, has quickly diminished in recent years with many homes built up against the steep hillsides. The mid to upper reaches of the Entiat Valley and the area of Navarre Coulee have a direct impact from timber adjacent to many home sites and improvements. Insect infestations, in the upper Entiat Valley areas, are causing large expanses of dead and dying trees that are adding to the fuel load. All of these variables provide a continuous fuel profile that can result in large intense wildfire.

The history of large wildland fires in the Entiat area has proven the risk to homes and improvements. During years of extreme fire conditions homes have been lost to fast moving wildland fire. The 1988 Dinkelman Fire saw one home lost in Mills Canyon and the 1994 Tyee Fire had thirteen homes lost in the upper Entiat Valley and Navarre Coulee areas.

The risk to homes and improvements is such that the need to provide apparatus for protection against wildland fire will continue to grow. Engines designed for wildland interface fire will be a priority. These engines can be used for fighting a typical structure fire or used to protect a structure from the external threat of wildland fire.

Mitigation practices to reduce fuels and reduce the exposure from wildland fire are the only way risk to homes and development can be diminished. Fire wise practices in home construction and landscaping will be needed.

Protection Capabilities

Chelan County Fire District 8 within the Entiat Valley and City of Entiat is assigned a numerical fire protection rating by the Washington Surveying and Rating Bureau. The Bureau, which is funded by insurance companies to perform evaluations, analyze five main areas; average response time, water supply, communication network, schedule of fire protection personnel training and staffing of facilities. Insurance companies use the fire protection rating to help determine insurance rates on all fire insurance policies. The rating is on a scale 1-10, with 1 representing the best possible score. Residents outside of a 5 mile radius of fire stations are generally required to pay higher rates for their home insurance policies.

Chelan County Fire District 8 provides fire protection for private lands inside their district boundaries and the City of Entiat. They are responsible for providing initial

attack response on state and federal lands within their district boundary and provide assistance through reciprocal agreement to adjacent state and federal lands. The Washington State Department of Natural Resources and United States Forest Service (Entiat Ranger District) are the primary agencies responsible for management of wildland fires on public lands in the Entiat Valley CWPP area. The Washington State Department of Natural Resources has overlapping jurisdictional responsibility for fire protection on timber-lands in the fire district. The department maintains a roster of about forty people. The department is made up of volunteers who can choose the extent of their fire service. The department maintains about 10 qualified emergency medical personnel, 30 qualified structure firefighters and 35 qualified wildland firefighters. The fire district has 12 fire fighting vehicles that operate from the 5 stations. Cooperative agreements are maintained with the Department of Natural Resources and the U.S. Forest Service whereby resources are utilized and shared between the different jurisdictions. Washington State Department of Fish and Wildlife and Chelan County P.U.D. provide no fire protection on their lands.

Chelan County Fire District 8 encompasses 38 square miles and the City of Entiat, and serves a population of about 3000 residents. The fire protection rating varies between 7 and 10 inside the district boundaries depending on proximity to fire stations and developed water systems. The chart below indicates the current capabilities of the district. The fire district has property for additional fire stations at Stayman Flats along the Columbia River and Navarre Coulee.

Chelan County Fire District 8 Stations

Station Number	Station Location	Volunteer Staffing Available
1	4674 Entiat River Road 2.75 miles up the Entiat River	8 Firefighters, 3 support personnel
2	2880 Entiat River Road .25 miles up the Entiat River	7 Firefighters, 3 support personnel
3	14070 Kinzel Street City of Entiat	10 Firefighters, 2 support personnel
4	291 Moe Ridge Road 10 miles up Entiat Valley Community of Ardenvoir	11 Firefighters, 2 support personnel
5	15670 Coyote Falls Road 19 miles up Entiat Valley Community of Riverwood	2 Firefighters, 1 support personnel

The objective of the Chelan County Fire District 8 structure protection plan is to safely and efficiently manage district resources to protect human life, property, essential infrastructure and resources in the event of a wildland fire. Strategic decisions should take into account the following tactical considerations.

- Identify that a wildland fire is in an area of high risk, (i.e. heavily forested areas with ladder fuels present, flashy fuels located on steep slopes). Fire will move rapidly through theses areas with group torching, crowning and long spotting distances.
- Initiation of business and residential evacuation levels.
- Timely triage of all threatened structures.
- Assessment of access and egress to threatened structures.
- Staging area implementation.
- Successful defense of residences will require homeowner cooperation in developing defensible space and fire resistant landscaping.
- Chelan County Fire District 8 must ask for timely assistance from their cooperators to have a reasonable probability of protecting residences threatened by fast moving wildland fire.

Future Fire District 8 Growth

The Entiat area has fast become a destination for those seeking a home in an area that abounds with natural beauty and recreational opportunity. The attraction is such that the population of the area could double in ten or twenty years. Current proposed development verifies this trend. Where the economy was once based on agriculture and timber industries, the trend has been to recreation, and a population that resides in the Entiat area, but commutes to other locations for work. A large percentage of new residents are retired.

To accommodate the expected growth the fire district will need to continue to expand its response capability. The number of alarms will rise with the increase in population. Response times will be impacted by increased traffic flow making station locations and number of apparatus available in those locations important for timely response.

The present and near future financial capability of the district would not support paid personnel. So long as the present level of volunteer participation continues the need to address the possibility of paid personnel will be averted. The need for a full time position to handle administrative or district clerical responsibilities is growing. The district presently has a part time secretarial position.

Outside support for stations and apparatus to deal with the expected growth will be important because the financial base to support the needs in a high wildfire prone area will not keep up with the rapid change. The fire district presently maintains the five fire

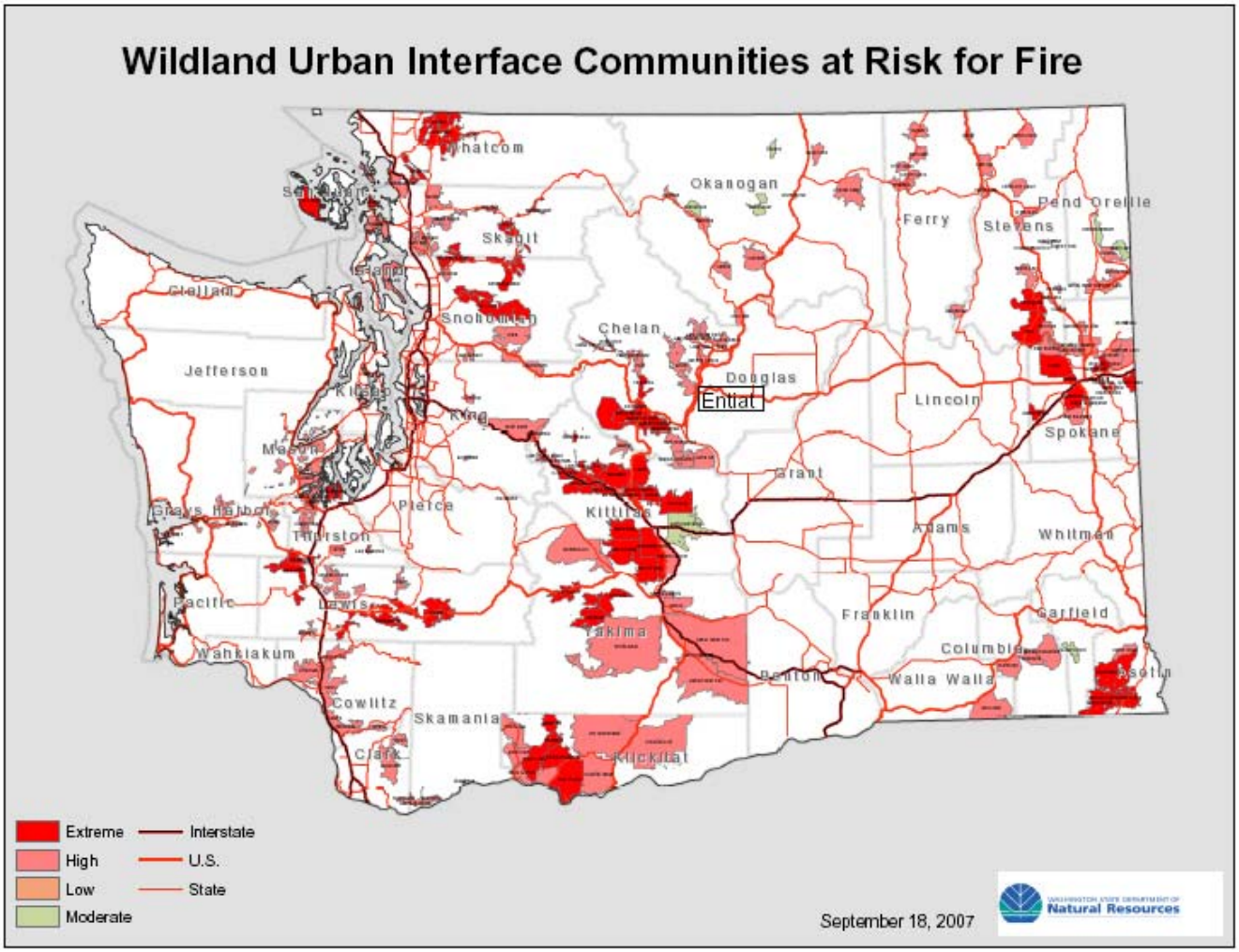
stations, and twelve apparatus, fire equipment and personal protective equipment for forty volunteers on tax base revenue of about $80,000.

Structural Vulnerability

Residences located in the different Wildland Urban Interface Assessment Zones have different levels of threat from wildland fire spread. Live vegetation, dead fuels, topography and weather patterns vary among the different zones and all contribute to the risk of structure damage from wildland fire. Actions identified in the mitigation action plan portion of this document address items that will improve Chelan County Fire District 8's ability to provide structure protection in the event of a wildland fire.

Key Emergency Contacts

Organization	Contacts	Phone Numbers
River Com		911 or (509) 663-9911
Chelan County Fire District 8	Mike Asher-Chief Jon Small-Asst.-Chief **District Commissioners** Keith Vradenburg Donald Olin Gary Todd	(509) 784-1203 (509) 784-1352 (509) 784-1642 (509) 784-1292 (509) 784-4036
Columbia River Fire District Entiat Ranger District United States Forest Service	**Division Chief** Marshall Haskins **District Ranger** Karin Whitehall	 (509) 784-1511 or (509) 682-2576 (509) 784-1511
Chelan County Sheriff	Mike Harum-Sheriff	(509) 667-6851
Central Washington Interagency Communication Center (CWICC)	WDNR, WDFW USFS	(509) 884-3473
City of Entiat	**Mayor** Keith Vradenburg **Public Works** Robert Whitehall	 (509) 784-1500
Chelan County P.U.D.		(509) 663-8121
Chelan County Emergency Management	Lt. Maria Agnew	(509) 667-6863
Entiat School District	**Principal** Miles Caples	(509) 784-1911



5. RISK EVALUATION

Chelan County Fire District 8 has completed risk assessments within the individual Wildland Urban Interface Assessment Zones. The fire district completed a NFPA Form 1144 Risk Assessment on each residence in the Entiat Valley CWPP analysis area. The individual assessments will provide a valuable starting point for fire district personnel to perform structure triage, when wildland fire poses a threat to private property. The individual assessment forms are on file with Chelan County Fire District 8 (AppendixA-NFPA Form 1144 example). Based on the large fire history of the Entiat Valley and resulting property damage, as well as the individual residence assessment, the CWPP area is rated as high risk.

Access

Chelan County Road 51 is the main emergency evacuation route into and out of the Entiat Valley. This is a low speed paved two-lane highway. Washington State Highway 97A, running north and south is the main emergency evacuation route along the Columbia River. Secondary unpaved roads, capable of safe fire apparatus travel, that provide access and egress out of the Entiat Valley into either the Wenatchee River drainage or Lake Chelan basin are as follows:

Mills Canyon Road (USFS 5200) Tillicum Creek Road (USFS 5800)
Mud Creek Road (USFS 5300, County 371) Potato Creek Road (USFS 5380)
Shady Pass Road (USFS 5900)

All of the above mentioned roads should remain open and maintained for safe travel by emergency response vehicles and by passenger cars evacuating the area.

Evacuation

The Chelan County Sheriffs Office is the responsible agency in charge of evacuation. Because the CWPP area experiences rapid moving wildland fires timely coordinated evacuation planning between the sheriff's office and the fire district is critical. Chelan County Comprehensive Emergency Management Plan 2004 (C.E.M.P.) provides overall direction for on-going incidents. A copy of this document is on file with the fire district. The descriptions of the three standard evacuation levels are as follows:

- Level 1 – Evacuation has become likely and it is suggested that you begin preparation for evacuation.

- Level 2 – The situation now warrants notification of affected persons that evacuation may become necessary in the immediate future. It is suggested you complete necessary preparations and be ready to evacuate on a moments notice.

- Level 3 – In the interest of protection of life and property the sheriffs office strongly suggests that affected persons evacuate immediately due to an imminent threat. Suggested evacuation routes will be determined as well as locations for emergency food and shelter. You will also be advised of options for livestock and pet shelters.

Information regarding evacuation levels will be disseminated via local radio, recorded phone information, posted information sites or public information centers. Whenever possible every attempt will be made to notify affected persons directly by members of sheriff's office personnel

Incident Command Post and Staging Areas

Should residents in the Entiat Valley or City of Entiat be threatened by wildfire, Chelan County Fire District 8 will provide first response. Additional resources are available in the county, through mutual aid agreements, as well as, additional state and federal wildland fire fighting personnel and apparatus. Incident Command Post (ICP) and staging areas are identified in the following chart.

Facility Name	**Address**	**Telephone Number**	**Functions**
City of Entiat Fire Station 3	14070 Kinzel Street, City of Entiat	(509) 784-1500 911	Incident Command Post Limited Staging Area
Fire District Main Station 1	4674 Entiat River Road 2.75 miles up Entiat River Road	(509) 784-1366 911	Incident Command Post Limited Staging Area
Fire District Ardenvoir Station 4	291 Moe Ridge Road Community of Ardenvoir 10 miles up Entiat River Road	911	Incident Command Post Limited Staging Area
Fire District Stayman Flats Station		911	Incident Command Post Limited Staging Area
Fire District Upper Entiat Valley Station 5	15670 Coyote Falls Road 19 Miles up Entiat River Road	911	Incident Command Post Limited Staging Area
Entiat High School		(509) 784-1911	Incident Command Post Staging Area
Entiat City Park		(509) 784-1500	Incident Command Post Staging Area
Rocky Reach Dam Chelan County P.U.D.		(509) 663-8121	Incident Command Post Staging Area
Tyee Ranch	Contact Entiat Ranger District	(509) 784-1511	Incident Command Post Staging Area
Entiat National Fish Hatchery		(509) 784-1131	Incident Command Post Staging Area

Entiat Ranger District Prescribed Fire Use – Preston Creek Wildland Urban Interface

Water Supplies

The City of Entiat has a hydrant system with large tender fill sites. The CWPP areas in the Entiat Valley and along the Columbia River have fill sites at Fire District 8 stations. Also, drafting sites are readily available in both the Entiat and Columbia Rivers. Currently, an emergency water storage analysis is being completed under contract with Golder Associates of Redmond, Washington through the Cascadia Conservation District. The Wenatchee National Forest Land and Resource Management Plan currently identifies the Entiat River on National Forest as a proposed "Wild and Scenic River". This management prescription (and any future such designation by congress) currently prohibits construction of water storage on designated rivers. The designation could be changed during forest plan revision or amendment. The following map indicates emergency water storage location analysis areas as selected by Chelan County Fire District 8.

