Ferry County, Washington

Community Wildfire Protection Plan (*CWPP*)

December 8, 2006

Vision: *Promote a countywide hazard mitigation ethic through leadership, professionalism, and excellence, leading the way to a safe, sustainable Ferry County.*

Volume II

This plan was developed by the Ferry County Community Wildfire Protection Plan Core Team in cooperation with Northwest Management, Inc., 233 E. Palouse River Dr., P.O. Box 9748, Moscow, ID, 83843, Tel: 208-883-4488, www.Consulting-Foresters.com

Acknowledgments

This Community Wildfire Protection Plan represents the efforts and cooperation of a number of organizations and agencies; through the commitment of people working together to improve the preparedness for wildfire events while reducing factors of risk.

Ferry County Commissioners
and the employees of Ferry County

Washington State Department of Natural Resources

USDI Bureau of Land Management

USDA Forest Service

USDI Bureau of Indian Affairs

City of Republic, Washington

USDI National Park Service

Federal Emergency Management Agency

Washington Military Department
Emergency Management Division

Confederated Tribes of the Colville Reservation

Northeast Washington Forestry Coalition

Ferry Conservation District

Conservation Northwest
Keeping the Northwest Wild

Ferry/Okanogan County Fire Protection District #13
Ferry/Okanogan County Fire Protection District #14
Ferry County Joint Fire Protection District #3

Ferry County Sheriff's Department
Ferry County Emergency Services
Republic City Police
Ferry County Public Utilities District
Ferry County Public Hospital District No. 1
Ferry Conservation District
&
Local Businesses and Citizens of Ferry County

To obtain copies of this plan contact:

Ferry County Commissioners Office
Ferry County Courthouse
290 East Tessie Avenue
Republic, Washington 99166

Phone: 509-775-5229
Fax: 509-775-5230
Website: www.ferry-county.com

Table of Contents

CHAPTER I: OVERVIEW OF THIS PLAN AND ITS DEVELOPMENT 2

1 INTRODUCTION 2

1.1 GOALS AND GUIDING PRINCIPLES 2
1.1.1 Federal Emergency Management Agency Philosophy 2
1.1.2 United States Government Accounting Office 4
1.1.2.1 Why GAO Did A Study 4
1.1.2.2 What GAO Found 4
1.1.3 Additional State and Federal Guidelines Adopted 5
1.1.3.1 National Fire Plan 5
1.1.3.2 Washington Statewide Implementation Strategy 6
1.1.3.2.1 County Wildland Fire Interagency Group 7
1.1.3.3 National Association of State Foresters 8
1.1.3.3.1 Identifying and Prioritizing Communities at Risk 8
1.1.3.3.2 Conceptual Approach 9
1.1.3.4 Healthy Forests Restoration Act 10
1.1.4 Local Guidelines and Integration with Other Efforts 11
1.1.4.1 Ferry County Fire Mitigation Planning Effort and Philosophy 11
1.1.4.1.1 Mission Statement 11
1.1.4.1.2 Vision Statement 11
1.1.4.1.3 Goals 11
1.1.4.2 Ferry County Local Hazard Mitigation Plan 12
1.1.4.3 Ferry County Comprehensive Plan 12
1.1.4.4 Lower Kettle River Community Wildfire Protection Plan 12

CHAPTER 2: DOCUMENTING THE PLANNING PROCESS 14

2 INITIATION 14

2.1 DESCRIPTION OF THE PLANNING PROCESS 14
2.2 THE PLANNING TEAM 14
2.2.1 Multi-Jurisdictional Participation 15
2.2.2 Committee Meetings 16
2.2.2.1 Committee Meeting Minutes 17
2.3 PUBLIC INVOLVEMENT 17
2.3.1 News Releases 17
2.3.2 Public Mail Survey 19
2.3.2.1 Survey Results 20
2.3.3 Public Meetings 22
2.3.4 Documented Review Process 26
2.3.5 Continued Public Involvement 27

CHAPTER 3: FERRY COUNTY CHARACTERISTICS 28

3 BACKGROUND AND AREA DESCRIPTION 28

3.1 DEMOGRAPHICS 28
3.2 SOCIOECONOMICS 30
3.2.1 Description of Ferry County 32
3.2.1.1 Land Use 32
3.2.1.2 Recreation 33
3.2.1.2.1 Colville and Okanogan & Wenatchee National Forests 34
3.2.1.2.2 Curlew Lake State Park 34
3.2.1.2.3 Boating 34
3.2.1.2.4 Camping 34
3.2.1.2.5 Fishing and Hunting 34
3.2.1.2.6 Wildlife Viewing 35
3.2.1.3 Resource Dependency 35
3.3 CULTURAL RESOURCES 35

3.3.1 Colville Indian Reservation *37*
3.3.2 National Register of Historic Places *39*
3.4 TRANSPORTATION & INFRASTRUCTURE 40
3.4.1 Communication Sites and Lookouts *41*
3.4.2 Primary Access Routes *41*
3.5 VEGETATION & CLIMATE 41
3.5.1 Monthly Climate Summaries in Ferry County *42*
3.5.1.1 Republic 42
3.5.1.2 Laurier, Washington 43
3.5.1.3 Inchelium, Washington 43
3.6 ECOSYSTEMS 43
3.7 SOILS 44
3.8 HYDROLOGY 46
3.9 AIR QUALITY 51
3.9.1 Washington State Smoke Management Plan *51*
3.9.1.1 Background 51
3.9.1.2 Purpose 52
3.9.1.3 Goals 52
3.9.1.4 Scope 52
3.9.1.5 Participation 53

CHAPTER 4: RISK AND PREPAREDNESS ASSESSMENTS 54

4 OVERVIEW 54

4.1 WILDLAND FIRE CHARACTERISTICS 54
4.1.1 Weather *54*
4.1.2 Topography *54*
4.1.3 Fuels *55*
4.2 WILDFIRE HAZARDS 55
4.2.1 Wildfire Ignition Profile *55*
4.2.2 Wildfire Extent Profile *61*
4.2.2.1 Past Fire Narratives 64
4.2.2.1.1 White Mountain Fire (1988) - 21,717 acres 64
4.2.2.1.2 Copper Butte Fire (1994) - 10,473 acres 65
4.2.2.1.3 Mount Leona Fire (2001) - 4,820 acres 65
4.2.2.1.4 Togo Fire (2003) - 5,200 acres 66
4.3 WILDFIRE HAZARD ASSESSMENT 67
4.3.1 Fire Prone Landscapes *67*
4.3.2 Historic Fire Regime *70*
4.3.2.1 General Limitations 70
4.3.3 Fire Regime Condition Class *71*
4.4 FERRY COUNTY CONDITIONS 74
4.5 FERRY COUNTY'S WILDLAND-URBAN INTERFACE 75
4.5.1 Potential WUI Treatments *78*
4.6 FERRY COUNTY COMMUNITIES AT RISK 79
4.7 NEIGHBORHOODS IN FERRY COUNTY 79
4.7.1 Vegetative Associations *80*
4.7.2 Overall Fuels Assessment *81*
4.7.3 Overall Mitigation Activities *82*
4.7.4 Strategic Planning Area #1 ..... *84*
4.7.4.1 Neighborhoods of West Fork, Sanpoil Valley, Granite, and Hadley-Walker 84
4.7.4.1.1 Fuels Assessment 85
4.7.4.1.2 Ingress-Egress 85
4.7.4.1.3 Infrastructure 85
4.7.4.1.4 Fire Protection 85
4.7.4.1.5 Community Assessment 86
4.7.4.1.6 Mitigation Activities 86
4.7.4.2 Neighborhoods of North Republic, Southwest Republic, Southeast Republic, and Klondike-Pine Grove ... 86
4.7.4.2.1 Fuels Assessment 87

4.7.4.2.2 Ingress-Egress ... 88
4.7.4.2.3 Infrastructure ... 88
4.7.4.2.4 Fire Protection ... 88
4.7.4.2.5 Community Assessment ... 89
4.7.4.2.6 Mitigation Activities ... 89
4.7.4.3 Neighborhoods of East Lake and West Lake ... 90
4.7.4.3.1 Fuels Assessment ... 91
4.7.4.3.2 Ingress-Egress ... 91
4.7.4.3.3 Infrastructure ... 92
4.7.4.3.4 Fire Protection ... 93
4.7.4.3.5 Community Assessment ... 93
4.7.4.3.6 Mitigation Activities ... 94
4.7.5 Strategic Planning Area #2 ... 95
4.7.5.1 Neighborhoods of Lundimo and Empire, ... 95
4.7.5.1.1 Fuels Assessment ... 95
4.7.5.1.2 Ingress-Egress ... 96
4.7.5.1.3 Infrastructure ... 96
4.7.5.1.4 Fire Protection ... 96
4.7.5.1.5 Community Assessment ... 96
4.7.5.1.6 Mitigation Activities ... 97
4.7.5.2 Neighborhoods of Kettle, Toroda, and Ferry ... 97
4.7.5.2.1 Fuels Assessment ... 98
4.7.5.2.2 Ingress-Egress ... 98
4.7.5.2.3 Infrastructure ... 98
4.7.5.2.4 Fire Protection ... 99
4.7.5.2.5 Community Assessment ... 99
4.7.5.2.6 Mitigation Activities ... 100
4.7.5.3 Neighborhoods of Curlew and Danville ... 100
4.7.5.3.1 Fuels Assessment ... 101
4.7.5.3.2 Ingress-Egress ... 101
4.7.5.3.3 Infrastructure ... 102
4.7.5.3.4 Fire Protection ... 102
4.7.5.3.5 Community Assessment ... 102
4.7.5.3.6 Mitigation Activities ... 103
4.7.5.4 Neighborhoods of Lone Ranch, Boulder, and Malo East ... 103
4.7.5.4.1 Fuels Assessment ... 104
4.7.5.4.2 Ingress-Egress ... 106
4.7.5.4.3 Infrastructure ... 106
4.7.5.4.4 Fire Protection ... 106
4.7.5.4.5 Community Assessment ... 107
4.7.5.4.6 Mitigation Activities ... 108
4.7.5.5 Ferry County Strategic Planning Area #3 ... 108
4.7.5.6 Little Boulder Neighborhood (LKR) ... 109
4.7.5.6.1 Fuels Assessment ... 109
4.7.5.6.2 Ingress-Egress ... 109
4.7.5.6.3 Infrastructure ... 110
4.7.5.6.4 Fire Protection ... 110
4.7.5.6.5 Community Assessments ... 110
4.7.5.6.6 Mitigation Activities ... 111
4.7.5.7 Boulder – Deadman Neighborhood ... 111
4.7.5.7.1 Fuels Assessment ... 111
4.7.5.7.2 Ingress-Egress ... 111
4.7.5.7.3 Infrastructure ... 112
4.7.5.7.4 Fire Protection ... 112
4.7.5.7.5 Community Assessment ... 112
4.7.5.7.6 Mitigation Activities ... 113
4.7.5.8 Sherman Neighborhood ... 113
4.7.5.8.1 Fuels Assessment ... 113
4.7.5.8.2 Ingress-Egress ... 114
4.7.5.8.3 Infrastructure ... 114
4.7.5.8.4 Fire Protection ... 114
4.7.5.8.5 Community Assessment ... 114

4.7.5.8.6 Mitigation Activities 115
4.7.6 Strategic Planning Area #4 ..... *116*
4.7.6.1 Colville Indian Reservation 116
4.8 FIREFIGHTING RESOURCES AND CAPABILITIES 116
4.8.1 Stevens/Ferry County Joint Fire Protection District #3 ..... *116*
4.8.1.1 Equipment Resource Lists 116
4.8.2 Ferry/Okanogan County Fire Protection District #13 ..... *117*
4.8.3 Ferry/Okanogan County Fire Protection District #14 ..... *122*
4.9 WILDLAND FIRE DISTRICTS 124
4.9.1 Washington Department of Natural Resources *124*
4.9.1.1 Highlands District 124
4.9.1.2 North Columbia District 127
4.9.1.2.1 Staffing 127
4.9.1.2.2 Resources and Crew Configurations 128
4.9.2 Bureau of Land Management – Spokane District *129*
4.9.3 USDA Forest Service – Colville National Forest *130*
4.10 ISSUES FACING FERRY COUNTY FIRE PROTECTION 132
4.10.1 Wildland Fire Suppression Mobility *132*
4.10.2 Accessibility *133*
4.10.3 Orient Watershed *133*
4.10.4 Recruitment and Retention, Funding, Equipment Needs, Etc. *133*
4.10.5 Road Signage and Rural Addressing *133*
4.11 CURRENT WILDFIRE MITIGATION ACTIVITIES IN FERRY COUNTY. 134
4.11.1 Granite – Trout Fuel Reduction Project *134*

CHAPTER 5: TREATMENT RECOMMENDATIONS 135

5 ADMINISTRATION & IMPLEMENTATION STRATEGY 135

5.1 MONITORING AND MAINTENANCE 135
5.2 PRIORITIZATION OF MITIGATION ACTIVITIES 135
5.2.1 Prioritization Scheme *136*
5.2.1.1 Benefit / Cost 137
5.2.1.2 Population Benefit 138
5.2.1.3 Property Benefit 138
5.2.1.4 Economic Benefit 138
5.2.1.5 Vulnerability of the Community 138
5.2.1.6 Project Feasibility (Environmentally, Politically & Socially) 138
5.2.1.7 Hazard Magnitude/Frequency 139
5.2.1.8 Potential for repetitive loss reduction 139
5.2.1.9 Potential to mitigate hazards to future development 139
5.2.1.10 Potential project effectiveness and sustainability 139
5.2.1.11 Final ranking 139
5.3 POSSIBLE WILDFIRE MITIGATION ACTIVITIES 140
5.4 WUI SAFETY & POLICY 140
5.5 PEOPLE AND STRUCTURES 142
5.6 INFRASTRUCTURE 151
5.7 RESOURCE AND CAPABILITY ENHANCEMENTS 160
5.8 REGIONAL LAND MANAGEMENT RECOMMENDATIONS 164
5.8.1 National Park Service *164*
5.8.1.1 Haag Cove – 27 Acres 164
5.8.1.2 Whispering Pines – 35 Acres 164
5.8.1.3 Kettle River Arm – 27 Acres 165
5.8.1.4 Sherman Creek – 10.5 Acres 166
5.8.1.5 Napolean to Railroad – 60.1 Acres 166
5.8.2 Washington Department of Natural Resources *166*
5.8.2.1 DNR Projects in Strategic Planning Area #1 166
5.8.2.1.1 Trout Creek T.S. Area – 654 Acres 166
5.8.2.1.2 Lambert Creek Road 166
5.8.2.1.3 Mires Creek T.S. Area – 752 Acres 166

5.8.2.1.4 North Storm King T.S. Area – 1,772 Acres 167
5.8.2.1.5 San Poil T.S. Area – 629 Acres 167
5.8.2.1.6 BPA Transmission Line Area – 359 Acres 167
5.8.2.1.7 O'Brien Creek Fuels Reduction Area – 659 Acres 167
5.8.2.1.8 San Poil Rim Area – 1,587 Acres 167
5.8.2.1.9 Swan Lake Road – 233 Acres 167
5.8.2.2 DNR Projects in Strategic Planning Area #2 167
5.8.2.2.1 Graphite Mountain Area – 835 Acres 167
5.8.2.2.2 North Vulcan Mountain Area – 1,031 Acres 168
5.8.2.2.3 Goosmus Area – 2,422 Acres 168
5.8.2.2.4 Lundimo T.S. Area – 607 Acres 168
5.8.2.2.5 Boulder Pass Area – 1,030 Acres 168
5.8.2.2.6 Long Alec Creek Area – 2,237 Acres 168
5.8.3 USDA Forest Service Projects 168

CHAPTER 6: SUPPORTING INFORMATION 170

6 170

6.1 LIST OF TABLES 170
6.2 LIST OF FIGURES 172
6.3 LIST OF PREPARERS 172
6.4 SIGNATURE PAGES 173
6.4.1 Local Government 173
6.4.1.1 Resolution of Adoption by Board of County Commissioners 173
6.4.1.2 Signatures of Participation by County and City Representatives 174
6.4.2 Signature of Participation by Ferry County Fire Districts 174
6.4.3 Signatures of Participation by other Ferry County Entities 175
6.5 GLOSSARY OF TERMS 176
6.6 LITERATURE CITED 183

Foreword

The **Ferry County All Hazard Mitigation Plan** was developed in 2006 by the Ferry County Hazard Mitigation planning team. The Ferry County Community Wildfire Protection Plan is part of the All Hazard Mitigation Plan. Although it is being published as a separate document, it should be considered one chapter of the Ferry County All Hazard Mitigation Plan and is hereby incorporated into that plan's contents.

Chapter I: Overview of this Plan and its Development

1 Introduction

This Community Wildfire Protection Plan for Ferry County, Washington, is the result of analyses, professional cooperation and collaboration, assessments of wildfire risks and other factors considered with the intent to reduce the potential for wildfires to threaten people, structures, infrastructure, and unique ecosystems in Ferry County, Washington. The core team responsible for implementing this project was led by the Ferry County Commissioners. Agencies and organizations that participated in the planning process included:

- Ferry County Commissioners and County Departments
- City of Republic
- Lower Kettle River CWPP Core team
- Ferry County Fire Districts
- Washington Department of Natural Resources
- Ferry County Public Utilities District
- USDI Bureau of Land Management
- Washington Military Department, Emergency Management Division
- Ferry County Conservation District
- National Park Service
- USDA Forest Service
- Conservation Northwest
- Confederated Tribes of the Colville Reservation
- USDI Bureau of Indian Affairs
- Northeast Washington Forestry Coalition
- Ferry County Sheriff's Department and Emergency Services
- Northwest Management, Inc.

The Ferry County Core Team met monthly throughout 2005 to establish the committee structure, goals, and strategies. In October of 2005, Ferry County solicited competitive bids from companies to provide the service of leading the assessment, developing the data, and writing the **Ferry County Community Wildfire Protection Plan**. Northwest Management, Inc. was selected to provide this service to the County. Northwest Management, Inc. is a professional natural resources consulting firm located in Moscow, Idaho. Established in 1984 NMI provides natural resource management services across the USA. The Project Co-Managers from Northwest Management, Inc. were Dr. William E. Schlosser, Mr. Vaiden Bloch, and Mrs. Tera R. King.

1.1 Goals and Guiding Principles

1.1.1 Federal Emergency Management Agency Philosophy

Effective November 1, 2004, an All Hazard Mitigation Plan approved by the Federal Emergency Management Agency (FEMA) is required for Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation Program (PDM) eligibility. The HMGP and PDM program provide

funding, through state emergency management agencies, to support local mitigation planning and projects to reduce potential disaster damages.

The new local All Hazard Mitigation Plan requirements for HMGP and PDM eligibility is based on the Disaster Mitigation Act of 2000, which amended the Stafford Disaster Relief Act to promote an integrated, cost effective approach to mitigation. Local All Hazard Mitigation Plans must meet the minimum requirements of the Stafford Act-Section 322, as outlined in the criteria contained in 44 CFR Part 201. The plan criteria cover the planning process, risk assessment, mitigation strategy, plan maintenance, and adoption requirements.

FEMA will only review a local All Hazard Mitigation Plan submitted through the appropriate State Hazard Mitigation Officer (SHMO). Draft versions of local All Hazard Mitigation Plans will not be reviewed by FEMA. FEMA will review the final version of a plan prior to local adoption to determine if the plan meets the criteria, but FEMA will be unable to approve it prior to adoption.

This Community Wildfire Protection Plan is one chapter of the Ferry County All Hazard Mitigation Plan.

In Washington the SHMO is:

Martin E. Best
Washington Military Department
Emergency Management Division
Building 20, M/S: TA-20
Camp Murray, WA 98430-5122

A FEMA designed plan will be evaluated on its adherence to a variety of criteria.

- Adoption by the Local Governing Body
- Multi-jurisdictional Plan Adoption
- Multi-jurisdictional Planning Participation
- Documentation of Planning Process
- Identifying Hazards
- Profiling Hazard Events
- Assessing Vulnerability: Identifying Assets
- Assessing Vulnerability: Estimating Potential Losses
- Assessing Vulnerability: Analyzing Development Trends
- Multi-jurisdictional Risk Assessment
- Local Hazard Mitigation Goals
- Identification and Analysis of Mitigation Measures
- Implementation of Mitigation Measures
- Multi-jurisdictional Mitigation Strategy
- Monitoring, Evaluating, and Updating the Plan
- Implementation Through Existing Programs
- Continued Public Involvement

1.1.2 United States Government Accounting Office

Technology Assessment - April 2005 – "Protecting Structures and Improving Communications during Wildland Fires".

1.1.2.1 Why GAO Did A Study

Since 1984, wildland fires have burned an average of more than 850 homes each year in the United States and, because more people are moving into fire-prone areas bordering wildlands, the number of homes at risk is likely to grow. The primary responsibility for ensuring that preventative steps are taken to protect homes lies with homeowners and state and local governments, not the federal government. Although losses from wildland fires made up only 2 percent of all insured catastrophic losses from 1983 to 2002, fires can result in billions of dollars in damages.

Once a wildland fire starts, various parties can be mobilized to fight it, including federal, state, local, and tribal firefighting agencies and, in some cases, the military. The ability to communicate among all parties - known as interoperability - is essential but, as GAO reported previously, is hampered because different public safety agencies operate on different radio frequencies or use incompatible communications equipment (GAO 2005).

GAO was asked to assess, among other issues, (1) measures that can help protect structures from wildland fires, (2) factors affecting use of protective measures, and (3) the role technology plays in improving firefighting agencies' ability to communicate during wildland fires.

1.1.2.2 What GAO Found

The two most effective measures for protecting structures from wildland fires are: (1) creating and maintaining a buffer, called defensible space, from 30 to 100 feet wide around a structure, where vegetation and other flammable objects are reduced or eliminated; and (2) using fire-resistant roofs and vents. In addition to roofs and vents, other technologies – such as fire-resistant windows and building materials, chemical agents, sprinklers, and geographic information systems mapping – can help in protecting structures and communities, but they play a secondary role.

Although protective measures are available, many property owners have not adopted them because of the time or expense involved, competing concerns such as aesthetics or privacy, misperceptions about wildland fire risks, and lack of awareness of their shared responsibility for fire protection. Federal, state, and local governments, as well as other organizations, are attempting to increase property owners' use of protective measures through education, direct monetary assistance, and laws requiring such measures. In addition, some insurance companies have begun to direct property owners in high risk areas to take protective steps.

Existing technologies, such as audio switches, can help link incompatible communication systems, and new technologies, such as software-defined radios, are being developed following common standards or with enhanced capabilities to overcome incompatibility barriers. Technology alone, however, cannot solve communications problems for those responding to wildland fires. Rather, planning and coordination among federal, state, and local public safety agencies is needed to resolve issues such as which technologies to adopt, cost sharing, operating procedures, training , and maintenance. The Department of Homeland Security is leading federal efforts to improve communications interoperability across all levels of government. In addition to federal efforts, several states and local jurisdictions are pursuing initiatives to improve communications interoperability.

1.1.3 Additional State and Federal Guidelines Adopted

This Community Wildfire Protection Plan will include compatibility with FEMA requirements for an All Hazard Mitigation Plan, while also adhering to the guidelines proposed in the National Fire Plan, the Washington Statewide Implementation Plan, and the Healthy Forests Restoration Act (2004). This Community Wildfire Protection Plan has been prepared in compliance with:

- The National Fire Plan; A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan–May 2002.
- The Washington Statewide Implementation Strategy for the National Fire Plan–July 2002.
- Healthy Forests Restoration Act (2004)
- The Federal Emergency Management Agency's Region 10 guidelines for a Local All Hazard Mitigation Plan as defined in 44 CFR parts 201 and 206, and as related to a fire mitigation plan chapter of a Natural Hazards Mitigation Plan.

"When implemented, the 10-Year Comprehensive Strategy will contribute to reducing the risks of wildfire to communities and the environment by building collaboration at all levels of government."
- The NFP 10-Year Comprehensive Strategy August 2001

The objective of combining these four complimentary guidelines is to facilitate an integrated wildland fire risk assessment, identify pre-hazard mitigation activities, and prioritize activities and efforts to achieve the protection of people, structures, the environment, and significant infrastructure in Ferry County while facilitating new opportunities for pre-disaster mitigation funding and cooperation.

1.1.3.1 National Fire Plan

The goals of this Community Wildfire Protection Plan include:

1. Improve Fire Prevention and Suppression
2. Reduce Hazardous Fuels
3. Restore Fire-Adapted Ecosystems
4. Promote Community Assistance

Its three guiding principles are:

1. Priority setting that emphasizes the protection of communities and other high-priority watersheds at-risk.
2. Collaboration among governments and broadly representative stakeholders
3. Accountability through performance measures and monitoring for results.

This Community Wildfire Protection Plan fulfills the National Fire Plan's 10-Year Comprehensive Strategy and the Washington Statewide Implementation Strategy for the National Fire Plan. The projects and activities recommended under this plan are in addition to other Federal, state, and private / corporate forest and rangeland management activities. The implementation plan does not alter, diminish, or expand the existing jurisdiction, statutory and regulatory responsibilities and authorities or budget processes of participating Federal, State, and tribal agencies.

By endorsing this implementation plan, all signed parties agree that reducing the threat of wildland fire to people, communities, and ecosystems will require:

- Firefighter and public safety continuing as the highest priority.
- A sustained, long-term and cost-effective investment of resources by all public and private parties, recognizing overall budget parameters affecting Federal, State, Tribal, and local governments.
- A unified effort to implement the collaborative framework called for in the Strategy in a manner that ensures timely decisions at each level.
- Accountability for measuring and monitoring performance and outcomes, and a commitment to factoring findings into future decision making activities.
- The achievement of national goals through action at the local level with particular attention on the unique needs of cross-boundary efforts and the importance of funding on-the-ground activities.
- Communities and individuals in the wildland-urban interface to initiate personal stewardship and volunteer actions that will reduce wildland fire risks.
- Management activities, both in the wildland-urban interface and in at-risk areas across the broader landscape.
- Active forestland and rangeland management, including thinning that produces commercial or pre-commercial products, biomass removal and utilization, prescribed fire and other fuels reduction tools to simultaneously meet long-term ecological, economic, and community objectives.

The National Fire Plan identifies a three-tiered organization structure including 1) the local level, 2) state/regional and tribal level, and 3) the national level. This plan adheres to the collaboration and outcomes consistent with a local level plan. Local level collaboration involves participants with direct responsibility for management decisions affecting public and/or private land and resources, fire protection responsibilities, or good working knowledge and interest in local resources. Participants in this planning process include Tribal representatives, local representatives from Federal and State agencies, local governments, landowners and other stakeholders, and community-based groups with a demonstrated commitment to achieving the strategy's four goals. Existing resource advisory committees, watershed councils, or other collaborative entities may serve to achieve coordination at this level. Local involvement, expected to be broadly representative, is a primary source of planning, project prioritization, and resource allocation and coordination at the local level. The role of the private citizen is not to be under estimated, as their input and contribution to all phases of risk assessments, mitigation activities, and project implementation is greatly facilitated by their involvement.

1.1.3.2 Washington Statewide Implementation Strategy

The Strategy adopted by the State of Washington is to provide a framework for an organized and coordinated approach to the implementation of the National Fire Plan, specifically the national "10-Year Comprehensive Strategy Implementation Plan".

Emphasis is on a collaborative approach at the following levels:

- County
- State

Within the State of Washington, the Counties, with the assistance of State and Federal agencies and local expert advice, will develop a risk assessment and mitigation plan to identify local

vulnerabilities to wildland fire. A Statewide group will provide oversight and prioritization as needed on a statewide scale.

This strategy is not intended to circumvent any work done to date and individual Counties should not delay implementing any National Fire Plan projects to develop this county plan. Rather, Counties are encouraged to identify priority needs quickly and begin whatever actions necessary to mitigate those vulnerabilities.

It is recognized that implementation activities such as; hazardous fuel treatment, equipment purchases, training, home owner education, community wildland fire mitigation planning, and other activities, will be occurring concurrently with this County wide planning effort.

1.1.3.2.1 County Wildland Fire Interagency Group

Each County within the State has been requested to write a Wildland Fire Mitigation Plan. These plans should contain at least the following five elements:

1) Documentation of the process used to develop the mitigation plan. How the plan was developed, who was involved and how the public was involved.
2) A risk assessment to identify vulnerabilities to wildfire in the wildland-urban interface (WUI).
3) A prioritized mitigation strategy that addresses each of the risks. Examples of these strategies could be: training for fire departments, public education, hazardous fuel treatments, equipment, communications, additional planning, new facilities, infrastructure improvements, code and/or ordinance revision, volunteer efforts, evacuation plans, etc.
4) A process for maintenance of the plan which will include monitoring and evaluation of mitigation activities
5) Documentation that the plan has been formally adopted by the involved agencies. Basically a signature page of all involved officials.

This five-element plan is an abbreviated version of the FEMA mitigation plan and will begin to meet the requirements for that plan. To develop these plans each county should bring together the following individuals, as appropriate for each county, to make up the County Wildland Fire Interagency Group (Core Team). It is important that this group has representation from agencies with wildland fire suppression responsibilities:

- County Commissioners (Lead)
- Local Fire Chiefs
- Washington Department of Natural Resources representative
- USDA Forest Service representative
- USDI Bureau of Land Management representative
- US Fish and Wildlife representative
- Bureau of Indian Affairs
- Local Tribal leaders
- Washington Military Department, Emergency Management Division
- LEPC Chairperson
- Resource Conservation and Development representative
- Washington Department of Wildlife representative
- Interested citizens and community leaders as appropriate

- Other officials as appropriate

Role of Resource Conservation and Development Councils (RC&D): If requested by the County Commissioners, the local RC&D's may be available to assist the County Commissioners in evaluating each County within their council area to determine if there is a wildland fire mitigation plan in place, or if a plan is currently in the development phase. If no plan is in place, the RC&D's, if requested, could be available to assist the Commissioners with the formation of the County Wildland Fire Interagency Group and/or to facilitate the development of wildland fire mitigation plan.

If a plan has been previously completed, the Commissioners will determine if the recommended five elements have been addressed. The Counties will provide a copy of the completed mitigation plan to the Washington Department of Natural Resources National Fire Plan Coordinator, which will include a contact list of individuals that developed the plan.

1.1.3.3 National Association of State Foresters

1.1.3.3.1 Identifying and Prioritizing Communities at Risk

This plan is written with the intent to provide the information necessary for decision makers (elected officials) to make informed decisions in order to prioritize projects across the entire county. These decisions may be made from within the council of Commissioners, or through the recommendations of ad hoc groups tasked with making prioritized lists of projects. It is not necessary to rank projects numerically, although that is one approach, rather it may be possible to rank them categorically (high priority set, medium priority set, and so forth) and still accomplish the goals and objectives set forth in this planning document.

The following was prepared by the National Association of State Foresters (NASF), June 27, 2003, and is included here as a reference for the identification of prioritizing treatments between communities.

Purpose: To provide national, uniform guidance for implementing the provisions of the "Collaborative Fuels Treatment" MOU, and to satisfy the requirements of Task e, Goal 4 of the Implementation Plan for the 10-Year Comprehensive Strategy.

Intent: The intent is to establish broad, nationally compatible standards for identifying and prioritizing communities at risk, while allowing for maximum flexibility at the state and regional level. Three basic premises are:

- Include all lands and all ownerships.
- Use a collaborative process that is consistent with the complexity of land ownership patterns, resource management issues, and the number of interested stakeholders.
- Set priorities by evaluating projects, not by ranking communities.

The National Association of State Foresters (NASF) set forth the following guidelines in the Final Draft Concept Paper; Communities at Risk, December 2, 2002.

Task: Develop a definition for "communities at risk" and a process for prioritizing them, per the Implementation Plan for the 10-Year Comprehensive Strategy (Goal 4.e.). In addition, this definition will form the foundation for the NASF commitment to annually identify priority fuels reduction and ecosystem restoration projects in the proposed MOU with the federal agencies (section C.2 (b)).