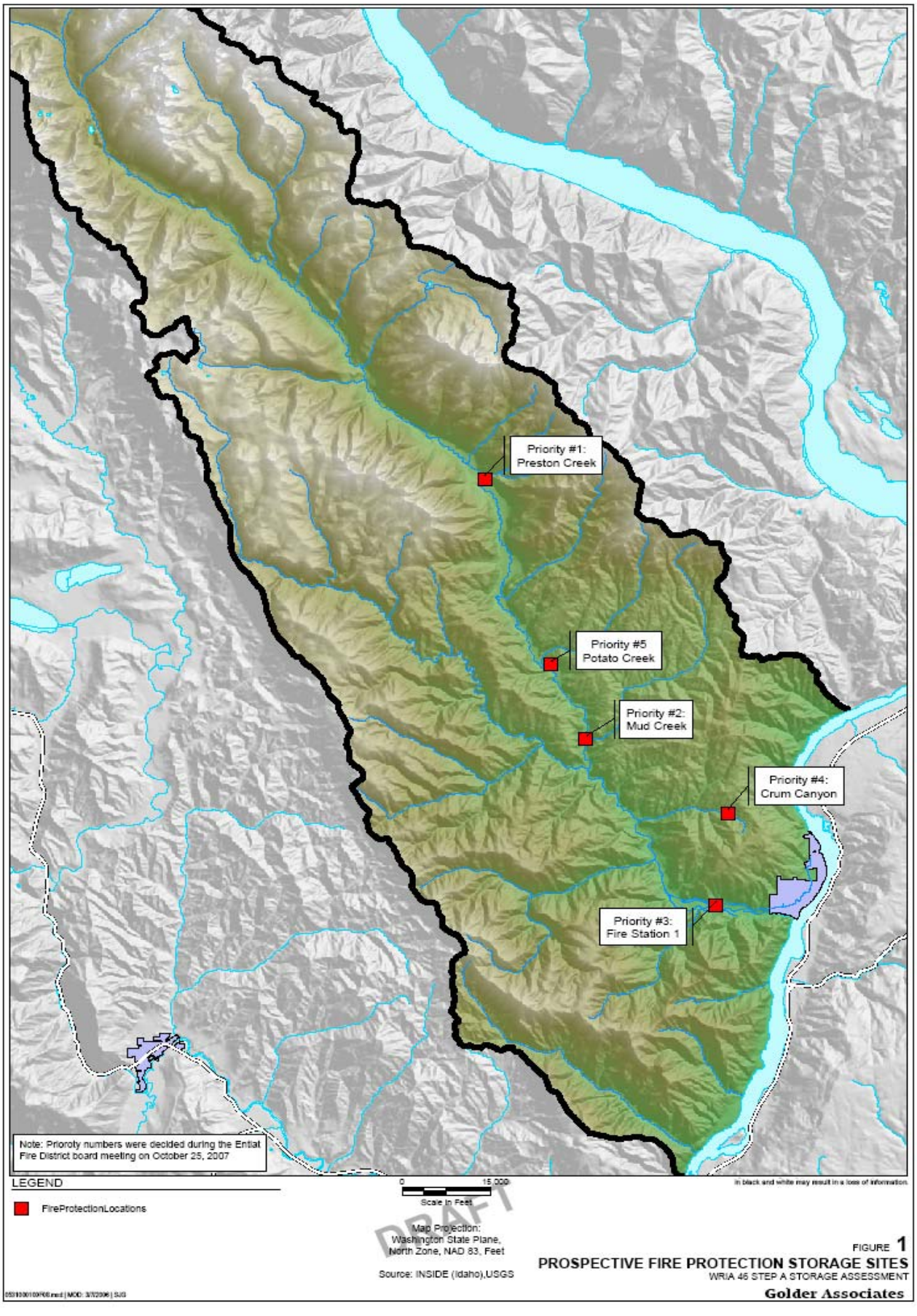


FIGURE 1

PROSPECTIVE FIRE PROTECTION STORAGE SITES

WRIA 46 STEP A STORAGE ASSESSMENT

Golder Associates

Safety Zones

Safety zones will be approved by the Incident Commander or his/her designee and will change upon wildland fire conditions. Depending on wildland fire conditions the following identified areas should be analyzed for possible use as safety zones:

- Tyee Ranch
- Entiat National Fish Hatchery
- Green belt orchards along the Entiat and Columbia Rivers
- Rocky Reach Dam
- Facilities within the City of Entiat
- Old Ardenvoir Mill site

6. CURRENT ACTIVITIES

Protection Measures

Chelan County Fire District 8, Washington State Department of Natural Resources and United States Forest Service (also provides protection for Bureau of Land Management lands) is responsible for providing initial attack response in the event of a wildland fire in the Entiat Valley CWPP area, except on Washington State Department of Fish and Wildlife, Chelan County Public Utility District and City of Seattle lands, who do not fund fire protection. Additional fire fighting resources are available through mutual aid agreements with Chelan and Douglas County Fire Districts.

Education/Fire Prevention

Chelan County Fire District 8 coordinates fire prevention efforts during summer fire season with the WDNR and USFS. These efforts include highway reader boards, fixed fire prevention sign location messages, roving patrols in high emphasis areas and joint public service announcements. Interagency FireWise Workshops have been used to educate the public on defensible space. NFPA Form 1144 Wildfire Hazard Severity Form Checklist information is being provided to landowners on how they can reduce the threat from wildland fire to their home and property.

The Columbia Breaks Fire Interpretative Center has and continues to train junior high school teachers in fire ecology and defensible space.

The Entiat Valley CWPP steering committee place high priority on individual landowners working to create defensible space around their homes and other structures.

They recognize that financial assistance may be necessary for some landowners. Steering committee members encourage expanding this private lands defensible space onto state and federal managed lands so that larger areas of needed vegetation management can be accomplished. It is critical that FireWise education materials not only be available to resident landowners, but also to non-resident landowners and the general visiting public.

Landowner Association

The Entiat Valley area has a long standing Land Owner Association. This group of individuals is a conduit for providing information from the community to various agency planning organizations (Watershed Analysis -WRIA, Entiat Valley Wildfire Protection Plan – CWPP, etc.).

Residential Signing Project

Chelan County Fire District 8 is currently purchasing signing material and installing the new Chelan County standardized residential numbering system in the CWPP area, outside the City of Entiat.

Mapping Project

Chelan County Fire District 8, working cooperatively with the Entiat Ranger District (USFS), is in the process of mapping data from the Wildfire Hazard Severity Form Checklist assessments. The resulting GIS data base layer will be invaluable during wildland fires for instant retrieval of critical information by Incident Management Teams. The GIS data base layer will be coordinated with River Com Dispatch Center and the Chelan County Geographic Information System (GIS). One of the fire districts goals is to purchase their own GIS software; dedicated lap-top computer and plotter (see mitigation action items).

Coordination with Public Agencies

In order to maximize the fuels reduction work planned for private land, it would be desirable for complimentary projects to take place on adjacent Washington State Department of Natural Resources, United States Bureau of Land Management and United States Forest Service managed lands in the Entiat Valley CWPP area. Current USFS activities in the Preston/Fox Vegetation Management Project, Moe Forest Restoration and East Pine Zone, as well as future additive vegetation treatments in these areas are endorsed by the Entiat Valley CWPP.

The Entiat Valley CWPP is recognized as the instrument necessary to organize and educate the public to further encourage and suggest design of such U.S.F.S. future projects as, East Pine Zone Fringe, Hancock Blow Down Salvage and Upper Entiat Valley. In addition, there is the potential for cooperative projects with the BLM, WDNR, WDFW and other agencies to achieve CWPP goals.

Project Proposals

No projects identified in the Mitigation Action Items portion of the Entiat Valley CWPP are currently pending funding. Grant funding will be pursued to address identified Mitigation Action Items, with a priority placed on those that encourage defensible space on private and agency managed lands.

7. PLAN MAINTENANCE

The Entiat Valley Steering Committee will assist in investigating and prioritizing on-the-ground wildland fire prevention and vegetation management projects in the Entiat Valley and along the Columbia River Breaks. Projects will be generally prioritized using the Wildland Urban Interface Assessment Zones. Projects will focus on private lands and move outward toward adjacent public agency lands.

Chelan County Fire District 8 Commissioners will be responsible for monitoring existing projects, soliciting citizen input for future projects and coordination with outside groups to investigate, write, and submit future grant applications. The commissioners are also responsible for partnering with appropriate agencies to review and update this CWPP at least once a year with assistance from the Cascadia Conservation District.

8. MITIGATION ACTION ITEMS

The Entiat Valley CWPP has three main action item categories. They are vegetation management, to lessen the impacts from wildland fire on both private and agency managed lands, improved protection capabilities in the Wildland Urban Interface Protection Zones and provide community assistance. Recommendations are organized into these categories and listed by priority.

A. Protection Capabilities: Public and firefighter safety is the first priority in all wildland fire management activities. The intent of Entiat Valley CWPP it to improve Chelan County Fire District #8, Washington State Department of Natural Resources and United States Forest Service (Columbia River Division) capability and readiness. There is a recognized need to reduce the risks to residences and private property by expanding outreach in areas of wildland fire education (defensible space) and prevention. The Washington State Department of Natural Resources and United States Forest Service have the largest share of wildland fire education and wildland fire suppression in the Entiat Valley CWPP area.

Action Item A-1:
Improve Fire District 8 Facilities

Description: The City of Entiat and the Entiat Valley is experiencing rapid residential growth. Four new subdivisions in the City of Entiat and two new residential developments in the Entiat Valley have completed infrastructure construction and selling home sites.	**Resources Needed:** Funding sources. Land within the City of Entiat identified.	**Who is Resposible:** Chelan County Fire District 8 Fire Commissioners
Tasks: Proceed forward with construction of new fire station in the City of Entiat and update the other four fire stations in Fire District 8	Research grants funding application. Conceptual designs of new station and remodel of present facilities.	Chelan County Fire District 8 Commissioners and Officers.
Notes and Updates: This action item has not been accomplished in 2007. Public input indicates more information needs to be provided to residents on the capabilities of Station 5 located on Coyote Road in the upper Entiat Valley.		

Action Item A-2:
Develop Emergency Water Storage

Description: Many areas in the Entiat Valley and along the Columbia Breaks do not have a readily available water supply for fast re-filling of initial attack engines and water tenders.	**Resources Needed:**	**Who is Responsible:**
Tasks: In a cooperative effort with Golder Associates (contractor through Cascadia Conservation District) identify possible locations for emergency water storage every five miles in the Entiat Valley.		District 8 Chief and Asst Chief. Golder Associates.
Notes and Updates: The initial field analysis for possible locations has started with Golder Associates in 2007.		

Action Item A-3

Increased Mapping Capability

Description: Chelan County Fire District 8 has completed NFPA 1144 Wildland Fire Assessment of all residences in the CWPP area.	**Resources Needed:** Fire District 8 purchase of necessary hard and software listed below.	**Who is Responsible:** Chelan County Fire District 8.
Tasks: GIS Data Layer needs to be developed in a cooperative effort with USFS and Chelan County Assessors Office to utilize data from NFPA 1144 forms.	Laptop computer, Arc View software, Plotter	Fire District 8 Commissioners working collaboratively with Chelan County Assessors Office and Entiat Ranger District
Notes and Updates: Entiat District Ranger has volunteered USFS GIS shop to initiate this work in 2007.		

Action Item A-4

Recruitment of Volunteer Firefighters

Description: The residential growth in the City of Entiat and Entiat Valley will require additional firefighters and support personnel in the future.	**Resources Needed:**	**Who is Responsible:**
Task: Do community outreach by planning, advertising and staging a public meeting with expressed purpose of increasing fire district membership.	Outreach program design. Agenda development. Location identified.	District 8 Commissioners, Chief and Asst. Chief
Notes and Updates: Public input indicated there are individuals who would like to become members based on their capabilities. Schedule public meeting for 2008.		

Action Item A-5

Interagency Fire Training

Description: The Entiat Valley experiences rapid moving wildland fires. Topography, fuels and weather make these fires extremely difficult to suppress. All agency firefighting resources, in the Entiat Valley, working in a unified effort are needed to suppress these wildland fires during initial and extended attack.	**Resources Needed:** Fire District 8, USFS and WDNR firefighters and equipment.	**Who is Responsible:** Fire District 8 Chief and Asst Chief. USFS Columbia River Division Chief, WDNR Local Area Manager
Tasks: Develop joint initial and extended attack exercise, with emphasis placed on unified command that utilizes resources from all three firefighting agencies.		
Notes and Updates: Past interagency cooperation has been excellent. This type of exercise, on an annual basis, would only further the effective and efficient use of agency resources. Target date June 2008.		

Action Item A-6

Management of Evacuation Routes

Description: Safe evacuation during fast moving fire requires evacuation routes have fuels reduced to only support low intensity fires. Critical evacuation routes are State Highway 97A, Entiat River Road, Shady Pass Road, Mud Creek Road, Tillicum Creek Road, Mills Canyon Road, Swakane Canyon Road, Johnson Creek Road and Navarre Coulee Road.	**Resources Needed:**	**Who is Responsible:**
Tasks: 1) Reduce down fuels to less than 4 tons per acre within 100 feet of evacuation routes and manage standing vegetation to not support crown fire. 2) All critical evacuation routes should remain open and maintained for safe travel by emergency response vehicles and by passenger cars evacuation the area.		Road managers of Chelan County, USFS, BLM, DNR, WDFW, Longview Fibre

B. Vegetation Management: Treatment of hazardous fuels is one of the most proactive ways to reduce the potential impacts from wildland fire. Treating fuels reduce the fire risk in an area, while increasing the chance that fire protection agencies can control a fire before it escapes initial attack. Defensible space practices and forest fuel treatments are effective ways of protecting residential homes, neighborhoods, and watersheds.

Thousands of acres of fuel treatments have occurred on private, state and federal lands over the past decade. However, thousands of acres with the Wildland Urban Interface Assessments Zones need some kind of treatment to adequately lower fire risk and protect Entiat Valley community residents. Once treated, regular maintenance is necessary to maintain the conditions that contribute to lower fire risks.

Final selection of areas to be treated will be the responsibility of the landowners or land managers, but the decision will be guided by collaborative input generated by this process. This process will be particularly instrumental in determining where potential grant dollars to agencies should be invested.

Community members endorse the desired future condition vegetation descriptions found in the Entiat Water Resource Inventory Area (WRIA 46) Management Plan. Additionally, the Entiat Valley CWPP area should have a reduced risk from uncharacteristically severe wildland fire, have a restored fire adapted ecosystem, and, have healthy function, composition and structure.