1.1.3.3.2 Conceptual Approach

1. NASF fully supports the definition of the Wildland Urban Interface (WUI) previously published in the Federal Register. Further, proximity to federal lands should not be a consideration. The WUI is a set of conditions that exists on, or near, areas of wildland fuels nation-wide, regardless of land ownership.
2. Communities at risk (or, alternately, landscapes of similar risk) should be identified on a state-by-state basis with the involvement of all agencies with wildland fire protection responsibilities: state, local, tribal, and federal.
3. It is neither reasonable nor feasible to attempt to prioritize communities on a rank order basis. Rather, communities (or landscapes) should be sorted into three, broad categories or zones of risk: high, medium, and low. Each state, in collaboration with its local partners, will develop the specific criteria it will use to sort communities or landscapes into the three categories. NASF recommends using the publication "Wildland/Urban Interface Fire Hazard Assessment Methodology" developed by the National Wildland/Urban Interface Fire Protection Program (circa 1998) as a reference guide. (This program, which has since evolved into the Firewise Program, is under the oversight of the National Wildfire Coordinating Group (NWCG)). At minimum, states should consider the following factors when assessing the relative degree of exposure each community (landscape) faces.
    - **Risk:** Using historic fire occurrence records and other factors, assess the anticipated probability of a wildfire ignition.
    - **Hazard:** Assess the fuel conditions surrounding the community using a methodology such as fire condition class, or [other] process.
    - **Values Protected:** Evaluate the human values associated with the community or landscape, such as homes, businesses, and community infrastructure (e.g. water systems, utilities, transportation systems, critical care facilities, schools, manufacturing and industrial sites, and high value commercial timber lands).
    - **Protection Capabilities:** Assess the wildland fire protection capabilities of the agencies and local fire departments with jurisdiction.
4. Prioritize by project not by community. Annually prioritize projects within each state using the collaborative process defined in the national, interagency MOU "For the Development of a Collaborative Fuels Treatment Program". Assign the highest priorities to projects that will provide the greatest benefits either on the landscape or to communities. Attempt to properly sequence treatments on the landscape by working first around and within communities, and then moving further out into the surrounding landscape. This will require:
    - First, focus on the zone of highest overall risk but consider projects in all zones. Identify a set of projects that will effectively reduce the level of risk to communities within the zone.
    - Second, determining the community's willingness and readiness to actively participate in an identified project.
    - Third, determining the willingness and ability of the owner of the surrounding land to undertake, and maintain, a complementary project.

- Last, set priorities by looking for projects that best meet the three criteria above. It is important to note that projects with the greatest potential to reduce risk to communities and the landscape may not be those in the highest risk zone, particularly if either the community or the surrounding landowner is not willing or able to actively participate.

5. It is important, and necessary, that we be able to demonstrate a level of accomplishment that justifies to Congress the value of continuing the current level of appropriations for the National Fire Plan. Although appealing to appropriators and others, it is not likely that many communities (if any) will ever be removed from the list of communities at risk. Even after treatment, all communities will remain at some, albeit reduced, level of risk. However, by using a science-based system for measuring relative risk, we can likely show that, after treatment (or a series of treatments); communities are at "*reduced risk*".

Similarly, scattered, individual homes that complete projects to create defensible space could be "counted" as "households at reduced risk". This would be a way to report progress in reducing risk to scattered homes in areas of low priority for large-scale fuels treatment projects.

Using the concept described above, the NASF believes it is possible to accurately assess the relative risk that communities face from wildland fire. Recognizing that the condition of the vegetation (fuel) on the landscape is dynamic, assessments and re-assessments must be done on a state-by-state basis, using a process that allows for the integration of local knowledge, conditions, and circumstances, with science-based national guidelines. We must remember that it is not only important to lower the risk to communities, but once the risk has been reduced, to maintain those communities at a reduced risk.

Further, it is essential that both the assessment process and the prioritization of projects be done collaboratively, with all local agencies with fire protection jurisdiction – federal, state, local, and tribal – taking an active role.

1.1.3.4 Healthy Forests Restoration Act

On December 3, 2003, President Bush signed into law the Healthy Forests Restoration Act of 2003 to reduce the threat of destructive wildfires while upholding environmental standards and encouraging early public input during review and planning processes. The legislation is based on sound science and helps further the President's Healthy Forests Initiative pledge to care for America's forests and rangelands, reduce the risk of catastrophic fire to communities, help save the lives of firefighters and citizens, and protect threatened and endangered species.

Among other things the Healthy Forests Restoration Act (HFRA):

- Strengthens public participation in developing high priority projects;
- Reduces the complexity of environmental analysis allowing federal land agencies to use the best science available to actively manage land under their protection;
- Creates a pre-decisional objections process encouraging early public participation in project planning; and
- Issues clear guidance for court action challenging HFRA projects.

The Ferry County Community Wildfire Protection Plan is developed to adhere to the principles of the HFRA while providing recommendations consistent with the policy document which should assist the federal land management agencies (US Forest Service and Bureau of Land Management) with implementing wildfire mitigation projects in Ferry County that incorporate

public involvement and the input from a wide spectrum of fire and emergency services providers in the region.

1.1.4 Local Guidelines and Integration with Other Efforts

1.1.4.1 Ferry County Fire Mitigation Planning Effort and Philosophy

The goals of this planning process include the integration of the National Fire Plan, the Washington Statewide Implementation Strategy, the Healthy Forests Restoration Act, and the requirements of FEMA for a wildfire plan chapter, a component of the County's Hazard Mitigation Plan. This effort will utilize the best and most appropriate science from all partners, the integration of local and regional knowledge about wildfire risks and fire behavior, while meeting the needs of local citizens, the regional economy, the significance of this region to the rest of Washington and the Inland West.

1.1.4.1.1 Mission Statement

The Ferry County Community Wildfire Protection Plan is meant to identify wildfire response capability, educate homeowners as to what actions can be taken to reduce the ignitability of structures, and evaluate critical infrastructure throughout the county. To identify prioritized areas for hazardous fuel reduction treatments on Federal, State, and Private land and to build on existing efforts to restore healthy forest conditions within the county. This plan will clarify and refine our priorities for the protection of life, property, critical infrastructure, and identify wildland-urban interface areas.

1.1.4.1.2 Vision Statement

Promote a countywide wildfire hazard mitigation concept through leadership, professionalism, and excellence, leading the way to a safe, sustainable Ferry County.

1.1.4.1.3 Goals

- To reduce the area of WUI land burned and losses experienced because of wildfires where these fires threaten communities in the wildland-urban interface
- Prioritize the protection of people, structures, infrastructure, and unique ecosystems that contribute to our way of life and the sustainability of the local and regional economy
- Educate communities about the unique challenges of wildfire in the wildland-urban interface (WUI)
- Establish mitigation priorities and develop mitigation strategies in Ferry County
- Strategically locate and plan fuel reduction projects
- Provide recommendations for alternative treatment methods, such as modifying forest stand density, herbicide treatments, fuel reduction techniques, and disposal or removal of treated slash
- Meet or exceed the requirements of the National Fire Plan and FEMA for a County-level Wildfire Protection Plan

1.1.4.2 Ferry County Local Hazard Mitigation Plan

The Ferry County Local Hazard Mitigation Plan was developed to meet the requirements of the Disaster Mitigation Act of 2000. The Ferry County Hazard Mitigation Advisory Group was established to make the population, neighborhoods, businesses, and institutions of the County more resistant to the impacts of future disasters. The Advisory Group completed a comprehensive, detailed evaluation of the vulnerabilities of the community to all types of future, natural, technological, and societal hazards in order to identify ways to make the communities of the planning area more resistant to their impacts. The Plan further addresses the mitigation goals and objectives established by the Advisory Group.

Mitigation planning is a dynamic process that can be adjusted when warranted to account for changes in the community and to further refine the information, judgments, and proposals documented in the local mitigation plan. Maintenance of the Hazard Mitigation Plan will included the Advisory Group's activities every five years to monitor implementation of the Plan, to evaluate the effectiveness of implemented mitigation initiatives, to revise and update the Plan to include initiatives proposed within the 5-year period, and to continually strive to engage the community in the planning process.

1.1.4.3 Ferry County Comprehensive Plan

The Ferry County Comprehensive Plan provides a vision for the County that indicates how it wants to develop and make public investments over the next 20 years. It analyzes land use, natural resources, public facilities, local services, population, economics, and housing to identify local issues and devise appropriate policies that will address those issues in a manner consistent with this vision. It provides the long-range focus to help decision-makers set priorities and evaluate whether development proposals are consistent with this vision. It is a tool to coordinate with other government agencies and to communicate to citizens and developers the vision of the community. The Comprehensive Plan provides the framework for regulatory updates, land use decisions, and public investments and will be an invaluable resource for the County as it enters the 21st Century.

The Comprehensive Plan is a dynamic document that represents a continuous process of setting goals and establishing priorities on actions to achieve those goals. This Plan provides for periodic updates and review of the plan. These updates will allow the County to reflect changing conditions and take advantage of new opportunities.

1.1.4.4 Lower Kettle River Community Wildfire Protection Plan

The Lower Kettle River (Orient) area was chosen as one of the first areas for a Community Wildfire Protection Plan in the Colville National Forest area with planning efforts beginning in the summer of 2004. A very active community was involved in the planning process as well as several fire suppression agencies working in the Lower Kettle River area, representatives from the Forest Service and Washington Department of Natural Resources, and private individuals. This CWPP provides an overall view of the watershed and its relationship with fire. It suggests ways the relationship can be improved; individually and as a community. It also provides direction to local agency land managers and concerned landowners who want to work with their neighbors in developing hazardous fuel reduction strategies.

The Lower Kettle River CWPP was finalized in December of 2005. Representative from the core team that worked on the Lower Kettle River CWPP have been invited to the table and are actively participating in the development of the Ferry County Community Wildfire Protection

Plan. Specific components of the Lower Kettle River CWPP are being incorporated into the Ferry County CWPP to ensure that the County Plan smoothly dovetails with the assessments, goals, and mitigation measures outlined in the Lower Kettle River Plan.

Chapter 2: Documenting the Planning Process

2 Initiation

Documentation of the planning process, including public involvement, is required to meet FEMA's DMA 2000 (44CFR§201.4(c)(1) and §201.6(c)(1)). This section includes a description of the planning process used to develop this plan, including how it was prepared, who was involved in the process, and how all of the involved agencies participated.

2.1 Description of the Planning Process

The Ferry County Community Wildfire Protection Plan was developed through a collaborative process involving all of the organizations and agencies detailed in Section 1.0 of this document. The County Commissioner's office contacted these organizations directly to invite their participation and schedule meetings of the core team. The planning process included 5 distinct phases which were in some cases sequential (step 1 then step 2) and in some cases intermixed (step 4 completed throughout the process):

1. **Collection of Data** about the extent and periodicity of hazards in and around Ferry County. This included an area encompassing Okanogan and Stevens County to ensure a robust dataset for making inferences about hazards in Ferry County specifically.
2. **Field Observations and Estimations** about risks, juxtaposition of structures and infrastructure to risk areas, access, and potential treatments.
3. **Mapping** of data relevant to pre-disaster mitigation control and treatments, structures, resource values, infrastructure, risk assessments, and related data.
4. **Facilitation of Public Involvement** from the formation of the core team, to a public mail survey, news releases, public meetings, public review of draft documents, and acknowledgement of the final plan by the signatory representatives.
5. **Analysis and Drafting of the Report** to integrate the results of the planning process, providing ample review and integration of committee and public input, followed by signing of the final document.

2.2 The Planning Team

Leading planning efforts from Ferry County, were Commissioner Brad Miller who served as Chairman of the Core Team and John Foster Fanning, Washington Department of Natural Resources and Ferry/Okanogan County Joint Fire Protection District #14 Chief who organized meetings, facilitated information management, and coordinated many activities associated with the development of the plan. Northwest Management Project Co-Directors were Dr. William E. Schlosser and Tera R. King, B.S., with Vaiden Bloch, M.S. Dr. Schlosser's education includes 4 degrees in natural resource management (A.S. geology; B.S. forest and range management; M.S. natural resource economic & finance; Ph.D. environmental science and regional planning). Mrs. King received a Bachelor of Science degree in natural resource management from the University of Idaho and Mr. Bloch has earned a Master of Science degree in forest products and a Bachelor of Science degree in forest management from the University of Idaho.

These individuals led a team of resource professionals that included Ferry County government, incorporated city officials, fire protection districts, law enforcement, Washington Department of

Natural Resources, Conservation Districts, the US Forest Service, fire mitigation specialists, resource management professionals, and hazard mitigation experts.

The planning team met with many residents of the county during the inspections of communities, infrastructure, and hazard abatement assessments. This methodology, when coupled with the other approaches in this process, worked adequately to integrate a wide spectrum of observations and interpretations about the project.

The planning philosophy employed in this project included the open and free sharing of information with interested parties. Information from federal and state agencies was integrated into the database of knowledge used in this project. Meetings with the committee were held throughout the planning process to facilitate a sharing of information between cooperators.

When the public meetings were held, many of the committee members were in attendance and shared their support and experiences with the planning process and their interpretations of the results.

2.2.1 Multi-Jurisdictional Participation

CFR requirement §201.6(a)(3) calls for multi-jurisdictional planning in the development of Hazard Mitigation Plans which impact multiple jurisdictions. This Community Wildfire Protection Plan is applicable to the following jurisdictions:

- Ferry County, Washington
- City of Republic

Several representatives from the Confederated Tribes of the Colville Reservation and the Colville Agency, Bureau of Indian Affairs participated in this Community Wildfire Protection Plan process. The Confederated Tribes of the Reservation are currently in the process of developing their own Hazard Mitigation Plan and Fire Management Plans. Much of the data collection and risk assessments for communities, structures, and infrastructure within the Reservation boundaries has been completed and will be included in a Reservation-wide hazard mitigation document. Although lands within the Reservation in Ferry County were considered overall, specific community risk assessments and recommendations regarding those lands are not addressed in this Community Wildfire Protection Plan. Tribal representatives on the Ferry County Community Wildfire Protection Plan committee served as advisors providing specific information and consultation for the preparation of this document. Both Ferry County and the Confederated Tribes of the Colville Reservation feel that it was in the best interest of both parties to promote the open and free sharing of information.

All jurisdictions were represented on the core team, in public meetings, and participated in the development of hazard profiles, risk assessments, and mitigation measures. The monthly core team meetings were the primary venue for authenticating the planning record. However, additional input was gathered from each jurisdiction in a combination of the following ways:

- Core team leadership visits to scheduled municipality public meetings (e.g., County Commissioner meetings, City Hall meetings) where planning updates were provided and information was exchanged.
- One-on-one visits between the core team leadership and the representatives of the municipalities (e.g., meetings with County Commissioners, City, Fire Districts, or communities).
- Special meetings at each jurisdiction by the core team leadership requested by the municipality involving elected officials (mayor and County Commissioners), appointed

officials (e.g., County Assessor, Sheriff, City Police), municipality employees, local volunteers (e.g., fire district volunteers), business community representatives, and local citizenry.

- Written correspondence was provided monthly between the core team leadership and each municipality updating the cooperators in the planning process, making requests for information, and facilitating feedback.

Core team leadership (referenced above) included: Commissioner Brad Miller, Chairman; John Foster Fanning, Core Team Coordinator; and Dr. William Schlosser, Tera King, and Vaiden Bloch of Northwest Management, Inc.

Like other rural areas of Washington and the USA, Ferry County's human resources have many demands put on them in terms of time and availability. None of the elected officials (County Commissioners and City Mayors) serve in a full-time capacity; all of them have other employment and serve the community through a convention of community service. Recognizing this, many of the jurisdictions decided to identify a representative to cooperate on the core team and then report back to the remainder of their organization on the process and serve as a conduit between the core team and the jurisdiction. In the case of the Ferry County Commissioners, Commissioner Miller was a regular attendee of the core team meetings and reported to Commissioners Blankenship and Bacon on the progress of the Ferry County CWPP.

2.2.2 Committee Meetings

The following list of people who participated in the core team meetings, volunteered time, or responded to elements of the Ferry County Community Wildfire Protection Plan's preparation.

NAME	ORGANIZATION
Bill Schlosser	Northwest Management, Inc.
Bob Hinds	Washington DNR
Brad Miller	Ferry County Commissioner
Casey Giddings	Republic Public Works Department
Chris McCuen	Colville Agency, BIA
Chuck Arnold	Ferry Conservation District
Chuck Johnson	Washington DNR
Deyo Esquivel	Colville Agency, BIA
Dick Dunton	NEW Forestry Coalition
Don Strand	Washington DNR
Fred Bremner	City of Republic
Gary Oliverson	Fire District #3
Gary Tucker	Fire District #3
Greg Palmier	Ferry County Emergency Management
Joe Alexander	Republic Ranger Station
John Foster	Washington DNR and Fire District #14
John Hamilton	Ferry Conservation District
Jon Chrysler	Fire District #13
Karrie Stevens	Republic Ranger District
Ken Kerr	Fire District #3
Linda Hall	Republic City Council
Lloyd Odell	Ferry County Conservation District
Loretta Duke	National Park Service

- Lyle Gardinier.....Ferry Conservation District
- Marsha Pakootas .....Colville Agency, BIA
- Melissa Rose.....Ferry County Resident
- Mike Almas.....Three Rivers Ranger District
- Nick Merit .....City of Republic Police
- Peter Forbes .....Colville National Forest
- Randy Sage .....Ferry County Public Utilities District
- Reed Heckly.....Republic Ranger District & Fire District #13
- Ron Fritsch.....Bureau of Land Management
- Sharon Shumate .....Natural Resources Board
- Steve Anthes.....Conservation Northwest
- Steve Rawlings .....Colville National Forest
- Tera King.....Northwest Management, Inc.
- Tim Vugteveen.....Washington DNR
- Tod Johnson .....National Park Service
- Tom Weinmann.....Three Rivers Ranger District
- Vaiden Bloch .....Northwest Management, Inc.

2.2.2.1 Committee Meeting Minutes

The Core Team began meeting in January of 2005 to lay the ground work for the Ferry County CWPP. In October of 2005, the core team began accepting proposals from contractors interested in assisting the core team in gathering data and completing the project. Northwest Management, Inc. was hired and began attending core team meetings in December 2005. In addition, during the initial stages of the project, the core team formed a Mapping Subcommittee to take on the task of reviewing and finalizing all mapping products before they were presented to the core team. All meeting minute records including Mapping Subcommittee Minutes are available for review at the Ferry County Commissioner's Office.

2.3 Public Involvement

Public involvement in this plan was made a priority from the inception of the project. There were a number of ways that public involvement was sought and facilitated. In some cases this led to members of the public providing information and seeking an active role in protecting their own homes and businesses, while in other cases it led to the public becoming more aware of the process without becoming directly involved in the planning.

2.3.1 News Releases

Under the auspices of the Ferry County Core Team, news releases were submitted to the Republic News-Miner and the Colville Statesman Examiner as well as the local radio station, KOMW Omak. Informative flyers were also distributed around town and to local offices within the communities.

Figure 2.1. Article in the Republic News-Miner on February 16th, 2006.

REPUBLIC NEWS-MINER $.65

2 160 SERVING ONLY THE "INTERESTS" OF FERRY COUNTY SINCE 1896

Washington 99166 "Ferry County" Gold - $545.90 - Silver - $9.29 VOL #103, Number 48 February 16, 20

Ferry County Wildfire Protection Plan Drafted

By John Foster, Fire Chief FY/OK FPD #14

If you've lived in Ferry County more than a year you know each summer brings a period of time when our skies turn smoky and our sunsets fire red. Most of our wildfires are started by lightning, but occasionally a human-caused fire rips through our forests. We have some of the best firefighters and firefighting agencies protecting our local lands, and that's one of the reasons why our home loss to wildland fires is low. However, ask any firefighter who's been around for awhile and you'll hear it's just a matter of time before we make national headlines with homes lost to wildfire. The firefighting agencies of our county have developed local partnerships to draft a Ferry County Wildfire Protection Plan to focus efforts towards improving fire protection capabilities within the county.

Representatives from Republic and Curlew fire districts wrote a National Fire Plan grant for funding to assist with the development of the county-wide plan. Northwest Management, Inc. has been hired as a consulting firm to do the mapping, assist in data gathering and write the Community Wildfire Protection Plan. The planning effort is being led by Ferry County Commissioner Brad Miller.

How you can get involved:

Each of our county fire protection districts will be hosting public meetings in the next few months to gather additional information from our citizens. These meetings will be advertised locally. Please plan on attending one in your area. Additionally, a survey will be mailed throughout the county to a random population sample. If you receive one of these survey forms please fill it out and mail it back to us.

Some of the goals included in the fire plan are:

- To reduce losses experienced because of wildfires in the wildland-urban interface (WUI)
- Protect people, structures, infrastructure, and unique ecosystems that contribute to our way of life and the sustainability of the local and regional economy
- Educate communities about the unique challenges of wildfire in the wildland urban interface (properties where residences are surrounded by forested areas)
- Establish mitigation priorities and continue strategies to reduce loss to wildfire in Ferry County.
- Strategically locate and plan fuel reduction projects.
- Provide recommendations for alternative treatment methods, such as modifying forest stand density, herbicide treatments, fuel reduction techniques, and disposal or removal of treated slash
- Meet or exceed the requirements of the National Fire Plan and FEMA for a County-level Wildfire Protection Plan

The partners working on this plan include: Republic Fire Department (FY/OK FPD #13), Curlew Fire Department (FY/OK FPD #14), Orient Fire Department (FY JFD #3), Ferry County Board of Commissioners, Citizens of Ferry County, WA Department of Natural Resources, Ferry County Sheriff Department & Emergency Services, City of Republic, Ferry County PUD, Ferry County Conservation District, Colville Bureau of Indian Affairs, Orient Watershed, Conservation Northwest, NEW Forestry Coalition, Lake Roosevelt National Recreational Area, Bureau of Land Management Spokane District, and USFS Colville National Forest. For more information call the County Commissioners office at 775-5229.

Figure 2.2. Article in the Republic News-Miner on May 4th, 2006.

NEWS-MINER $.65
"INTERESTS" OF FERRY COUNTY SINCE 1896
County" Gold - $664.70 -- Silver - $14.11 VOL #104, Number 7 May 4, 2006

Meetings To Address Wildfire Plan

Barstow Training Center next to Kettle River Grange: Tuesday, May 9, 7:00 pm. Republic Fire Station, 645 S. Keller: Wednesday, May 10, 7:00 pm. Malo Grange Hall, North Highway 21: Thursday, May 11, 7:00 pm. Refreshments will be provided.

These upcoming public meetings will address the Ferry County Community Wildfire Protection Plan. These meetings are open to the public and will include slideshow presentations from wildfire mitigation specialists working on the Ferry County Community Wildfire Protection Plan. Public input is being sought in order to better frame the County's efforts of wildfire mitigation treatments, fire district resource enhancements, and public land management. This meeting will last for approximately 1.5 hours. Learn about the assessments of Wildfire Risk and the Wildland-Urban Interface of Ferry County. Discuss your priorities for how our communities can best mitigate these risks. For more information on Community Wildfire Protection Plan projects in Ferry County contact the Ferry County Commissioner's Office at 509-775-5229 or William Schlosser at Northwest Management Inc. 208-883-4488.

2.3.2 Public Mail Survey

In order to collect a broad base of perceptions about wildland fire and individual risk factors of homeowners in Ferry County, a mail survey was conducted. Approximately 232 residents of Ferry County were randomly selected to receive a mail survey.

The public mail survey developed for this project has been used in the past by Northwest Management, Inc., during the execution of other Mitigation Plans. The survey used The Total Design Method (Dillman 1978) as a model to schedule the timing and content of letters sent to the selected recipients. Copies of each cover letter, mail survey, and communication are included in Appendix II.

The first in the series of mailings was sent March 9, 2006, and included a cover letter, a survey, and an offer of receiving a custom GIS map of the area of their selection in Ferry County if they would complete and return the survey. The free map incentive was tied into assisting their community and helping their interests by participating in this process. Each letter also informed residents about the planning process. A return self-addressed enveloped was included in each packet. A postcard reminder was sent to the non-respondents on March 21, 2006, encouraging their response. A final mailing, with a revised cover letter pleading with them to participate, was sent to non-respondents on March 30, 2006.

Surveys were returned during the months of March, April, May, and June. A total of 138 residents responded to the survey as of July 14, 2006. The effective response rate for this survey was 59%. Statistically, this response rate allows the interpretation of all of the response variables significantly at the 99% confidence level.

2.3.2.1 Survey Results

A summary of the survey's results will be presented here and then referred back to during the ensuing discussions on the need for various treatments, education, and other information.

Of the 138 respondents in the survey, approximately 55% were from the Republic area, 22% from Curlew, 16% were from Malo, 3% from Pine Grove, 2% from Danville, with the remaining respondents from other areas in the county.

The vast majority of the respondents (96%) correctly identified that they have emergency telephone 911 services in their area. Approximately 63% of residents indicated that their address was clearly visible from the nearest public road and 93% responded that their homes were within a taxing fire district.

Respondents were asked to indicate the type of roofing material covering the main structure of their home. Approximately 64% of respondents living in a rural area indicated their homes were covered with a metal roofing material (e.g. aluminum, tin). About 25% of these residents indicated their homes were covered with a composite (e.g. asphalt shingles) roofing material and 6% of respondents indicated they have a wooden roofing material such as shakes or shingles.

When asked how many trees were within 75 feet of their homes 10% said none and 90% indicated less than 10. When asked how many were within 250 feet, 10% responded none, 41% responded less than 10, 20% said between 10 and 20, and 33% said more than 25.

The average driveway length of respondents to the survey was 1,161 feet long (0.22 miles). The longest reported was 13,200 feet (2.5 miles). Of those respondents (18%) with a driveway over ¼ mile long, approximately 50% do not have turnouts allowing two vehicles to pass. 18% of all respondents indicated that a 25 foot long vehicle *could not* turn around in their driveway. Survey recipients were also asked how wide the running surface was and what type of material it was covered with. Average driveway width of respondents is 17 feet, with 61% saying their drive was a gravel or rock surface, 10% saying it was paved, and 29% saying it was dirt. Approximately 72% of the respondents indicated an alternate escape route was available in an emergency which cuts off their primary driveway access.

Survey recipients were asked to report emergency services training received by members of the household. Their responses are summarized in Table 2.1.

Table 2.1. Emergency Services Training received by household.

Type of Training	Percent of Households	If yes, was it within the last 5 years?
Wildland Firefighting	33%	39%
City or Rural Fire Fighting	20%	44%
EMT (Emergency Medical Technician)	14%	8%
Basic FirstAid/ CPR	78%	54%
Search and Rescue	20%	28%

Nearly all respondents (99%) indicated they have some type of tools to use against a wildfire that threatens their home. Table 2.2 summarizes these responses.

Table 2.2. Percent of homes with indicated fire fighting tools in Ferry County.

99% – Hand tools (shovel, Pulaski, etc.)

12% – Portable water tank

18% – Stationery water tank

34% – Pond, lake, or stream water supply close

23% – Water pump and fire hose

22% – Equipment suitable for creating fire breaks (bulldozer, cat, skidder, etc.)

Respondents were asked to complete a fuel hazard rating worksheet to assess their home's fire risk rating. An additional column titled "results" has been added to the table, showing the percent of respondents circling each rating (Table 2.3).

Circle the ratings in each category that best describes your home.

Table 2.3. Fuel Hazard Rating Worksheet		**Rating**	**Results**
Fuel Hazard	Small, light fuels (grasses, forbs, weeds, shrubs)	1	51%
	Medium size fuels (brush, large shrubs, small trees)	2	36%
	Heavy, large fuels (woodlands, timber, heavy brush)	3	14%
Slope Hazard	Mild slopes (0-5%)	1	43%
	Moderate slope (6-20%)	2	32%
	Steep Slopes (21-40%)	3	21%
	Extreme slopes (41% and greater)	4	4%
Structure Hazard	Noncombustible roof and noncombustible siding materials	1	22%
	Noncombustible roof and combustible siding material	3	56%
	Combustible roof and noncombustible siding material	7	8%
	Combustible roof and combustible siding materials	10	14%
Additional Factors	Rough topography that contains several steep canyons or ridges	+2	Average -2.0 pts
	Areas having history of higher than average fire occurrence	+3	
	Areas exposed to severe fire weather and strong winds	+4	
	Areas with existing fuel modifications or usable fire breaks	-3	
	Areas with local facilities (water systems, rural fire districts, dozers)	-3	

Calculating your risk

Values below are the average response value to each question for those living in both rural and urban areas.

Fuel hazard	1.9	x Slope Hazard	2.0	= 3.8
Structural hazard		+	3.9	
Additional factors		(+ or -)	-2.0	
Total Hazard Points		=	5.7 .	

Table 2.4. Percent of respondents in each risk category as determined by the survey respondents.
03% – Extreme Risk = 26 + points
04% – High Risk = 16–25 points
32% – Moderate Risk = 7–15 points
61% – Low Risk = 6 or less points

Respondents were asked a series of questions regarding mitigation activities they had recently done or currently do on their property. The first question asked if their property had been professionally assessed for wildfire danger in the last 5 years; only 8% said that their property had been assessed. The second question asked if they conducted a periodic fuels reduction program near their home; a majority; 65%, said that they did. Finally, respondents were asked if livestock was grazed around their home and 37% indicated that there was.

Finally, respondents were asked "If offered in your area, would members of your household attend a free or low cost, one-day training seminar designed to share with homeowners how to reduce the potential for casualty loss surrounding your home?" A strong majority, 62% of respondents, indicated a desire to participate in this type of training.

Homeowners were also asked, "How Hazard Mitigation projects should be funded in the areas surrounding homes, communities, and infrastructure such as power lines and major roads?" Responses are summarized in Table 2.5.

Table 2.5. Public Opinion of Hazard Mitigation Funding Preferences.

	100% Public Funding	Cost-Share (Public & Private)	Privately Funded (Owner or Company)
Home Defensibility Projects →	23%	48%	29%
Community Defensibility Projects →	53%	42%	5%
Infrastructure Projects Roads, Bridges, Power Lines, Etc. →	74%	16%	10%

We wish to thank all Ferry County residents for completing and returning these surveys.

2.3.3 Public Meetings

Public meetings were scheduled in a variety of communities in Ferry County during the hazard assessment phase of the planning process. Public meetings were scheduled to share information on the planning process, inform details of the hazard assessments, and discuss potential mitigation treatments. Attendees at the public meetings were asked to give their impressions of the accuracy of the information generated, and provide their opinions of potential treatments.

The initial schedule of public meetings included three locations in the county and were attended by a number of individuals on the committee and from the general public. Total attendance was as follows: 6 in Barstow on May 9th, 17 in Republic on May 10th, and 17 in Malo on May 11th. The public meeting announcement was sent to the two local newspapers, KOMW Omak, fire district representatives, the Republic Chamber of Commerce, and distributed by committee members is included below in Figure 2.2. Public meeting minutes are also available for review at the Ferry County Commissioner's Office.

Figure 2.3. Public meeting announcement for May 2006 meetings.

Ferry County, Washington Community Wildfire Protection Plan

Public Meetings!

Barstow Training Center (next to Kettle River Grange): Tuesday, May 9th, 7:00 PM

Republic Fire Station (645 S. Keller): Wednesday, May 10th, 7:00 PM

Malo Grange Hall (Highway 21 North): Thursday, May 11th, 7:00 PM

Refreshments will be provided

These upcoming public meetings will address the **Ferry County Community Wildfire Protection Plan**. These meetings are open to the public and will include slideshow presentations from wildfire mitigation specialists working on the Ferry County Community Wildfire Protection Plan. Public input is being sought in order to better frame the County's efforts of wildfire mitigation treatments, fire district resource enhancements, and public land management.

This meeting will last for approximately 1.5 hours.

Learn about the assessments of Wildfire Risk and the Wildland-Urban Interface of Ferry County. Discuss ***YOUR*** priorities for how our communities can best mitigate these risks.

For more information on Community Wildfire Protection Plan projects in Ferry County, contact the Ferry County Commissioner's Office at (509) 775-5229 or William Schlosser at Northwest Management, Inc. (208) 883-4488.

The following slideshow was presented at each of the public meetings by Tera King of Northwest Management, Inc. In addition, a fire district representative from each jurisdiction

opened the meeting with a brief introduction and, in some cases, a slideshow of local pictures and a narration of recent fires, vegetation changes, and forest health issues in Ferry County.

Figure 2.4. Public Meeting Slideshow as presented by NMI.

The public meeting slide show (title slide above) is outlined below.

Table 2.6. Public meeting slide show.

Slide 1

Slide 2

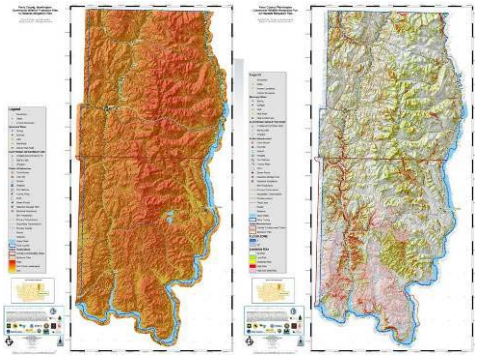
Slide 3

Slide 4

Slide 5

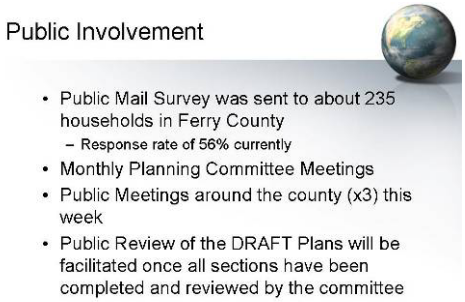
Slide 6

Slide 7



Slide 8

Slide 9

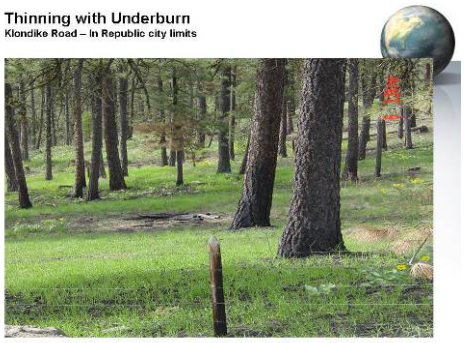


Slide 10

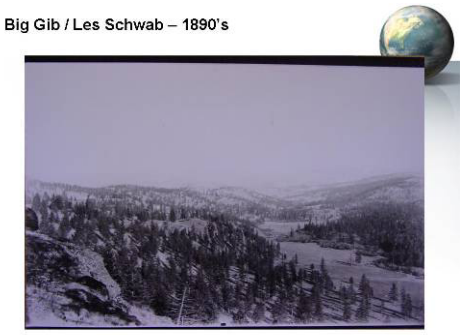
Slide 11

Slide 12

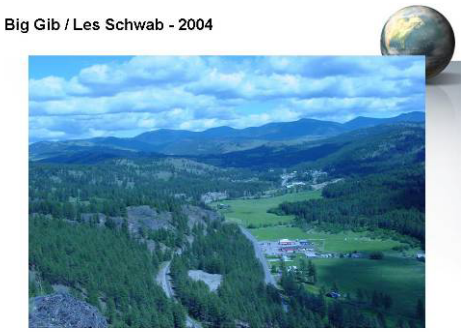
Slide 13



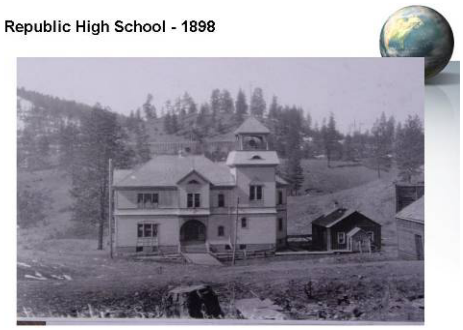
Slide 14



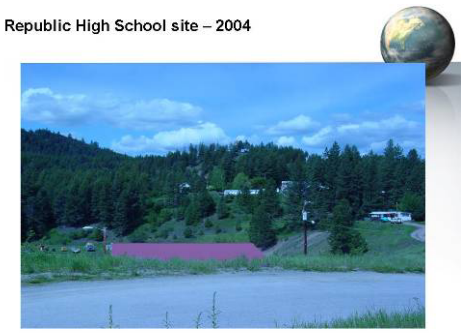
Slide 15



Slide 16

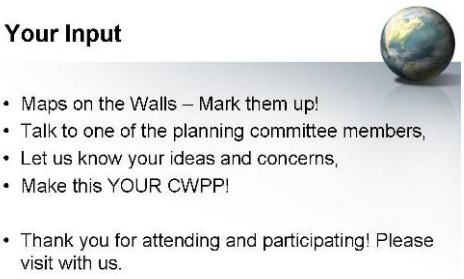


Slide 17

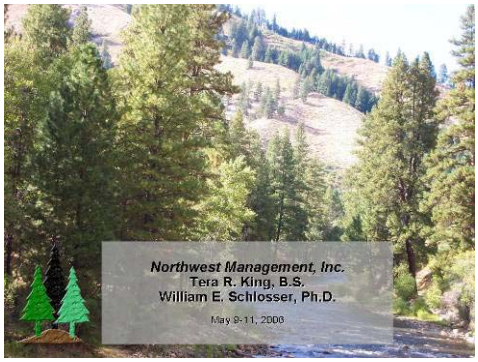


Slide 18

Slide 19



Slide 20



2.3.4 Documented Review Process

Review and comment on these plans has been provided through a number of avenues for the committee members as well as the members of the general public.

During regularly scheduled committee meetings in 2006, the committee met to discuss findings, review mapping and analysis, and provide written comments on draft sections of the document. During the public meetings attendees observed map analyses, photographic collections, discussed general findings from the community assessments, and made recommendations on potential project areas.

The first draft of the document was prepared after the public meetings and presented to the committee on May 25th, 2006, for a full committee review. The draft document was released for public review on July 17th, 2006. The public review period remained open until August 18th, 2006.

2.3.5 Continued Public Involvement

Ferry County is dedicated to involving the public directly in review and updates of this Community Wildfire Protection Plan. The Ferry County Commissioners, through the Community Wildfire Protection Plan Core Team, are responsible for the annual review and update of the plan as recommended in the "Administration and Implementation Strategy" section of this document.

The public will have the opportunity to provide feedback about the Plan annually on the anniversary of the adoption of this plan at a meeting of the County Commissioners. Copies of the Plan will be kept at the Ferry County Commissioner's Office, Ferry County Fire Protection District #13 Republic Fire Station, Ferry County Fire Protection District #14 Curlew Fire Station, and Ferry County Joint Fire Protection District #3 Orient Fire Station. The Plan also includes the address and phone number of the County Homeland Security Coordinator, responsible for keeping track of public comments on the Plan.

A public meeting will also be held as part of each annual evaluation or when deemed necessary by the Community Wildfire Protection Plan Core Team. The meetings will provide the public a forum for which they can express concerns, opinions, or ideas about the Plan. The County Commissioner's Office will be responsible for using county resources to publicize the annual public meetings and maintain public involvement through the County webpage and newspapers.

Chapter 3: Ferry County Characteristics

3 Background and Area Description

3.1 Demographics

Ferry County reported an increase in total population from 6,295 in 1990 to 7,260 in 2000 with approximately 2,814 households. Ferry County has only one incorporated community, Republic, which has a population of 1,009 according to the 2000 Census. Almost 14% of the total county population resides in Republic. Unincorporated communities include Curlew, Danville, Malo, Pine Grove, Orient, Toroda, Boyds, Barstow, and Laurier. The total land area of the county is roughly 2,257.46 square miles (1,444,774.4 acres) approximately half of which is part of the Colville Indian Reservation. The unincorporated communities of Keller and Inchelium are within the Reservation boundaries.

Table 3.1 summarizes some relevant demographic statistics for Ferry County.

Table 3.1. Selected demographic statistics for Ferry County, Washington, from Census 2000.

Subject	Number	Percent
Total population	**7,260**	**100.0**
SEX AND AGE		
Male	3,747	51.6
Female	3,513	48.4
Under 5 years	391	5.4
5 to 9 years	488	6.7
10 to 14 years	598	8.2
15 to 19 years	715	9.8
20 to 24 years	320	4.4
25 to 34 years	661	9.1
35 to 44 years	1,037	14.3
45 to 54 years	1,249	17.2
55 to 59 years	473	6.5
60 to 64 years	409	5.6
65 to 74 years	567	7.8
75 to 84 years	281	3.9
85 years and over	71	1.0
Median age (years)	40.0	(X)
18 years and over	5,306	73.1
Male	2,708	37.3
Female	2,598	35.8
21 years and over	4,993	68.8
62 years and over	1,147	15.8
65 years and over	919	12.7

Table 3.1. Selected demographic statistics for Ferry County, Washington, from Census 2000.

Subject	Number	Percent
Male	460	6.3
Female	459	6.3
RELATIONSHIP		
Population	**7,260**	**100.0**
In households	7,040	97.0
Householder	2,814	38.8
Spouse	1,582	21.8
Child	2,047	28.2
Own child under 18 years	1,700	23.4
Other relatives	238	3.3
Under 18 years	113	1.6
Nonrelatives	359	4.9
Unmarried partner	203	2.8
In group quarters	220	3.0
Institutionalized population	31	0.4
Noninstitutionalized population	189	2.6
HOUSEHOLDS BY TYPE		
Households	**2,814**	**100.0**
Family households (families)	1,970	70.0
With own children under 18 years	859	30.5
Married-couple family	1,550	55.1
With own children under 18 years	558	19.8
Female householder, no husband present	287	10.2
With own children under 18 years	210	7.5
Nonfamily households	844	30.0
Householder living alone	703	25.0
Householder 65 years and over	246	8.7
Households with individuals under 18 years	934	33.2
Households with individuals 65 years and over	902	32.1
Average household size	2.50	(X)
Average family size	2.96	(X)
HOUSING TENURE		
Occupied housing units	**2,823**	**100.0**
Owner-occupied housing units	2,060	73.0
Renter-occupied housing units	763	27.0
Average household size of owner-occupied unit	2.43	(X)
Average household size of renter-occupied unit	2.66	(X)

3.2 Socioeconomics

Ferry County had a total of 2,823 occupied housing units and a population density of 3.3 persons per square mile reported in the 2000 Census. Ethnicity in Ferry County is distributed: white 75.5%, black or African American 0.2%, American Indian or Alaskan Native 18.3%, Asian 0.3%, Hispanic or Latino 2.8%, two or more races 3.5%, and some other race 2.2%.

Specific economic data for individual communities is collected by the US Census; in Ferry County this information is limited to Republic. City of Republic households earn a median income of $25,284 annually, which compares to the Ferry County median income during the same period of $30,388. Table 3.2 shows the dispersal of households in various income categories in Ferry County.

Table 3.2. Income in 1999.	**Ferry County**	
	Number	**Percent**
Households	**2,814**	**100.0**
Less than $10,000	417	14.8
$10,000 to $14,999	304	10.8
$15,000 to $24,999	463	16.5
$25,000 to $34,999	423	15.0
$35,000 to $49,999	482	17.1
$50,000 to $74,999	493	17.5
$75,000 to $99,999	136	4.8
$100,000 to $149,999	68	2.4
$150,000 to $199,999	12	0.4
$200,000 or more	16	0.6
Median household income (dollars)	30,388	(X)

(Census 2000)

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, directs federal agencies to identify and address any disproportionately high adverse human health or environmental effects of its projects on minority or low-income populations. In Ferry County, a significant number, 13.3%, of families are at or below the poverty level (Table 3.3).

Table 3.3. Poverty Status in 1999 (below poverty level).	**Ferry County**	
	Number	**Percent**
Families	**262**	**(X)**
Percent below poverty level	(X)	13.3
With related children under 18 years	195	(X)
Percent below poverty level	(X)	21.3
With related children under 5 years	65	(X)
Percent below poverty level	(X)	23.5
Families with female householder, no husband present	**114**	**(X)**
Percent below poverty level	(X)	39.7
With related children under 18 years	110	(X)
Percent below poverty level	(X)	46.8
With related children under 5 years	34	(X)

Table 3.3. Poverty Status in 1999 (below poverty level).	Ferry County	
	Number	Percent
Percent below poverty level	(X)	52.3
Individuals	**1,368**	**(X)**
Percent below poverty level	(X)	19.0
18 years and over	907	(X)
Percent below poverty level	(X)	17.2
65 years and over	94	(X)
Percent below poverty level	(X)	10.3
Related children under 18 years	370	(X)
Percent below poverty level	(X)	20.4
Related children 5 to 17 years	279	(X)
Percent below poverty level	(X)	19.2
Unrelated individuals 15 years and over	549	(X)
Percent below poverty level	(X)	40.7

(Census 2000)

The unemployment rate was 10.9% in Ferry County in 1999, compared to 4.4% nationally during the same period. Approximately 12.8% of the Ferry County employed population worked in natural resources, with much of the indirect employment relying on the employment created through these natural resource occupations.

Table 3.4. Employment and Industry.	Ferry County	
	Number	Percent
Employed civilian population 16 years and over	2,655	100.0
OCCUPATION		
Management, professional, and related occupations	879	33.1
Service occupations	446	16.8
Sales and office occupations	576	21.7
Farming, fishing, and forestry occupations	92	3.5
Construction, extraction, and maintenance occupations	318	12.0
Production, transportation, and material moving occupations	344	13.0
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	341	12.8
Construction	197	7.4
Manufacturing	179	6.7
Wholesale trade	36	1.4
Retail trade	219	8.2
Transportation and warehousing, and utilities	108	4.1
Information	43	1.6
Finance, insurance, real estate, and rental and leasing	91	3.4
Professional, scientific, management, administrative, and waste management services	94	3.5
Educational, health and social services	617	23.2
Arts, entertainment, recreation, accommodation and food services	217	8.2

Table 3.4. Employment and Industry.	Ferry County	
	Number	Percent
Other services (except public administration)	130	4.9
Public administration	383	14.4

(Census 2000)

Approximately 47% of Ferry County's employed persons are private wage and salary workers, while around 39% are government workers (Table 3.5).

Table 3.5. Class of Worker.	Ferry County	
	Number	Percent
Private wage and salary workers	1,257	47.3
Government workers	1,027	38.7
Self-employed workers in own not incorporated business	362	13.6
Unpaid family workers	9	0.3

(Census 2000)

3.2.1 Description of Ferry County

Information adapted from the North Ferry Area Soil Survey Manuscript.

Ferry County is in the northeastern part of Washington. Ferry County is east of the Columbia River and is bounded on the north by the international boundary with Canada. The southern boundary is the Roosevelt Lake. The area is characterized by a hilly to mountainous topography and narrow stream valleys. For the most part, the stream valleys are oriented in a north-south direction. The Kettle River Range, a part of the Okanogan Highlands, divides the area into two parts. This range rises to an elevation of 5,000 to more than 7,000 feet and is crossed by the highest all-weather road in the State. Copper Butte, the high point of this range, rises to an elevation of 7,135 feet.

The only railroad in the area follows the Kettle River north from Kettle Falls to Laurier and then extends west to Grand Forks in Canada. It returns to Washington at Danville, continues south through Curlew and Malo, and ends at Republic. The segment between Grand Forks, B.C. and Republic is currently under consideration for abandonment and is likely to be discontinued.

Republic, the county seat, overlooks the Sanpoil River Valley, which is in western Ferry County. Republic is the largest town in Ferry County. The Sanpoil River, Curlew Creek, and the Kettle River are the three main streams draining the western part of the area. Curlew Lake, approximately 885 acres in size, is just north of Republic.

The chief industries are lumbering, mining, and farming. The major timber types are Douglas-fir, western larch, and ponderosa pine. A number of the mountains in the area contain, besides gold, deposits of copper, iron, silver, lead, and other ores. Breeding and raising beef cattle is the chief farming enterprise. Hay and small grain are the main crops.

3.2.1.1 Land Use

A relatively large percentage of the county is publicly owned. The majority of the property is held either as public property or as Indian lands. Private land is becoming more and more expensive as the population grows and more property is developed. This factor combined with the mountainous nature of the geography is expected to produce significantly higher demands on privately held land in the future.

Table 3.6. Ownership Categories in Ferry County.

Land Owner	Acres
Tribal	652,819
US Forest Service	475,317
Private	159,763
Forest Industry	71,760
US Bureau of Reclamation	37,594
Washington State Department of Natural Resources	29,970
US Bureau of Land Management	9,814
Washington State Department of Fish and Wildlife	6,853
Washington State Parks and Recreation Commission	134

A map of Land Ownership in Ferry County is included in Appendix I.

Management of access and use of both publicly owned lands and Indian lands in the future is also a major factor affecting the adequacy of transportation facilities serving those areas.

Residential properties in Ferry County represent 8% of the total land use. There are approximately 10 square miles throughout the county used as commercial or as industrial land sites. These are mining sites, gravel pits, saw mills, and miscellaneous commercial developments. The total area is approximately less than .5% of the total land base of the county. Most of the commercial development is within the City of Republic and some in the town sites around the county.

Ferry County has approximately 109,086 acres in crops and rangeland. Lands currently in crop production total 29,300 acres. These lands generally lie in the valley bottoms and are limited in extent because of the soil and topographic restrictions to crop production. Private rangeland is approximately 79,786 acres allowing cattle ranches to be more diverse in areas. Also, Forest Service and Tribal lands are leased for grazing.

Ferry County has a total of approximately 700,000 acres of different classes of timber land. This is about ½ of the total land mass of the county. The total private acreage of timber land is approximately 140,000. Of this, approximately 91,000 are being held by lumber producing companies and 49,000 are in private, non-industrial ownership.

3.2.1.2 Recreation

Ferry County provides a rich setting for numerous recreational opportunities, including berry-picking, bicycling, camping, hunting, fishing, hiking, horse-back riding, picnicking, boating, and swimming to name a few. Recreational lands are divided into two groups. Public lands, such as the Colville Reservation, U.S. Forest Service, and State Parks. Private recreational lands are primarily those surrounding the lakes and rivers of the county. These lands include private resorts, vacation properties and homes, and year-round residences. There are some private recreational lands that are not surrounding water bodies. These are primarily used for hunting, hiking, off road vehicle access, cross country skiing, and other recreational uses.

The economic impacts of these activities to the local economy and the economy of Washington have not been enumerated. However, they are substantial given the many months of the year that activities take place and the large numbers of visitors that travel to this location.

3.2.1.2.1 Colville and Okanogan & Wenatchee National Forests

The Colville and Okanogan & Wenatchee National Forests disprove the widely held notion that Washington State lies flat east of the Cascade Mountains. These million acres in the northeast corner roll like the high seas. Three waves of mountains run from north to south, separated by troughs of valleys. These ranges -- the Okanogan, Kettle River, and Selkirk -- are considered foothills of the Rocky Mountains. The troughs between the mountains channel water into the Columbia River system.

The major rivers in the national forests are following paths bulldozed by Ice Age glaciers. Mile-high ice sheets surging south from Canada drowned all but the tallest peaks several times during the last two million years. The ice ground off sharp edges, leaving the mountains well rounded.

Today's landscape emerged from the melting ice about 10,000 years ago. Animals and plants followed the retreating glaciers northward, and humans were not far behind. The first Indians probably began hunting, fishing, and gathering in the area about 9,000 years ago.

3.2.1.2.2 Curlew Lake State Park

Curlew Lake State Park, located ten miles north of Republic, offers visitors a lines-free boat launch and choice of 82 campsites dotted across the park's 127 acres of uncrowded, grass-covered hills. Surrounded on three sides by the peaks and valleys of the Colville National Forest, the park provides walk-in lake-view sites set atop grassy knolls; secluded sites tucked in hillside clefts; and RV and trailer sites.

After you've settled into your campsite, walk the park's tree-lined waterfront paths or swim in the spring-fed waters of the lake. For boating and fishing enthusiasts, Curlew Lake offers trout and bass fishing (night fishing as well), and water- and jet-skiing.

3.2.1.2.3 Boating

Boating is a very popular activity in Ferry County. The Franklin D. Roosevelt Lake, Curlew Lake, and the Kettle and Columbia Rivers along with many of their tributaries offer excitement for various types of boaters and recreators during the warmer months. Boat ramps, docks, and other facilities are conveniently located at several access points along the waterfronts.

3.2.1.2.4 Camping

Camping is another popular activity enjoyed by tourists and the residents of Ferry County. The Colville National Forest provide many developed and undeveloped campsites. The amenities vary from full RV hookup to only a cleared tent site. There are also numerous RV parks closer to populated areas. Curlew Lake State Park offers waterfront camping facilities and easy access from State Route 21. Ferry Lake and Swan Lake provide a more secluded camping experience without being too far from Republic.

3.2.1.2.5 Fishing and Hunting

Fishing and hunting is very important to Ferry County both from a recreational standpoint and as an economic resource. A wide variety of fish can be caught including: trout, salmon, bass, crappie, perch, and pike. The river systems and many of the stocked lakes and mountain lakes provide excellent fishing. Franklin D. Roosevelt Lake draws crowds of fisherman from all over the northwest.

For those who prefer a gun or bow to a fly rod, Ferry County offers a bounty of hunting experiences. Wild birds and game, like deer, elk, bear, mountain lion, pheasant, turkey, quail, grouse, wild duck, and geese are found in abundance.

3.2.1.2.6 Wildlife Viewing

Ferry County is known for its large diversity of birds and other wildlife. There are several wildlife viewing organizations in the area that frequent Ferry County to see its vast array of wildlife in a natural setting.

3.2.1.3 Resource Dependency

Historically, Ferry County has had a cyclical economy dependent on the extraction of the abundant natural resources of the area, such as timber and minerals. The County unemployment rate is consistently among the highest in the State, and per capita income levels well below the state average. Expansion of Ferry County's industrial and commercial base will depend on the economic development of the county. Currently, mining is the backbone of Ferry County's economy. The future of gold mining in Ferry County is uncertain based on the grade and availability of ore, the market value, the cost and the method of extracting and processing ore, and regulatory controls and restraints.

There are approximately 204 farms and ranches in Ferry County. Of those, approximately 88 have agriculture as their principle operation. The major agricultural industry in this acreage is cow/calf production, then timber/tree farms, and finally hay and grain production. The number of cattle in Ferry County has increased from 16,800 to 21,000 from 1987 through 1991 as indicated by the Washington Agriculture Statistics 1990-1991/USDA National Agriculture Statistics Service; however, the number of farms has decreased from 241 to 204 in the past ten years. This implies a more intensive use of every acre farmed or ranched.

Private commercial timber stocks comprise of approximately 50,000 acres and 90,000 acres are considered as marginal forest/non-commercial. The total private acreage in Ferry County for timber land is approximately 140,000. Of this, approximately 91,000 acres are being held by lumber producing companies, and approximately 49,000 acres are in private non-industrial ownership.

Gold mining has played an important role in Ferry County's history and is still considered to be a major land use. Because of the geology of Ferry County, hard rock mining is the method of extracting ore. The mining is both open pit and underground. Mining is an everyday part of Ferry County and will probably be so in the future as long as the economy and gold prices maintain.

Over the past century, employment through agricultural farming, timber harvesting, mining, and livestock ranching has been significant in the region. Forestry, farming, ranching, mining, trucking, and related support industries have relied on resource extraction from this region. Livestock ranching has been and continues to be an important component of the economy of Ferry County providing stable employment .

3.3 Cultural Resources

Cultural resource impacts were qualitatively assessed through a presence/absence determination of significant cultural resources and mitigation measures to be employed during potential fire mitigation activities such as thinning and prescribed fire.

The United States has a unique legal relationship with Indian tribal governments defined in history, the U.S. Constitution, treaties, statutes, Executive Orders, and court decisions. Since

the formation of the union, the United States has recognized Indian tribes as domestic dependant nations under its protection. The Federal Government has enacted numerous regulations that establish and define a trust relationship with Indian tribes.

The relationship between Federal agencies and sovereign tribes is defined by several laws and regulations addressing the requirement of Federal agencies to notify or consult with Native American groups or otherwise consider their interests when planning and implementing Federal undertakings, among these are:

- **EO 13175, November 6, 2000**, Consultation and Coordination with Indian Tribal Governments.
- **Presidential Memorandum, April, 1994**. Government-Government Relations with Tribal Governments (Supplements EO 13175). Agencies must consult with federally recognized tribes in the development of Federal Policies that have tribal implications.
- **EO 13007, Sacred sites, May 24, 1996**. Requires that in managing Federal lands, agencies must accommodate access and ceremonial use of sacred sites and must avoid adversely affecting the physical integrity of these sites.
- **EO 12875, Enhancing Intergovernmental Partnerships, October 26, 1993**. Mainly concerned with unfunded mandates caused by agency regulations. Also states the intention of establishing "regular and meaningful consultation and collaboration with state, local and tribal governments on matters that significantly or uniquely affect their communities."
- **Native American Graves Protection and Repatriation Act (NAGPRA) of 1989**. Specifies that an agency must take reasonable steps to determine whether a planned activity may result in the excavation of human remains, funerary objects, sacred objects and items of cultural patrimony from Federal lands. NAGPRA also has specified requirements for notifying and consulting tribes.
- **Archaeological Resources Protection Act (ARPA), 1979**. Requires that Federal permits be obtained before cultural resource investigations begin on Federal land. It also requires that investigators consult with the appropriate Native American tribe prior to initiating archaeological studies on sites of Native American origin.
- **American Indian Religious Freedom Act (AIRFA), 1978**. Sets the policy of the US to protect and preserve for Native Americans their inherent rights of freedom to believe, express, and exercise the traditional religions of the American Indian . . . including, but not limited to access to sacred sites, use and possession of sacred objects, and the freedom to worship through ceremonies and traditional rites.
- **National Environmental Policy Act (NEPA), 1969**. Lead agency shall invite participation of affected Federal, State, and local agencies and any affected Indian Tribe(s).
- **National Historic Preservation Act (NHPA), 1966**. Requires agencies to consult with Native American tribes if a proposed Federal action may affect properties to which they attach religious and cultural significance. (Bulletin 38 of the act, identification of TCPs, this can only be done by tribes.)
- Treaties (supreme law of the land) in which tribes were reserved certain rights for hunting, fishing and gathering and other stipulations of the treaty.
- Unsettled aboriginal title to the land, un-extinguished rights of tribes.

3.3.1 Colville Indian Reservation

Summarized from Confederated Tribes of the Colville Reservation at www.colvilletribes.com.

Total Size: 1.4 Million Acres (2,100 Square Miles)

Twelve Bands compose the Confederated Tribes of the Colville Reservation:

- Wenatchee
- Nespelem
- Moses-Columbia
- Methow
- Colville
- Okanogan
- Palus
- Sanpoil
- Entiat
- Chelan
- Nez Perce
- Lake

Tribal Enrollment Total: 8,700

Physical Characteristics of the Reservation:

***Topography*:** Elevation of the Reservation lands generally increase from South to North and from West to East. Elevations range from 790 feet at the mouth of the Okanogan River to 6,774 feet at the Summit of Moses Mountain. Average elevation of the Reservation is above 3,000 feet.

Climate: Summers, on the plains, are sunny, warm and dry with some hot days. During 4 or 5 months, in the lower elevations extreme highs may be 100°F, while, in the higher elevations 1 or 2 months may reach above 90°F. In winter, minimum temperatures of -10° to -20°F are common although a few stations report -25° to -30°F. Normally, precipitation is light in the summer and heaviest in the winter. Valleys and lowlands receive and average of 10 to 14 inches of precipitation; in the mountains, precipitation increases with elevation where 25 to 30 inches per year can be expected on the higher ridges, with the majority occurring as snow. Growing seasons vary from over 180 days in the Southwest to less than 80 days in the forested highlands.

Geology: The Reservation lies in a physiographic province called the Okanogan Highlands. A period of compression and uplifting formed the present mountains, however, glacial erosion shaped much of the land to its present form.

Soils: The most abundant soil parent materials found on the Reservation are produced by glaciation, water laid glacial out wash or alluvium and lacustrine sediments are the only materials of major agricultural importance. Most of the soils that are suitable for cultivation occur on the level to undulating alluvial and out wash terraces and in isolated upland areas.

Vegetation: The major vegetative cover is divided into two groups; forest and steppe. Forest areas range from open forested grasslands to dense coniferous forests. Dominant species in forested areas are Ponderosa Pine, Douglas-fir, Lodge Pole Pine, and Western Larch. Huckleberry, Service Berry, and a number of sub shrubs and roots are as important to Tribal gatherings today, as they were in years past.

Fish & Wildlife: Wildlife is plentiful on the Reservation. Deer hunting is open year-round to Tribal members only, and plays an important role as a food source. The Tribal elk herd numbers around 800 with a limited hunting season. Game bird populations and protected predators such as the Bald Eagle and Peregrine Falcon are managed by the Tribal Fish & Wildlife Department. The Sharp Tailed Grouse or Prairie Chicken is an endangered species with nesting and dancing grounds on the Reservation. Although salmon fishing is still an important food source, salmon runs are restricted due to the construction of Grand Coulee and Chief Joseph Dams on the Columbia River, but fishing on the numerous lakes and streams on the Reservation is still enjoyed by many Tribal members. Fishing permits are offered by the Tribal Fish and Wildlife Department.

History: The Confederated Tribes of the Colville Reservation is a Sovereign Nation. The Confederated Tribes of the Colville Reservation is a federally recognized American Indian Tribe.

Today, over 9,065 descendants of 12 aboriginal tribes of Indians are enrolled in the Confederated Tribes of the Colville Reservation. The tribes, commonly known by English and French names, are: the Colville, the Nespelem, the Sanpoil, the Lake, the Palus, the Wenatchi (Wenatchee), the Chelan, the Entiat, the Methow, the southern Okanogan, the Moses Columbia and the Nez Perce of Chief Joseph's Band.

Prior to the influx of Canadians and Europeans in the mid-1850's the ancestors of the 12 aboriginal tribes were nomadic, following the seasons of nature and their sources of food. Their aboriginal territories were grouped primarily around waterways such as the Columbia River, the Sanpoil River, the Okanogan River, the Snake River and the Wallowa River.

Many tribal ancestors traveled throughout their aboriginal territories and other areas in the Northwest (including Canada), gathering with other native peoples for traditional activities such as food harvesting, feasting, trading, and celebrations that included sports and gambling. Their lives were tied to the cycles of nature both spiritually and traditionally.

The Colville Indian Reservation was established by Presidential Executive Order in 1872 and was originally twice as large as it is today.

The Colville Indian Reservation land base covers 1.4 million acres or 2,100 square acres located in North Central Washington, primarily in Okanogan and Ferry counties. The Reservation consists of tribally owned lands held in federal trust status for the Confederated Tribes, land owned by individual Colville tribal members, most of which is held in federal trust status, and land owned by others, described as fee property and taxable by counties.

Colville Reservation lands are diverse with natural resources including standing timber, streams, rivers, lakes, minerals, varied terrain, native plants and wildlife.

The Colville Indian Reservation is occupied by over 5,000 residents, both Colville tribal members and their families and other non-Colville members, living either in small communities or in rural settings. Approximately fifty percent of the Confederated Tribes membership live on or adjacent to the reservation.

The Confederated Tribes and the Colville Indian Reservation are governed by the Colville Business Council.

From its administrative headquarters located at the Bureau of Indian Affairs (BIA) Agency at Nespelem, the Colville Business Council oversees a diverse, multi-million dollar administration that employees from 800 to 1200 individuals in permanent, part- time and seasonal positions.

The Confederated Tribes operates on a yearly budget which is financed primarily from revenues generated from the sale of the Tribes timber products and from other sources including federal, state and private contributions.

The Confederated Tribes adheres to Colville Tribal Member Preference. Both Colville tribal members and non-Colville members are employed throughout its extensive governmental operation.

This governmental operation provides a variety of services for Colville tribal members living on the reservation and elsewhere, and for the management of reservation natural resources.

In addition, the Confederated Tribes have chartered its own corporation, the Colville Tribal Enterprise Corporation (CTEC), which oversees several enterprise divisions including a gaming division and three casinos. The Corporation employs several hundred permanent and part-time employees. The work force is composed primarily of Colville tribal members and non-tribal members from the communities where the enterprises are located.

Numerous chronic situations affect the daily lives of Colville tribal members such as high unemployment on the Colville Indian Reservation and lack of employment opportunities for much of the available labor force. Individuals and families suffer from the effects of extensive drug and alcohol abuse, domestic violence and crime.

In many instances, Colville Indian families are living below the national poverty standards year after year and depend on the Confederated Tribes and other welfare systems to survive.

Colville Indian Reservation communities lack adequate, affordable housing, home water systems and even electricity. Safe, usable roadways throughout the reservation are lacking as well as facilities such as modern health clinics and youth shelters.

Confederated Tribes strive to protect and enhance the quality of life for Colville tribal members and at the same time, govern as a sovereign nation.

3.3.2 National Register of Historic Places

The National Park Service maintains the National Register of Historical Places as a repository of information on significant cultural locale. These may be buildings, roads or trails, places where historical events took place, or other noteworthy sites. The NPS has recorded sites in its database. These sites are summarized in Table 3.7.