Action Item B-1.
Support Hazardous Fuel Treatment Projects Within the Wildland Urban Interface.

Description: Support expansion of hazardous fuel treatment projects in the Entiat Valley CWPP area in high risk/high hazard locations with emphasis on private landownership (i.e. grant opportunities and agency priority on vegetation treatment in the Wildland Urban Interface).	**Resources Needed:**	**Who is Responsible:**
Tasks: Provide landowners with training pertaining to fuels management methods and techniques, forestry skills and utilization of wood products. Focus on defensible space program Secure matching grants to provide financial assistance to those private landowners in need for reducing fire risk on their properties. Develop a list of hazardous fuel treatment contractors and forestry consultants. Concentrate USFS, WDNR, WDFW and BLM vegetation management work in areas adjacent to private landowners. Work cooperatively starting in greatest hazard areas. Enhance agency outreach efforts for effective public involvement in proposed vegetation treatment analysis areas. Secure grant funding to purchase community chipper. Develop hourly use rates to cover replacement cost and yearly maintenance cost.	Public Meeting, Grant writer, field personnel with forestry and fuels management knowledge.	Collaborative effort between Fire District 8, WDNR, USFS Priorities: 1. Projects adjacent to fuels reduction on private land and public improvements. 2. Projects which ensure safe ingress/egress of evacuation routes. 3. Projects which maintain condition class 1. 4. Projects which move toward condition class 1.
Notes and Updates: USFS should work cooperatively with Chelan County District 8 and Columbia Breaks Fire Interpretative Center to improve public participation in the present and upcoming NEPA analysis projects (i.e. Moe Forest Restoration,		

Preston Fox Vegetation Management Project, East Pine Zone Fringe, East Pine Zone, Upper Entiat Valley, Hancock Blow Down Salvage. Emphasis should be placed on projects on agency lands and adjacent to private lands, in a collaborative effort.

Action Item B-2.

Coordinate hazardous fuel treatment projects between private landowners, state and federal land managers.

Description: Ensure the effectiveness of hazardous fuel treatments is maximized by coordinating efforts across private-public landownership boundaries and supporting hazardous fuels treatment programs on public lands within and near the wildland urban interface.	**Resources Needed:**	**Who is Responsible:**
Tasks: Coordinate, at a minimum, annual discussion regarding hazardous fuel treatment programs with Forest Service, WDNR, and Fire District 8, landowners where appropriate on cross boundary projects. Create a wildland urban interface fuels reduction zone from Potato Creek to the United States Forest Service Boundary at mile marker 26. Treat fuels along Chelan County Road 51 and all residences creating a 150 foot fuels reduction zone. Chelan County Fire District 8, United States Forest Service, Washington State Department of Natural Resources and private land owners should work cooperatively to maximize available resources. Engage volunteer firefighters and WUI Assessment Zone leaders in identifying desirable cross-boundary projects.	USFS, WDNR, Fire District 8, BLM and WDFW leaders	Entiat District Ranger Fire District Commissioners, Chelan Douglas Land Trust Fire District Commissioners
Notes and Updates: Coordination meeting should be scheduled for January 2008.		

C. Community Assistance: As community members understanding of the risks associated with wildland fire increases, their interest in learning more about living in a fire-dependent ecosystem and actions that can be taken to reduce the risk to lives and property expands. An emphasis will be placed on enhancing wildland fire prevention and detection in the Entiat Valley CWPP area.

Action C-1.
Expand awareness with community members for prevention and early detection of wildland fires.

Description: Review of wildland fire prevention and detection program.	**Resources Needed:**	**Who is Responsible:**
Tasks: Annual agency meeting to discuss upcoming wildland fire season. Annually review and update prevention signing program, including the use of highway electronic reader boards (appropriate message). Develop radio public service announcements specifically tailored to wildland fires that occur in the Entiat Valley. Annual newsletter to community members informing them of upcoming wildland fire season issues and ongoing cooperative agency/landowner projects.	USFS, WDNR, Fire District 8, BLM and CBFIC leaders	Columbia River Division Fire Operations Specialist and Information Assistant
Notes and Updates: Meeting date January 2008.		

APPENDIX A

Wildfire Hazard Severity Form Checklist NFPA 1144
Name:
Address:
Mile Post/ Access Rd:
GPS (Lat/ Long):
Ownership Plat #:

A. Subdivision Design	Points	Risk Rating	Notes
1. Ingress and egress (The main road, ie; county Rd)			
Two or more roads in/out	0		
One road in/out	7		
2. Road width (The main road, ie; county Rd)			
Greater than 24 feet	0		
Between 20 and 24 feet	2		
Less than 20 feet wide	4		
3. All-season road condition (The main road, ie; county Rd)			
Surfaced, grade < 5%	0		
Surfaced, grade > 5%	2		
Non-surfaced, grade < 5%	2		
Non-surfaced, grade > 5%	5		
Other than all-season	7		
4. Fire service access (Access to the house, ie; driveway)			
< = 300ft, with turnaround	0		
> = 300ft, with turnaround	2		
< = 300ft, no turnaround	4		
> = 300ft, no turnaround	5		
5. Street signs			
Present (4 in. in size and reflectorized)	0		
Not present	5		
B. Vegetation (Use the 13 Fuel Models- 300' and beyond)			
1. Predominant vegetation			
Light (grasses, forbs)	5		
Medium (light brush and small trees)	10		
Heavy (dense brush, timber, and hardwoods)	20		
Slash (timber harvest residue)	25		
2. Defensible space			
More than 100 ft of treatment from buildings	1		
More than 71 -100 ft of treatment from buildings	3		
30-70 ft of treatment from buildings	10		
Less than 30 feet	25		
C. Topography			
1. Slope			

Less than 9%	1		
Between 10-20%	4		
Between 21-30%	7		
Between 31-40%	8		
Greater than 41%	10		

Totals for this page 0

D. Additional Rating Factors	Points	Risk Rating	Notes
1. Topography that adversely affects wildland fire behavior	0 - 5		
2. Area with history of higher fire occurrence	0 - 5		
3. Areas of unusually severe fire weather and winds	0 - 5		
4. Separation of adjacent structures	0 - 5		
E. Roofing Materials			
1. Construction material			
Class A roof (metal, tile)	0		
Class B roof (composite)	3		
Class C roof (wood shingle)	15		
Non-rated (no roofing material)	25		
F. Existing Building Construction			
1. Materials (predominant)			
Noncombustible siding, eaves, and deck	0		
Noncombustible siding with combustible wood deck	5		
Combustible siding and deck	10		
2. Setback from slopes > 30%			
More than 30 feet to slope	1		
Less than 30 feet to slope	5		
Not applicable	0		
G. Available Fire Protection			
1. Water source availability (on site)			
500 gpm pressurized hydrants < 1000ft apart	0		
250 gpm pressurized hydrants < 1000ft apart	1		
More than 250 gpm non-pressurized, 2 hours (off site)	3		
Less than 250 gpm non-pressurized, 2 hours (off site)	5		
Water unavailable	10		
2. Organized response resources			
Station within 5 miles of structure	1		
Station greater than 5 miles	3		
3. Fixed fire protection (Interior sprinklers)			
Sprinkler system (NFPA 13, 13R, 13D)	0		
None	5		
H. Utilities (Gas and Electric)			
1. Placement			
All underground utilities	0		
One underground, one aboveground	3		
All aboveground	5		

Totals for this page			0			
I. Totals for Risk Assessments						
Totals for page 1 and 2			0			
1. Low Hazard:	< 39 points					
2. Moderate Hazard:	40-69 points					
3. High Hazard:	70-112 points					
4. Extreme Hazard:	113 > points					
Census Data						
Track number						
Block group number						
Block number (s)						

APPENDIX B

ENTIAT VALLEY COMMUNITY WILDFIRE PROTECTION PLAN

CHELAN COUNTY FIRE DISTRICT # 8

As you may know, the United States Department of the Interior, Bureau of Land Management, has awarded a $53,000 National Fire Plan Community Assistance Grant to Chelan County Fire District #8.

Because the Entiat Valley and surrounding vicinity has a history of large, destructive wildfires, Chelan County Fire District #8 will use the grant monies to prepare a Community Wildfire Protection Plan, with a completion date of January 2007. Future grant funding for hazard fuel reduction projects will not be available if a Community Wildfire Protection Plan has not been completed. In choosing to use the grant monies in this manner, Fire District # 8 will be better positioned for future implementation grant funding.

The goals of the community wildfire protection plan are to complete a comprehensive risk assessment, residence mapping and address identification, prioritization/coordination of future fuels hazard reduction projects between private landowners, federal and state agencies.

Completion of the Entiat Valley Community Wildfire Protection Plan will require community and agency involvement and collaboration. To accomplish this task a series of community meetings is being planned. ***The first of these community meetings will be a Washington State Department of Natural Resources FireWise Workshop, May 17th at the Entiat Grange Hall. This workshop will start at 7 P.M. This meeting will provide property owners with information on how to lessen property damage from wildfires. Dates, times and locations of additional meetings will be announced in a future newsletter.***

ENTIAT VALLEY COMMUNITY WILDFIRE PROTECTION PLAN

CHELAN COUNTY FIRE DISTRICT # 8

The steering committee members of the Entiat Valley Community Wildfire Protection Plan would like to take this opportunity to update Entiat Valley residents on our progress in completing the community wildfire protection plan.

Progress during the past few months has included the following tasks:

- **Sponsored a Community FireWise Workshop on how to protect private property from wildland fires.**
- **Completed a comprehensive fire history, fire behavior and fuels analysis of the planning area.**
- **Completed planning area base map.**
- **Continued working on residence risk assessments, mapping and address identification.**

We continue to need community input in three critical areas, they are:

- **Future fuels reduction ideas on state and federal lands.**
- **Ideas on ways to reduce ignitability on private property.**
- **Ideas on enhancing Fire District #8 protection capabilities.**

To help solicit your ideas the following valley residents have volunteered to serve as geographic area group leaders. Please contact them with your thoughts and ideas.

Group Leaders	**Telephone**	**Area Represented**
Terry Fulton Ginger Wilcox	784-0456 784-9066	18 mile post to Forest Boundary
Bruce Duncan	784-8600	Mud Creek to 18 mile post
Jim Smothers Chris Mallon	784-1350 784-1860	Tillicum Creek, Mud Creek, Ardenvoir
John Spencer Dan Woods Mike Cada	784-0583 784-2247 784-3649	Mouth of Entiat River to Ardenvoir (including Mills and Crum Canyons and Roaring Creek area
Joannie Wedlund	784-1869	City of Entiat
Troy Corn	784-1673	Highway 97A from Swakane Canyon to Tunnel Hill

We need group leaders in the Navarre Coulee and Stayman Flats areas. If you are interested, please contact Troy Corn at 784-1673.

Our Entiat Valley Community Wildfire Protection Plan needs your participation. Please contact your geographical group leader.

Thank you for your participation!

Steering Committee

Entiat Firewise Workshop

There will be a FireWise workshop on Wednesday, May 17, 2006 at 7:00 P.M. at the Entiat Grange Hall.

According to the project coordinator the upcoming FireWise Workshop will kick off future Community Wildfire Protection Plan public meetings. This process will provide Entiat Valley residents, who live in a fire adapted ecosystem, with a choice to become involved in their own problem solving. Large landscape wildland fires have impacted the Entiat Valley, as recently as the Dinkleman fire in 1988, and in 1994 the Tyee fire. The peace of mind this project can provide as an educational tool with changes in fire hazards, it will be extremely valuable to this community. Your participation is vital.

If you would like further information please contact Troy Corn, Project Coordinator, 784-1673

APPENDIX C

PLANNING FOR HAZARD MITIGATION ON NON-PRIVATE LANDS

Eight per cent of the CWPP land area is privately owned; the remaining 92% is controlled by various government agencies. This simple fact makes is obvious that hazard mitigation by the government agencies will be far more influential at protecting: 1) Entiat's citizen's, 2) Entiat's homes, 3) Entiat's essential infrastructure, 4) Entiat's areas of community importance and 5) Entiat's resources from the destruction of catastrophic wildfire than the influence of the private landowners. Effective, community-supported projects will require science-based planning augmented by local knowledge and data and timely implementation. Therefore, this CWPP will respectfully recommend that the government agencies implement ecosystem management activities to restore condition class. Our specific recommendations include:

Local governments:
Chelan County and City of Entiat Zoning should require safe, year-round ingress and egress for emergency services.

City of Seattle and Chelan PUD should manage wildlands with the objective of moving them towards condition class 1, restoring terrestrial and aquatic ecosystems and disturbance regimes and reducing invasives. Both entities should work collaboratively with the local community to improve condition class on intermingled lands. Chelan PUD should recognize that this CWPP is identified by NOAA-Fisheries as a short term recovery action for Upper Columbia Salmon and steelhead; it would appear appropriate to utilize Mid Columbia HCP funds to implement CWPP projects. Urban areas should be managed as special areas of community importance with an objective of community social and economic vitality.

Entiat CWPP believes Columbia Breaks Fire Interpretive Center is providing an important service for ecosystem restoration and CWPP goals. Entiat CWPP encourages Chelan County, City of Entiat and Chelan PUD to support CBFIC in every way possible.

Cascadia Conservation District, Chelan PUD, WSU Extension, Columbia Breaks Fire Interpretive Center and Fire District#8 should continue to provide Firewise workshops and expertise for private landowners.

State governments:
WDFW and DNR should manage wildlands with an objective of reducing fuels and moving them towards condition class 1, restoring terrestrial and aquatic ecosystems and disturbance regimes and reducing invasives. Both entities should work collaboratively with the local community to improve condition class on intermingled lands. Priority would be: DNR Priority 1) Mud/Potato WUI Assessment Zone, DNR Priority 2) Tyee/Hornet WUI Assessment Zone, DNR Priority 3) Tillicum WUI Assessment Zone, DNR Priority 3) Crum WUI Assessment Zone, DNR Priority 4) Mesa/Oklahoma WUI Assessment Zone; WDFW Priority 1) Crum WUI Assessment Zone, WDFW Priority 2) Mesa/Oklahoma WUI Assessment Zone.

WDFW should recognize that this CWPP is identified by NOAA-Fisheries as a short term recovery action for Upper Columbia Salmon and steelhead; it would appear appropriate to utilize Mid Columbia HCP funds to implement CWPP projects. WDFW should also recognize the economic and social impact on the local community when fire closures restrict/eliminate hunting opportunities or fisheries. WDFW should develop a plan that recognizes that such closures are inevitable and pro-actively plan for alternate opportunities (including high hunt and waters open to fishing) to mitigate local economic and social impacts.
Entiat CWPP believes Columbia Breaks Fire Interpretive Center is providing an important service for ecosystem restoration and CWPP goals. Entiat CWPP encourages WDFW and DNR to support CBFIC in every way possible.

DNR should continue to provide Firewise workshops and expertise for private landowners.