Table 3.7. National Register of Historic Places in Ferry County, Washington.

Item Number	Resource Name	Address	City	Listed	Architect, builder, or engineer
1	Ansorge Hotel	River St. and Railroad Ave.	Curlew	1979`	
2	Barstow Bridge	US 395 and Co. Rd 4061 over Kettle River	Kettle Falls	1995	U.S. War Department
3	Columbia River Bridge at Kettle Falls	US 395 over Columbia River	Kettle Falls	1995	Washington State Highway Dept.
4	Creaser Hotel	664 Church Lane	Republic	1982	Unknown
5	Curlew Bridge	Spans Kettle River	Curlew	1982	Oliver, William
6	Curlew School	Off WA 4A	Curlew	1980	
7	Fairweather – Trevitt House	645 Kaufman	Republic	2000	
8	Kettle Falls District	Restricted	Kettle Falls	1974	
9	Nelson-Grunwell Store	Main and Wall Sts.	Danville	1990	
10	St. Paul's Mission	W of Kettle Falls on Roosevelt Lake	Kettle Falls	1974	

(NRHP 2003)

Fire mitigation activities in and around these sites has the potential to affect historic places. In all cases, the fire mitigation work will be intended to reduce the potential of damaging the site due to wildfire. Areas where ground disturbance will occur will need to be inventoried depending on the location. Such actions may include, but are not limited to, constructed fire lines (hand line, mechanical line, etc.), new roads to creeks to fill water tankers, mechanical treatments, etc. Only those burn acres that may impact cultural resources that are sensitive to burning (i.e., buildings, peeled bark trees, etc.) would be examined. Burns over lithic sites are not expected to have an impact on those sites, as long as the fire is of low intensity and short duration. Some areas with heavy vegetation may need to be examined after the burn to locate and record any cultural resources although this is expected to be minimal. Traditional Cultural Properties (TCPs) will also need to be identified. Potential impact to TCPs will depend on what values make the property important and will be assessed on an individual basis.

3.4 Transportation & Infrastructure

The Ferry County transportation system relies heavily on US Route 395 and State Routes (SR) 20 and 21, which link the communities together. US 395 enters Ferry County from Kettle Falls and heads north, paralleling the Kettle River along the eastern border of the County. This highway links the small communities of Barny's Junction, Boyds, Barstow, Orient, and Laurier before crossing the U.S. border in Canada just north of Laurier..

State Route 20 traverses from west to east, beginning at the border with Okanogan County, travels through Republic and Pine Grove, goes over Sherman Pass, and finally crosses the Columbia River into Kettle Falls in Stevens County. State Route 20 is a rural two-lane highway.

State Route 21 runs north to south through Ferry County beginning at the U.S. border near Danville. This rural two-lane route passes through the communities of Curlew, Malo, Pine Grove, Republic, and finally Keller on the Colville Reservation before exiting Ferry County by way of the Keller Ferry into Lincoln County.

The Inchelium Highway, also known as the Inchelium - Kettle Falls Road, accesses the community of Inchelium from State Route 20. This is a paved two-lane roadway that travels south along the Columbia River from State Route 20 near Barny's Junction to Inchelium on the Colville Reservation. Although there are several secondary roads in the area, the Inchelium Highway ends at Inchelium. In addition, the Bridge Creek Road connects the community of Inchelium to State Route 21 near Keller over Gold Mountain Ridge on the Colville Reservation. This is a paved rural route; however, it abuts continuous forest fuels on both sides throughout its length.

The Cache Creek Road and the Manilla Creek Road provide alternative routes from State Route 21 near Keller to State Route 155 in Okanogan County to the west. These are both paved, two lane routes; however, they are adjacent to forestland fuels until they cross into Okanogan County. The Deer Creek – Boulder Creek Road is a paved, two-lane highway providing a direct connection between the community and Curlew and U.S. Highway 395 near Orient. This roadway is considered an alternative escape route to State Route 20 over the Kettle River Range. The wildfire planning committee has identified these routes as well as U.S. 395 and State Routes 20 and 21 to be primary access routes in this plan.

Almost all of the roads in the county were originally built to facilitate logging and farming activities. As such, these roads can support timber harvesting equipment, logging trucks, and firefighting equipment referenced in this document. However, many of the new roads have been built for home site access, especially for new subdivisions. In most cases, these roads are adequate to facilitate firefighting equipment as they adhere to County road standards. County

road standards and building guidelines for new developments should be adhered to closely to insure this tendency continues.

Transportation networks in the county have been challenged by a number of communities with only one, two, or three access points suitable for use during an emergency. The community of Orient is a prime example. Other communities that may be at risk because of limited access include Danville, Laurier, Malo, Boyds, Barstow, Keller, and Inchelium.

Ferry County has both significant infrastructure and unique ecosystems within its boundaries. Of note for this Community Wildfire Protection Plan are the existence of US 395, State Routes 20 and 21, Deer Creek – Boulder Creek Road, Bridge Creek Road, Cache Creek Road, Manilla Creek Road, and the presence of high tension power lines supplying most communities in Ferry and Stevens Counties.

3.4.1 Communication Sites and Lookouts

Included in the assessment of critical infrastructure is the location of lookouts, repeater towers, and other communication sites. Thirteen items were identified in the county and are summarized in Table 3.8.

Table 3.8. Lookouts, Repeater Towers, and Communication Site Locations.

Name	Type	UTM_X	UTM_Y
Bisbee Mountain Site	Communications Site	414840.15625	414840.15625
Franson Peak	Communications Site/Fire Lookout	380330.62500	380330.62500
Mount Leona	Tower	391816.96875	391816.96875
Talisman Mine	Tower	409541.81250	409541.81250
Klondike Mountain Tower	Tower	374631.28125	374631.28125
Finley Tower	Tower	415478.40625	415478.40625
Jackknife Mountain	Repeater	407031.00000	407031.00000
Mount Leona	Communications Site	391793.00000	391793.00000
Quartz Mountain	Repeater	376879.00000	376879.00000
Klondike Mountain	Repeater	374676.00000	374676.00000
Togo Mountain	Repeater	397719.62500	397719.62500
Gold Hill	Communications Site	378149.09375	5391844.0000
Bodie Mountain	Repeater	365581.65625	365581.65625
Knob Hill Tower	Tower	370569.50000	539235.50000

3.4.2 Primary Access Routes

Access routes were identified by committee members and amended by the public during public meetings. These routes identify the primary access into and out of the county that are relied on during emergencies. As such, they often receive prioritized treatment when allocating resources for hazard abatement. There is 272 miles of primary access routes identified in Ferry County.

3.5 Vegetation & Climate

Vegetation in Ferry County is a mix of forestland and agricultural ecosystems. An evaluation of satellite imagery of the region provides some insight to the composition of the vegetation of the

area. The full extent of the county was evaluated for cover type as determined from Landsat 7 ETM+ imagery in tabular format.

The most represented vegetated cover type is ponderosa pine at approximately 53% of the total area. The next most common vegetation cover types represented are a western larch forest at 14% and Douglas-fir at 9%. Urban areas and agriculture represents approximately 7% of the total area (Table 3.9).

Table 3.9. Vegetative Cover Types in Ferry County.

Cover	Acres	Percent
Ponderosa pine	760,855	53%
Western Larch	202,036	14%
Douglas-fir	128,996	9%
Urban/Development/Ag	96,809	7%
Lodgepole pine	96,561	7%
Agriculture	84,677	6%
Western white pine	41,348	3%
Water	15,103	1%
Other Shrub	9,904	1%
Grassland	7,428	1%
Western hardwoods	248	0%
Total	**1,443,965**	

Vegetative communities within the county follow the strong moisture and temperature gradient related to the major drainages. As moisture availability increases, so does the abundance of conifer species, with subalpine forest communities present in the highest elevations where precipitation and elevation provide more available moisture during the growing season.

3.5.1 Monthly Climate Summaries in Ferry County

3.5.1.1 Republic

Period of Record Monthly Climate Summary

Period of Record: 11/1/1948 to 9/30/2005

Table 3.10. Monthly climate records for Republic, Ferry County, Washington.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	29.5	37.9	46.8	57.2	65.9	72.9	81.4	81.1	71.7	56.7	38.9	29.8	55.8
Average Min. Temperature (F)	14.9	18.8	23.9	29.9	37.0	43.0	46.2	45.3	38.2	30.1	23.7	16.7	30.6
Average Total Precipitation (in.)	1.70	1.22	1.29	1.14	1.81	1.68	1.05	1.07	0.82	0.99	1.65	2.04	16.47
Average Total SnowFall (in.)	15.0	6.8	3.6	0.6	0.1	0.0	0.0	0.0	0.0	0.6	6.8	16.9	50.4
Average Snow Depth (in.)													

Percent of possible observations for period of record. Max. Temp.: 97.1% Min. Temp.: 97.1% Precipitation: 96.7% Snowfall: 96.9% Snow Depth: 96.1%

3.5.1.2 Laurier, Washington

Period of Record Monthly Climate Summary

Period of Record: 6/ 2/1948 to 10/31/1986

Table 3.11. Monthly climate records for Laurier, Ferry County, Washington.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	29.8	38.7	49.6	61.2	71.7	77.9	86.2	85.7	74.9	57.8	40.6	31.8	58.8
Average Min. Temperature (F)	15.3	19.9	24.8	31.1	39.4	46.4	49.2	48.6	40.6	32.8	25.9	19.2	32.8
Average Total Precipitation (in.)	2.16	1.54	1.43	1.37	1.88	2.11	1.21	1.27	1.09	1.49	2.02	2.39	19.97
Average Total SnowFall (in.)	20.0	7.2	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	4.0	18.1	51.9
Average Snow Depth (in.)	15	12	5	0	0	0	0	0	0	0	0	6	3

Percent of possible observations for period of record. Max. Temp.: 86.5% Min. Temp.: 86.3% Precipitation: 86.7% Snowfall: 76% Snow Depth: 74.1%

3.5.1.3 Inchelium, Washington

Period of Record Monthly Climate Summary

Period of Record: 5/18/1953 to 9/30/1975

Table 3.12. Monthly climate records for Inchelium, Ferry County, Washington.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	32.5	40.1	48.8	59.7	70.3	77.4	85.9	84.9	74.7	58.5	42.8	34.6	59.2
Average Min. Temperature (F)	17.4	21.2	25.3	32.1	39.3	45.9	48.6	47.6	41.1	33.2	27.3	21.3	33.4
Average Total Precipitation (in.)	2.23	1.50	1.45	1.08	1.33	0.95	0.47	0.68	0.82	1.10	2.33	2.66	16.62
Average Total SnowFall (in.)	19.3	7.1	4.2	0.3	0.0	0.0	0.0	0.0	0.0	0.1	6.2	17.9	55.1
Average Snow Depth (in.)	12	11	4	0	0	0	0	0	0	0	1	5	3

Percent of possible observations for period of record. Max. Temp.: 94.2% Min. Temp.: 94.3% Precipitation: 93.2% Snowfall: 93.8% Snow Depth: 93.3%

3.6 Ecosystems

Ferry County is a diverse ecosystem with a complex array of vegetation, wildlife, and fisheries that have developed with, and adapted to fire as a natural disturbance process. A century of wildland fire suppression coupled with past land-use practices (primarily timber harvesting and grazing) has altered plant community succession and has resulted in dramatic shifts in the fire regimes and species composition. As a result, forests and rangelands in Ferry County have become more susceptible to large-scale, high intensity fires posing a threat to life, property, and natural resources including wildlife and special status plant populations and habitats. High-intensity, stand-replacing fires have the potential to seriously damage soils and native

vegetation. In addition, an increase in the number of large high intensity fires throughout the nation's forest and rangelands, has resulted in significant safety risks to firefighters and higher costs for fire suppression (House of Representatives, Committee on Agriculture, Washington, DC, 1997).

3.7 Soils

There are various soil types in the Ferry County area. The following information is adapted from the *Soil Survey of North Ferry Area, Washington* available online at http://soils.usda.gov/survey/online_surveys/. Nine major soil associations are found in Ferry County:

1. Molson-Edds-Rock land association - Nearly level to very steep, well-drained soils and rock land at elevations above 1,900 feet. This association is on lower hills above the main drainage channels. The vegetation is dominantly bunchgrass; conifers have encroached, mainly on north facing slopes. Clumps of aspen and cottonwood grow in depressions and in the shallow drainage channels on south-facing slopes. This association makes up about 15 percent of the survey area.
2. Nevine-Pepoon-Oxerine association - Nearly level to very steep, well-drained, cool soils at elevations above 2,000 feet. This association is on uplands between the grasslands at the lower elevations and the fir-spruce forests at the higher elevations. The main drainage channels are narrow and oriented in a dominantly southeast to northwest direction. North-facing slopes are steep and break abruptly from the ridges into the drainageways. The ridges are gently rounded, and bedrock is exposed in many places. South-facing slopes are longer and less steep. Many are gently sloping to moderately steep. At the lower elevations, these slopes support open stands of ponderosa pine and bunchgrass. At the higher elevations are mixed stands of pine, Douglas-fir, and larch and on the shaded slopes thick stands of fir and larch. Lodgepole pine is dominant in the old burn areas. This association makes up about 43 percent of the survey area.
3. Chesaw-Mires association - Nearly level to very steep, somewhat excessively drained and well drained soils formed under grass. This association is mainly in Curlew Valley. It also occurs as small areas along the narrow drainage channels leading into this valley. The vegetation is chiefly bunchgrass. Scattered stands of ponderosa pine have become established in protected areas along the drainage channels and in some nearly level areas. This association makes up about 2 percent of the survey area.
4. Torboy-Wapal-Gahee association - Nearly level to very steep, well drained and somewhat excessively drained soils formed under trees. This association occurs as scattered areas throughout the survey area. The largest areas are near Copper Lakes and along the Sherman, Boulder, and Trout Creek drainageways. The vegetation is Douglas-fir, ponderosa pine, larch, lodgepole pine, and an understory of pinegrass and kinnikinnick. This association makes up about 8 percent of the survey area.
5. Springdale-Bisbee-Scala association - Nearly level to steep, somewhat excessively drained and well drained soils. This association, a long, narrow strip between the rocky uplands to the west and the Kettle River and Lake Roosevelt to the east, is a small but important part of the survey area. The only crops in the eastern part of the survey area are grown on this association. The vegetation is coniferous trees, shrubs, and grasses. This association makes up about 2 percent of the survey area.
6. Malo-Ret association - Nearly level, well drained and somewhat poorly drained soils This association borders two major rivers-the Sanpoil and the Kettle. The flood plain is

dominantly narrow, but from Laurier to Lake Roosevelt it is wide. The vegetation is coniferous trees, deciduous trees, shrubs, and grasses. In many places the timber has been cut. This association makes up about 1 percent of the survey area.

7. Vallan-Bamber-Tenas association - Moderately steep to very steep, well-drained soils at elevations above 3,000 feet. This association is on uplands. The vegetation is mainly bunchgrass and scattered Douglas-fir and ponderosa pine on southern exposures and ridge tops. Western larch and Douglas-fir dominate the northern exposures. This association makes up about 6 percent of the survey area.
8. Growden-Leonardo-Rock land association - Moderately steep to very steep, well-drained soils and Rock land at elevations above 5,500 feet. This association is on ridges and uplands in mountainous areas. The vegetation is mostly ponderosa pine, Douglas-fir, and an understory of Idaho and rough fescue, bluebunch wheatgrass, and forbs. This association makes up 7 percent of the survey area.
9. Togo-Manley-Scar association - Nearly level to very steep, well-drained, cold soils at elevations above 3,000 feet. This association is on ridges and mountainsides. The main drainage channels tend to be narrow and are oriented in an east-west direction. North-facing slopes are steep. They break abruptly from the ridges into the drainage channels. South-facing slopes are longer and less steep. The ridges are gently rounded. The vegetation is mostly mixed stands of subalpine fir, Engelmann spruce, larch, and Douglas-fir. This association makes up 16 percent of the survey area.

Our soil resource is an extremely important component for maintaining a healthy ecosystem and economy. Fire can play an intricate role in this process, if it occurs under normal conditions of light fuels associated with low intensity underburns. However, the buildup of fuels and consequent high severity fires can cause soils to become water repellent (hydrophobic), and thus greatly increases the potential for overland flow during intense rains. Soil in degraded conditions does not function normally, and will not be able to sustain water quality, water yield, or plant communities that have normal structure, composition, and function. Fire is also strongly correlated with the carbon-nutrient cycles and the hydrologic cycle. Fire frequency, extent, and severity are controlled to a large degree by the availability of carbon, as well as the moisture regime (Quigley & Arbelbide 1997).

Soils were evaluated for their propensity to become hydrophobic during and after a fire as evidenced by the presence of clay and clay derivatives (e.g., clay loam, cobbly clay) in the upper soil layers. In addition, their permeability and tendency to allow runoff to infiltrate the soil was evaluated. In general, with notable exceptions, the majority of the area within Ferry County has low clay content in the B horizon. Much of the area has little to no reported clay content in the A horizon with a silty, sandy, or gravely loam present. On average these soils are well drained with moderate permeability.

Low to moderate intensity fires would not be expected to damage soil characteristics in the region, especially if the hotter fires in this range were limited to small extents associated with jackpots of cured fuels. Hot fires providing heat to the B horizon substrate depth have the potential to create hydrophobic characteristics in that layer. This can result in increased overland flow during heavy rains, following wildfire events, potentially leading to mass wasting. Rocky and gravelly characteristics in the A horizon layer would be expected to be displaced, while the silty and loamy fines in these soils may experience an erosion and displacement potential. These soils will experience the greatest potential impacts resulting from hot fires that burn for prolonged periods (especially on steep slopes).

The National Resource Conservation Service (NRCS) has mapped a large portion of Ferry County in detail. Please refer the North Ferry Area NRCS Soil Survey Report to view each soil unit in the County and the associated characteristics relating to the effects of wildland fire.

3.8 Hydrology

The Washington Department of Ecology & Water Resources Program is charged with the development of the Washington State Water Plan. Included in the State Water Plan are the statewide water policy plan, and component basin and water body plans which cover specific geographic areas of the state (WDOE 2005). The Washington Department of Ecology has prepared General Lithologies of the Major Ground Water Flow Systems in Washington.

The state may assign or designate beneficial uses for particular Washington water bodies to support. These beneficial uses are identified in section WAC 173-201A-200 of the Washington Surface Water Quality Standards (WQS). These uses include:

- **Aquatic Life Uses:** char; salmonid and trout spawning, rearing, and migration; nonanadromous interior redband trout, and indigenous warm water species
- **Recreational Uses:** primary (swimming) and secondary (boating) contact recreation
- **Water Supply Uses:** domestic, agricultural, and industrial; and stock watering

While there may be competing beneficial uses in streams, federal law requires protection of the most sensitive of these beneficial uses.

The geology and soils of this region lead to rapid to moderate moisture infiltration. Slopes are moderate to steep, however, headwater characteristics of the watersheds lead to a high degree of infiltration as opposed to a propensity for overland flow. Thus sediment delivery efficiency of first and third order streams is fairly low. The bedrock is typically well fractured and moderately soft. This fracturing allows excessive soil moisture to infiltrate into the rock and thus surface runoff is rare. Natural mass stability hazards associated with slides are low. Natural sediment yields are low for these watersheds. However, disrupted vegetation patterns from logging (soil compaction), farming, road construction, and wildland fire (especially hot fires that increase soil hydrophobic characteristics), can lead to increased surface runoff and debris flow to stream channels.

A correlation to mass wasting due to the removal of vegetation caused by high intensity wildland fire has been documented. Burned vegetation can result in changes in soil moisture and loss of rooting strength that can result in slope instability, especially on slopes greater than 30%. The greatest watershed impacts from increased sediment will be in the lower gradient, depositional stream reaches.

Of critical importance to Ferry County will be the maintenance of the domestic watershed supplies in the Sanpoil River Watershed (Watershed Resources Inventory Area 52) and the Kettle River Watershed (Watershed Resources Inventory Area 60). More discussion about these watersheds will be provided in the recommendations section.

Timberlands in the region have been extensively harvested for the past several decades, therefore altering riparian function by removing streamside shade and changing historic sediment deposition. Riparian function and channel characteristics have been altered by ranch and residential areas as well. The current conditions of wetlands and floodplains are variable. Some wetlands and floodplains have been impacted by past management activities.

Table 3.13 lists the Washington Water Resources database of municipal water supplies in Ferry County and the Recorded Water Certificates and Permits in Ferry County. These water sources may be placed at risk in the event of a wildland fire.

Table 3.13. Municipal Water Sources in Ferry County.

System Name	System Type	Source Name	Source Type	County	Capacity	Latitude	Longitude
TOWNSHIP CREEK WATER SYSTEM	Group B	MEYERS SPRING	Spring	FERRY	15	48.742490	-118.147000
KETTLE COURT WATER SYSTEM	Group B	WELL 1	Well	FERRY	30	48.898320	-118.584000
EAGLE TRACT ORV FACILITY	Group B	FERRY CO. P & R WELL	Well	FERRY	9	48.628150	-118.756000
HUNT, WALTER WTR. SYS.	Group B	HUNT WELL #1	Well	FERRY	25	48.698990	-118.666000
PENDRY, RALPH WATER SYSTEM	Group B	PENDRY WEELL #1	Well	FERRY	50	48.619070	-118.857000
WATKINS, RAY WATER SYSTEM	Group B	WATKINS WELL #1	Well	FERRY	70	48.746450	-118.740000
MARCH, TED WATER SYSTEM	Group B	WELL #1	Well	FERRY	20	48.883970	-118.600000
LAURIER ENTERPRISES	Group B	WELL 1	Well	FERRY	15	48.998720	-118.229000
LAKECREST WATER SYSTEM	Group B	WELL 1	Well	FERRY	37	48.764300	-118.660000
ROCKCUT WATER	Group B	WELL #1 - ACK874	Well	FERRY	30	48.917770	-118.213000
REPUBLIC SDA CHURCH	Group B	WELL 1	Well	FERRY	4	48.677460	-118.677000
KENT WATER SYSTEM	Group B	WELL 1	Well	FERRY	30	48.709470	-118.125000
KPM WATER SYSTEM	Transient Non-Community	Well #1 - AHC062	Well	FERRY	25	48.681207	-118.666754
WATERING HOLE, THE	Transient Non-Community	Well #1 - ABJ680	Well	FERRY	20	48.724596	-118.131730
BLACK BEACH RESORT	Transient Non-Community	Well #1 - AHC060	Well	FERRY	20	48.729045	-118.666757
LIBERTY BAPTIST CHURCH	Group B	AEC037 WELL 1	Well	FERRY	10	48.655740	-118.712000
COLUMBIA CEDAR	Non-Transient, Non-Community	NANCY CREEK	Surface	FERRY	100	48.654970	-118.119000
COLUMBIA CEDAR	Non-Transient, Non-Community	AEP748/WELL 1	Well	FERRY	10	48.660320	-118.116000
CURLEW KAI HOMEOWNER WATER SYSTEM	Community	Well #1 - AHC057	Well in Well Field	FERRY	200	48.709868	-118.662186
CURLEW KAI HOMEOWNER WATER SYSTEM	Community	Well #2 - AHC058	Well in Well Field	FERRY	50	48.709742	-118.662152
CURLEW KAI HOMEOWNER WATER SYSTEM	Community	Well #3 - AHC059	Well in Well Field	FERRY	200	48.709731	-118.662170
CURLEW KAI HOMEOWNER WATER SYSTEM	Community	WF/S01,2,3	Well Field	FERRY	240	48.709780	-118.662169
RUBERTS CURLEW LAKE TRACT ASSN	Group B	Well #1 - AHC061	Well	FERRY	60	48.731756	-118.667934
CURLEW WATER DISTRICT	Community	Well #3	Well in Well Field	FERRY	210	48.878427	-118.605815
CURLEW WATER DISTRICT	Community	Well #4	Well in Well Field	FERRY	205	48.878156	-118.605648
CURLEW WATER DISTRICT	Community	WF/S03,S04	Well Field	FERRY	415	48.878291	-118.605731
US BORDER STATION - DANVILLE	Group B	WELL 1	Well	FERRY	5	48.998570	-118.502000
US BORDER STATION - FERRY	Group B	WELL #1	Well	FERRY	5	48.998740	-118.757000
FISHERMANS COVE	Transient Non-Community	Well #1 - AHC052	Well	FERRY	10	48.746908	-118.659509
ABRAHAM SHORT PLAT	Group B	WELL #1	Well	FERRY	33	48.938470	-118.562000
NORTH LAKE ROOSEVELT RESORT	Transient Non-Community	Well #1 - AHC071	Well	FERRY	20	48.686391	-118.122737
LAKESIDE PARK	Community	Well #1 AHC073	Well	FERRY	15	48.626409	-118.122096

Table 3.13. Municipal Water Sources in Ferry County.

System Name	System Type	Source Name	Source Type	County	Capacity	Latitude	Longitude
ANDERSON K. R. LOTS	Group B	WELL 1	Well	FERRY	65	48.789630	-118.120000
INCHELIUM WATER DISTRICT	Community	Big Well (Hall Cr) AHC097	Well in Well Field	FERRY	180	48.315423	-118.223655
INCHELIUM WATER DISTRICT	Community	Little Well AHC096	Well in Well Field	FERRY	12	48.316079	-118.224082
INCHELIUM WATER DISTRICT	Community	WF/S06,7	Well Field	FERRY	225	48.311503	-118.220068
INCHELIUM WATER DISTRICT	Community	Sub-Agency Well	Well	FERRY	100	48.310647	-118.221175
INCHELIUM WATER DISTRICT	Community	WF/S01,2	Well Field	FERRY	192	48.315751	-118.223868
INCHELIUM WATER DISTRICT	Community	Well #4 AHC098	Well in Well Field	FERRY	110	48.311470	-118.219980
INCHELIUM WATER DISTRICT	Community	Well #5 AHC099	Well in Well Field	FERRY	110	48.311536	-118.220157
COLUMBIA RIVER WATER ASSOCIATION	Group B	WELL #1	Well	FERRY	9	48.618860	-118.140000
US BORDER STATION - LAURIER	Group B	WELL 1	Well	FERRY	80	48.998720	-118.229000
HARTMANS LOG CABIN RESORT INC	Transient Non-Community	Well #1 - AHC836	Well	FERRY	10	48.271973	-118.376332
HARTMANS LOG CABIN RESORT INC	Transient Non-Community	Well #2 - AHC837	Well	FERRY	10	48.270257	-118.374456
HARTMANS LOG CABIN RESORT INC	Transient Non-Community	Well #3 - AHC838	Well	FERRY	10	48.272694	-118.377454
HARTMANS LOG CABIN RESORT INC	Transient Non-Community	Well #4 - AHC839	Well	FERRY	10	48.270465	-118.376431
MARTIN CREEK COMMUNITY ASSN	Community	Well #1	Well	FERRY	30	48.526500	-118.187886
MARTIN CREEK COMMUNITY ASSN	Community	Well #2	Well	FERRY	25	48.527834	-118.185866
MATNEY, FRANK	Group B	SPRING #1	Spring	FERRY	15	48.646640	-118.248000
NORTH TWIN LAKE TRIBAL YOUTH CAMP	Group B	WELL #1	Well	FERRY	30	48.288890	-118.360000
NORTH TWIN LAKEVIEW ASSN	Community	Well #1 - AHC102	Well	FERRY	220	48.294296	-118.367194
THIELE-NELSON WATER SYSTEM	Group B	WELL #1	Well	FERRY	22	48.890910	-118.573000
ORIENT WATER COMPANY	Community	E Deer Creek	Surface	FERRY	100	48.863429	-118.210327
Trans Canadas GTN System #8	Group B	Well #2	Well	WALLA WALLA	15	47.986800	-118.809000
PINE GROVE WATER CO-OP	Community	AHC070 WELL 1	Well in Well Field	FERRY	100	48.650573	-118.689574
PINE GROVE WATER CO-OP	Community	WELL 2	Well in Well Field	FERRY	150	48.650271	-118.688518
PINE GROVE WATER CO-OP	Community	WF/S01,S02	Well Field	FERRY	250	48.650422	-118.689046
PINES CAFE	Group B	Well 01	Well	FERRY	20	48.173070	-118.704000
REPUBLIC, CITY OF	Community	Well #1 - AHC067	Well in Well Field	FERRY	250	48.636410	-118.730508
REPUBLIC, CITY OF	Community	Well #2 - AHC068	Well in Well Field	FERRY	250	48.636186	-118.730542
REPUBLIC, CITY OF	Community	Well #3 - AHC066	Well in Well Field	FERRY	500	48.635174	-118.729839
REPUBLIC, CITY OF	Community	WF/S01,2,3	Well Field	FERRY	1,000	48.635923	-118.730296
RIVERWOOD WATER SYSTEM	Community	Well #1 - AHC072	Well in Well Field	FERRY	28	48.622849	-118.127336
RIVERWOOD WATER SYSTEM	Community	Well #2	Well in Well Field	FERRY	30	48.622795	-118.127336
RIVERWOOD WATER SYSTEM	Community	WF/S01,S02	Well Field	FERRY	58	48.622822	-118.127336

Table 3.13. Municipal Water Sources in Ferry County.

System Name	System Type	Source Name	Source Type	County	Capacity	Latitude	Longitude
VAAGEN BROS LUMBER COMPANY	Group B	Well #1 AHC065	Well	FERRY	100	48.662443	-118.670202
TIFFANYS RESORT	Group B	WELL #1	Well	FERRY	30	48.746210	-118.671000
Key Mill Facility	Non-Transient, Non-Community	Well #1	Well	FERRY	335	48.668458	-118.611837
Key Mill Facility	Non-Transient, Non-Community	Well #2	Well	FERRY	275	48.669268	-118.609780
K2 Mine	Non-Transient, Non-Community	Well #1 - AA1857	Well	FERRY	8	48.879557	-118.668454
Dreamswept Farms Water System 1	Transient Non-Community	Well # AHT279	Well	FERRY	30	48.720540	-118.192000
CURLEW CONSERVATION CENTER	Community	Well #2	Well in Well Field	FERRY	150	48.931456	-118.752323
CURLEW CONSERVATION CENTER	Community	Well #3 - AFN465	Well in Well Field	FERRY	150	48.931377	-118.752450
CURLEW CONSERVATION CENTER	Community	WF/S02,S03	Well Field	FERRY	300	48.931416	-118.752386
LONG LAKE CAMPGROUND	Group B	HANDPUMP	Well	FERRY	-	48.498050	-118.815000
SWAN LAKE CAMPGROUND	Transient Non-Community	Well #3 - AHC069	Well	FERRY	-	48.514136	-118.834233
HAAG COVE CAMPGROUND	Transient Non-Community	Haag Cove Well - AHC048	Well	FERRY	15	48.560741	-118.151377
KETTLE RIVER CAMPGROUND	Transient Non-Community	Campground Well - AHC049	Well	FERRY	75	48.715982	-118.122484
CURLEW LAKE STATE PARK	Transient Non-Community	Well #1	Well	FERRY	50	48.717228	-118.663986

3.9 Air Quality

The primary means by which the protection and enhancement of air quality is accomplished is through implementation of National Ambient Air Quality Standards (NAAQS). These standards address six pollutants known to harm human health including ozone, carbon monoxide, particulate matter, sulfur dioxide, lead, and nitrogen oxides (USDA Forest Service 2000).

The Clean Air Act, passed in 1963 and amended in 1977, is the primary legal authority governing air resource management. The Clean Air Act provides the principal framework for national, state, and local efforts to protect air quality. Under the Clean Air Act, OAQPS (Organization for Air Quality Protection Standards) is responsible for setting standards, also known as national ambient air quality standards (NAAQS), for pollutants which are considered harmful to people and the environment. OAQPS is also responsible for ensuring these air quality standards are met, or attained (in cooperation with state, Tribal, and local governments) through national standards and strategies to control pollutant emissions from automobiles, factories, and other sources (Louks 2001).

Smoke emissions from fires potentially affect an area and the airsheds that surround it. Climatic conditions affecting air quality in Eastern Washington are governed by a combination of factors. Large-scale influences include latitude, altitude, prevailing hemispheric wind patterns, and mountain barriers. At a smaller scale, topography and vegetation cover also affect air movement patterns. Air quality in the area is generally good to excellent. However, locally adverse conditions can result from occasional wildland fires in the summer and fall, and prescribed fire and agricultural burning in the spring and fall. All major river drainages are subject to temperature inversions which trap smoke and affect dispersion, causing local air quality problems. This occurs most often during the summer and fall months and would potentially affect all communities in Ferry County.

3.9.1 Washington State Smoke Management Plan

The Department of Natural Resources (DNR), Department of Ecology (DOE), U.S. Forest Service (USFS), National Park Service (NPS), Bureau of Land Management (BLM), participating Indian nations, military installations (DOD), and small and large forest landowners have worked together to deal with the effect of outdoor burning on air.

Protection of public health and preservation of the natural attractions of the state are high priorities and can be accomplished along with a limited, but necessary, outdoor burning program. Public health, public safety, and forest health can all be served through the application of the provisions of Washington State law and this plan, and with the willingness of those who do outdoor burning on forest lands to further reduce the negative effects of their burning.

The Washington State Smoke Management Plan pertains to DNR-regulated silvicultural outdoor burning only and does not include agricultural outdoor burning or outdoor burning that occurs on improved property. Although the portion of total outdoor burning covered by this plan is less than 10 percent of the total air pollution in Washington, it remains a significant and visible source.

3.9.1.1 Background

Washington State has had a Smoke Management Plan in effect since 1969. After the enactment of the original plan, and with the addition of the 1975 plan, the number of smoke intrusions into designated population areas has dropped significantly every year.

The 1975 Smoke Management Plan has undergone several informal and semi-formal modifications since its adoption, mainly by agreement with the plan's signatories and other agencies. These modifications represent significant changes in DNR operating procedures and emphases.

The earlier Smoke Management Plans of 1969 and 1975 have done their job well. Today the Pacific Northwest is regarded as a leader in controlling smoke from outdoor burning on forest lands; many other states have used past plans as models in setting up their own smoke management programs.

3.9.1.2 Purpose

The purpose of this plan is to coordinate and facilitate the statewide regulation of prescribed outdoor burning on lands protected by the DNR and on unimproved, federally-managed forest lands and participating tribal lands. The plan is designed to meet the requirements of the Washington Clean Air Act.

3.9.1.3 Goals

- Protect human health and safety from the effects of outdoor burning
- Facilitate the enjoyment of the natural attractions of the state
- Provide a limited burning program for the people of this state
- Provide the opportunity for essential forest land burning while minimizing emissions
- Reduce emissions from silvicultural burning other than for forest health reasons first by 20 percent and later by 50 percent, as required by law
- Foster and encourage the development of alternative methods for disposing, of or reducing the amount of, organic refuse on forest lands
- Acknowledge the role of fire in forest ecosystems and allow the use of fire under controlled conditions to maintain healthy forests.

3.9.1.4 Scope

The plan provides regulatory direction, operating procedures, and advisory information regarding the management of smoke and fuels on the forest lands of Washington State. It applies to all persons, landowners, companies, state and federal land management agencies, and others who do outdoor burning in Washington State on lands where the DNR provides fire protection, or where such burning occurs on federally-managed, unimproved forest lands and tribal lands of participating Indian nations in the state.

This plan does not apply to agricultural outdoor burning and open burning as defined by Washington Administrative Code (WAC) 173-425-030 (1) and (2), nor to burning done "by rule" under WAC 332-24 or on non-forested wildlands (e.g., range lands). All future reference to burning in this plan will refer only to silvicultural burning unless otherwise indicated.

The plan does not address nor attempt to regulate prescribed natural fire in wilderness areas and national parks for several reasons: the amount of emissions caused by such burning in Washington is relatively small, it is impossible to "regulate" unforecastable natural ignitions, and it is nearly impossible to gather emission data efficiently in the areas where this type of burning

generally takes place. Federal agencies that have adopted the use of prescribed natural fires will remain solely responsible for the administration of such programs.

3.9.1.5 Participation

Those who receive fire protection from the DNR, or from agencies contracted by the DNR, must abide by the requirements of this plan. This includes all burning done on private and state-managed lands that pay, or are subject to paying, Forest Protection Assessment.

Federal agencies that do outdoor burning on forest lands must participate in and abide by the requirements of this plan under the direction of the federal Clean Air Act. These agencies include, but are not limited to, the Forest Service (USFS), Park Service (NPS), Fish and Wildlife Service (F&WS), Bureau of Land Management (BLM), and Department of Defense (DOD).

Indian nations may choose to participate in all or portions of the plan. Participation would be by written agreement between the Indian nation and the DNR. Advantages of participation by Indian nations would include statewide coordination of burning, shared weather forecasting services, uniform data reporting and storage, better protection of the public through a unified burn approval system, satisfaction of federal EPA requirements, and other services provided by either party to the other. Such future agreements would become appendices to this plan.

Chapter 4: Risk and Preparedness Assessments

4 Overview

4.1 Wildland Fire Characteristics

An informed discussion of fire mitigation is not complete until basic concepts that govern fire behavior are understood. In the broadest sense, wildland fire behavior describes how fires burn; the manner in which fuels ignite, how flames develop and how fire spreads across the landscape. The three major physical components that determine fire behavior are the fuels supporting the fire, topography in which the fire is burning, and the weather and atmospheric conditions during a fire event. At the landscape level, both topography and weather are beyond our control. We are powerless to control winds, temperature, relative humidity, atmospheric instability, slope, aspect, elevation, and landforms. It is beyond our control to alter these conditions, and thus impossible to alter fire behavior through their manipulation. When we attempt to alter how fires burn, we are left with manipulating the third component of the fire environment; fuels which support the fire. By altering fuel loading and fuel continuity across the landscape, we have the best opportunity to determine how fires burn.

A brief description of each of the fire environment elements follows in order to illustrate their effect on fire behavior.

4.1.1 Weather

Weather conditions contribute significantly to determining fire behavior. Wind, moisture, temperature, and relative humidity ultimately determine the rates at which fuels dry and vegetation cures, and whether fuel conditions become dry enough to sustain an ignition. Once conditions are capable of sustaining a fire, atmospheric stability and wind speed and direction can have a significant affect on fire behavior. Winds fan fires with oxygen, increasing the rate at which fire spreads across the landscape. Weather is the most unpredictable component governing fire behavior, constantly changing in time and across the landscape.

4.1.2 Topography

Fires burning in similar fuel conditions burn dramatically different under different topographic conditions. Topography alters heat transfer and localized weather conditions, which in turn influence vegetative growth and resulting fuels. Changes in slope and aspect can have significant influences on how fires burn. Generally speaking, north slopes tend to be cooler, wetter, more productive sites. This can lead to heavy fuel accumulations, with high fuel moistures, later curing of fuels, and lower rates of spread. In contrast, south and west slopes tend to receive more direct sun, and thus have the highest temperatures, lowest soil and fuel moistures, and lightest fuels. The combination of light fuels and dry sites lead to fires that typically display the highest rates of spread. These slopes also tend to be on the windward side of mountains. Thus these slopes tend to be “available to burn” a greater portion of the year.

Slope also plays a significant roll in fire spread, by allowing preheating of fuels upslope of the burning fire. As slope increases, rate of spread and flame lengths tend to increase. Therefore, we can expect the fastest rates of spread on steep, warm south and west slopes with fuels that are exposed to the wind.

4.1.3 Fuels

Fuel is any material that can ignite and burn. Fuels describe any organic material, dead or alive, found in the fire environment. Grasses, brush, branches, logs, logging slash, forest floor litter, conifer needles, and buildings are all examples. The physical properties and characteristics of fuels govern how fires burn. Fuel loading, size and shape, moisture content and continuity and arrangement all have an affect on fire behavior. Generally speaking, the smaller and finer the fuels, the faster the potential rate of fire spread. Small fuels such as grass, needle litter and other fuels less than a quarter inch in diameter are most responsible for fire spread. In fact, "fine" fuels, with high surface to volume ratios, are considered the primary carriers of surface fire. This is apparent to anyone who has ever witnessed the speed at which grass fires burn. As fuel size increases, the rate of spread tends to decrease, as surface to volume ratio decreases. Fires in large fuels generally burn at a slower rate, but release much more energy, burn with much greater intensity. This increased energy release, or intensity, makes these fires more difficult to control. Thus, it is much easier to control a fire burning in grass than to control a fire burning in timber.

When burning under a forest canopy, the increased intensities can lead to torching (single trees becoming completely involved) and potentially development of crown fire. That is, they release much more energy. Fuels are found in combinations of types, amounts, sizes, shapes, and arrangements. It is the unique combination of these factors, along with the topography and weather, which determine how fires will burn.

The study of fire behavior recognizes the dramatic and often-unexpected affect small changes in any single component has on how fires burn. It is impossible to speak in specific terms when predicting how a fire will burn under any given set of conditions. However, through countless observations and repeated research, some of the principles that govern fire behavior have been identified and are recognized.

4.2 Wildfire Hazards

4.2.1 Wildfire Ignition Profile

Fire was once an integral function of the majority of ecosystems in Washington. The seasonal cycling of fire across the landscape was as regular as the July, August and September lightning storms plying across the canyons and mountains. Depending on the plant community composition, structural configuration, and buildup of plant biomass, fire resulted from ignitions with varying intensities and extent across the landscape. Shorter return intervals between fire events often resulted in less dramatic changes in plant composition (Johnson 1998). The fires burned from 1 to 47 years apart, with most at 5- to 20-year intervals (Barrett 1979). With infrequent return intervals, plant communities tended to burn more severely and be replaced by vegetation different in composition, structure, and age (Johnson *et al.* 1994). Native plant communities in this region developed under the influence of fire, and adaptations to fire are evident at the species, community, and ecosystem levels. Fire history data (from fire scars and charcoal deposits) suggest fire has played an important role in shaping the vegetation in the Columbia Basin for thousands of years (Steele *et al.* 1986, Agee 1993).

Detailed records of fire ignitions and extents have been compiled by the larger land management agencies in Ferry County including the Washington State Department of Natural Resources, Confederated Tribes of the Colville Reservation, and United States Forest Service. However, the period of data collection from these three agencies varies from 1940 to 1983. In order to make an accurate analysis of fire history across all ownerships, only data from 1983 to the present was used in the following tables and graphs. Using this data on past fire extents and

fire ignition data, the occurrence of wildland fires in the region of Ferry County has been evaluated.

An analysis of the wildfire ignitions in Ferry County reported by the Department of Natural Resources, the Colville Tribe, and the Forest Service from 1983 through 2005 reveals that approximately 2,229 wildfires have been ignited and 94,914 acres burned during this period in Ferry County (Table 4.1).

Table 4.1. Summary of wildfire ignitions in Ferry County from aggregated DNR, Colville Tribe, and USFS database.

Cause	Acres Burned	Percent	Number of Ignitions	Percent
Aircraft	1,071	1%	84	4%
Arson	14	0%	13	1%
Brakeshoe	15,239	16%	66	3%
Burning Vehicle	25	0%	22	1%
Children	3	0%	17	1%
Cooking Fire	27	0%	53	2%
Debris Burn	390	0%	103	5%
Exhaust-Other	3,569	4%	191	9%
Exhaust-Powersaw	2,098	2%	92	4%
Lightning	68,171	72%	1,244	56%
Logging	4	0%	5	0%
Logging Line	105	0%	1	0%
Miscellaneous	1,303	1%	122	5%
Railroad	3	0%	5	0%
Recreation	74	0%	38	2%
Smoker	21	0%	7	0%
Warming Fire	2,795	3%	166	7%
Total	**94,914**		**2,229**	

Figure 4.1. Wildfire Ignitions in Ferry County from aggregated DNR, Tribe, and USFS database 1983-2005..

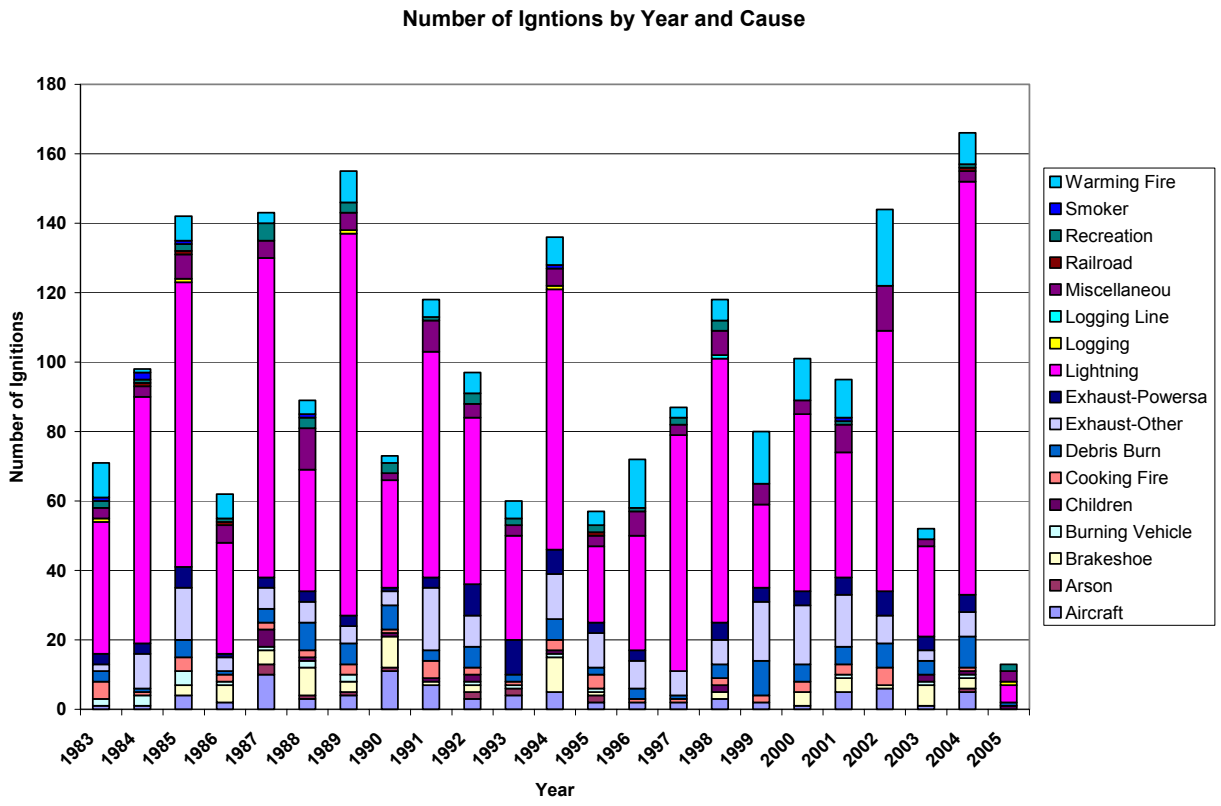


Table 4.1 and Figure 4.1 show not only that there are more ignitions caused by lightning than any other source, but that the vast majority of acres burned since 1983 (72%) have been a result of a lightning ignition. Although brakeshoes only account for 3% of the ignitions, they are responsible for 16% or 15,239 of the total acres burned in Ferry County since 1983. Other frequently occurring ignition sources include aircraft, debris burning, exhaust, powersaws, and warming fires. Due to the aggressive tactics of the fire suppression personnel, these types of human caused fires do not usually result in large acreages burned; however, the potential is still very high.

Table 4.2. Wildfire Ignition and Extent Summary by Year from aggregated DNR, Tribe, and USFS database 1983-2005.

Year	Acres Burned by Year	Number of Ignitions
1983	165	71
1984	113	98
1985	4,192	142
1986	104	62
1987	549	143
1988	42,817	89
1989	523	155
1990	2,475	73

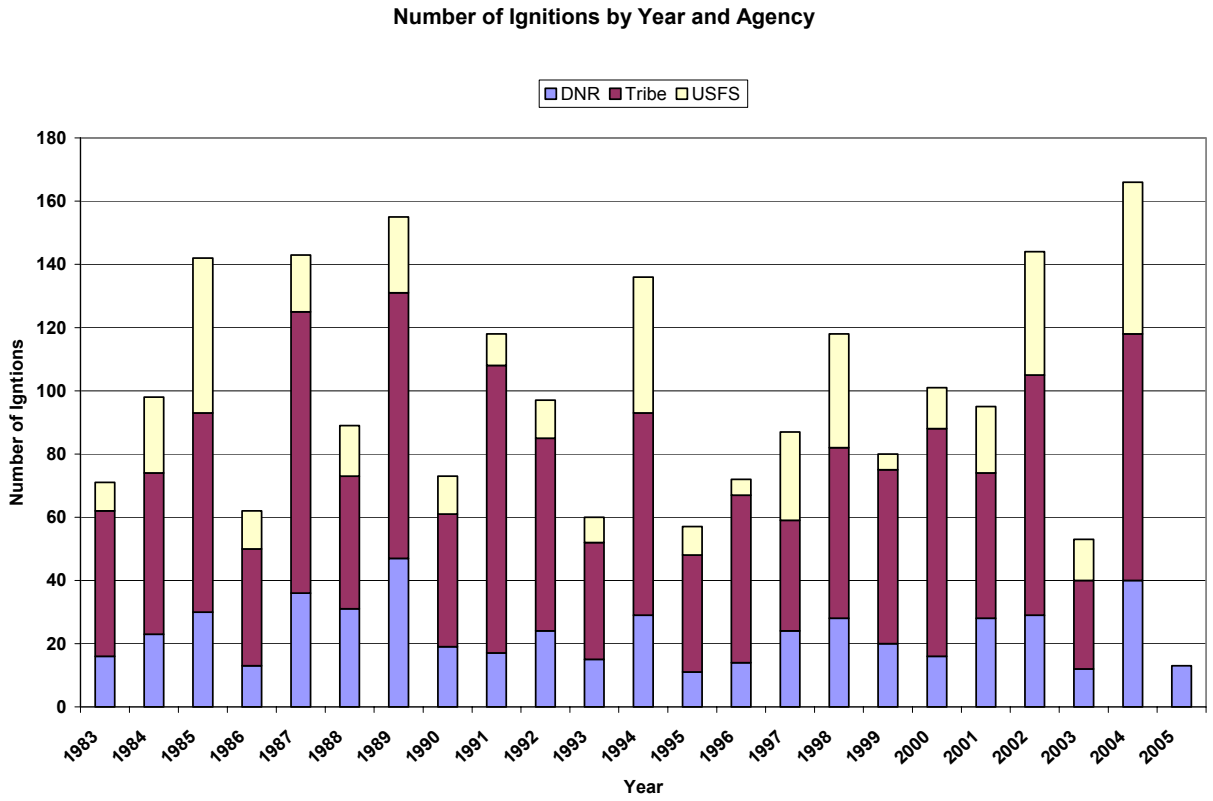
Table 4.2. Wildfire Ignition and Extent Summary by Year from aggregated DNR, Tribe, and USFS database 1983-2005.

Year	Acres Burned by Year	Number of Ignitions
1991	411	118
1992	738	97
1993	19	60
1994	11,602	136
1995	181	57
1996	1,108	72
1997	122	87
1998	643	118
1999	504	80
2000	357	101
2001	9,397	95
2002	624	144
2003	18,092	52
2004	168	166
2005	10	13
Total	**94,914**	**2,229**

Table 4.2 shows that large acreages burned is not necessarily correlated with high numbers of ignitions. Large acreages were burned in 1988, 1994, and 2003; however, the highest numbers of ignitions occurred in 1985, 1987, 1989, 1994, 2002, and 2004.

Figure 4.2 shows that there are typically more fire ignitions on Tribal lands than Department of Natural Resources or Forest Service managed lands. This could be due to the annual practice of cultural burning by Tribal members.

Figure 4.2. Number of Ignitions per Year by Agency 1983 – 2005.



In addition to the agencies' fire ignition records, the local fire departments also keep an account of the number of fire calls they have received annually since 1997. In some cases, these fire calls may be in response to the fires documented above; however, fire departments in Ferry County are frequently called upon for initial attack purposes on private lands. The following data was recorded by the individual fire departments in Ferry County. In some instances, multiple fire departments may have responded to the same fire.

Ferry County Joint Fire Protection District #3 responded to a total of 32 wildfire calls and 2 controlled burn calls between 1997 and 2004.

Table 4.3. Fire Calls Recorded by Ferry County Joint Fire Protection District #3.

Year	Wildfire Calls	Control Burn Calls
1997	0	0
1998	0	0
1999	2	0
2000	1	1
2001	9	0
2002	8	0
2003	7	0
2004	5	1
Total	**32**	**2**

Ferry County Fire Protection District #13 responded to a total 108 wildfire calls and 2 controlled burn calls between 1997 and 2004.

Table 4.4. Fire Calls Recorded by Ferry/Okanogan County Fire Protection District #13.

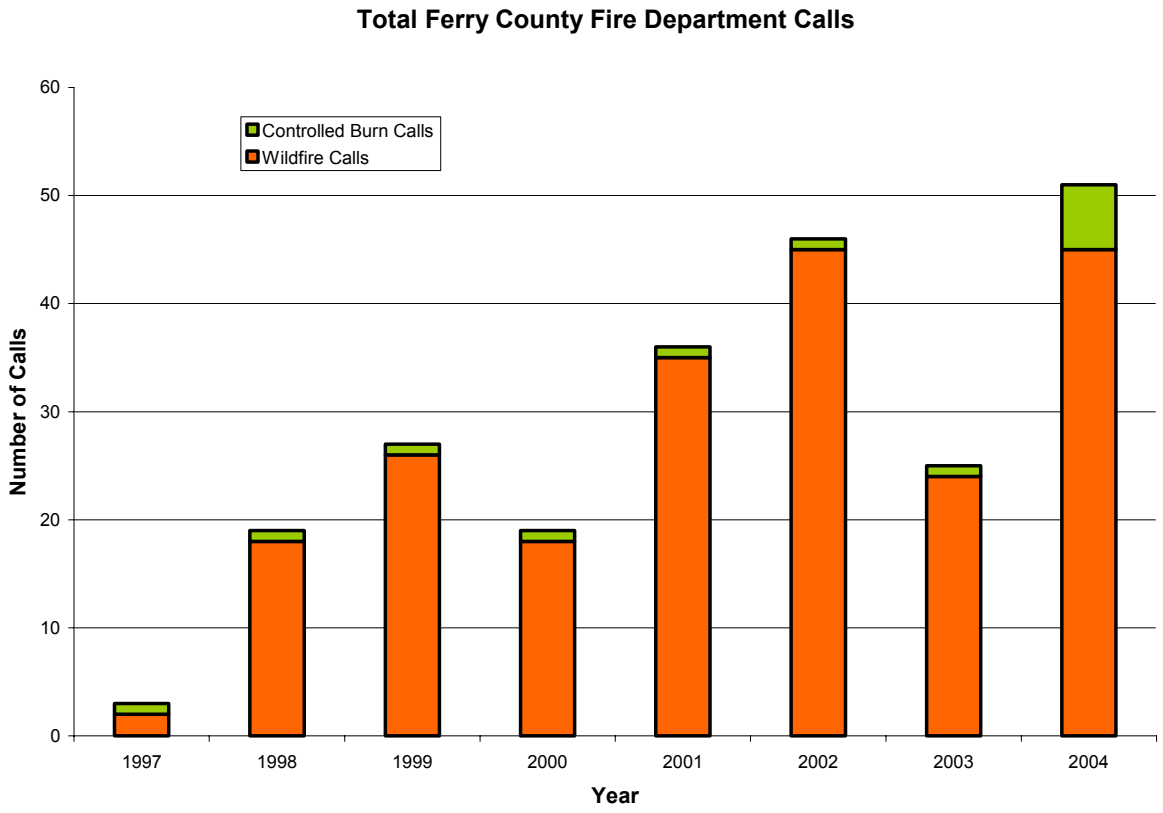
Year	Wildfire Calls	Control Burn Calls
1997	1	0
1998	9	0
1999	15	1
2000	11	1
2001	17	0
2002	24	0
2003	7	0
2004	24	0
Total	**108**	**2**

Ferry County Fire Protection District #14 responded to a total 73 wildfire calls and 5 controlled burn calls between 1997 and 2004.

Table 4.5. Fire Calls Recorded by Ferry/Okanogan County Fire Protection District #14.

Year	Wildfire Calls	Control Burn Calls
1997	1	0
1998	9	0
1999	9	1
2000	6	0
2001	9	0
2002	13	0
2003	10	0
2004	16	4
Total	**73**	**5**

Figure 4.3. Total Ferry County Fire Department Calls from 1997 – 2004.



In all analyses, Ferry County is heavily impacted by wildland fire.

4.2.2 Wildfire Extent Profile

Across the west, wildfires have been increasing in extent and cost of control. The National Interagency Fire Center (2005) reported over 77,500 wildfires in 2004 which burned a total of 6.7 million acres and cost $890 million in containment (Table 4.4). Data summaries for 2000 through 2004 are provided and demonstrate the variability of the frequency and extent of wildfires nationally (Table 4.7). It is important to note that the 10 year moving average number of acres burned reported each year has been increasing constantly since 2000.

Table 4.6. National Fire Season Summaries.

Statistical Highlights	2000	2001	2002	2003	2004
Number of Fires	122,827	84,079	88,458	85,943	77,534
10-year Average ending with indicated year	106,393	106,400	103,112	101,575	100,466
Acres Burned	**8,422,237**	**3,555,138**	**6,937,584**	**4,918,088**	**6,790,692**
10-year Average ending with indicated year	3,786,411	4,083,347	4,215,089	4,663,081	4,923,848
Structures Burned	861	731	2,381	5,781	1,095
Estimated Cost of Fire Suppression (Federal agencies only)	$1.3 billion	$917 million	$ 1.6 billion	$1.3 billion	$890 million

The National Interagency Fire Center, located in Boise, Idaho, maintains records of fire costs, extent, and related data for the entire nation. Tables 4.7 and 4.8 summarize some of the relevant wildland fire data for the nation, and some trends that are likely to continue into the future unless targeted fire mitigation efforts are implemented and maintained.

These statistics are based on end-of-year reports compiled by all wildland fire agencies after each fire season, and are updated by March of each year. The agencies include: Bureau of Land Management, Bureau of Indian Affairs, National Park Service, US Fish and Wildlife Service, USDA Forest Service and all State Lands.

Table 4.7. Total Fires and Acres 1960 - 2004 Nationally.

Year	Fires	Acres	Year	Fires	Acres
2004	77,534	* 6,790,692	1981	249,370	4,814,206
2003	85,943	4,918,088	1980	234,892	5,260,825
2002	88,458	6,937,584	1979	163,196	2,986,826
2001	84,079	3,555,138	1978	218,842	3,910,913
2000	122,827	8,422,237	1977	173,998	3,152,644
1999	93,702	5,661,976	1976	241,699	5,109,926
1998	81,043	2,329,709	1975	134,872	1,791,327
1997	89,517	3,672,616	1974	145,868	2,879,095
1996	115,025	6,701,390	1973	117,957	1,915,273
1995	130,019	2,315,730	1972	124,554	2,641,166
1994	114,049	4,724,014	1971	108,398	4,278,472
1993	97,031	2,310,420	1970	121,736	3,278,565
1992	103,830	2,457,665	1969	113,351	6,689,081
1991	116,953	2,237,714	1968	125,371	4,231,996
1990	122,763	5,452,874	1967	125,025	4,658,586
1989	121,714	3,261,732	1966	122,500	4,574,389
1988	154,573	7,398,889	1965	113,684	2,652,112
1987	143,877	4,152,575	1964	116,358	4,197,309
1986	139,980	3,308,133	1963	164,183	7,120,768
1985	133,840	4,434,748	1962	115,345	4,078,894
1984	118,636	2,266,134	1961	98,517	3,036,219
1983	161,649	5,080,553	1960	103,387	4,478,188
1982	174,755	2,382,036			

(National Interagency Fire Center 2004)

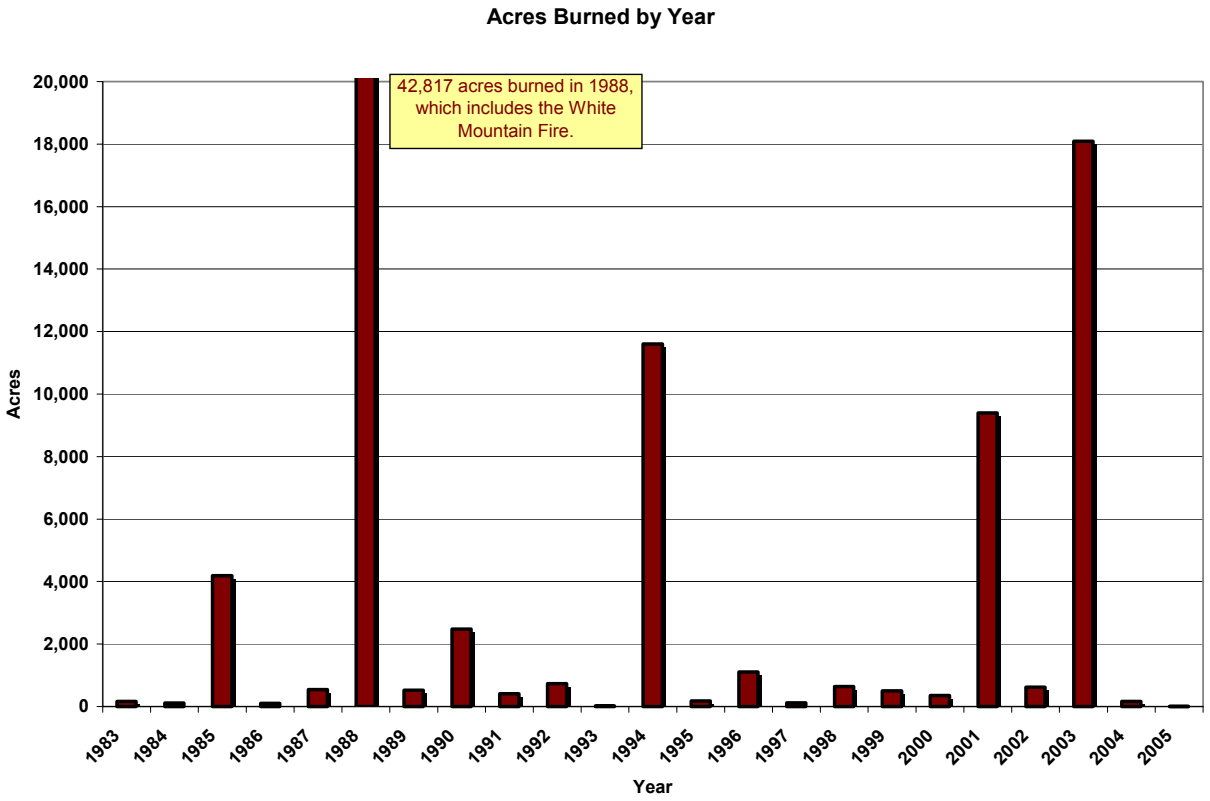
Table 4.8. Suppression Costs for Federal Agencies Nationally.

Year	Bureau of Land Management	Bureau of Indian Affairs	Fish and Wildlife Service	National Park Service	USDA Forest Service	Totals
2004	$ 147,165,000	$ 63,452,000	$ 7,979,000	$ 34,052,000	$ 637,585,000	**$890,233,000**
2003	$151,894,000	$ 96,633,000	$ 9,554,000	$ 44,557,000	$ 1,023,500,000	**$1,326,138,000**
2002	$ 204,666,000	$ 109,035,000	$ 15,245,000	$ 66,094,000	$ 1,266,274,000	**$1,661,314,000**
2001	$ 192,115,00	$ 63,200,000	$ 7,160,000	$ 48,092,000	$ 607,233,000	**$917,800,000**
2000	$180,567,000	$ 93,042,000	$ 9,417,000	$ 53,341,000	$ 1,026,000,000	**$1,362,367,000**
1999	$ 85,724,000	$ 42,183,000	$ 4,500,000	$ 30,061,000	$ 361,000,000	**$523,468,000**
1998	$ 63,177,000	$ 27,366,000	$ 3,800,000	$ 19,183,000	$ 215,000,000	**$328,526,000**
1997	$ 62,470,000	$ 30,916,000	$ 2,000	$ 6,844,000	$ 155,768,000	**$256,000,000**
1996	$ 96,854,000	$ 40,779,000	$ 2,600	$ 19,832,000	$ 521,700,000	**$679,167,600**
1995	$ 56,600,000	$ 36,219,000	$ 1,675,000	$ 21,256,000	$ 224,300,000	**$340,050,000**
1994	$ 98,417,000	$ 49,202,000	$ 3,281,000	$ 16,362,000	$ 678,000,000	**$845,262,000**

(National Interagency Fire Center 2005)

Figure 4.4 below shows the extent of wildfires by acreage burned per year in Ferry County. The various fire suppression agencies in Ferry County respond to many wildland fires each year, but few of those fires grow to a significant size. According to national statistics, only 2% of all wildland fires escape initial attack. However, that 2% accounts for the majority of fire suppression expenditures, which also threaten lives, properties, and natural resources. These large fires are characterized by a size and complexity that requires special management organizations, drawing suppression resources often from across the nation. It is these big fires that gobble acres and leave the most lasting effects. They create unique challenges to local communities by their quick development and the scale of their footprint. Ferry County is located within an area where natural vegetation and weather combine to make dangerous fire conditions. Natural ignitions from lightning have been part of the history of the county and will continue to be. Even though firefighters understand this potential, it is impossible for agencies to guarantee 100% success in fire suppression. It is important for fire planners to understand what has happened in the past in order to be more effective in the future when preparing for the inevitable.