Federal governments:
BLM, USF&WS and USFS should manage wildlands with an objective of reducing fuels and moving them towards condition class 1, restoring terrestrial and aquatic ecosystems and disturbance regimes and reducing invasives. BLM, USF&WS, NOAA-Fisheries, BPA and USFS should work collaboratively with the local community to improve condition class on intermingled lands. BLM Priority would be: BLM Priority 1) Mud/Potato WUI Assessment Zone, BLM Priority 2) Tyee/Hornet WUI Assessment Zone, BLM Priority 3) Tillicum WUI Assessment Zone, and BLM Priority 3) Crum WUI Assessment Zone. USF&WS Priority would be: USF&WS Priority 1) Tillicum WUI Assessment Zone, USF&WS Priority 2) Tyee/Hornet WUI Assessment Zone, USF&WS Priority 3) Crum WUI Assessment Zone. USFS planning Priority would be: USFS Priority 1) Tyee/Hornet WUI Assessment Zone, USFS Priority 2) Mud Potato WUI Assessment Zone, USFS Priority 3) Swakane Breaks WUI Assessment Zone USFS Priority 4) Tillicum WUI Assessment Zone, USFS Priority 5) Mills/Roaring WUI Assessment Zone, USFS Priority 6) Silver/Lake WUI Assessment Zone, Tommy WUI Assessment Zone, Cottonwood/North Fork WUI Assessment Zone, Upper Mad WUI Assessment Zone, Preston/Stormy WUI Assessment Zone and Upper Entiat WUI Assessment Zone.

BLM, USF&WS, NOAA-Fisheries, BPA and USFS should also recognize the economic and social impact on the local community due to fires; such as the short term impact when fire closures restrict/eliminate hunting opportunities or fisheries or recreation and the long term impact of the loss of economic benefit from unburned lands and resources. BLM, USF&WS, NOAA-Fisheries and USFS should cooperate with WDFW to develop a plan that recognizes that such closures are inevitable and pro-actively plan for alternate opportunities (including high hunt and waters open to fishing) to mitigate all local economic and social impacts.

USF&WS and NOAA-Fisheries should act on the fact that this CWPP is identified by NOAA-Fisheries as a short term recovery action for Upper Columbia Salmon and

steelhead; it would appear appropriate to utilize Mid Columbia HCP funds to implement CWPP projects.

Entiat CWPP believes Columbia Breaks Fire Interpretive Center is providing an important service for ecosystem restoration and CWPP goals. Entiat CWPP encourages BLM, USF&WS, NOAA-Fisheries, BPA and USFS to support CBFIC in every way possible.

BLM, USF&WS, NOAA-Fisheries, BPA and USFS overarching decisions for actions or non-action should be science-based while incorporating local history, data and conditions. Entiat community support for science-based decisions includes total support for fully funding and revitalizing Entiat Experimental Forest---the watershed with the world's longest period of scientifically collected data following wildland fire and its effects. Federal decisions should be collaborative with the Entiat community while not encumbering project planning with redundant or oppressive paperwork. Community support is support for actions which improve conditions not support for plans which take long periods of time to develop if new information is not required. In this vein, the Entiat CWPP supports the science-based actions which will lead to forests with large green trees and abundant, clean water while limiting catastrophic fires and providing for Entiat community's social vitality and robust economy.

- ⇨ Entiat community has spent more than 15 years working on a watershed plan and the Entiat CWPP supports the science-based riparian areas documented in the 1989 Wenatchee Forest and Land Management Plan rather than the riparian reserves in the Northwest Forest Plan or PACFISH/INFISH which do not have a basis in science.
- ⇨ Entiat community does not support converting any acres currently identified as *matrix* (or any similar designation) into any type of *reserve* (or any similarly restrictive designation). Community opinion and experience is that *reserves* are not leading towards large green trees, abundant, clean water nor limiting destruction of catastrophic fires nor providing for Entiat community's social vitality and robust economy. This opinion is reflected in PNW General Technical Report 651, *Northwest Forest Plan—The First 10 Years (1994-2003): Synthesis of Monitoring and Research Results* and its companion general technical reports.
- ⇨ Entiat community understands and supports the need for roadless areas but feels a conflicting pull with needing to get into these areas for fire suppression or active ecosystem management. Further discussion is needed to provide agreement on reconciling these conflicting values. Thus, Entiat CWPP supports Appendix C roadless areas identified in the 1989 Wenatchee Forest and Land Management Plan with the exclusion of the Entiat Experimental Forest. Entiat CWPP does not support any expansion of roadless areas identified in the 1989 Wenatchee Forest and Land Management Plan Appendix C because analysis of fire history and potential fire behavior shows catastrophic wildfire will occur in these areas and threaten 1) Entiat's citizen's, 2) Entiat's homes, 3) Entiat's essential infrastructure, 4) Entiat's areas of community importance and 5) Entiat's resources with destruction. Analysis also shows that the risk could be reduced

with vegetative or fuels management. Further, Entiat CWPP wants roads to be defined by on-the-ground presence and not limited to presence in a data base.

- ⇨ Wilderness designation implements even more restrictions than roadless designation. Entiat CWPP does not endorse additional acres designated as wilderness within the Entiat CWPP boundary because analysis of fire history and potential fire behavior shows catastrophic wildfire will occur in these areas and threaten 1) Entiat's citizen's, 2) Entiat's homes, 3) Entiat's essential infrastructure, 4) Entiat's areas of community importance and 5) Entiat's resources with destruction. Analysis also shows that the risk could be reduced with vegetative or fuels management.
- ⇨ Federal planning should include ensuring adequate access for public recreation in special places, ecosystem restoration and fuels reduction and fire suppression. This would include BPA stopping erosion on their power line rights of way and routinely maintaining their roads for easy access and control of erosion and invasives.
- ⇨ Identifying, planning and developing ways to augment summer water yields for people and fish are an identified need in the Entiat Watershed Plan and Entiat CWPP. Thus, the Entiat community does not support any designations that would encumber planning or implementing water yield augmentation which could include additional water storage. Entiat CWPP does not support the currently proposed Wild and Scenic River designation for the Entiat River and does not support any additional proposed Wild and Scenic River designations in the Entiat watershed. The Entiat community has never supported a proposed Wild and Scenic River designation for the Entiat River; public meetings during the 1988 SEIS process were very contentious in the Entiat community. Entiat community's rationale for not designating any waters include: the identified need for augmenting summer streamflows in the watershed with storage as one solution; the additional processes required for proposed wild or scenic waters will not provide any more protection than the rivers already have but will add unnecessary time and paperwork to planning; the portion of the Entiat River that is proposed recreational designation was channelized after the 1948 flood and thus does not meet the criteria; and the thought that scenery is the outstandingly remarkable characteristic of the proposed wild and scenic river when the view will be black snags if the designation goes thru and actions to restore the ecosystems and reduce fuel loadings are not allowed or effective with catastrophic fire being the result of no action. Overarching federal planning should include vegetation management that would increase water yield by reducing vegetation density or manipulating vegetation to increase snowpack; both of which are demonstrated to increase water yield.

We do fully support implementation of the following activities as Entiat CWPP projects.

USFS Ecosystem Management Activities

Active:

Swakane TS and Veg. Management – Commercial, non-commercial, and underburn.

Lower Swakane Underburn – Underburn

Preston/Fox Veg. Management – Non-commercial thin and underburn

East Pine Zone Ecosystem Maintenance –Non-commercial thin and underburn

Crum Canyon TS and Veg. Management – Commercial thin (completed), non-commercial thin and underburn

Moe TS and Veg. Management – Commercial, non-commercial and underburn.

Hancock Salvage – Commercial remove

Mad River Trail – Provide a safe evacuation route, improve fish habitat, provide access for ecosystem management activities and fire suppression.

In Planning:

Pine Zone Fringe Ecosystem Maintenance – Non-commercial thin and underburn

West Pine Zone Ecosystem Maintenance – Non-commercial thin and underburn

Tenas Underburn – Underburn

Mad River Trail – Provide a safe evacuation route, improve fish habitat, provide access for ecosystem management activities and fire suppression.

APPENDIX D

EAST PINE ZONE FIRE HISTORY

JOHN A. BARNES

ENTIAT RANGER DISTRICT
WENATCHEE NATIONAL FOREST
U.S. DEPARTMENT OF AGRICULTURE
ENTIAT, WASHINGTON 98822

1983

INTRODUCTION

This study was developed to provide information on historical fire occurence within the west half of the East Pine Zone Study Area on the Entiat Ranger District, Wenatchee National Forest. The study is based upon fire scar collection through out the 32,000 acre area, which includes the drainages of Potato Creek, Mud Creek, and Morical Canyon.

The present study is an on going project started with scar sampling in 1979.
More data will be gathered in the coming years. At this time enough information has been obtained to develop certain conclusions and some speculation.Further data will not drastically change the conclusions, but give a more accurate look at the extent of the historical fires and support the speculations.

A knowledge of the historical fire occurence is essential in describing forest ecosystems, development of management alternatives, and planning subsequent programs and projects.

METHODS

Scar Sampling

The area, usually a recently completed timber sale, was covered and the best possible samples were located. Best samples were those with: the most scars, the least amount of decay, and the best ring growth. Priority was given to those samples with the most scars because they better represented the fire history. Often a sample with fewer scars, but which had little decay and good growth, was taken to get an accurate count and date of fire years. The best samples were then collected by cutting a thin slab from the stump or by cutting a partial slab from a live tree (using techniques of Arno and Sneck, 1977).

More than one slab was often cut from a stump because additional fire scars were gained by cutting lower to the ground. To minimize weight and size, usually the back 40% and occasionally one side of the scar was cut and left in the field.

The sample was located on a 4" topography map and assigned a number. This number, along with the name of the area (usually a Timber Sale name), was stamped into the sample using a metal stamping dye set.

Sample Preparation

Samples were prepared for analysis by sanding with a belt table sander and/or a portable belt sander. Usually only the fire scarred edge was sanded, unless a more accurate count could be done from another point on the sample. A light amount of Linseed Oil was applied, usually making the rings more identifiable. Additional hand sanding (using very fine grit), was needed on some samples during the actual ring count. If samples were wet or green, a drying period was needed (usually 1 to 2 weeks) before sanding could be done.

Sample Analysis-Ring Count

Ring counts were done using techniques from Arno and Sneck (1977). Several additional points that aided in the ring count and location of fire scars were discovered through experience.

Often times the rings were so close that an accurate count could not be made. Also, rot and pitch pockets hindered accuracy. An attempt was made and the best estimates were recorded. On most of these samples there were rings that could actually be counted between 2 or more scars. These were recorded as such and used later to correlate with other samples having more accurate, overall ring counts.

On most samples, the rings of 1977 were very distinguishable because of the drought conditions that occured that year. If there were doubts as to which year the cambium occured, the count could be started on the 1977 ring and a starting date assigned.

Some time a scar would show on the face of the sample but not on the cut surface. A best estimate, with a note of "a possible fire", was recorded for that year. These possible fires were then compared with other samples in the general area and either retained or deleted as evidence dictated.

On occasion, fires occured very late in a given year. These could be distinguised on some samples and not on others. These "fall" fires should be recorded as such. On samples with tight rings, it is difficult to determine which year these fires occured. Comparing this data from one sample to others facilitates a more accurate fire year determination.

When recording the fire years it was essential to use Arno and Snecks (1977) technique for identifying accuracy of ring counts. These are:

X-clear rings (date accurate)
o-rings slightly obscurred (date approximate)
0-rings difficult to interpret

These designations were helpful later on in the weighting of scars in correlation of fire chronologies.

Correlating Fire Chronologie

Ring counts from each individual sample may not be entirely accurate or coincide because of pockets of obscurred rings, rot, or occasional missing or false rings. A more accurate estimation of the actual fire years can be developed by combining records from several samples into a "master fire chronology". The techniques of Arno and Sneck (1977) were once again utilized.

Mapping Fires

Samples were located on a 1" to the mile map by placing a dot on the site. All samples that were scarred in that year were marked with a "".

Using this evidence of fire occurence, a rough outline of the fire area was plotted. Remember that 100% of the plotted area probably did not burn. A mosaic pattern was more likely to have occurred over the area.

There is a shortage of data near the center of the area in the vicinity of McKenzie, Murdock, and Bisping Canyons. By studying the available samples, present ecotypes, old photo's, and previous fire years, it was assumed that the fire (s) covered the area of McKenzie, Murdock, and Bisping Canyons. As more scars are collected and analyzed, a more accurate picture of the extent of the fire years will become evident.

RESULTS AND DISCUSSION

Data Base

A total of 71 samples were taken. Most of the samples were from Ponderosa Pine, with a few from Douglas Fir and Lodgepole Pine. Ponderosa Pine provided the clearest, most abudant, and oldest records. The oldest records dated fires more than 350 years ago, but these scars were scarce. However, there was a large enough data base to calculate a fire chronology from 1750-1900. This data base is displayed in Appendix A.

Fire Frequency

Fire frequencies obtained from individual trees are usually less than the actual fire frequencies. Not all trees were scarred by every fire. There were samples taken within yards of each other, both showing one or more different scar dates. Example: 6 samples taken from the 1976 Crum Canyon fire area, with 4 being scarred.

Fire frequency is diffucult to formulate for a large area, such as in this study, as a fire year did not necessarily involve the entire area. Therefore, 4 general areas were chosen and frequencies determined for each during a 150 year period (1750-1900).

1. North of Potato Creek - 150 years - 20 fires = 7.5
2. East of Mud Creek - 150 years - 19 fires = 7.9
3. Wilkinson Canyon- 150 years - 17 fires = 8.8
4. Morical Canyon - 150 years - 15 fires = 10.0

The difference in frequencies between areas is probably due to fuel types and, to a smaller degree, topography. The Morical site is sparcely vegetated ground area, with light densities of grass cover. This would inhibit the fire spread from an ignition. These areas are bounded by the Entiat River on one side and cool, moist, north and east slopes on two other sides, thus possibly hindering spread into the area from starts outside, especially with the westerly gradient airflow.

It is interesting to note that lightning fire occurence within the area between 1960 and 1984 was twice as high in the Morical area than in the Potato area, yet historical fire occurence was 1/3 more in the Potato area.

Another interesting note, without much implication, is that between 1750 and 1900 a large fire occured somewhere within the study area every 4.8 years.

Intensities

The relatively short intervals between fires throughout the study area suggest that fire intensity was not usually great, because there was little time for heavy fuel accumulation. There was one sample which was scarred at 4 years from the pith (5-7 years old). This sample was about .5" in diameter when fire scarred on one side. There were numerous 1" to 1 1/2" diameter trees that were scarred and survived. This indicates low fire intensity.

There were probably smaller, localized areas, that occasionally exhibited medium to high intensity fires. These areas are located in the upper elevations toward Baldy and Forest Mountains. The cooler north and east slopes that may not have burned during some fire years, but did when fuel and climatic conditions existed to sustain fire spread. This is evidenced by small stands of Lodgepole Pine in the upper elevations.