Figure 4.4. Acres burned in DNR Protection Areas 1970-2005.



4.2.2.1 Past Fire Narratives

The following narratives are provided to emphasize that Ferry County has experienced "the big one" several times over and are still at significant risk of experiencing another large fire. Ferry County residents should not become lax about taking precautionary measures around their homes and businesses because it can take miles of elbow room for firefighters to contain a fire once it get going. The following excerpts provide support for the extent of treatment areas targeted in this plan.

4.2.2.1.1 White Mountain Fire (1988) - 21,717 acres

This fire was started by a dry lightning storm at night during a warm period in July. The same storm ignited numerous fires on the Colville Indian Reservation as it drifted northeastward onto the Colville National Forest. By dawn, six fires were burning in and around the headwaters of the Hall Creek basin. Forest Service firefighters from Republic and Kettle Falls, and smokejumpers from Winthrop began suppression efforts, but each of the fires escaped initial attack by the end of the first day. Additional resources were ordered as well as a Type 1 incident management team. However, the nation was simultaneously faced with its largest firefighting mobilization in history as numerous fires threatened a crown jewel of the National Park Service; Yellowstone Park. Resources were slow in arriving. The six individual fires quickly grew and burned together within a few days.

Fire suppression was hampered by heavy surface fuels, dense stands of trees, and poor access. The area is mostly designated in the Colville National Forest Land and Resource Management Plan for Semi-Primitive, Non-Motorized Recreation uses.

Prevailing winds pushed the fire generally northward and northeastward. State Route 20 and the Forest Service roads in the O'Brien Creek drainage were chosen as a defendable line to work from to stop the fires northward movement. Burnout operations ahead of the fire's advance were problematic due to heavy fuels. Spot fires from the main fire and burnout operations crossed State Route 20 and almost created a new run to the northeast where residences occupy locations surrounded by grassy slopes and brushy draws. The highway was obstructed by falling trees and was closed for days, further hampering fire suppression efforts. A main power transmission line owned by the Bonneville Power Administration was threatened, but the fire was stopped before reaching the line. The BPA line is the sole power provider for all of western Ferry County and parts of Okanogan County. Any further movement of the fire northward would have directly jeopardized private structures and triggered the beginning of evacuations in Republic.

The fire was finally contained and mopped up by fall weather. Progress in stopping the fire was most successful where road systems or old harvest units provided a break in the continuity of the fuels and eased the tendency for spot fires.

4.2.2.1.2 Copper Butte Fire (1994) - 10,473 acres

This fire was started during a multiple-ignition lightning event. It rained during the thunderstorm and the fire smoldered without detection. Other large fires on the Okanogan & Wenatchee National Forest, ignited by the same weather event, cast a smoke pall over the area and obscured northern Ferry County. A week after ignition, a wind change during an afternoon cleared the air and a strong column of smoke was revealed on the west side of Copper Butte. Smokejumpers dispatched to the fire reported upon arrival that there was no use in eight smokejumpers jumping the fire since it was over one hundred acres in size in thick decadent lodgepole pine and expanding with extreme fire behavior.

Suppression began quickly with a Type 1 incident management team and adequate resources. As the beginning efforts initiated a suppression strategy, downdrafts from a thunderstorm pushed the fire northeastward downhill into the Lambert Creek drainage, spotting over the Marcus Road and Palmer Spur Road. Residences were directly threatened as the fire blew across the Lambert Creek drainage and ran northward up long grassy south slopes and over the ridge into the south fork of St. Peter's Creek. The fire advanced three miles through Lambert Creek in less than 12 hours, adding close to 2000 acres to the fire's size, half of which was private land occupied by residents fighting for their lives and property.

Much of the intensity of the Copper Butte Fire was provided by remnant fuels from when the area burned in the 1920s. Fallen snags and logs from the earlier fire had accumulated on the north slopes in a criss-cross arrangement several feet deep. Trees thickly repopulated the old fire area and provided aerial fuels that contributed to spotting, torching, and crown fires. Those fuels were extremely dry from drought and burned with high severity environmental impacts.

The fire was eventually corralled after slowing down in the shaded draws and north slopes in the south fork of St. Peter's Creek and Mount Leona.

4.2.2.1.3 Mount Leona Fire (2001) - 4,820 acres

This fire was started during a multiple-ignition lightning event. The area received some rain, but all local fire agencies were stretched doing initial attack on numerous other lightning fires

ranging in size from spots to several acres. The Mount Leona Fire began on a steep western face of the mountain that required a two hour hike in. Smokejumpers were not available. Local fire crews found two fires close together and were close to getting them lined, but hot weather, winds, and steep terrain overwhelmed their efforts. Rolling embers, spot fires, and uphill runs could not be stopped, even with air support.

After escaping initial attack, the fire quickly ran to the top of Mount Leona and spotted over onto the north side where it began backing down into the north fork. It did this for a couple of days while suppression efforts built dozer line along private land on the western flank. It looked possible to catch the fire in the bottom of the north fork of St. Peter's Creek, but during an evening run up the north side of Mount Leona, a spotfire crossed the creek one half mile to the north. The spotfire, pushed by a southwesterly breeze, ran up the south slopes of Tonasket Mountain, running two miles during the night to the ridgetop, adding another 1500 acres to the fire's size.

Once the fire had reached higher elevations on Profanity Peak and the northerly slopes of the headwaters of Long Alec Creek, the fire behavior moderated so that hand crews and dozers were able to stop the fire.

The firefighting effort was aided by the road system on Tonasket Mountain and in St. Peter's Creek. Burnout and holding operations on the west and south sides of the fire were successful only because the wind pattern was steadily from the southwest. Heavy timber grew adjacent to the road systems and dozer lines, making holding a problematic situation unless under the most favorable circumstances. If the southwesterly winds had not prevailed, the daily downslope, downcanyon winds typical of summer nights would have pushed the fire further westward onto private lands and nearer to residences. Torching and crowning of timber along the west and south lines provide evidence that extreme fire behavior was typical on exposed aspects where heavy vegetation existed. Road systems located along timbered stands that had been thinned were the easiest to defend with less problems from spot fires.

4.2.2.1.4 Togo Fire (2003) - 5,200 acres

The Togo Fire was started from a lightning storm that ignited multiple fires. The area received some rain during the storm, but two fires showed the next day and were suppressed. Two more showed the following day and were suppressed. Five lightning strikes showed up on the lightning detection map on Togo Mountain, so there was a potential for another fire. Patrols by engine crews and aerial observers could find nothing. After several days of drying, a fifth fire awoke and showed itself on the top of Togo Mountain. The Togo Mountain area generally receives a little more rain as compared to areas ten or twenty miles to the south. The natural fire return interval is longer, so fuels have more time to accumulate. In fact, the fire area began in some of the heaviest fuel loadings on the Kettle Range. Subalpine fir, spruce, and lodgepole pine are common and densely stocked. Surface fuels on the north slopes of Togo Mountain ranged from 50 to 75 tons per acre. Ridgetop and south slope fuels ranged from 35 to 50 tons per acre. The Pacific Northwest was in its third year of drought. When the Togo Fire became active, it quickly developed into an intense and dangerous fire.

The winds were southeasterly on the day that Togo began. Torching and crowning on the ridgetop threw embers over onto the western side of the mountain, where spotfires ignited on the steep slopes and produced uphill runs of crown fire. Each of these runs produced more spot fires downhill from the main fire. Throughout the afternoon, spot fires descended the western slope of Togo Mountain until the entire side of the mountain was afire. By six o'clock, the extreme fire behavior was spinning the smoke column into a rotating vortex that tossed burning embers high into the sky. Spot fires began appearing 1½ to 2 miles to the northwest. 3½ miles

to the northwest, residents of Grand Forks, B.C. understandably became alarmed as warm slabs of charred bark and cinders fell throughout the town from the dark smoke column leaning over them. However, during the evening, a wind shift gradually turned from southeasterly to southwesterly. By ten o'clock, the fire and smoke column were steadily heading toward the northeast away from populated areas. Firefighters were given an unexpected reprieve the next morning from a short rain shower that dampened the area and provided several days of moderated fire behavior during which the fire was contained.

The overall size and shape of the fire footprint was gained in the first eighteen hours. Minimal growth occurred after resource mobilization occurred and suppression efforts began. There was potential for enormous spread and catastrophic property loss if any spot fires had occurred in the dry grassy hills around Grand Forks. The B.C. Forest Service partnered with the U.S. Forest Service in a cooperative suppression effort on both sides of the border. The Canadians constructed contingency lines and did defensible space fuel reduction in timbered residential areas downhill of the fire's north side. Their lines were never tested by fire as the main Togo suppression efforts held.

4.3 Wildfire Hazard Assessment

Ferry County and the adjacent counties of Stevens and Okanogan, were analyzed using a variety of techniques, managed on a GIS system (ArcGIS 8.2). Physical features of the region were represented by data layers including roads, streams, soils, elevation, and remotely sensed images. Field visits were conducted by specialists from Northwest Management, Inc., and others. Discussions with area residents and fire control specialists augmented field visits and provided insights to forest health issues and treatment options.

This information was analyzed and combined to develop an assessment of wildland fire risk in the region.

4.3.1 Fire Prone Landscapes

Schlosser *et al.* 2002, developed a methodology to assess the location of fire prone landscapes on forested and non-forested ecosystems in the western US. Northwest Management, Inc. has completed similar assessments on over 35 counties and Indian Reservations in Idaho, Montana, Nevada, and Washington to determine fire prone landscape characteristics.

The goal of developing the Fire Prone Landscapes analysis is to make inferences about the relative risk factors across large geographical regions (multiple counties) for wildfire spread. This analysis uses the extent and occurrence of past fires as an indicator of characteristics for a specific area and their propensity to burn in the future. Concisely, if a certain combination of vegetation cover type, canopy closure, aspect, slope, stream and road density have burned with a high occurrence and frequently in the past, then it is reasonable to extrapolate that they will have the same tendency in the future, unless mitigation activities are conducted to reduce this potential.

The analysis for determining those landscapes prone to wildfire utilized a variety of sources.

Digital Elevation: Digital elevation models (DEM) for this project used USGS 10 meter DEM data provided at quarter-quadrangle extents. These were merged together to create a continuous elevation model of the analysis area.

The merged DEM file was used to create two derivative data layers; aspect and slope. Both were created using the spatial analyst extension in ArcGIS 8.2. Aspect data values retained one decimal point accuracy representing the cardinal direction of direct solar radiation, represented in degrees. Slope was recorded in degrees and retained two decimal points accuracy.

Remotely Sensed Images: Landsat 7 Enhanced Thematic Mapper (ETM+) images were used to assess plant cover information and percent of canopy cover. The Landsat ETM+ instrument is an eight-band multi-spectral scanning radiometer capable of providing high-resolution image information of the Earth's surface. It detects spectrally-filtered radiation at visible, near-infrared, short-wave, and thermal infrared frequency bands from the sun-lit Earth. Nominal ground sample distances or "pixel" sizes are 15 meters in the panchromatic band; 30 meters in the 6 visible, near and short-wave infrared bands; and 60 meters in the thermal infrared band.

The satellite orbits the Earth at an altitude of approximately 705 kilometers with a sun-synchronous 98-degree inclination and a descending equatorial crossing time of 10 a.m. daily.

Image spectrometry has great application for monitoring vegetation and biophysical characteristics. Vegetation reflectance often contains information on the vegetation chlorophyll absorption bands in the visible region and the near infrared region. Plant water absorption is easily identified in the middle infrared bands. In addition, exposed soil, rock, and non-vegetative surfaces are easily separated from vegetation through standard hyper-spectral analysis procedures.

Two Landsat 7 ETM images were obtained to conduct hyper-spectral analysis for this project. The first was obtained in 1998 and the second in 2002. Hyper-spectral analysis procedures followed the conventions used by the Idaho Vegetation and Land Cover Classification System, modified from Redmond (1997) and Homer (1998).

Riparian Zones: Riparian zones were derived from stream layers created during the Interior Columbia Basin Ecosystem Management Project (Quigley *et al.* 2001).

Wind Direction: Wind direction and speed data detailed by monthly averages was used in this project to better ascertain certain fire behavior characteristics common to large fire events. These data are spatially gridded Average Monthly Wind Directions in Idaho. The coverage was created from data summarized from the Interior Columbia Basin Ecosystem Management Project (Quigley *et al.* 2001).

Past Fires: Past fire extents represent those locations on the landscape that have previously burned during a wildfire. Past fire extent maps were obtained from a variety of sources for the North Central Washington area including the USDA Forest Service and Washington Department of Natural Resources.

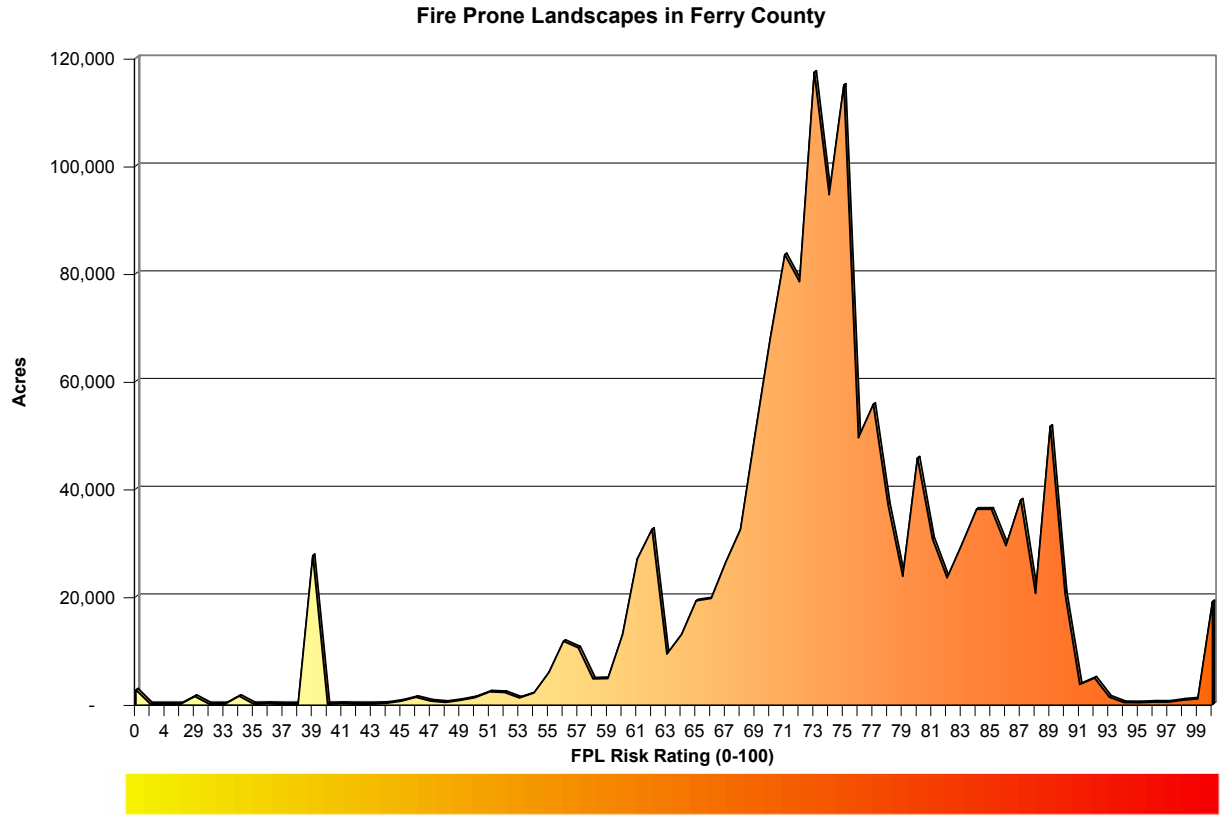
Fire Prone Landscapes: Using the methodology developed by Schlosser *et al.* (2002, 2003, 2004), and refined for this project, the factors detailed above were used to assess the potential for the landscape to burn during the fire season in the case of fire ignition. Specifically, the entire region was evaluated at a resolution of 10 meters (meaning each pixel on the screen represented a 10 meter square on the ground) to determine the propensity for a particular area (pixel) to burn in the case of a wildfire. The analysis involved creating a linear regression analysis within the GIS program structure to assign a value to each significant variable, pixel-by-pixel. The analysis ranked factors from 0 (little to no risk) to 100 (extremely high risk) based on past fire occurrence.

A map of Fire Prone Landscapes in Ferry County is included in Appendix I.

Table 4.9. Fire Prone Landscape rankings and associated acres in each category for Ferry County.

Color Code	Value	Total Acres	Percent of Total Area
	0	2,686	0%
	10	0	0%
	20	0	0%
	30	1,464	0%
	40	29,292	2%
	50	5,172	0%
	60	58,246	4%
	70	297,496	21%
	80	700,622	49%
	90	316,545	22%
	100	32,132	2%

Figure 4.5. Distribution of Fire Prone Landscapes in Ferry County by ranking scale.



The risk category values developed in this analysis should be considered **ordinal data**, that is, while the values presented have a meaningful ranking, they neither have a true zero point nor scale between numbers. Rating in the “40” range is not necessarily twice as “risky” as rating in the “20” range. These category values also do not correspond to a rate of fire spread, a fuel loading indicator, or measurable potential fire intensity. Each of those scales is greatly influenced by weather, seasonal and daily variations in moisture (relative humidity), solar

radiation, and other factors. The risk rating presented here serves to identify where certain constant variables are present, aiding in identifying where fires typically spread into the largest fires across the landscape.

4.3.2 Historic Fire Regime

In the fire-adapted ecosystems of Washington, fire is undoubtedly the dominant process in terrestrial systems that constrain vegetation patterns, habitats, and ultimately, species composition. Land managers need to understand historical fire regimes (that is, fire frequency and fire severity prior to settlement by Euro-Americans) to be able to define ecologically appropriate goals and objectives for an area. Moreover, managers need spatially explicit knowledge of how historical fire regimes vary across the landscape.

Many ecological assessments are enhanced by the characterization of the historical range of variability which helps managers understand: (1) how the driving ecosystem processes vary from site to site; (2) how these processes affected ecosystems in the past; and (3) how these processes might affect the ecosystems of today and the future. Obviously, historical fire regimes are a critical component for characterizing the historical range of variability in the fire-adapted ecosystems of Washington. Furthermore, understanding ecosystem departures provides the necessary context for managing sustainable ecosystems. Land managers need to understand how ecosystem processes and functions have changed prior to developing strategies to maintain or restore sustainable systems. In addition, the concept of departure is a key factor for assessing risks to ecosystem components. For example, the departure from historical fire regimes may serve as a useful proxy for the potential of severe fire effects from an ecological perspective.

A database of fire history studies in the region was used to develop modeling rules for predicting historical fire regimes (HFRs). Tabular fire-history data and spatial data was stratified into ecoregions, potential natural vegetation types (PNVs), slope classes, and aspect classes to derive rule sets which were then modeled spatially. Expert opinion was substituted for a stratum when empirical data was not available.

Fire is the dominant disturbance process that manipulates vegetation patterns in Washington. The HFR data were prepared to supplement other data necessary to assess integrated risks and opportunities at regional and subregional scales. The HFR theme was derived specifically to estimate an index of the relative change of a disturbance process, and the subsequent patterns of vegetation composition and structure.

4.3.2.1 General Limitations

These data were derived using fire history data from a variety of different sources. These data were designed to characterize broad scale patterns of historical fire regimes for use in regional and subregional assessments. Any decisions based on these data should be supported with field verification, especially at scales finer than 1:100,000. Because the resolution of the HFR theme is 1,000 meter cell size, the expected accuracy does not warrant their use for analyses of areas smaller than about 10,000 acres (for example, assessments that typically require 1:24,000 data).

Table 4.10. Assessment of Historic Fire Regimes in Ferry County.

Regime	Description	Acres	Percent
1	0-35 yrs; Low Severity	30,949	2%
2	0-35 yrs; Stand Replacement	19,807	1%

Table 4.10. Assessment of Historic Fire Regimes in Ferry County.

Regime	Description	Acres	Percent
3	35-100+ yrs; Mixed Severity	1,079,260	75%
4	35-100+ yrs; Stand Replacement	298,845	21%
7	Water	15,103	1%
	Total	**1,443,965**	

4.3.3 Fire Regime Condition Class

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.* (2002) 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 on the 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 vegetation 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 (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the central tendency of the natural (historical) 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.

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 a surface fire. Determination of the amount of departure is based on comparison of a composite measure of 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 are presented in Table 4.11. Maps depicting Fire Regime and Condition Class are presented in Appendix I.

Table 4.11. Fire Regime Condition Class Definitions.

Fire Regime Condition Class	Description	Potential Risks
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.
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 is moderate.
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.

An analysis of Fire Regime Condition Class in Ferry County shows that approximately 4% of the County is in Condition Class 1 (low departure), just about 78% is in Condition Class 2 (moderate departure), with 5% of the area in Condition Class 3 (Table 4.12).

Table 4.12. Assessment of Current Condition Class in Ferry County.

	Condition Class	Acres	Percent of Area
1	Condition Class 1	55,213	4%
2	Condition Class 2	1,124,569	78%
3	Condition Class 3	67,593	5%

Table 4.12. Assessment of Current Condition Class in Ferry County.

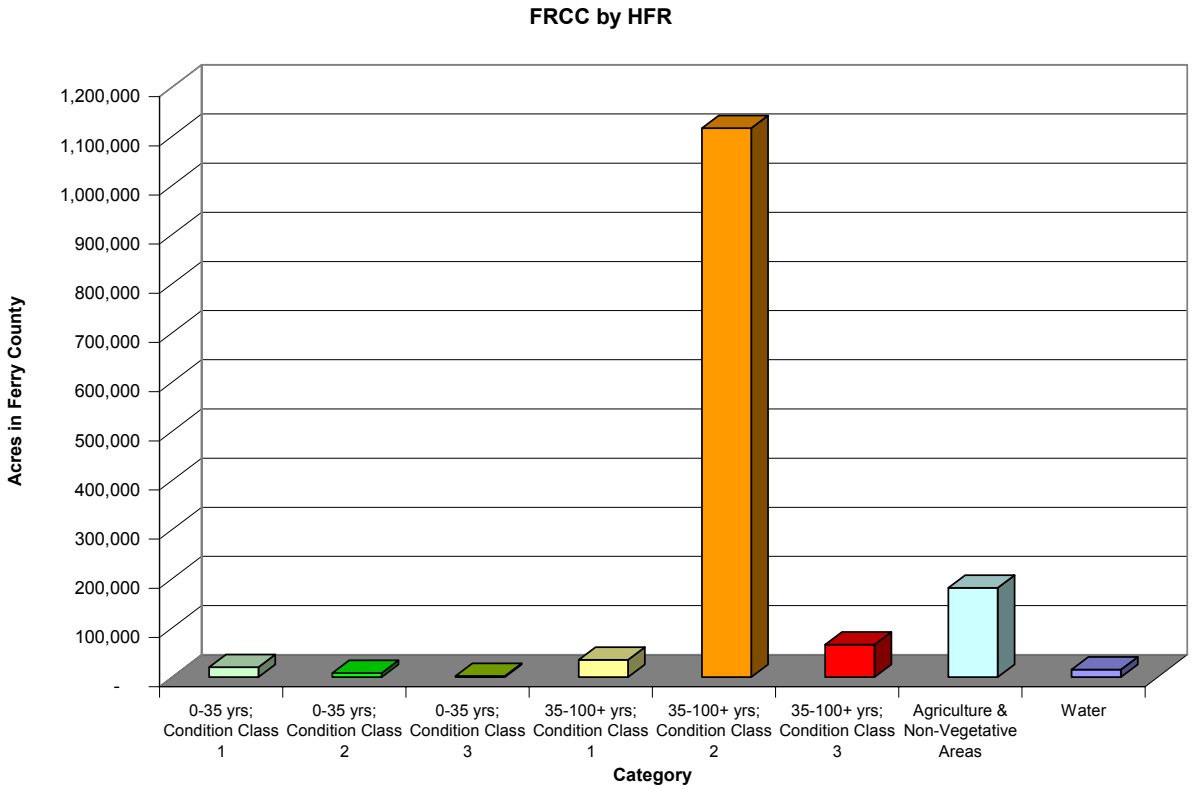
	Condition Class	Acres	Percent of Area
5	Agriculture	84,677	6%
6	Urban/Development/Ag	96,809	7%
7	Water	15,103	1%
		1,443,965	

When evaluated by historic fire frequency and fire regime against current condition class, additional insights to departures from the natural role of fire becomes evident (Table 4.13). Future land management activities targeted at maintaining lands in Condition Class 1, can use the relationships shown in Table 4.13 as a guideline to attain these conditions. For instance, those areas with a historic fire frequency of 0-35 years, and currently in Condition Classes 2 or 3, can be managed through mechanical harvesting, followed by broadcast burning to treat slash. However, if forest harvest rotations exceed 35 years, then an intermediate treatment that includes an under-burning would be consistent with maintaining the historical fire frequency. The same process can be used on other lands as well.

Table 4.13. Fire Regime Condition Class by Historical Fire Frequency.

Fire Regime Condition Class by Historical Fire Frequency	Acres	Percent of Area
0-35 yrs; Condition Class 1	20,055	1%
0-35 yrs; Condition Class 2	8,171	1%
0-35 yrs; Condition Class 3	1,981	0%
35-100+ yrs; Condition Class 1	35,158	2%
35-100+ yrs; Condition Class 2	1,116,399	77%
35-100+ yrs; Condition Class 3	65,612	5%
Agriculture & Non-Vegetative Areas	181,486	13%
Water	15,103	1%
Total	1,443,965	

Figure 4.6. Fire Regime Condition Class by Historic Fire Regime in Ferry County.



The Ferry County Fire Regime Condition Class Map is printed in Appendix I.

4.4 Ferry County Conditions

Ferry County is comprised by three ecologically diverse subregions, the Curlew Lake and Kettle River valley on the west side of the Kettle Range, the Kettle River, Columbia River, and Roosevelt Lake drainage on the east side of the Kettle Range, and all of the surrounding forestlands commonly known as the Okanogan Highlands.

The productive soils of the bottomlands make the river valleys well suited to growth of both grassland vegetation and agriculture. Over the course of the past century, much of the native riparian vegetation has been converted to agriculture fields supporting livestock grazing and predominately hay crops.

Coniferous woodlands associated with the national forests cover the majority of the county. The transition zone between forest and riparian vegetation consists of a complex interfingering dependent on localized topographic and climatic conditions. A ponderosa pine and Douglas-fir habitat type typically forms the lower timberline on hills and low mountains. Mixed Douglas-fir, grand fir, lodgepole pine, western red cedar, and western larch forests dominate at mid-elevations elevations, while subalpine fir, lodgepole, and Engelmann spruce occur at higher elevations.

Ferry County is characterized by cold winters and warm, dry summers. Fires in the forest fuel types present throughout the Okanogan Highlands have the potential to produce frequent, large, intense fires, resulting in high social and economic costs. This potential has been realized

several times over in the last century. Just within the last 20 years Ferry County residents have seen more than three large and damaging wildfires including the 1988 White Mountain Fire, which burned 26,000 acres in Ferry County, the 1994 Copper Butte Fire, which burned 10,000 acres, and the 2001 Leona Complex, which burned 6,000 acres. These events clearly illustrate the mounting urban-interface issue facing Ferry County. Population growth rates have been steadily increasing throughout the County. The growing appreciation for seclusion has led to significant development in the lower elevation forests and, particularly around Curlew Lake and many of its tributaries. Frequently, this development is in the dry ponderosa pine – Douglas-fir forest types where grass, needle, and brush surface litter create forest fuel conditions that are at a high propensity for fire occurrence. Human use is strongly correlated with fire frequency, with increasing numbers of fires as use increases. Discarded cigarettes, tire fires, and hot catalytic converters increase the potential for fire starts along roadways. Careless and unsupervised use of fireworks also contributes to unwanted and unexpected wildland fires. Further contributing to ignition sources are the debris burners and "sport burners" who use fire to rid ditches of weeds and other burnable materials. The increased potential for fire starts and the fire prone landscapes in which homes have been constructed greatly increases the potential for fires in interface areas.

4.5 Ferry County's Wildland-Urban Interface

The Wildland-Urban Interface has gained attention through efforts targeted at wildfire mitigation; however, this analysis technique is also useful when considering other hazards because the concept looks at where people and structures are concentrated in any particular region. For Ferry County, the WUI shows the relative concentrations of structures scattered across the county.

A key component in meeting the underlying need for protection of people and structures is the protection and treatment of hazards in the wildland-urban interface. The wildland-urban interface refers to areas where wildland vegetation meets urban developments, or where forest fuels meet urban fuels in the case of wildfires (such as houses). These areas encompass not only the interface (areas immediately adjacent to urban development), but also the continuous slopes that lead directly to a risk to urban developments be it from wildfire, landslides, or floods. Reducing the hazard in the wildland urban interface requires the efforts of federal, state, and local agencies and private individuals (Norton 2002). "The role of [most] federal agencies in the wildland-urban interface includes wildland firefighting, hazard fuels reduction, cooperative prevention and education and technical experience. Structural fire protection [during a wildfire] in the wildland urban interface is [largely] the responsibility of Tribal, state, and local governments" (USFS 2001). Property owners share a responsibility to protect their residences and businesses and minimize danger by creating defensible areas around them and taking other measures to minimize the risks to their structures (USFS 2001). With treatment, a wildland-urban interface can provide firefighters a defensible area from which to suppress wildland fires or defend communities against other hazard risks. In addition, a wildland-urban interface that is properly thinned will be less likely to sustain a crown fire that enters or originates within it (Norton 2002).

By reducing hazardous fuel loads, ladder fuels, and tree densities, and creating new and reinforcing defensible space, landowners would protect the wildland-urban interface, the biological resources of the management area, and adjacent property owners by:

- minimizing the potential of high-severity ground or crown fires entering or leaving the area;

- reducing the potential for firebrands (embers carried by the wind in front of the wildfire) impacting the WUI. Research indicates that flying sparks and embers (firebrands) from a crown fire can ignite additional wildfires as far as 1¼ miles away during periods of extreme fire weather and fire behavior (McCoy *et al.* 2001);
- improving defensible space in the immediate areas for suppression efforts in the event of wildland fire.

Three wildland-urban interface conditions have been identified (Federal Register 66(3), January 4, 2001) for use in wildfire control efforts. These include the Interface Condition, Intermix Condition, and Occluded Condition. Descriptions of each are as follows:

- **Interface Condition** – a situation where structures abut wildland fuels. There is a clear line of demarcation between the structures and the wildland fuels along roads or back fences. The development density for an interface condition is usually 3+ structures per acre;
- **Intermix Condition** – a situation where structures are scattered throughout a wildland area. There is no clear line of demarcation, the wildland fuels are continuous outside of and within the developed area. The development density in the intermix ranges from structures very close together to one structure per 40 acres;
- **Occluded Condition** – a situation, normally within a city, where structures abut an island of wildland fuels (park or open space). There is a clear line of demarcation between the structures and the wildland fuels along roads and fences. The development density for an occluded condition is usually similar to that found in the interface condition and the occluded area is usually less than 1,000 acres in size; and

In addition to these classifications detailed in the Federal Register, three additional classifications of population density have been included to augment these categories:

- **Rural Condition** – a situation where the scattered small clusters of structures (ranches, farms, resorts, or summer cabins) are exposed to wildland fuels. There may be miles between these clusters.
- **High Density Urban Areas** – those areas generally identified by the population density consistent with the location of incorporated cities, however, the boundary is not necessarily set by the location of city boundaries: it is set by very high population densities (more than 7-10 structures per acre or more). Many counties and reservations in the west do not have high density urban areas. Ferry County, Washington, was determined not to have any areas of high density urban based on current (2006) structure locations.
- **Infrastructure Area WUI** – those locations where critical and identified infrastructure are located outside of populated regions and may include high tension power line corridors, critical escape or primary access corridors, municipal watersheds, areas immediately adjacent to facilities in the wildland such as radio repeater towers or fire lookouts. These are identified by county or reservation level core teams.

  The Ferry County core team created two Infrastructure WUI sub-categories to better suit the wildfire mitigation needs of the County. These are: Primary Access Route WUI and Watershed WUI.

  - **Access Route WUI** – a situation where primary access routes travel through designated Non-WUI areas (lands outside of the four main WUI conditions). This WUI includes a one mile buffer extending from each side of the roadway. There

are approximately 34 miles of access routes totaling 39,248 acres of potential treatment areas which would otherwise have been designated as Non - WUI. The Access Route WUI surrounding State Route 20 also encompasses the BPA High Tension powerline. For the most part, this powerline parallels the highway's path over the Kettle Range; however, the Access Route WUI was extended slightly at a few points in order to include the BPA powerline within the WUI as a key component of the critical infrastructure in Ferry County.

  - **Watershed WUI** – a situation where known watershed boundaries, which communities depend on for their water resources, extend into designated Non-WUI areas. There are approximately 14,192 acres of Watershed WUI (Orient Watershed) in Ferry County.

- **Non-WUI Condition** - a situation where the above definitions do not apply because of a lack of structures in an area or the absence of critical infrastructure crossing these unpopulated regions. This classification is not WUI.

In summary, the designations of areas by the Ferry County core team includes:

- Interface Condition: WUI
- Intermix Condition: WUI
- Occluded Condition: Not Present
- Rural Condition: WUI
- Infrastructure Areas: WUI
- High Density Urban Areas: Not Present
- Non-WUI Condition: Not WUI, but present in Ferry County

The locations of structures in Ferry County have been mapped and are presented on a variety of maps in this analysis document; specifically in Appendix I. The location of all structures was determined by examining two sets of remotely sensed images. The more detailed information was garnered from digital ortho-photos at a resolution of 1 meter (from 1998). For those areas not covered by the 1 meter DOQQ images (primarily Colville National Forest lands), black and white ortho-photos were used. These records were augmented with data collected on hand-held GPS receivers to record the location of structures.

All structures are represented by a "dot" on the map. No differentiation is made between a garage and a home, or a business and a storage building. The density of structures and their specific locations in this management area are critical in defining where the potential exists for casualty loss in the event of a disaster in the region.

By evaluating this structure density, we can define WUI areas on maps by using mathematical formulae and population density indexes to define the WUI based on where structures are located. The resulting population density indexes create concentric circles showing high density areas of Interface and Intermix Condition WUI, as well as Rural Condition WUI (as defined above). This portion of the analysis allows us to "see" where the highest concentrations of structures are located in reference to high risk landscapes, limiting infrastructure, and other points of concern. The WUI, as defined here, is unbiased, consistent, allows for edge matching with other counties and the Reservations, and most important – it addresses all of the county, not just identified communities. It is a planning tool showing where homes and businesses are located and the density of those structures leading to identified WUI categories. It can be determined again in the future, using the same criteria, to show how the WUI has changed in

response to increasing population densities. It uses a repeatable and reliable analysis process that is unbiased. This mapping procedure was followed and is presented in the maps included in the Appendix I.

The Healthy Forests Restoration Act makes a clear designation that the location of the WUI is at the determination of the County or Reservation when a formal and adopted Community Wildfire Protection Plan is in place. It further states that the Federal Agencies are obligated to use this WUI designation for all Healthy Forests Restoration Act purposes. The Ferry County Community Wildfire Protection Plan core team evaluated a variety of different approaches to determining the WUI for the County and selected this approach and has adopted it for these purposes. In addition to a formal WUI map for use with the Federal Agencies, it is hoped that it will serve as a planning tool for the county and local fire districts.

4.5.1 Potential WUI Treatments

The definition and mapping of the WUI is the creation of a planning tool to identify where structures, people, and infrastructure are located in reference to each other. This analysis tool does not include a component of fuels risk. There are a number of reasons to map and analyze these two components separately (population density vs. fire risk analysis). The primary among these reasons is the fact that population growth often occurs independent from changes in fire risk, fuel loading, and infrastructure development. Thus, making the definition of the WUI dependant on all of them would eliminate populated places with a perceived low level of fire risk today, which may in a year become an area at high risk due to forest health issues or other concerns.

By examining these two tools separately the planner is able to evaluate these layers of information to see where the combination of population density overlays on top of areas of high current fire risk and then take mitigative actions to reduce the fuels, improve readiness, directly address factors of structure ignitability, improve initial attack success, mitigate resistance to control factors, or (more often) a combination of many approaches.

It should not be assumed that just because an area is identified as WUI, that it will therefore receive treatments because of this identification alone. Nor should it be implicit that all WUI treatments will be the application of the same prescription. Instead, each location targeted for treatments must be evaluated on its own merits: factors of structural ignitability, access, resistance to control, population density, resources and capabilities of firefighting personnel, and other site specific factors.

It should also not be assumed that WUI designation on national forest lands automatically equates to a treatment area. The Forest Service is still obligated to manage according to the Standards and Guides listed in the Colville National Forest Land and Resource Management Plan (Forest Plan). The Forest Plan has legal precedence over the WUI designation until such a time that the Forest Plan is revised to reflect updated priorities.

All planning in relation to wildfire mitigation must be taken in light of the existing regulatory and environmental laws in place. This will be determined by the owner of the parcel implementing the treatment. Thus, if proposed activities are to occur on federal lands, then the National Environmental Policy Act (NEPA) will determine environmental protection measures. Similarly, if the proposed action is to occur on state lands or private lands, then the Forest Practices Act and SEPA would govern environmental impacts. We have not diminished private property rights through the development of this document. Environmental protection is inherent to all projects because of the existing regulatory environment in Washington State.

Most treatments may begin with the home evaluation, and the implicit factors of structural ignitability (roofing, siding, deck materials), and vegetation within the treatment area of the structure. However, treatments in the low population areas of rural lands (mapped as yellow) may look closely at access (two ways in and out) and communications through means other than land based telephones. On the other hand, the subdivision with densely packed homes (mapped as brown – interface areas) surrounded by forests and dense underbrush, may receive more time and effort implementing fuels treatments beyond the immediate home site to reduce the probability of a crown fire entering the subdivision.

4.6 Ferry County Communities At Risk

Individual community assessments have been completed for all of the populated places in the county. The following summaries include these descriptions and observations. Local place names identified during this plan's development include:

Table 4.14. Ferry County Communities.

Community Name	Planning Description	Vegetative Community	National Register Community At Risk?[1]
Republic	City	Forestland	Yes
Curlew	Community	Forestland/Rangeland	Yes
Danville	Community	Forestland/Rangeland	Yes
Malo	Community	Rangeland	Yes
Pine Grove	Community	Forestland	No
Laurier	Community	Forestland/Rangeland	Yes
Orient	Community	Forestland/Rangeland	Yes
Boyds	Community	Forestland	No
Toroda	Community	Forestland/Rangeland	No
Barstow	Community	Forestland	No
Keller	Community	Forestland	Yes
Inchelium	Community	Forestland	Yes

[1]Those communities with a "Yes" in the National Register Community at Risk column are included in the Federal Register, Vol. 66, Number 160, Friday, August 17, 2001, as "Urban Wildland Interface Communities within the vicinity of Federal Lands that are at high risk from wildfires". All of these communities have been evaluated as part of this plan's assessment.

Because the Wildland Urban Interface map for Ferry County was based primarily on population density as described above, all of these communities and the populated areas surrounding them are within the Ferry County Wildland Urban Interface.

4.7 Neighborhoods in Ferry County

In order to facilitate the mutual understanding of wildfire risks specific to commonly referred to areas in Ferry County, the core team identified Ferry County subregions on a map they felt not only had similar fuel conditions, but also would render similar initial attack techniques. These subregions are called neighborhoods. Typically, neighborhood boundaries lie along local fire district boundaries or known anchor points such as roads or ridgelines. All of the neighborhoods lie within or mostly within the Wildland Urban Interface identified by Ferry County in this plan. Where the Wildland Urban Interface boundaries are primarily based on population density , the neighborhood boundaries are strategic boundaries for fire suppression.

For the individual community assessments, the four Strategic Planning Areas in Ferry County were broken down by these neighborhoods. Furthermore, drainages or place names within neighborhoods are identified in the assessments in order to present as much specific wildfire risk information as possible.

4.7.1 Vegetative Associations

Vegetative structure and composition in Ferry County is closely related to elevation, aspect, and precipitation. Relatively mild and dry environments characterize the undulating topography of the region which transitions from the Kettle River and Curlew Lake valley riparian plant communities to the forest ecosystems that characterize the vast majority of the land area in Ferry County. These forest communities contain high fuel accumulations that have the potential to burn at moderate to high intensities. Highly variable topography coupled with dry, windy weather conditions typical of the region is likely to create extreme fire behavior.

The transition between developed agricultural land and timberlands occurs somewhat abruptly, usually along toe slopes or distinct property boundaries. At higher elevation mountainous regions, moisture becomes less limiting due to a combination of higher precipitation and reduced solar radiation. Vegetative patterns shift from forested communities dominated by ponderosa pine, western larch, grand fir, and Douglas-fir at the lower elevations to lodgepole pine and subalpine fir at the higher elevations. Engelmann spruce and western red cedar are commonly found in moist draws and frost pockets. These forested conditions possess a greater quantity of both dead and down fuels as well as live fuels. Rates of fire spread tend to be lower than those in the grasslands; however, intensities can escalate dramatically, especially under the effect of slope and wind. These conditions can lead to control problems and potentially threaten lives, structures and other valued resources.

As elevation and aspect increase available moisture, forest composition transitions to moister habitat types. Increases in moisture keep forest fuels unavailable to burn for longer periods during the summer. This increases the time between fire events, resulting in varying degrees of fuel accumulation. When these fuels do become available to burn, they typically burn in a mosaic pattern at mid elevations, where accumulations of forest fuels result in either single or group tree torching, and in some instances, short crown fire runs. At the highest elevations, fire events are typically stand replacing, as years of accumulation fuel large, intense wildfires.

Insects and disease can cause widespread mortality of forest stands in a very short amount of time. Pine bark beetle populations have continued to increase at epidemic levels throughout Washington State; however, mortality increases are most pronounced in Eastern Washington. Ponderosa pine and lodgepole pine seem to be the most affected species at all elevations in Ferry County. The occurrence of Ips beetles, Douglas-fir Beetle, Douglas-fir Tussock Moth, and root disease have also been recorded in Eastern Washington (Washington State Department of Natural Resources 2006). Insects and disease often focus and cause the most mortality in forest stands that are overcrowded or otherwise stressed by drought, recent fires, or other factors. Large areas of dead trees are a significant fire hazard. Oftentimes, dry, dead needles hang on the killed trees for several years making them prime for a potential ignition and subsequent crown fire. Thinning overcrowded stands can help reduce stress on individual trees allowing them to better withstand insect attacks. Planting of appropriate species for the site and continual management can also help ward off future outbreaks.

Many lower elevation forested areas throughout Ferry County are highly valued for their scenic qualities as well as for their proximity to travel corridors. These attributes have led to increased recreational home development and residential home construction in and around forest fuel

complexes. The juxtaposition of highly flammable forest types and rapid home development will continue to challenge the ability to manage wildland fires in the wildland-urban interface.

4.7.2 Overall Fuels Assessment

The steep topography and relatively low moisture availability across much of Ferry County does not permit extensive farming operations; however, there are some areas within the Kettle River Valley, Curlew Valley and Sanpoil Valley that are flat enough to make small scale farming operations feasible. Agricultural fields infrequently serve to fuel a fire after curing; burning in much the same manner as consistent low grassy fuels. Fires in grass and rangeland fuel types tend to burn at relatively low intensities, with moderate flame lengths and only short-range spotting. Suppression resources are generally quite effective in such fuels. Homes and other improvements can be easily protected from the direct flame contact and radiant heat through adoption of precautionary measures around the structure. Although fires in these fuels may not present the same control problems as those associated with large, high intensity fires in timber fuel types, they can cause significant damage if precautionary measures have not taken place prior to a fire event. Wind driven fires in these short grass fuel types spread rapidly and can be difficult to control. During extreme drought and pushed by high winds, fires in grassland fuel types can exhibit extreme rates of spread, thwarting suppression efforts.

The Okanogan Highlands are a patch-work of dry Douglas-fir and ponderosa pine forests that, in many areas, have become overstocked, resulting in multistoried conditions with abundant ladder fuels. During pre-settlement times, much of this area was characterized by low intensity fires due to the relatively light fuel loading, which mostly consisted of small diameter fuels. Frequent, low intensity fires generally kept stands open; free of fire intolerant species and maintained seral species such as ponderosa pine as well as larger diameter fire resistant Douglas-fir. In some areas, low intensity fires stimulated shrubs and grasses, maintaining vigorous browse and forage. The shrub layer could either inhibit or contribute to potential fire behavior, depending on weather and live fuel moisture conditions at the time of the burn.

In general, large fires that start in the Kettle Range start high in elevation and move downhill. As fires move down in elevation, they encounter drier and flashier fuels in the lower elevations. Rolling embers and spot fires are a common method of downhill fire spread. Spot fires ignited on slopes trigger uphill runs that throw more spot fires, expanding the downward fire progression. Modifying fuels to reduce the likelihood of torching and crowning trees will in turn reduce the likelihood of spot fires.

Increased activities by pathogens will continue to increase levels of dead and down fuel, as host trees succumb to insect attack and stand level mortality increases. Overstocked, multi-layered stands and the abundance of ladder fuels lead to horizontal and vertical fuel continuity. These conditions, combined with an arid and often windy environment, can encourage the development of a stand replacing fire. These fires can burn with very high intensities and generate large flame lengths and fire brands that can be lofted long distances. Such fires present significant control problems for suppression resources, often developing into large, destructive wildland fires.

A probability that needs to be planned for is the likelihood of extended spot fires. Large fires may easily produce spot fires from ½ to 2 miles away from the main fire. How fire suppression forces respond to spot fires is largely dependent upon the fuels in which they ignite. Stands of timber that are managed for fire resilience are much less likely to sustain torching and crowning behavior that produces more spot fires. The objective of fuel reduction thinning is to change the fuels in a way that will moderate potential fire behavior. If fire intensity can be moderated by vegetation treatments, then ground and air firefighting resources can be much more effective.

4.7.3 Overall Mitigation Activities

There are many specific actions that will help improve the safety in a particular area; however, there are also many potential mitigation activities that apply to all residents and all fuel types. General mitigation activities that apply to all of Ferry County are discussed below while area specific mitigation activities are discussed within the individual community assessments.

The safest, easiest, and most economical way to mitigate unwanted fires is to stop them before they start. Generally, prevention actions attempt to prevent human-caused fires. Campaigns designed to reduce the number and sources of ignitions can be quite effective. Prevention campaigns can take many forms. Traditional "Smokey Bear" type campaigns that spread the message passively through signage can be quite effective. Signs that remind folks of the dangers of careless use of fireworks, burning when windy, and leaving unattended campfires can be quite effective. It's impossible to say just how effective such efforts actually are, however the low costs associated with posting of a few signs is inconsequential compared to the potential cost of fighting a fire.

Slightly more active prevention techniques may involve mass media, such as radio or the local newspaper. Fire districts in other counties have contributed to the reduction in human-caused ignitions by running a weekly "run blotter," similar to a police blotter, each week in the paper. The blotter briefly describes the runs of the week and is followed by a "tip of the week" to reduce the threat from wildland and structure fires. The federal government has been a champion of prevention, and could provide ideas for such tips. When fire conditions become high, brief public service messages could warn of the hazards of misuse of fire or any other incendiary device. Such a campaign would require coordination and cooperation with local media outlets. However, the effort is likely to be worth the efforts, costs and risks associated with fighting unwanted fires.

Fire Reporting: The success of the Enhanced – 911 (E-911) emergency reporting system can be measured at the frequency that fire calls route to the county emergency centers. Some wildland firefighting agencies maintain direct Forest Fire Reporting numbers, but the bulk of fire reports go to the Communication Centers.

When a fire call comes into Ferry County E-911 Communication Center, the local fire protection districts are paged out to respond. Then the Communication Center staff calls the appropriate wildland agency (usually WA DNR) and relays the fire report info along with the reporting party's phone number.

Fire Reporting Numbers:

- Ferry County - 911
- WA DNR 1-800-562-6010
- Mount Tolman Fire Center 1-509-634-3100
- USFS Republic Ranger District 1-509-775-7400 or after hours 1-509-684-7218

Burn Permits: Washington State Department of Natural Resources is the prime agency issuing burn permits in Ferry County. Colville BIA issues burn permits for DNR on "Fee Lands" on the Colville Reservation. Washington DNR burn permits regulate silvacultural burning.

Washington Department of Ecology (DOE) issues burn permits for improved property and agricultural lands. All DOE burn permits are subject to fire restrictions in place with WA DNR & local Fire Protection Districts.

Washington DNR has a general burning period referred to as "Rule Burn" wherein a written burn permit is not required in low to some moderate fire dangers.

The timeframes for the Rule Burn are from October 16th to June 30th. Washinton DNR allows for Rule Burns to be ten foot (10') piles of forest, yard, and garden debris. From July 1st to October 15th if Rule Burns are allowed, they are limited to four foot (4') piles.

The restrictions for the RULE BURNS are;

- Before conducting the burn permittee must check with the Washington DNR toll free burn number – 1-800-323-BURN (2876);
- Permittee must call Ferry County Sheriff Department at the Communication Center business number and report where and when they will be burning and that they are able to meet all restrictions and conditions of the Rule Burn;
- All burns must have landowner permission;
- Permittee must be able to control the fire at all times;
- Do not burn in windy days;
- Burn must be attended by a person capable of extinguishing the fire at all times;
- Only one pile to be burned at a time;
- An area cleared to mineral soil at least two feet wide needs to surround the burn pile;
- A charged hose or dedicated fire bucket with a shovel or other firefighting hand tool must be present at the burn;
- Fire must be completely extinguished before burner leaves the scene of the fire;

Fire Restriction Information Numbers:

- WA DNR– 1-800-323-BURN (2876)
- Ferry County E-911 Communication Center (Sheriff Office) 1-509-775-3132 or 1-800-342-4344
- Mount Tolman 1-509- 634-3100

As part of their standard operating procedures Ferry County E-911 Communication Center, who handles the Fire Restriction calls for the Ferry County Sheriff's Department asks that all burners call the Communication Center business number and report when the burning is complete.

Defensible Space: Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Ferry County must be made aware that home defensibility starts with the homeowner. Once a fire has started and is moving toward a structure or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home. "Living with Fire, A Guide for the Homeowner" is an excellent tool for educating homeowners as to the steps to take in order to create an effective defensible space. Residents of Ferry County should be encouraged to work with local fire departments and fire management agencies within the county to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations. Beyond the homes, forest management efforts must be considered to slow the approach of a fire that threatens a community. The survey of the public conducted during the preparation of this Community Wildfire Protection Plan indicated that approximately 62% of the respondents are interested in participating in wildfire education programs.

Evacuation Plans: Development of community evacuation plans is necessary to assure an orderly evacuation in the event of a threatening wildland fire. Designation and posting of escape

routes would reduce chaos and escape times for fleeing residents. Community safety zones should also be established in the event of compromised evacuations. Efforts should be made to educate homeowners through existing homeowners associations or creation of such organizations to act as conduits for this information.

Accessibility: Also of vital importance is the accessibility of the homes to emergency apparatus. If a home cannot be protected safely, firefighting resources will not jeopardize lives to protect a structure. Thus, the fate of the home will largely be determined by homeowner actions prior to the event. In many cases, homes' survivability can be greatly enhanced by following a few simple guidelines to increase accessibility such as widening or pruning driveways and creating a turnaround area for large vehicles.

Fuels Reduction: Recreational facilities near communities, along the Kettle River, Sanpoil River, Franklin D. Roosevelt Lake, and Curlew Lake, or in the surrounding forest lands should be kept clean and maintained. In order to mitigate the risk of an escaped campfire, escape proof fire rings and barbeque pits should be installed and maintained. Surface fuel accumulations in nearby forests can also be kept to a minimum by periodically conducting pre-commercial thinning, pruning and limbing, and possibly controlled burns.

Other actions that would reduce the fire hazard would be thinning and pruning timbered areas, creating a fire resistant buffer along roads and power line corridors, and strictly enforcing fire-use regulations. The high tension power line coming across the Kettle River Range via Sherman Pass is the only source of electrical power to western Ferry County; thus, protecting this corridor should be a high priority. Ensuring that the area beneath the line has been cleared of potential high risk fuels and making sure that the buffer between the surrounding forest lands is wide enough to adequately protect the poles as well as the lines is imperative.

Emergency Response: Once a fire has started, how much and how large it burns is often dependent on the availability of suppression resources. In most cases, rural fire departments are the first to respond and have the best opportunity to halt the spread of a wildland fire. For many districts, the ability to reach these suppression objectives is largely dependent on the availability of functional resources and trained individuals. Increasing the capacity of departments through funding and equipment acquisition can improve response times and subsequently reduce the potential for resource loss.

Rural Addressing: In order to assure a quick and efficient response to an event, emergency responders need to know specifically where emergency services are needed. Continued improvement and updating of the rural addressing system is necessary to maximize the effectiveness of a response.

Other Activities: Other specific mitigation activities are likely to include improvement of emergency water supplies and management of trees and vegetation along roads and power line right-of-ways. Furthermore, building codes should be revised to provide for more fire conscious construction techniques such as using fire resistant siding, roofing, and decking.

4.7.4 Strategic Planning Area #1

4.7.4.1 Neighborhoods of West Fork, Sanpoil Valley, Granite, and Hadley-Walker

The neighborhoods of West Fork and Sanpoil Valley straddle State Route 21 in the southern extent of Strategic Planning Area #1. The main topographical features in this area are the narrow bottom lands of the Sanpoil River valley bordered by the extremely steep slopes of the mountains which extend to the east and west for many miles. While much of the Sanpoil Valley

neighborhood is National Forest land, much of the West Fork neighborhood is within the borders of the Colville Reservation.

The Hadley-Walker neighborhood is located to the east of the more densely populated areas of Republic and Pine Grove. This area is characterized by rugged mountains and forestland. The 1988 White Mountain Fire burned along the eastern border of the Hadley-Walker neighborhood. The Granite neighborhood lies to the west of the City of Republic straddling a segment of State Highway 20. Ownership in this area is a mixture of National Forest, Department of Natural Resources, and private, which leads to a mixture of past management regimes that show up on the landscape. This area is mostly mountainous with Granite Creek, the North Fork of Granite Creek, and Copper Mountain defining the main topographical features.

4.7.4.1.1 Fuels Assessment

The West Fork, Sanpoil Valley, Granite, and Hadley-Walker neighborhoods are almost entirely dominated by forestland consisting of ponderosa pine, Douglas-fir, western larch, lodgepole pine, Engelmann spruce, and subalpine fir depending on the aspect, elevation, and availability of moisture. Many of the higher elevation peaks are void of timber due to the lack of sufficient soil and harsh weather conditions. The Granite Creek watershed as well as several other drainages supports a more dense forest type due to increased moisture availability and less exposure to the sun. Vegetation along the creek banks are typical of a riparian zone and include birch and black cottonwood as well as a variety of thick grasses, forbs, and shrubs. The Sanpoil River valley has a flat bottom, but the slopes on each side rise very sharply forming many large rock faces and outcroppings. Due to the steep, rugged terrain fires in Sanpoil River valley are difficult and potentially dangerous to fight. Furthermore, winds from the southwest typically blow directly up the Sanpoil River valley. This places the community of Republic and the surrounding area at extremely high risk of an uncontrolled wildfire. The natural topography, vegetation, and orientation of the town are not prohibitive to an oncoming fire.

The placement of State Routes 20 and 21 near the bottom of major drainages, increased traffic and recreational use, and the frequency of lightning storms, increases the probability of an ignition along these corridors.

4.7.4.1.2 Ingress-Egress

State Routes 20 and 21 are the main access routes in the West Fork, Sanpoil Valley, Granite, and Hadley-Walker neighborhoods. These are both two-lane, paved highway routes. Major secondary routes include Swamp Creek Road and Swan Lake Road, which are two-lane graveled routes. There is a multitude of forest roads throughout the area; however, many of these are not well-maintained.

4.7.4.1.3 Infrastructure

Residents in these more rural neighborhoods typically rely on personal well systems for their water resources. Additionally, most residents are connected to the main power grid supplying Ferry County; however, some homeowners use solar resources or propane.

4.7.4.1.4 Fire Protection

Ferry/Okanogan Fire Protection District #13 provides both structural and wildland fire protection to portions of the Granite, West Fork, Sanpoil Valley, and Hadley-Walker neighborhoods.

All of the private lands within the three fire protection districts of Ferry County have joint jurisdiction with the Washington Department of Natural Resources (DNR). Under joint jurisdiction, it is recognized that the fire district has primary responsibility for structure protection and the DNR will have primary responsibility for wildland fire suppression on state and private lands. The DNR provides wildfire protection during fire season between April and October with varying degrees of available resources in the early spring and late autumn months. U.S. Forest Service responds to all wildland fires on their jurisdiction and may also respond to wildland fires on private or state lands based on a closest forces, reciprocal agreement with the DNR when resources are available.

4.7.4.1.5 Community Assessment

Most of the population in the West Fork, Sanpoil Valley, Granite, and Hadley-Walker neighborhoods are clustered around State Highways 20 and 21. There are also several homes scattered throughout the Sanpoil River valley north of the Colville National Forest boundary. These are typically larger landowners with 5 to 20 acre homesites. Homes in the Sanpoil River valley are typically located in the open valley bottom with little to no forest vegetation immediately surrounding structures. In the event of a wildfire, it is likely that many of the structures would be defendable. Nevertheless, the valley itself would, in most cases, act as a funnel for hot gases and toxic fumes making fire suppression efforts very difficult and dangerous. It is imperative that the entire valley be evacuated well ahead of an advancing fire due to this possibility. Highway 21 either to the north or the south is the only escape route for the valley.

Homes in the Granite Creek drainage and along Swamp Creek Road in the North Fork of the Granite Creek drainage are at high risk to wildfire. Much of the forest in this area is overstocked with an abundance of dead and down fuel as well as ladder fuels in the understory. Fires in this area would be expected to burn intensely. Many homes lack a defensible space between structures and forest fuels and many are accessed via private driveways. Escape routes for residents are somewhat limited depending on their location.

The Old Kettle Falls Road in the Hadley-Walker neighborhood occurs about mid-slope on the south aspect of Gold Hill. The increased solar exposure and subsequent moisture constraints limit vegetation growth; thus, this area is mostly made up of patchy Douglas-fir and ponderosa pine. The lack of fire in this area has increased the historic amount of understory vegetation, which increases the potential fire risk. Fires in this type of vegetation would be expected to move very rapidly upslope, but burn at a lower intensity.

4.7.4.1.6 Mitigation Activities

The most important mitigation activities in these more rural neighborhoods of West Fork, Sanpoil Valley, Granite, and Hadley-Walker will be creating adequate defensible spaces around homes and other structures and conducting fuel reduction projects along State Routes 20 and 21 and private driveways. The forest lands surrounding homes and along the main thoroughfares should also be evaluated for potential thinning projects that would improve the safety of residents and evacuation routes.

4.7.4.2 Neighborhoods of North Republic, Southwest Republic, Southeast Republic, and Klondike-Pine Grove

The neighborhoods of North Republic, Southwest Republic, Southeast Republic, and Klondike-Pine Grove cover the more densely populated areas of the City of Republic and Pine Grove.

The City of Republic is located at the west junction of State Route 20 and State Route 21 near the northern extent of the Sanpoil River valley and is part of the North Republic, Southeast Republic, and Southwest Republic neighborhoods. Republic has a rich history as a mining and logging town, which is evident in the well preserved historic downtown area. Republic also serves as the commercial center for Ferry County and provides Ferry County residents on the west side of the Kettle River Range with basic services including groceries, fuel, schools, hospitals, libraries, post offices, and lodging.

The Knob Hill area is located directly north of Republic on the south aspect slope of Klondike Mountain, which is encompassed by the North Republic neighborhood. These homes sit on large lots overlooking the Sanpoil River valley to the south. The Knob Hill Mine is located near the base of the mountain where the Knob Hill Road bisects Trout Creek Road. The forest vegetation consists of patchy ponderosa pine and Douglas-fir with low growing grasses and shrubs in the understory.

The Klondike Road basically serves as a short cut route from Republic to the West Curlew Lake Road. The Klondike Road also serves as the border between the North Republic and Southeast Republic neighborhoods before passing through the Klondike-Pine Grove neighborhood. Homes are scattered throughout this area; typically, on larger lots and are generally surrounded by open fields or meadows with a few stringers of timber.

Pine Grove is a small community located at the east junction of State Route 20 and State Route 21 in the Klondike-Pine Grove neighborhood. There are only a few operating businesses in the area and homes are scattered along the highways and up the Old Kettle Falls Road. Pine Grove also marks the confluence of O'Brien Creek out of the Colville National Forest to the east and the Sanpoil River.

4.7.4.2.1 Fuels Assessment

Throughout Ferry County there is abundant evidence of large past wildfires including the recent White Mountain Fire and the Togo Fire. This region receives only about 20 inches of moisture annually, most of which is in the form of snow. This leads to extremely dry summer conditions. In addition most of the vegetation in the North Republic, Southwest Republic, Southeast Republic, and Klondike-Pine Grove neighborhoods is adapted to frequent fire return intervals; meaning it is highly probable that wildfires will continue to burn large acreages throughout Ferry County.

The topographic relief around the Republic neighborhoods is highly variable. The Republic townsite sits on a south to southwest facing slope with the Granite Creek drainage immediately below. This south aspect is dominated primarily by open ponderosa pine and Douglas-fir stands. Portions of this forested area have recently been burned by wildfire leaving a stand with much lower fire risk due to the removal of the understory vegetation. Other areas are somewhat overgrown with dense regeneration and brush in the understory.

The topography around Klondike-Pine Grove neighborhood is highly variable. The north aspect slope rising steeply to the south towards Gibralter Mountain is dominated by thick Douglas-fir, ponderosa pine, and some western larch. This forest type continues along the south side of State Route 20 east towards the Colville National Forest. The north side of this highway is predominantly open Douglas-fir and ponderosa pine due to the south aspect. Fires in these forest types on a north aspect tend to burn very intensely and are likely to be stand replacing.

Fuels north of Pine Grove and extending north along State Route 21 are patch stands of Douglas-fir and ponderosa pine mixed with some riparian vegetation associated with the Sanpoil River. Regeneration is relatively abundant in these stands, which could act as ladder

fuels contributing to a crown fire. This forest type is somewhat thicker bordering the State Route 21, but thins out into an open valley just north of Sanpoil Lake. Grazing in the fields surrounding the Klondike Road keep the fine grassland fuels to a minimum; however, a fire could easily be carried across these meadows and pastures, especially under the influence of wind.

4.7.4.2.2 Ingress-Egress

State Routes 20 and 21 are two-lane highway routes that bisect all but the North Republic neighborhood. The Klondike Road, Trout Creek Road, and Old Kettle Falls Road are well maintained, two lane graveled routes in the North Republic, Southwest Republic, Southeast Republic, and Klondike-Pine Grove neighborhoods that could serve as escape routes in an emergency situation.

4.7.4.2.3 Infrastructure

The community of Republic maintains a municipal water system; however, residents living outside the city limits rely on personal wells. Republic has also developed a municipal sewer system with two settling ponds near the north end of the Sanpoil River valley.

There is a radio tower located near the top of Klondike Mountain that serves the communication infrastructure for emergency response in the Republic area.

Republic has two primary care medical facilities; Ferry County Memorial Hospital and the Republic Medical Clinic. Ferry County Memorial Hospital is a full service facility offering Emergency, Obstetrics, Surgery, and General Medicine units. Republic Medical Clinic is well trained in family practice offering a full range of primary care services.