Extent

As the maps in Appenix B indicate there are fire years in which the entire study area was covered, realizing that the actual ground area was not 100% burned. Note that "fire year" is used instead of "a fire" because it is difficult to determine if the burned area started from one ignition or a combination of numerous starts that burned together. These large fire(s) inevitably extended beyond the study area into adjacent areas because of a lack of natural barriors, possibly encompassing 100,000 acres. With additional scar sampling in these adjacent areas, a larger area could be mapped to support this assumption.

It appears that the lower reaches of Potatoe Creek and Mud Creek were natural barriers to the spread of fires in some years. (e.g. 1860, 1844, 1829, 1817, 1794). The crest between the Entiat Drainage and the Columbia Drainage appears to be a barrier from fires originating east of this divide (e.g. 1875, 1841, 1828). This would be further supported with samples from the Columbia Side.

It appears that the greatest barrier to the spread of fire is fire itself. Comparing the maps of fire years (Appendix B), it can be seen that the spread of one fire was stopped at the boundry of previous fire that occurred 3-6 years before. The 1875 fire year, which probably originated to southeast of the study area, did not spread further because of the 1870 fire. The 1864 fires were small because the area was burned in 1860. The 1863 fires did not burn in the area of the 1860 burn. Note that the west boundary of the 1863 fire is very close to the east boundary of the 1860 fire. Looking at the west boundary of the 1860 fire, it appears that it shares the boundary of a fire in 1854. The 1844 fire year burned north and west of Mud Creek, but did not spread further because of an 1841 burn to the east and an 1840 burn to the south. Note that the 1844 fire in Morical Canyon did not get larger probably because of a burn 4 years earlier in the same area. There are exceptions, as there were fires that did burn in the same area 3 to 5 years after another burn (e.g.

1900-1895, 1889-1886, 1834-1829, 1822-1817).

Vegetation

For these fires to burn large areas, a continous fuel bed had to be present. Because of the low intensity and high frequency of the fire, this fuel bed consisted mainly of fine fuels. With this determination, along with old photos and stumps, it can be concluded that primary vegetation consisted of an open Ponderosa Pine stand, with a fairly continous understory of perennial grasses, and varying densities of Snowbrush Ceanothus and Antelope Bitterbrush. The cooler north and east slopes supported widely spaced Douglas Fir with some Ponderosa Pine, Pine Grass, and varying densities of fire resistant shrubs, such as Snowberry, Willow, and Rose.

These vegetation types would allow wide spread of fire after a burn as few as 4-5 years earlier. There would be enough litter cast, supported by grasses to provide a continous fuel bed.

At present, the predominant shrub type in the Ponderosa Pine stands and open south slopes is the Antelope Bitterbrush. This plant is valuable as a food source within the Mule Deer winter range (Giunta et al., 1978).

Bitterbrush ranges from moderate to very susceptible to fire, with a rapid to slow post fire regeneration response according Volland and Dell (1981). This means there is a 10 - 64% chance that at least 50% of the plant population will survive or re-establish itself 2 to 10+ years after passage of fire, depending on fire intensity, soil moisture, and time of the year burned. Since most historical fires burned in mid to late summer, the responses of Bitterbrush to fire would be near the lower ranges (Rice, 1982). Martin and Driver (1982) experienced no resprout of Bitterbrush seedlings (under 5 years old) following a fire. It would seem that few Bitterbrush plants would become established with intervals between fires of 3-6 years. From this response level, coupled with fire frequencies and old photos, it appears that Bitterbrush was sparce, except perhaps in the rockier, more open areas, where fire spread was restricted

Snowbrush Ceanothus is very resistant to fire, regenerating to approximate preburn coverage within 1 to 2 years through resprouting of existing plants (Volland and Dell 1981). Ceanothus seeds require fire or other ground disturbance for seed germination (Volland and Dell 1981). The exclusion of fire since man's protection began in the early 1900's, has probably reduced the Ceanothus population through less seed germination, less resprouting, and more shading.

From the responses to fire of Bitterbrush and Ceanothus, it may be stated, that Ceanothus was the predominant shrub type within the Mule Deer winter range at mid elevations. Wolf and others (1984) observed that Mule Deer find the Ceanothus more palatable than Bitterbrush on sites where both are present.

It may be concluded that Ceanothus was a primary food source for wintering Mule Deer before man's influence on historical fire occurance. The slow

decline of Ceanothus and increase in Bitterbrush populations has forced the Mule Deer to switch browse priority simply because of availability.

MANAGEMENT IMPLICATIONS

Data from the study area shows a marked decrease in fire since about 1900. Thus, a major ecological force has been largly excluded for 80 years. The years since the last burn on most of the forested land now exceeds 10 times the average fire frequency before man's influence. This has allowed fuels to accumulate in most areas. In many stands, especially where Douglas Fir is the potential climax species, dense understories have developed, making a ladder of fuels that now endanger even the fire-resistant, old-growth overstory. Through out the area, additional heavy fuels have been generated as a result of logging and thinning operations.

Continued fire suppression without fuels management apparently promotes accumulation of fuels as well as greater continuity of fuels over the land-scape. This favors the development of high-intensity fires.

The prescribed use of fire, both planned and unplanned, should be seriously considered for fuel reduction and stand management. Fire can be applied when burning conditions are moderate and forecasted to remain stable, especially inearly autumn.

A burning program would require carefully developed fire prescriptions designed to accomplish management objectives, while minimizing unwanted fires.

After the initial fuel reduction, maintenance of desirable fuel and stand conditions should become less difficult. A fuel management plan might incorporate both prescribed fire and naturally caused fires burning under certain conditions in specified areas. Natural fires not burning as desired would be suppressed.

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FIRE YEARS

MIDDLE MUD

Fire scar study area. (1) A fire susceptible tree is one that has been scarred at least once.

Fire Year	# of trees scarred	# of trees susceptible (1)	Fire Year	# of trees scarred	# of trees susceptible (1)
1900	3	5			
1895	2	5			
1889	4	5			
1886	3	5			
1877	1	5			
1870	3	5			
1863	5	5			
1854	2	5			
1844	3	5			
1834	2	5			
1828	3	5			
1822	3	5			
1812	5	5			
1806	1	5			
1799	1	3			
1794	3	3			
1791	1	3			

FIRE YEARS

LOWER STORMY/STORMY RIDGE

Fire scar study area (1) A Fire susceptible tree is one that has been scarred at least once.

Fire Year	# of trees scarred	# of trees susceptible (1)	Fire Year	# of trees scarred	# of trees susceptible (1)
1932	1	11	1768	5	6
1924	3	11	1756	4	6
1912	1	11	1750	3	5
1900	5	11	1742	1	4
1895	6	11	1733	3	3
1889	1	11	1721	3	3
1877	1	11	1709	1	2
1870	9	11	1706	1	2
1864	3	11	1691	1	2
1860	10	11	1685	1	1
1844	8	11	1672	1	1
1839	1	11	1647	1	1
1834	7	11	1617	1	1
1829	8	11			
1822	3	9			
1817	5	9			
1812	7	9			
1817	5	9			
1812	7	9			
1804	7	9			
1799	1	8			
1794	2	8			
1791	6	7			
1782	4	7			
1776	5	6			

FIRE YEARS

BLOCK 10

Fire scar study area (1) A Fire susceptible tree is one that has been scarred at least once.

Fire Year	# of trees scarred	# of trees susceptible (1)	Fire Year	# of trees scarred	# of trees susceptible (1)
1976	4	20	1786	4	9
1930	1	20	1781	4	9
1918	1	20	1773	2	6
1905	1	20	1768	3	6
1901	3	20	1764	1	6
1896	4	20	1758	2	6
1894	1	20	1756	1	4
1889	6	20	1725	2	3
1886	17	20	1712	2	3
1875	7	20	1708	2	3
1870	9	20	1687	2	3
1863	15	20	1687	2	3
1854	14	19	1656	1	2
1841	15	19	1642	1	1
1834	8	18			
1828	9	18			
1822	14	15			
1816	1	13			
1812	10	13			
1803	1	13			
1799	9	13			
1796	9	13			
1991	9	10			

FIRE YEARS

MORICAL CANYON

Fire scar study area (1) A Fire susceptible tree is one that has been scarred at least once.

Fire Year	# of trees scarred	# of trees susceptible (1)	Fire Year	# of trees scarred	# of trees susceptible (1)
1967	1 mech?	19	1760	1	7
1952	1 mech?	19	1756	4	6
1909	1	19	1751	3	4
1901	1	19	1740	1	3
1896	2	19	1721	2	3
1891	8	19	1721	2	3
1886	16	19			
1875	2	19			
1870	9	19			
1863	12	16			
1854	17	19			
1844	4	19			
1840	17	19			
1833	4	19			
1822	15	19			
1812	4	16			
1806	1	16			
1799	12	16			
1793	1	15			
1791	5	15			
1781	10	12			
1765	1	7			
1762	2	7			

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FIRE YEARS

EAST PINE ZONE - MISC. SAMPLES

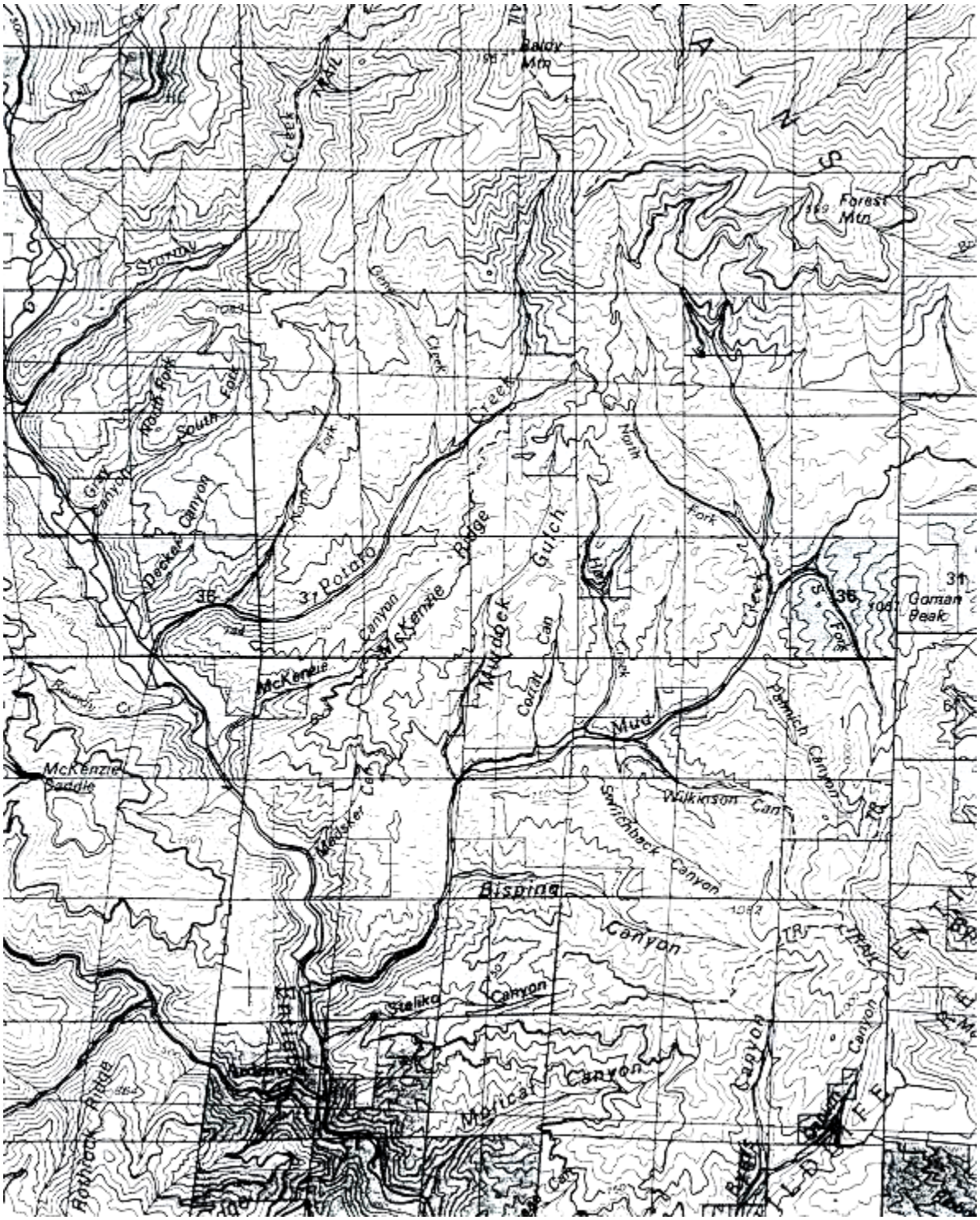
Fire scar study area (1) A Fire susceptible tree is one that has been scarred at least once.

Fire Year	# of trees scarred	# of trees susceptible (1)	Fire Year	# of trees scarred	# of trees susceptible (1)
1939	1	16	1817	5	13
1938	1	16	1815	5	13
1937	1	16	1812	9	13
1933	1	16	1807	1	12
1928	1	16	1804	5	12
1925	1	16	1799	6	12
1924	1	16	1794	6	12
1918	2	16	1791	6	12
1913	1	16	1782	5	11
1911	1	16	1776	4	11
1904	1	16	1768	6	11
1903	1	16	1766	1	8
1900	1	16	1765	1	8
1895	9	16	1761	1	8
1886	10	16	1756	6	7
1884	1	16	1748	1	5
1879	1	16	1746	2	5
1878	1	16	1742	2	5
1873	1	16	1736	1	5
1870	11	16	1732	1	5
1867	1	16	1724	2	4
1864	3	16	1709	2	3
1863	2	16	1701	2	3
1860	9	16	1699	1	2
1854	8	16	1675	1	2
1844	11	15	1664	1	2
1840	1	15	1656	2	2
1837	2	15	1645	1	2
1834	6	15	1638		
1829	7	14			
1826	5	13			
1822	7	13			

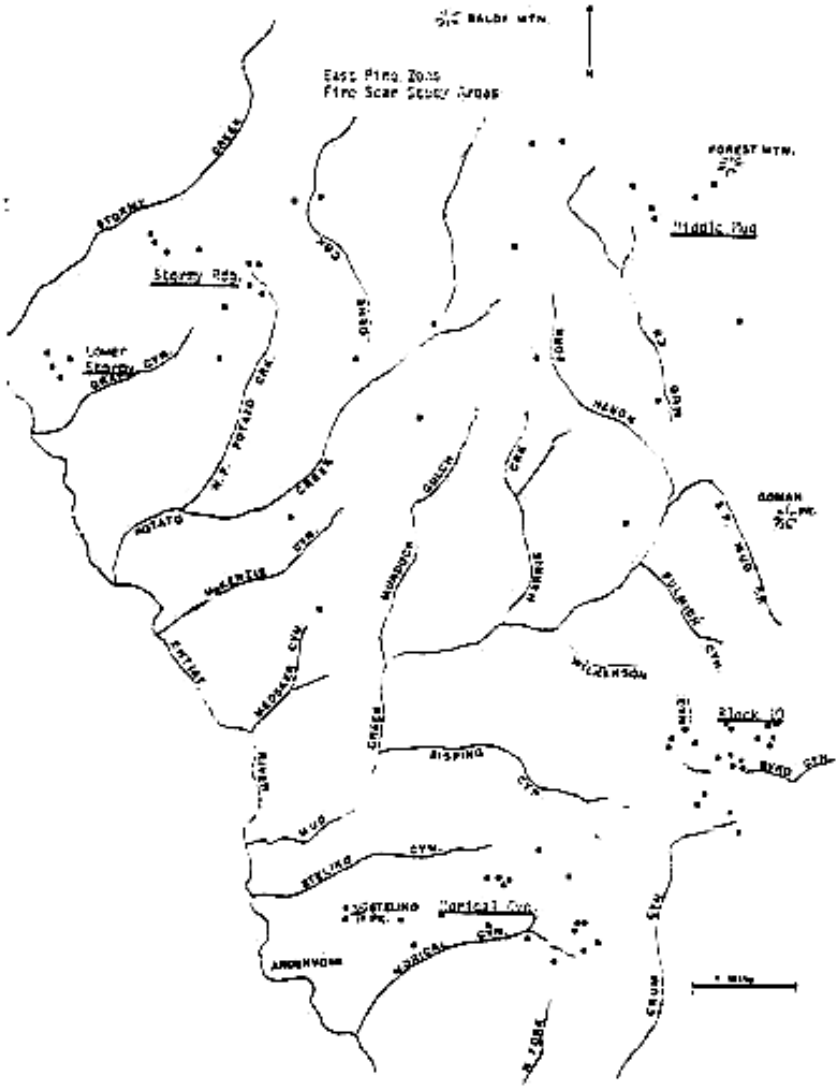
APPENDIX A

FIRE CHRONOLGY

General Area Map



Fire Scar Study Areas



APPENDIX B

BURN AREA BY FIRE YEAR

EAST PINE ZONE STUDY AREA

Dots show sample locations.

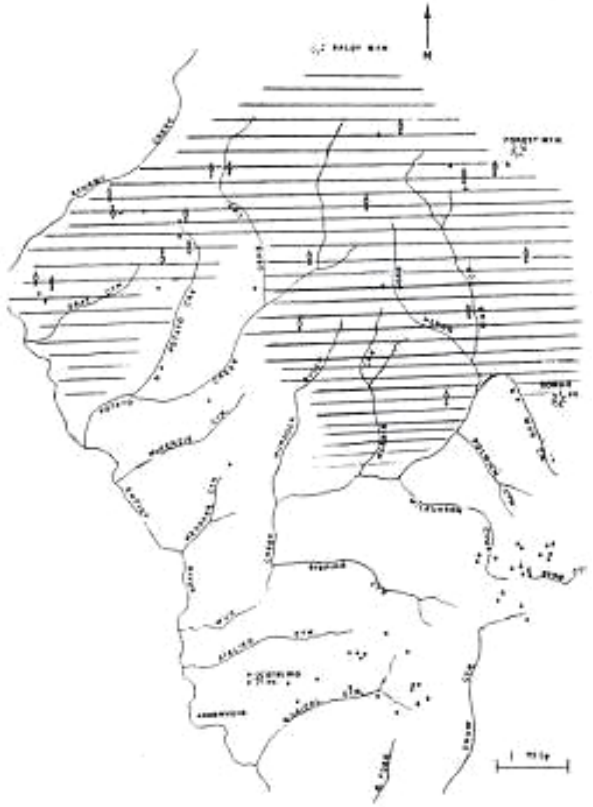
"ϕ" = scar on that sample that year

"ϕ" = trees that are not susceptible to fire
(one that has not been scarred earlier
or one that does not exist at that time)

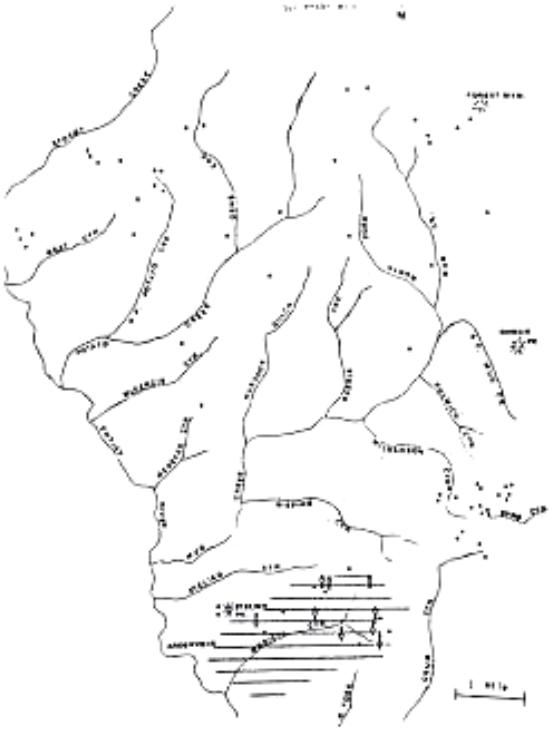
1901

1900

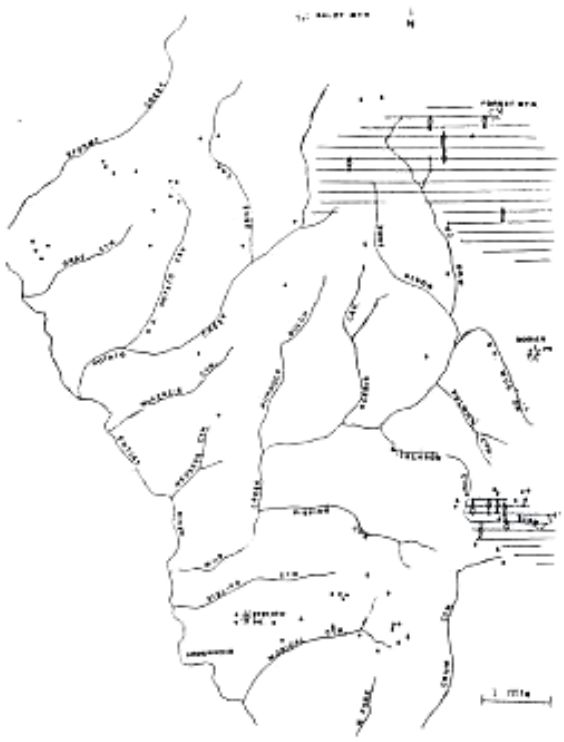
1896



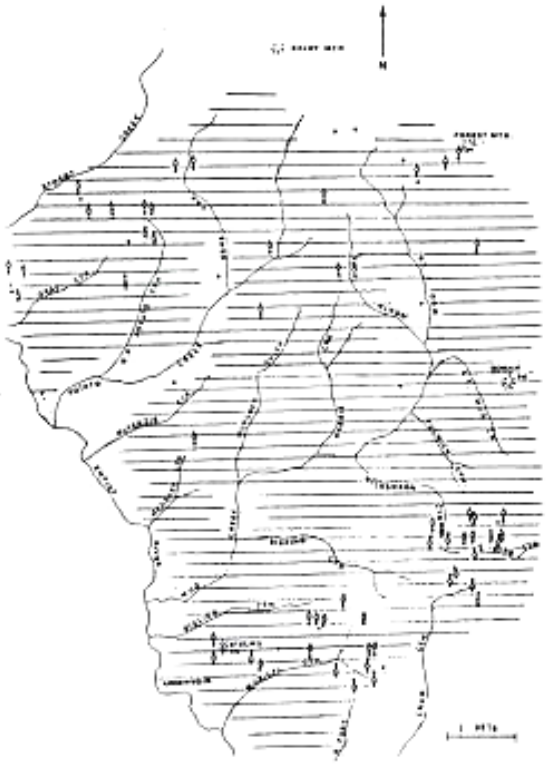
1895



1891

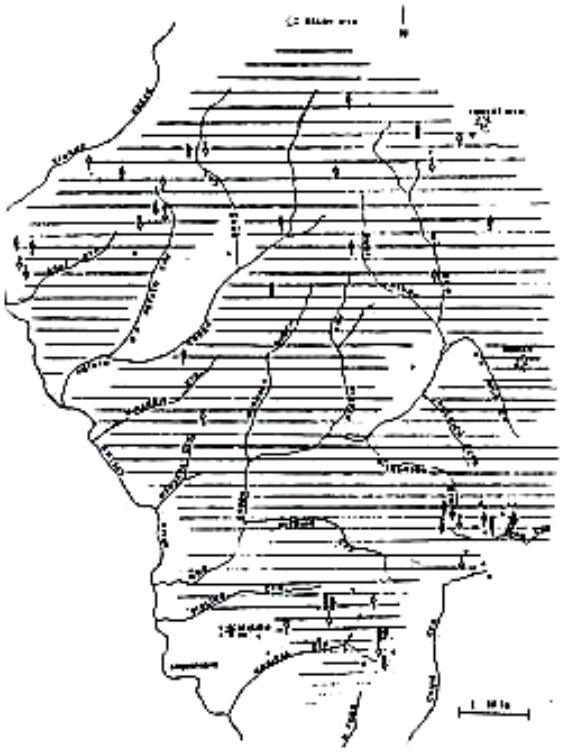


1889

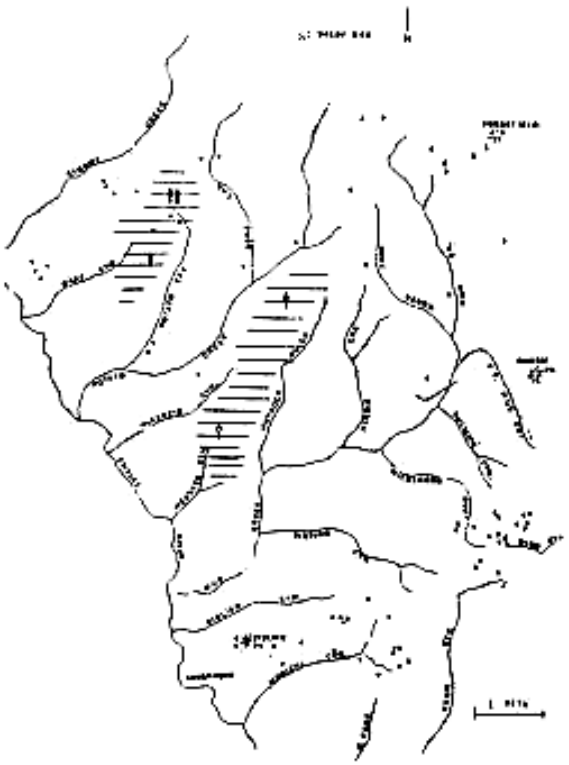


1886

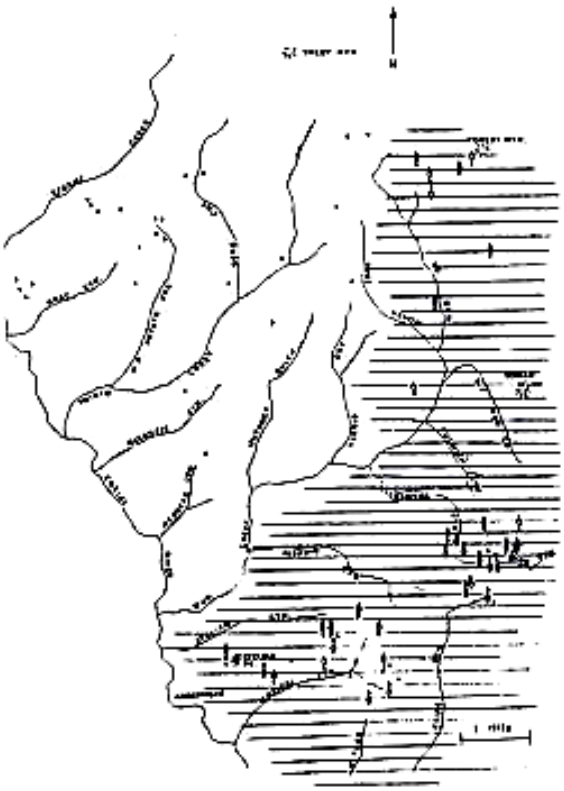
1875



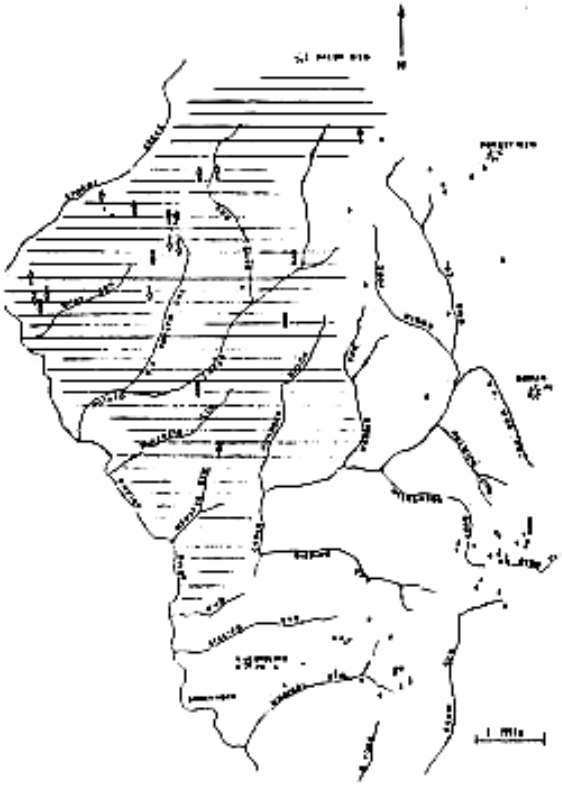
1870



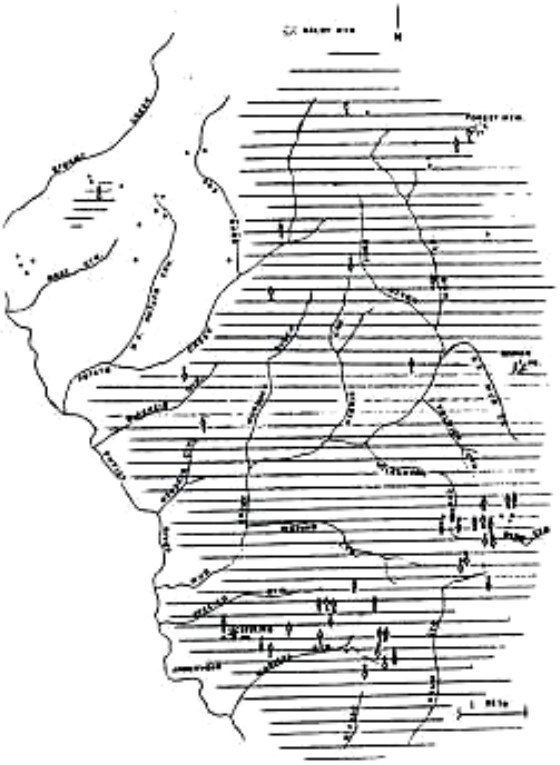
1864



1863

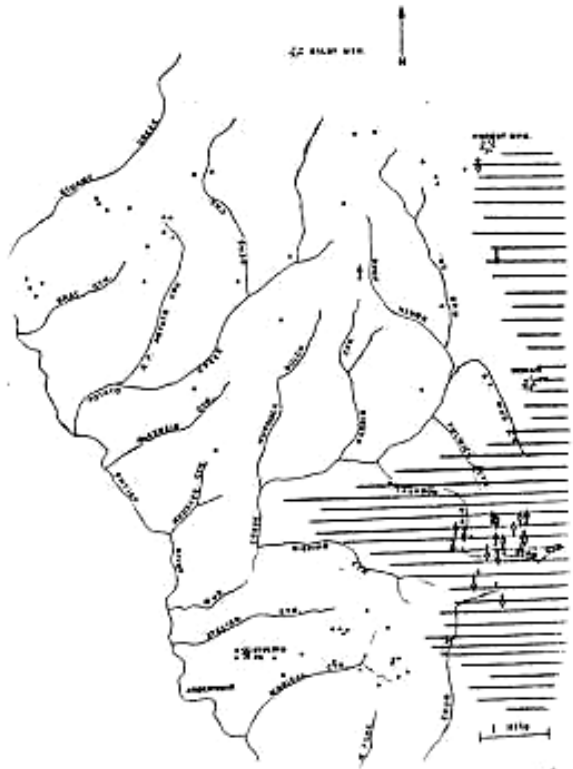


1860

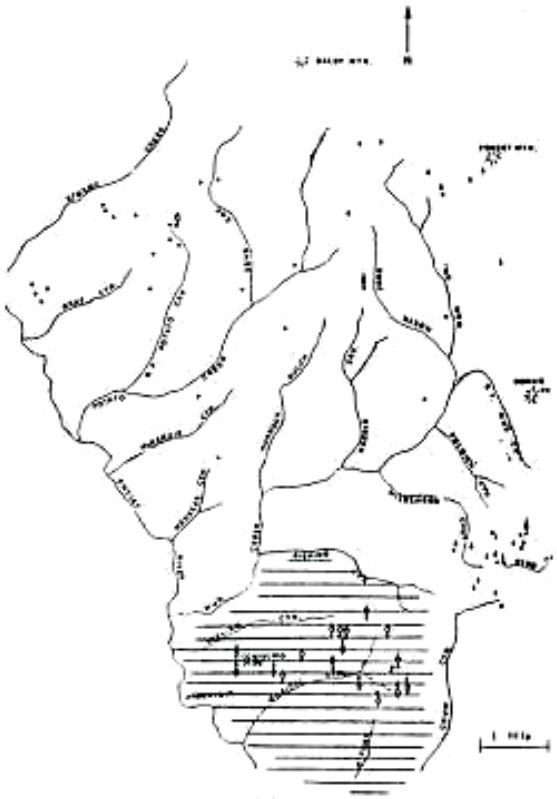


1854

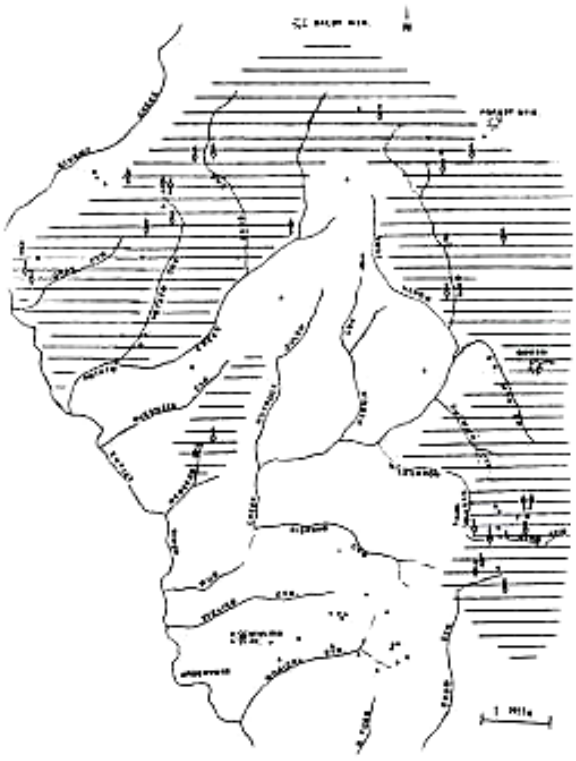
1844



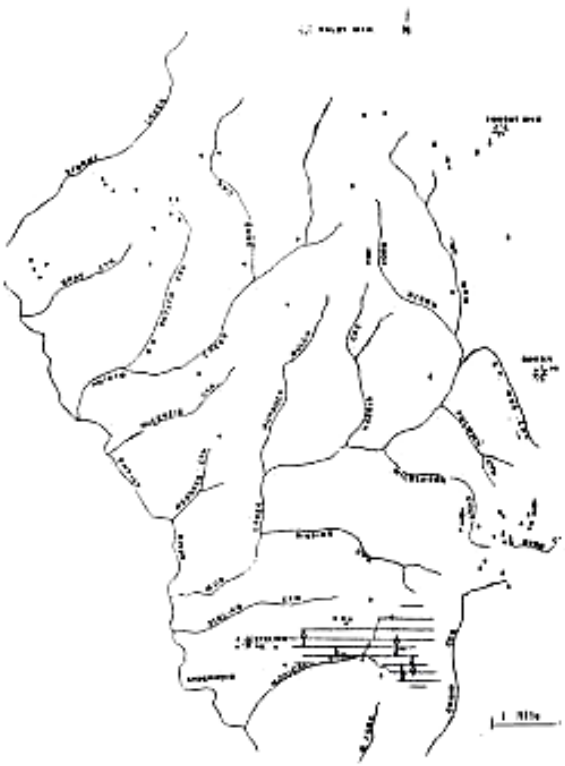
1841



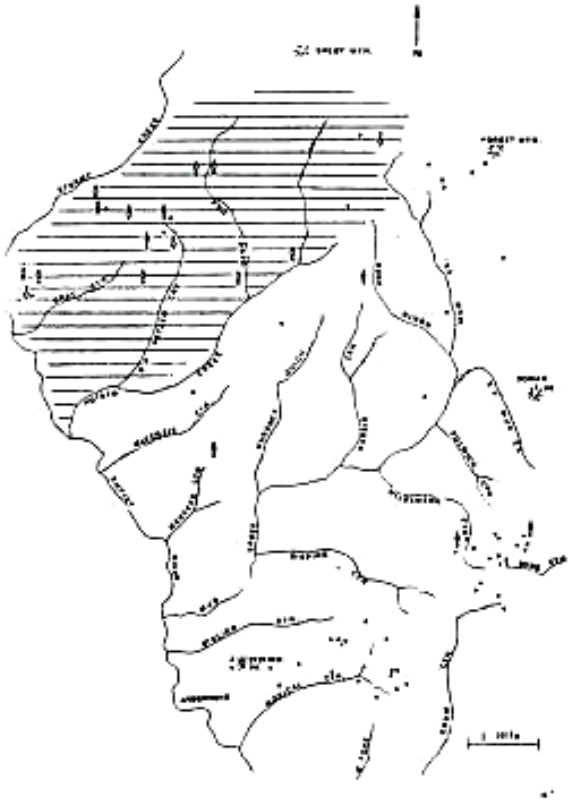
1840



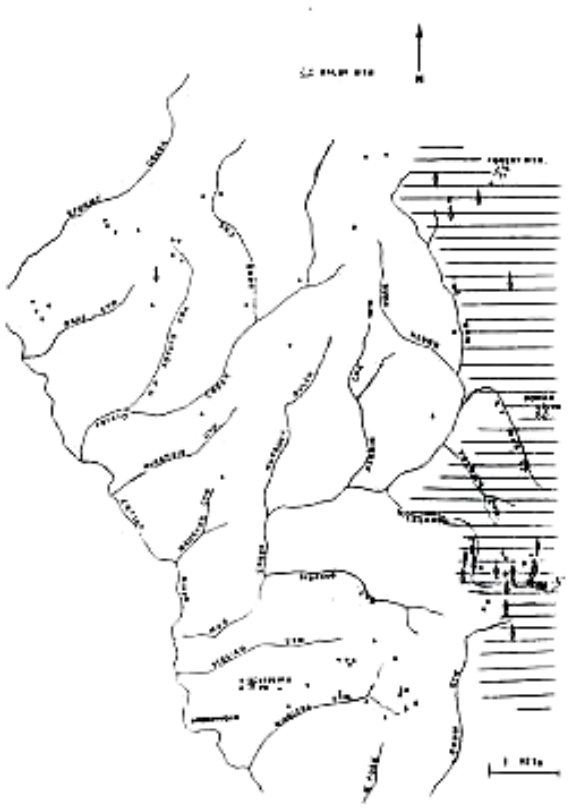
1834



1833

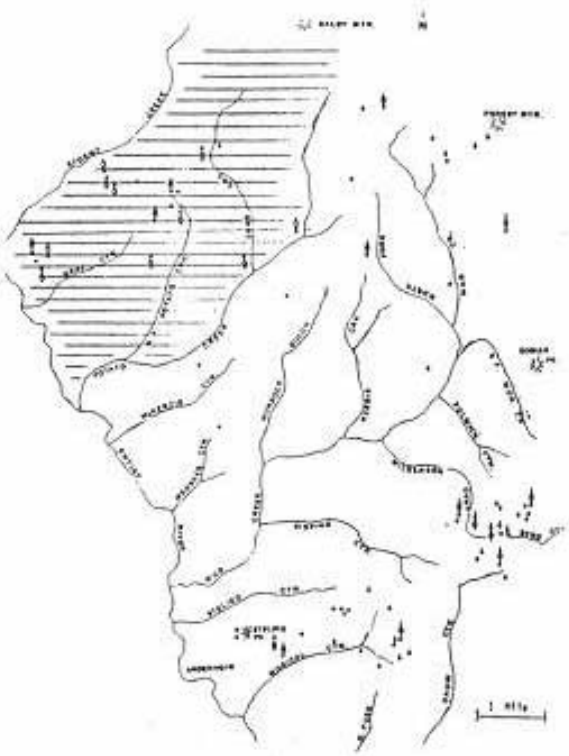


1829

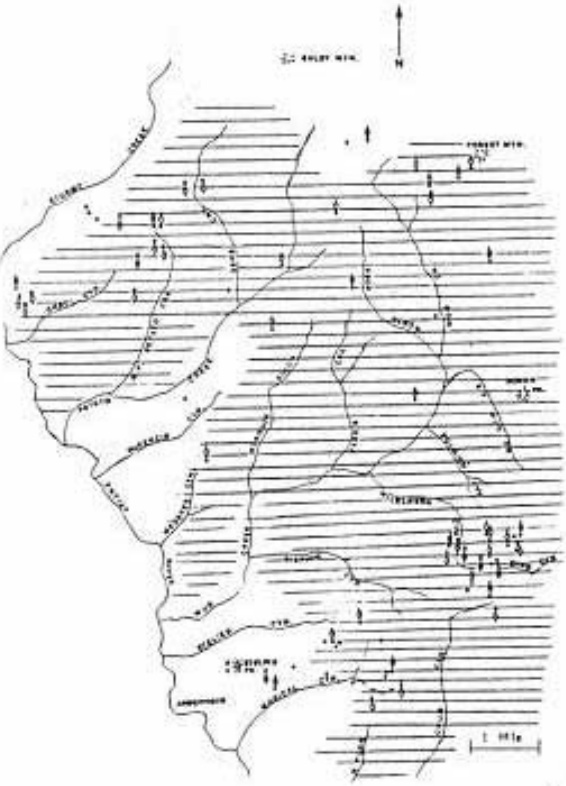


1828

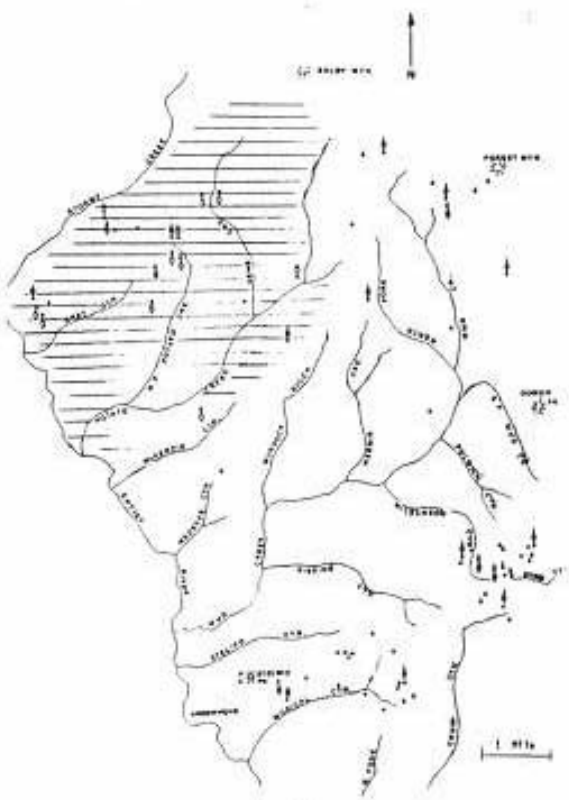
1822



1817

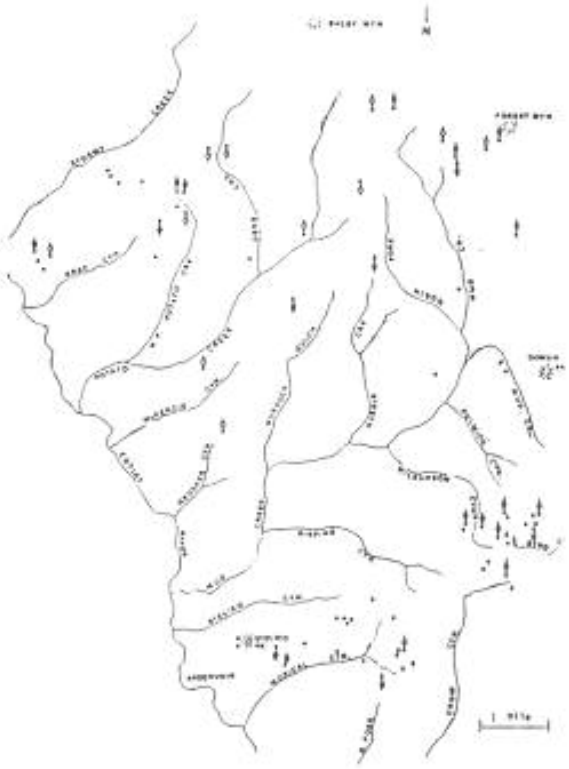


1812

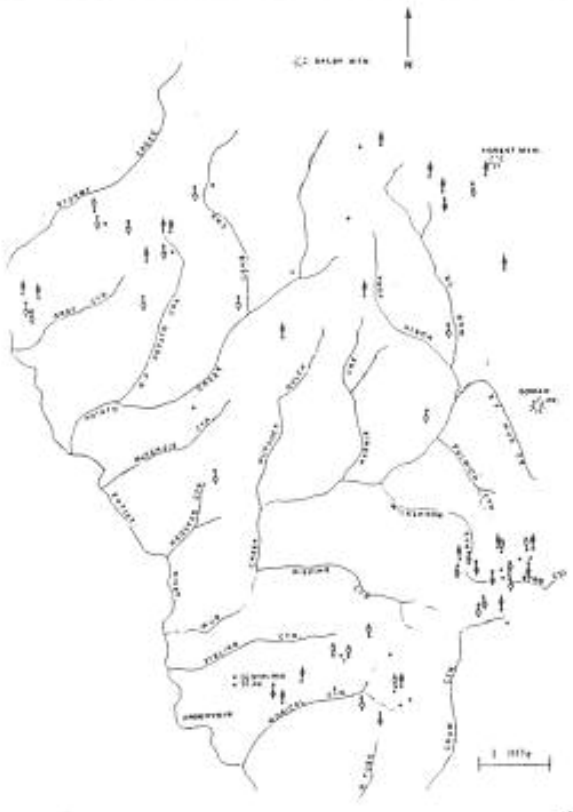


1804

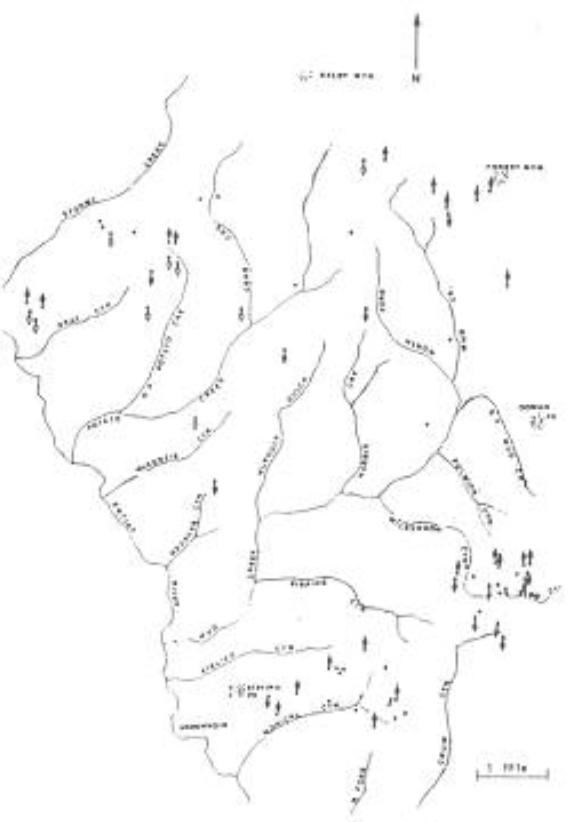
1799



1794



1791



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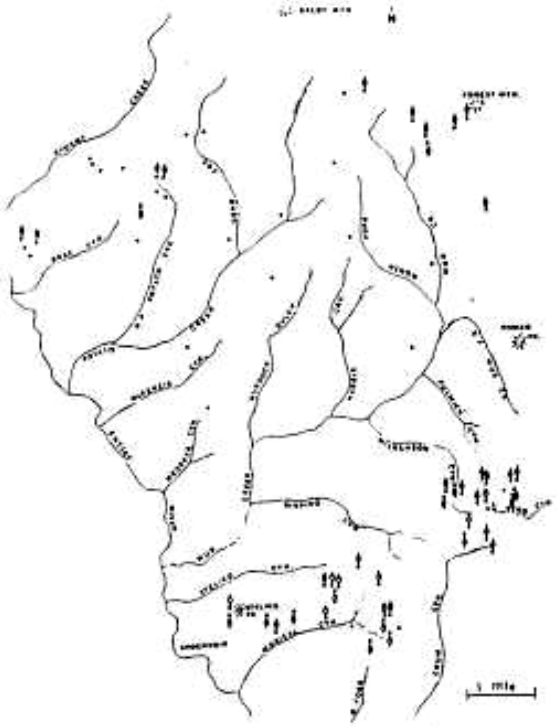
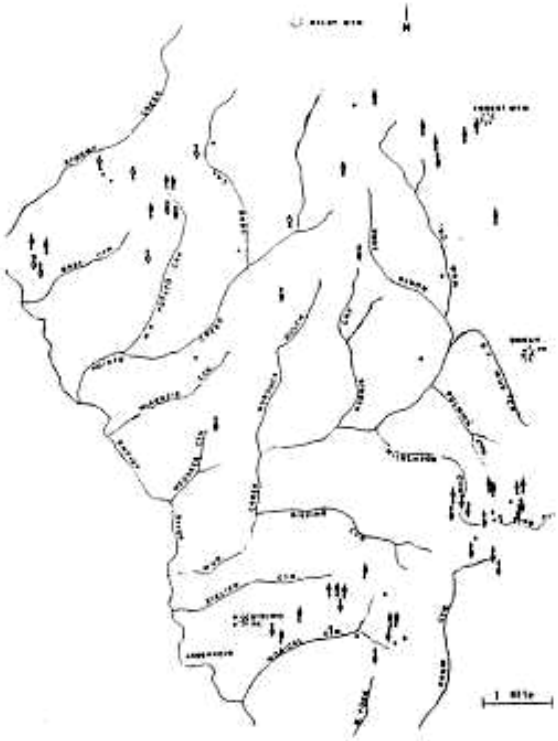
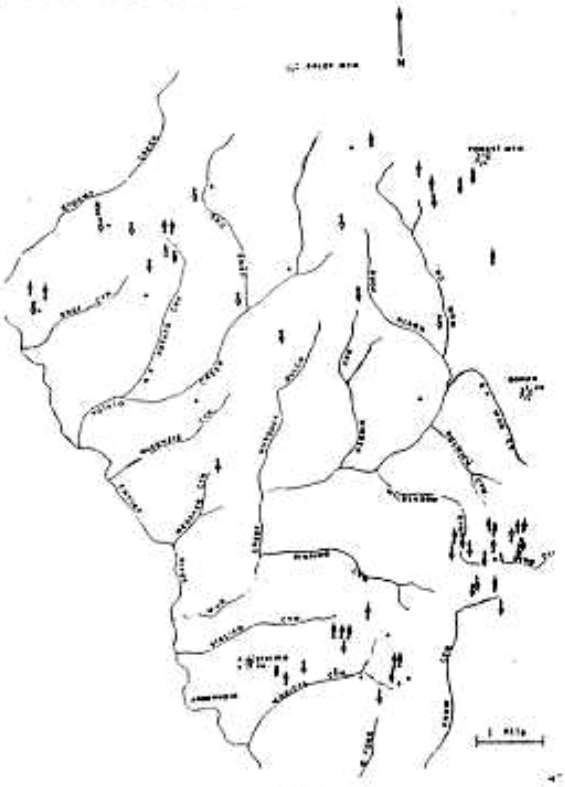


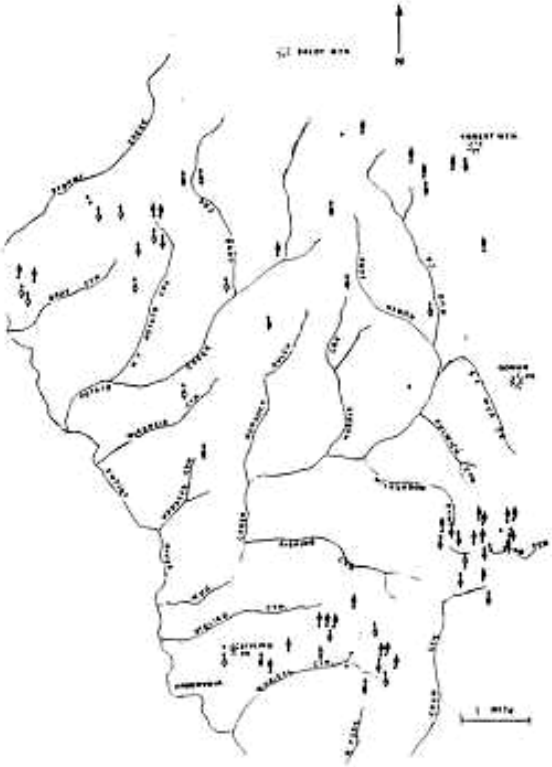
1781



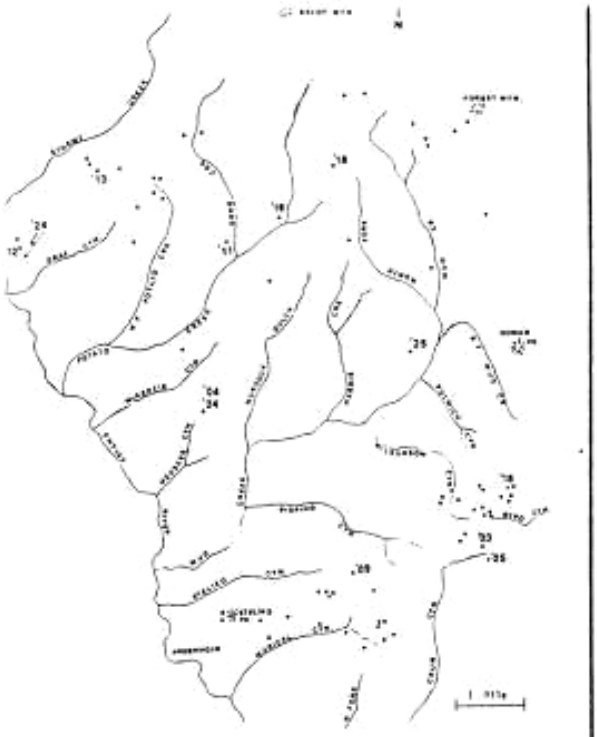
1776



1768

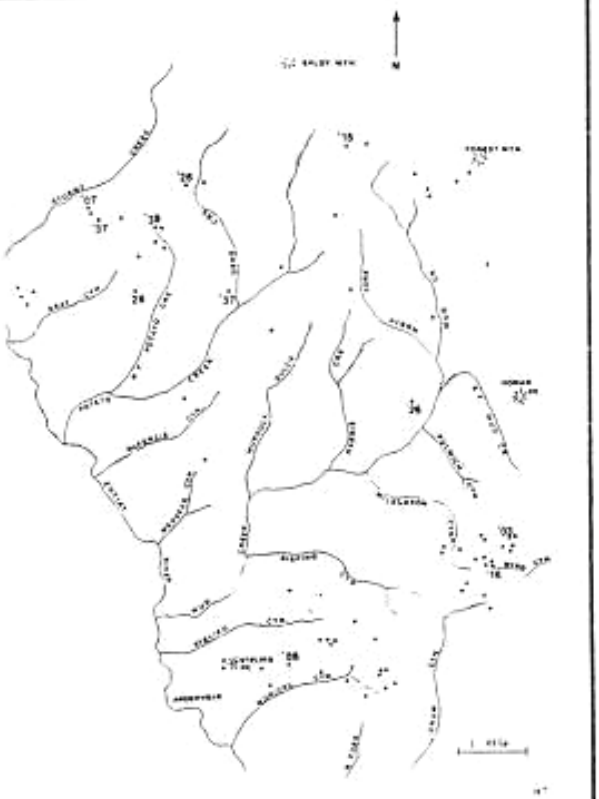


1756



1900 - 1925

1850 - 1900



1800 - 1850

1750 - 1800

APPENDIX E

Some citizens have expressed a passion for implementing ecosystem restoration projects and hazardous fuels reduction on their own properties and adjacent government lands. Entiat CWPP prioritization for 2008 was based on that passion and drive. Implementation priorities were based on planning completed on any adjacent government land. Planning priorities were based on the lack of planning on any adjacent government land.

Implementation Priorities: Private landowners in four assessment zones are interested in restoring ecosystems and reducing fuels on their lands. USFS has planned and is implementing projects in those WUI assessment zones. Other government agencies need to complete their planning for a coordinated resource management plan and to avoid delaying implementation on the private lands.

WUI Zone	WDFW	DNR	F&WS	BLM	USFS-implementation	BPA-implementation
Mud/Potato	no lands managed in WUI Assessment Zone	Priority 1) plan	no lands managed in WUI Assessment Zone	Priority 1) plan	Priority 1) implementation	no lands managed in WUI Assessment Zone
Tillicum	no lands managed in WUI Assessment Zone	Priority 3) plan	Priority 1) plan	Priority 3) plan	Priority 2) implementation	Priority 2) implementation
Preston/Stormy	no lands managed in WUI Assessment Zone	no lands managed in WUI Assessment Zone	no lands managed in WUI Assessment Zone	no lands managed in WUI Assessment Zone	Priority 3) implementation	no lands managed in WUI Assessment Zone
Crum	Priority 1) plan	Priority 3) plan	Priority 3) plan	Priority 3) plan	Priority 4) implementation	Priority 1) implementation
Mesa/Oklahoma	Priority 2) plan	Priority 4) plan	no lands managed in WUI Assessment Zone	Priority 4) plan	Priority 5) implementation	Priority 3) implementation

Planning Priorities: Private landowners in two assessment zones are interested in restoring ecosystems and reducing fuels on their lands. All government agencies need to complete their planning for a coordinated resource management plan.

WUI Zone	WDFW	DNR	F&WS	BLM	USFS-planning	BPA-implementation
Tommy&Tyee/Hornet	no lands managed in WUI Assessment Zone	Priority 2) plan	Priority 2) plan	Priority 2) plan	Priority 1) plan	Priority 4) implementation

WUI Zone	WDFW	DNR	F&WS	BLM	USFS-plan	USFS-implem	BPA
Tommy&Tyee/Hornet	n/a	Priority 2) plan	Priority 3) plan	Priority 2) plan	Priority 1) plan	Priority 6) implementation	Priority 4) implementation
Mud/Potato	n/a	Priority 1) plan	n/a	Priority 1) plan	Priority 2) plan	Priority 2) implementation	n/a
Preston/Stormy	n/a	n/a	n/a	n/a		Priority 1) implementation	n/a
Tillicum		Priority 3) plan	Priority 1) plan	Priority 3) plan		Priority 3) implementation	Priority 2) implementation
Crum	Priority 1) plan	Priority 3) plan	Priority 4) plan	Priority 3) plan		Priority 3) implementation	Priority 1) implementation
Mills/Roaring	n/a	Priority 4) plan	Priority 2) plan	Priority 4) plan	Priority 6) plan		n/a
Swakane Breaks	Priority 3) plan	Priority 5) plan	n/a	Priority 4) plan	Priority 3) plan	Priority 4) implementation	n/a
Mesa/Oklahoma	Priority 2) plan	Priority 6) plan	n/a	Priority 4) plan	Priority 6) plan	Priority 5) implementation	Priority 3) implementation
Silver/Lake	n/a	n/a	n/a	n/a	Priority 4) plan		n/a
Cottonwood/North Fork	n/a	n/a	n/a	n/a	Priority 8) plan		n/a
Upper Swakane	n/a	n/a	n/a	n/a	Priority 7) plan		n/a
Upper Mad	n/a	n/a	n/a	n/a	Priority 5) plan	Priority 6) implementation	n/a
Upper Entiat	n/a	n/a	n/a	n/a	Priority 9) plan		n/a