Homes in the Pine Grove area rely on personal or multiple home well systems. The Kinross gold mine is located about 5 miles northeast of the community. This leads to increased industrial activity and truck traffic through the area. The primary Public Utilities District (PUD) work station is also located in Pine Grove. This station houses a plethora of heavy equipment and trucks that may be useful in a wildfire situation.

Above ground public transmission lines crisscross western Ferry County; however, the sole high tension power line feeding the local lines roughly parallels Highway 20 over Sherman Pass. Many past fires (including the recent White Mountain Fire) have occurred along this corridor; thus, there is a high probability of the main high tension power lines being compromised due to a wildfire.

4.7.4.2.4 Fire Protection

Ferry/Okanogan Fire Protection District #13 provides both structural and wildland fire protection to the North Republic, Southwest Republic, Southeast Republic, and Klondike-Pine Grove neighborhoods.

All of the private lands within the three fire protection districts of Ferry County have joint jurisdiction with the Washington Department of Natural Resources (DNR). Under joint jurisdiction, it is recognized that the fire district has primary responsibility for structure protection and the DNR will have primary responsibility for wildland fire suppression on state and private lands. The DNR provides wildfire protection during fire season between April and October with varying degrees of available resources in the early spring and late autumn months. U.S. Forest Service responds to all wildland fires on their jurisdiction and may also respond to wildland fires on private or state lands based on a closest forces, reciprocal agreement with the DNR when resources are available.

4.7.4.2.5 Community Assessment

The City of Republic in the North Republic, Southeast Republic, and Southwest Republic neighborhoods is at fairly high risk of experiencing a wildfire. Winds coming from the southwest could easily push an uncontrolled fire directly out of the Sanpoil River valley up the south aspect slope on which the townsite was built. Fire would spread very rapidly upslope due to the abundance of flashy fuels. The recent wildfire that burned along the east side of Republic shows the high potential for loss of life and structure if a fire were to occur in this area again. In addition, many of the homes and business in Republic have wood siding, decking, and roofing making them significantly more prone to ignition.

Homes on Knob Hill in the North Republic neighborhood are also at high fire risk due to the likelihood of a wildfire burning rapidly up the south slope on which most homes are located. The fire risk is increased by the multitude of private driveways and the one-way in, one-way out nature of the main Knob Hill Road. The lack of additional escape routes makes evacuation and fire suppression very difficult. Furthermore, the radio tower located near the top of Klondike Mountain and accessed by Knob Hill Road could also be at high risk to fire.

Homes along the Klondike Road in the Klondike-Pine Grove neighborhood are at low to moderate risk of experiencing a wildfire. This area is mostly open making modification of the grassland or farmland vegetation to form a fuel break reasonably uncomplicated using the available farm or construction implements. This area could serve as an emergency safety zone for the residents of Republic in the event of a compromised evacuation.

The community of Pine Grove and homes in the Klondike-Pine Grove neighborhood are at high risk of experiencing a wildfire. Southwest winds could push an uncontrolled fire up the Sanpoil River drainage directly through Pine Grove. Additionally, the community's close proximity to the Colville National Forest and several past fires that have occurred along the Kettle River Range demonstrate the likelihood of a fire in this area.

Homes in the Klondike-Pine Grove neighborhood are very widely scattered making fire suppression efforts more difficult. Furthermore, many homes lack a clean and clear defensible space and/or were built using non-fire resistant siding, decking, and roofing.

To their advantage, residents may be able to use the Curlew Lake valley to the north as an emergency safety zone in the event of a compromised evacuation. Additionally, Sanpoil Lake and nearby Curlew Lake provide water resources for firefighting.

4.7.4.2.6 Mitigation Activities

The risk of wildfire could be reduced in the North Republic, Southwest Republic, and Southeast Republic neighborhoods by conducting fuel reduction and understory cleanup projects, particularly along the south and western edges of the City of Republic. Creating a fire resistant buffer in this area will help prevent a wind driven wildfire out of the Sanpoil River valley or the Granite Creek drainage from sweeping through the townsite.

The best defense for individual homeowners is education and action. Being aware of the potential threat of wildfire is the first step, but being proactive by creating a defensible space around homes and using fire resistant construction and landscaping materials will significantly increase the survivability of families and homes.

Fuels reduction projects in high risk areas along State Routes 20 and 21 and other main access routes should be carried out in order to improve their safety as potential evacuation routes.

The most important mitigation activities in the Klondike-Pine Grove area will be creating adequate defensible spaces around homes and other structures and conducting fuel reduction projects along State Routes 20 and 21. The forest lands to the south and along State Route 20 to the east should also be evaluated for potential thinning projects that would improve the safety of the town and the evacuation routes.

4.7.4.3 Neighborhoods of East Lake and West Lake

The neighborhoods of East Lake and West Lake split down the middle of Curlew Lake and extend into the forested mountain areas to the east and west, respectively. There are no defined communities in these neighborhoods; however, there are several housing clusters, particularly around Curlew Lake and in many of the drainages.

Curlew Lake, which is shared by the East Lake and West Lake neighborhoods, is located alongside State Route 21 between the communities of Pine Grove and Malo. There are several new and old developments occurring along the lake's shores as well as in several of the small drainages feeding the lake. The area immediately surrounding the lake is open grassland with some agricultural development extending several miles to the north and south. Many of the developed drainages and the slopes rising from the valley bottom are heavily timbered.

There are many homes clustered around the shores of Curlew Lake; many of which are organized into named subdivisions such as Curlew Kai and Pete's Retreat. These homes are surrounded by mostly grassland vegetation and are reasonably defendable against wildfire. Nevertheless, there are increasingly more homes being built throughout the open ponderosa pine on the gentle slope leading up to West Curlew Lake Road in the West Lake neighborhood. The Curlew Lake State Park sits near the southern end of the lake on the eastern shore.

The Lambert Creek drainage in the East Lake neighborhood is located on the east side of State Route 21 near the northern end of Curlew Lake. Lambert Creek Road follows Lambert Creek east several miles before running into the Colville National Forest boundary and eventually dead ending. Most homes are located in the fairly wide bottom surrounded by riparian grasses and shrubs with limited forest vegetation in the immediate vicinity of structures. The south aspect slope rising gently from the north side of the drainage is characterized by open ponderosa pine while the steeper south slope is well stocked with Douglas-fir, ponderosa pine, western larch.

The Herron Creek drainage also in the East Lake neighborhood is located on the east side of State Route 21 near the southern end of Curlew Lake. The Herron Creek Road follows Herron Creek east several miles before turning north at the Colville National Forest boundary and connecting with the Lambert Creek Road via Forest Route 2154. There are many homes scattered throughout this drainage, many of which are located on private drives or narrow loop roads. The north aspect rising from the south side of the drainage is heavily overstocked with Douglas-fir, ponderosa pine, and western larch with an abundance of ladder fuels and dead and down material in the understory. The south aspect slope is also heavily overstocked with Douglas-fir and ponderosa pine; however, the fuel loading is less due to decreased productivity.

Rose Valley in the West Lake neighborhood is the wide, gently rolling drainage of Bacon Creek. This area is accessed by turning north onto Rose Valley Road from the Trout Creek Road west of Curlew Lake. This area is characterized by a large natural meadow. There are many structures located in this area and most are surrounded by grassland vegetation, a lot of which is being used as pasture for domestic livestock. Riparian vegetation including black cottonwood and other shrubs occur in the creek bottom and several of the small draws contain stands of ponderosa pine and Douglas-fir. The Rose Valley Road travels north through the valley for about two miles before turning into a trail at the Colville National Forest boundary.

Barrett Creek drainage is located between Bald Mountain (to the north) and Klondike Mountain (to the south) just west of Curlew Lake in the West Lake neighborhood. This area is accessed via the Barrett Creek Road either off of Trout Creek Road on the west side or West Curlew Lake Road on the east side. There are many homes scattered throughout the drainage. Some of these homes are located along the main access route, but there are also many private driveways. The Barrett Creek area is mostly forested; however, there are some natural openings along the bottom of the draw and along the north slope.

The main Trout Creek Road in the West Lake neighborhood accesses many homes along the North Fork of the Granite Creek drainage. These homes are typically widely spaced and many are set back from the main road and accessed only by private drives. The forest vegetation is considerably thicker and more overgrown than the forest around Republic. The east and west aspect slopes are dominated by overstocked stands of Douglas-fir, ponderosa pine, and western larch. Canopy closure in many areas is limiting understory vegetation growth, but there is an abundance of dead and down fuels littering the forest floor.

4.7.4.3.1 Fuels Assessment

The vegetation and fuel loading in the East Lake and West Lake neighborhoods are highly variable. Fuels surrounding the immediate Curlew Lake area are primarily mid-length grasses. There is some scattered ponderosa pine on the rolling east facing slope on the west side of the lake; however, currently, this area is reasonably well spaced with primarily grass in the understory. There are a few larger trees remaining in the Curlew State Park; however, these are well spaced and pruned. High density recreational use in the park significantly increases the potential for an ignition; however, the grounds are kept clean and green to help reduce the risk. A wildfire near Curlew Lake would spread very rapidly, particularly under the influence of wind, but would tend to burn at a lower intensity. Fuel breaks created by exposing the mineral soil are usually effective at controlling the spread of grassland fires. The Rose Valley area in the West Lake neighborhood is also primarily grassland fuels; however, the valley itself is surrounded by forestland vegetation. Furthermore, Rose Valley's sole escape route, the Trout Creek Road, is bordered by timber.

The developed drainages feeding Curlew Lake such as Lambert Creek and Herron Creek in the East Lake neighborhood and Barrett Creek and Trout Creek in the West Lake neighborhood typically have an east-west orientation. This means the north side of each drainage is characterized by a south aspect slope vegetated with ponderosa pine and Douglas-fir. In most cases, this timber occurs in patches or is fairly well spaced due to the lack of moisture and increased solar exposure. The north aspect slopes occurring on the south side of the drainages are typically much more densely forested with Douglas-fir, ponderosa pine, western larch, and lodgepole pine. These north aspects also have increased ladder fuels due to more prolific regeneration and increased amounts of dead and down fuels on forest floor. In Herron Creek; however, both the north and south side of the drainage are overstocked with mature timber as well as regeneration and dead and down fuels in the understory.

4.7.4.3.2 Ingress-Egress

State Highway 21 in the East Lake neighborhood is the only paved, two lane route in this vicinity; however, Trout Creek Road and Barrett Creek Road are two lane, graveled loop roads that could potentially serve as escape routes. Roads accessing the populated drainages including Rose Valley Road, Lambert Creek Road and Herron Creek Road are generally two-lane, graveled routes; however, their primary direction of escape will be into the Curlew Lake Valley due to heavy forestland fuels in the surrounding Colville National Forest lands.

Additionally, the Herron Creek Road, Rose Valley Road, and the main Lambert Creek Road either dead end or become limited access surfaces once they enter the National Forest. Forest Route 2154, a connecting route between Lambert Creek and Herron Creek, could be developed to provide an additional, safe escape route for residents in these drainages. The following is a more specific description of each roadway:

Lambert Creek Road accesses homes in the Lambert Creek drainage. This is a fairly well-maintained, two-lane, graveled road border by dense forest vegetation on the south side and a mix of grass, trees, and homesites on the north side. The safety of residents in this area would be improved by conducting a fuels reduction project along the south side of Lambert Creek Road. Additionally, Forest Route 2154 provides a connection to the Herron Creek Road; however, evacuation via this route may be difficult for some types of vehicles.

Herron Creek Road provides the main access into the Herron Creek drainage. This is, for the most part, a two-lane, graveled road. Dense forest vegetation borders, and in some places actually overhangs, the road on both sides for most of its length. The Herron Creek Road would be very hazardous during an emergency evacuation of residents and would not likely be useful as a fuel break. This route does connect to the Lambert Creek drainage via a narrow forest route; however, this road may not be passable for all types of vehicles. There has been some thinning operations conducted along the road; however, much more is needed to make this road a safe escape route.

The Rose Valley Road traveling through the Rose Valley is a two-lane, graveled route that has a low risk of wildland fire due to the surrounding grassland vegetation. Nevertheless, the Trout Creek Road, which provides access to the Rose Valley Road, is bordered by forest vegetation. Some of this area has been thinned to help reduce the fire risk; however, more could be done to improve the safety of residents and firefighters during an evacuation or suppression operation.

Homes in the Barrett Creek area are accessed by the Barrett Creek Road off of Trout Creek Road on the west side and West Curlew Lake Road on the east side. Barrett Creek Road is a well maintained, two-lane, gravel route. Thinning in some of the more densely forested areas would drastically improve the safety of both residents and firefighters during an evacuation.

The Trout Creek Road forms a loop from the City of Republic north to the West Fork of Trout Creek where it turns eastward following the drainage to Curlew Lake. This is a well maintained, two-lane, graveled route bordered by forestland vegetation. Several fuels reduction projects have been completed or are planned for the future to help reduce the fire risk along this roadway.

4.7.4.3.3 Infrastructure

Newer homes around Curlew Lake rely on personal or multiple home well systems; however, older homes may still pump water directly from the lake. More rural homes located in the developed drainages of the East Lake and West Lake neighborhoods have drilled personal wells.

Above ground public transmission lines crisscross western Ferry County; however, the sole high tension power line feeding the local lines roughly parallels Highway 20 over Sherman Pass. Many past fires (including the recent White Mountain Fire) have occurred along this corridor; thus, there is a high probability of the main high tension power lines being compromised due to a wildfire.

4.7.4.3.4 Fire Protection

Ferry/Okanogan Fire Protection District #13 provides both structural and wildland fire protection to the East Lake and West Lake neighborhoods.

All of the private lands within the three fire protection districts of Ferry County have joint jurisdiction with the Washington Department of Natural Resources (DNR). Under joint jurisdiction, it is recognized that the fire district has primary responsibility for structure protection and the DNR will have primary responsibility for wildland fire suppression on state and private lands. The DNR provides wildfire protection during fire season between April and October with varying degrees of available resources in the early spring and late autumn months. U.S. Forest Service responds to all wildland fires on their jurisdiction and may also respond to wildland fires on private or state lands based on a closest forces, reciprocal agreement with the DNR when resources are available.

4.7.4.3.5 Community Assessment

Homes near Curlew Lake in the East Lake and West Lake neighborhoods are at low risk of wildland fire due to the lack of fuels. A fire in this area would be much more easily suppressed than a forest fire, especially since firefighters would have an unlimited supply of water resources nearby. Increased recreational use at Curlew Lake State Park results in a higher probability of an ignition; however, this risk is kept to a minimum by careful grooming and maintenance of the park grounds. Residents and recreationalists can also help reduce the potential for an ignition by using fire proof fire rings and barbeque pits as well as adhering to fire use restrictions and being cautious with fireworks.

Residents of Lambert Creek in the East Lake neighborhood are at moderate to high risk of wildfire. Large fires occur frequently in the Kettle River Range; remnants of which are evident by the large stands of dead timber visible from State Route 21. Many homes in the Lambert Creek drainage have created a defendable area between their structures and the forest lands, yet there are many landowners with high risk trees and other vegetation adjacent to or even overhanging buildings. Furthermore, many homes in this area have been using highly ignitable wood siding, decking, and roofing. Even if an actual flame front does not enter the drainage, residents could be at high risk due to hot gases and toxic fumes that may be funneled through the draw. Since Lambert Creek Road is the sole main access route, it will be imperative that residents are evacuated well in advance of an oncoming wildfire.

Herron Creek drainage also in the East Lake neighborhood is at very high risk of wildfire. The dense fuels in this area would support a very high intensity fire. There is evidence of a past stand replacing fire entering the drainage, which demonstrates resident's vulnerability. Herron Creek Road is the sole main access route into and out of the area; however, dense, high risk fuels are directly adjacent to the road surface and in some instances actually hang over the road. There are also many narrow, one-way in, one-way out private driveways, which may or may not support emergency response vehicles. This is not only a very dangerous situation for residents, but it also puts firefighters at great risk. Forest Route 2154 could be used as a potential escape route; however, in order to function as such, it will need improvements and regular maintenance.

Rose Valley residents in the West Lake neighborhood are at moderate risk of wildfire. The grassland vegetation becomes very dry during the summer and is conducive to a wind driven fire. There are also several homes tucked into the timber surrounding the meadow area that lack an adequate defensible space and some are accessed by narrow, one-way drives. Trout Creek Road, which provides access into the Rose Valley, is bordered by forest type fuels; thus,

it is possible that residents could become trapped in the event of a fire along this escape route. Nevertheless, Rose Valley is large enough to provide an adequate safety zone for all residents, if they had access to the appropriate equipment and were educated on how to build one without outside help.

The Barrett Creek area has a moderate to high risk of fire. Many of the homeowners in this region of the West Lake neighborhood have created a defensible space between structures and forest fuels; however, there are also those that have forest vegetation abutting or even overhanging structures. Also, many of the homes in this area are accessed by narrow, one-way in, one-way out private drives. This creates a very dangerous situation for residents as well as firefighters. Several homeowners have used wood siding, decking, and roofing materials, which are not resistant to an ignition. Since Barrett Creek Road is a through road either to Trout Creek Road or West Curlew Lake Road, emergency personnel have the option of evacuating residents in either or both directions.

The Trout Creek Road loop in the West Lake neighborhood is at high risk to wildfire. Much of the forest in this area is overstocked with an abundance of dead and down fuel as well as ladder fuels in the understory. Fires in this area would be expected to burn more intensely, but possibly not move as rapidly as those that would be expected near the Republic townsite. Many homes lack a defensible space between structures and forest fuels and many are accessed via private driveways. Escape routes for residents are somewhat limited depending on their location. There are currently several fuels reduction projects occurring and proposed on private property bordering the main access routes. Completion of these projects will significantly increase the safety of bordering structures and the evacuation route.

4.7.4.3.6 Mitigation Activities

In general, fuels in the Lambert Creek and Herron Creek in the East Lake neighborhood and Barrett Creek, Rose Valley, and Trout Creek drainages in the West Lake neighborhood are overstocked, particularly on the north aspects. Thinning and controlled underburns in high risk areas would be conducive to increasing the safety of residents. It is also very important that residents create a defensible space around their structures large enough to protect them against an oncoming forest fire. Not only are these residents at risk of direct wildfire threats, but they are also at risk of the toxic fumes and smoke that may be funneled through the draws. Therefore, aggressive educational campaigns may also be necessary.

Constructing additional escape routes for residents living in Lambert Creek and Herron Creek will significantly reduce the wildfire risk. Forest Route 2154 currently connects Lambert Creek Road and Herron Creek Road; however, in order to serve as an escape route, this road will need improved to accommodate all types of passenger vehicles and two way traffic. Fuels along the roadside should also be thinned to improve the safety of the escape route.

Although residents in the Rose Valley are surrounded by lower risk fuels, it is possible that their sole escape route could be cut off during a wildfire; thus, residents should be made aware of the potential danger and instructed on how to prepare a fire proof safety zone large enough for all residents of the valley.

Recreational activities around Curlew Lake drastically increase the potential for an accidental ignition; thus, it is important that fire use regulations and firework bans are strictly enforced.

4.7.5 Strategic Planning Area #2

4.7.5.1 Neighborhoods of Lundimo and Empire,

The neighborhoods of Lundimo and Empire are bounded by Highway 21 north of Malo almost to Curlew and then along the north side by an imaginary border roughly paralleling the Kettle River Road about one mile to south.

Lundimo Meadows are the namesake for the Lundimo neighborhood and are large natural occurring meadows located about five miles southwest of Curlew along Lundimo Meadows Road. There are several homes located along the roadway as well as in the actual meadows. Many of these structures are surrounded by forestland fuels.

Empire Creek is located on the west side of State Route 21 about three miles north of Malo in the Empire neighborhood. This drainage contains numerous homes, many of which are located in small groups accessed by secondary roads or private driveways off the main North Empire Creek Road. North Empire Creek Road dead ends within about one mile of the Colville National Forest boundary at the base of Granite Mountain and Mount Elizabeth; however, one of the secondary roads that splits off to the north connects with the Franson Peak Road providing at least one additional escape route.

The community of Malo is located on State Route 21 between Curlew Lake and the town of Curlew. Residents on the west side of Highway 21 are in the Empire neighborhood, while those on the east side are in the Malo East neighborhood. Malo has a very small community center because most residents are scattered throughout the surrounding area. The area around Malo community center is known as St. Peter Flat and has been developed mostly for agricultural purposes and pasture.

4.7.5.1.1 Fuels Assessment

There are several natural meadows including the Lundimo Meadows along the Lundimo Meadows Road. These grassy areas provide a natural fuel break in the forest fuels, which helps to reduce the intensity of a fire and give fire suppression personnel a place to anchor their efforts. The forestland fuels on the surrounding mountains and along the road are somewhat variable depending on the topography, but generally consist of Douglas-fir, ponderosa pine, and some western larch and lodgepole pine. Fire behavior in this area would also be highly variable depending on the topography and the local weather conditions. The discontinuity of the fuels would likely produce varying degrees of fire intensity, but a fire would move through the area fairly rapidly, particularly under the influence of wind.

The Empire neighborhood is made up of patchy stands of Douglas-fir and ponderosa pine that become more consistent to the west. The north side of the Empire Creek drainage can be described as rolling foothills covered in natural grasslands, developed pasture, and stringers or small patches of Douglas-fir and ponderosa pine. The timber on the south side of the drainage occurs in larger, slightly denser patches, but there are still large open areas as well. Fires in these fuels would likely spread very rapidly, particularly upslope, with occasional “jackpotting” and torching of individual or groups of trees.

Fuels around the town of Malo and along the foothills area consist of agricultural fields, livestock pasture, and native grasses with occasional timbered ravines reaching the valley floor. There is timber on the mid and upper slopes of the valley, intermixed with homes in open meadows in the Art Creek and Blue Place Road areas.

4.7.5.1.2 Ingress-Egress

The main access into the Lundimo and Empire neighborhoods is State Highway 21, which is a paved, two-lane route. The North Empire Creek Road and Lundimo Meadows Road, which access their respective drainages, are typically two-lane, gravel routes. These are generally well maintained roads that pass through both grassland and timbered areas. The Lundimo Meadows Road connects Forest Route 600 and Forest Route 2150 to the west. These two routes are typically one-lane, gravel routes traveling through forested areas; however, they could provide an additional escape route for some residents in the Lundimo Meadows area. Fuels reduction projects on the secondary routes in these neighborhoods may be necessary to improve safety in areas where forestland fuels directly abut the road right-of-way.

4.7.5.1.3 Infrastructure

Homeowners in Malo and the surrounding area rely on personal well systems for their water resources.

Above ground PUD primary transmission line routes north and south parallel to Highway 21. PUD “feeder” lines crisscross through out the Lundimo and Empire neighborhoods.

4.7.5.1.4 Fire Protection

Ferry County Joint Fire Protection District #14 provides both structural and wildland fire protection to the community of Malo and the surrounding area.

All of the private lands within the three fire protection districts of Ferry County have joint jurisdiction with the Washington Department of Natural Resources (DNR). Under joint jurisdiction, it is recognized that the fire district has primary responsibility for structure protection and the DNR will have primary responsibility for wildland fire suppression on state and private lands. The DNR provides wildfire protection during fire season between April and October with varying degrees of available resources in the early spring and late autumn months. U.S. Forest Service responds to all wildland fires on their jurisdiction and may also respond to wildland fires on private or state lands based on a closest forces, reciprocal agreement with the DNR when resources are available.

4.7.5.1.5 Community Assessment

Residents in the Lundimo Meadows neighborhood have a moderate to high wildfire risk. There are significant amounts of burnable fuels both along the road and surrounding many homes. Also, many homes in this area were constructed using wood siding, decking, and roofing and, furthermore, are located at the end of one-way in, one-way out private drives. The varying fuels and topography in this area make it difficult to predict fire behavior; thus, potentially complicating suppression tactics. All homeowners should maintain a clean defensible space around structures in order to help improve their survivability. Working with neighbors to develop a pre-approved evacuation plan and safety zones will also help reduce the fire risk.

There are many homes in the Empire Creek neighborhood, most of which have a high risk to wildfire. A cluster of homes near the western extent of Empire Creek Road are surrounded by continuous forestland fuels and have a significantly higher fire risk. Fuels and topography in this area is somewhat variable making it difficult to predict fire behavior. It is important that residents are made aware of the inherent fire danger and take preemptive actions to increase their own safety. Empire Creek Road, Kompan Road, secondary roads, and private roads should be

made as safe as possible by conducting fuels reduction projects and potentially widening the running surface.

The community of Malo immediately adjacent to Highway 21 is at low to moderate risk of experiencing a wildland fire due to the abundance of agricultural development in the surrounding valley bottom. Homes in the surrounding Empire neighborhood are at high fire risk during normal summer fire seasons due to increased human activity, the abundance of lighting, and the fuel arrangement and continuity of the area. Homes located in this neighborhood need to maintain a reasonable defensible space and be aware of the potential fire danger in the general area.

4.7.5.1.6 Mitigation Activities

Residents adjacent to Highway 21 in the town of Malo are reasonably protected from fire by the agricultural development in St. Peter Flats; nevertheless, many of the homes in the Lundimo neighborhood and the remainder of the Empire neighborhood have a much higher fire risk. Homeowners in these areas should be instructed on how to build a fire resistant defensible space and how to improve the safety of their driveways. The main access routes such as Lundimo Meadows Road and North Empire Creek Road should be maintained as escape routes by reducing the high risk fuels along the road right-of-way and, where possible, constructing through roads to provide an additional safe way out.

4.7.5.2 Neighborhoods of Kettle, Toroda, and Ferry

The Kettle neighborhood is located along the Kettle River Road extending from Curlew west to Toroda. The area west of the Kettle neighborhood extending to the Ferry/Okanogan County border is known as the Toroda neighborhood. The Ferry neighborhood lies to the north of both the Kettle and Toroda neighborhoods encompassing the western extent of Customs Road to the Canadian border.

The Kettle River Road travels west from Curlew roughly paralleling the Kettle River along its southern bank in the Kettle neighborhood. Many homes have been built along this road overlooking the river. The mountain slope rising from the south side of the road is covered by dense forest vegetation. Riparian vegetation including trees, grasses, and shrubs grows along the waters edge and is sometimes incorporated into the landscaping of homes. The Curlew Civilian Conservation Center (Job Corps) is located along the western edge of the Kettle neighborhood on Bamber Creek Road. The Curlew CCC houses approximately 200 people at a given time.

Toroda has become a place name at the junction of Toroda Creek Road, Kettle River Road, and Kroupa Road. There are several homes in the Toroda neighborhood, but there is no designated community. This area is mostly grassland or pasture with forest vegetation occurring on the nearby slopes, particularly to the south towards Bamber Mountain. There are several homesites scattered on larger acreages throughout the area, particularly along Toroda Creek Road.

The Customs Road runs parallel to the river along its northern bank traveling west of Curlew. This roadway travels through the Kettle neighborhood until it turns north with the river and crosses into the Ferry neighborhood. On the eastern extent of the road near Curlew, the slope to the north is more gentle and covered primarily with grass. Further to the west, this slope is very steep resulting in nearly vertical cliffs in some areas. Patches of sparse timber occur in the draws and along the benches and ridge tops. Homes are scattered throughout the area, but are generally limited to the grassland areas and the river corridor.

4.7.5.2.1 Fuels Assessment

The area along the north side of Toroda Creek Road in the Toroda neighborhood is moderately steep grasslands with patches of timber, much of which is being used for pasture. Forestland fuels along the south side of Toroda Creek Road and extending into the National Forest lands to the south are typically well stocked, multi-storied stands of Douglas-fir, ponderosa pine, western larch, and lodgepole pine.

The dense stands of Douglas-fir, ponderosa pine, western larch, and lodgepole pine along the south side of Kettle River Road would support a very intense wildfire. Fire frequencies on this type of north aspect slope are very low; therefore, when they do burn, they are likely to be stand (and structure) replacing. Fuels along the north side of Customs Road are highly variable. Much of this area is dominated by grasslands; however, there are also steep slopes and even cliffs that support sparse stands of ponderosa pine, Douglas-fir, and juniper. Fires on this south aspect slope, especially those originating near the road, would spread very quickly burning at variable intensities. Due to the narrowness of the Kettle River Road and Customs Road corridors, residents and fire suppression personnel would need to be on the lookout for falling and rolling debris. The riparian fuels including black cottonwood, birch, and other brush and grass species along both sides of the river are available to burn in dry years. This area is also at higher risk of ignition due to the increased human activity. A fire traveling through the river corridor would threaten many homes in its path.

Fuels in the Ferry neighborhood are highly variable. Much of the vegetation along the Kroupa and Customs Roads is typically open grasslands with stringers and patches of timbers on steep slopes rising out of the river valley. Forestland vegetation dominates the more rural areas on both the east and west sides of the Ferry neighborhood. These areas are very rugged with limited access points making fire suppression much more difficult.

The Curlew CCC grounds are bordered by pasture ground to the north and along the access route; however, Douglas-fir, ponderosa pine, western larch dominate the steep northeast aspect slope rising behind the compound. There is an abundance of dead and down fuels and ladder fuels in the understory. Fires in these timber fuels are likely to burn with a higher intensity than the grassland fuels. Due to the increased human activity in the area, an ignition stemming from the CCC compound is significantly more probable.

4.7.5.2.2 Ingress-Egress

The Kettle River Road, Toroda Creek Road, Customs Road, and Kroupa Road provide the primary access routes through the Kettle, Toroda, and Ferry neighborhoods. These are well-maintained, two-lane, graveled routes. For the most part these roads would serve well as potential escape routes; however, there is room for maintenance and roadside fuels treatments in areas where forest vegetation abuts or even overhangs the roadway. There are also several secondary routes and private driveways accessing individual or clusters of homes throughout these neighborhoods that are mostly one-lane graveled routes. The bridge near Toroda that connects the Custom and Kettle River Roads could be particularly advantageous during evacuation and simultaneous suppression efforts. The Curlew CCC is accessed from Bamber Creek Road off of Kettle River Road.

4.7.5.2.3 Infrastructure

Residents in the Kettle, Toroda, and Ferry neighborhoods rely on personal well systems and river accessed irrigation pumps for their water resources.

There is a primary PUD power transmission line between Curlew and Toroda with a PUD substation near the Job Corps.

4.7.5.2.4 Fire Protection

Ferry County Joint Fire Protection District #14 provides both structural and wildland fire protection to the Kettle, Toroda, and Ferry neighborhoods and maintains a satellite station at the junction of Bamber Creek Road and Kettle River Road.

All of the private lands within the three fire protection districts of Ferry County have joint jurisdiction with the Washington Department of Natural Resources (DNR). Under joint jurisdiction, it is recognized that the fire district has primary responsibility for structure protection and the DNR will have primary responsibility for wildland fire suppression on state and private lands. The DNR provides wildfire protection during fire season between April and October with varying degrees of available resources in the early spring and late autumn months. U.S. Forest Service responds to all wildland fires on their jurisdiction and may also respond to wildland fires on private or state lands based on a closest forces, reciprocal agreement with the DNR when resources are available.

4.7.5.2.5 Community Assessment

Homes along the Kettle River Road and Customs Road in the Kettle neighborhood have a high risk of wildfire. The fuels along most of this corridor would be conducive to an ignition; however, most of the homes are located near the river making them more defendable and less likely to be overrun by wildfire. Additionally these homes are along travel routes easy for fire suppression apparatus to negotiate. It is very important that homeowners maintain a defensible space between structures and both forest fuels and dense riparian vegetation. An ignition along either slope or along the river corridor is highly probable due to the high density of travel along both sides of the river, human activity around homesites, and the high recreational use. Fortunately, both the Kettle River and Customs Road are wide through roads allowing evacuation in either direction.

The Curlew CCC compound has a moderate risk of experiencing a wildland fire. The grounds around the structures are well kept and free of debris and heavy vegetation and the access road is wide enough to accommodate two-way traffic. Nevertheless, the increased human activity contributes to a higher risk of ignition.

Most of the Toroda neighborhood has a high risk of wildland fire due to grassland fuels surrounding the more densely populated areas along the Toroda Creek Road. Many of the homes in this area were built using non-fire resistant siding, decking, and roofing. Additionally, there are many homes accessed only by long, private driveways, which may be hazardous to firefighting personnel and equipment. However, having more than one escape route significantly increases the safety of residents.

Most of the homes in Ferry neighborhood are located with or near the valley containing the Kettle River in this area. The mixture of grassland and timber fuels places many of the residences at high risk to wildfire. Additionally, much of the forestland vegetation in the surrounding mountains is difficult to access making fire suppression immensely more complicated.

4.7.5.2.6 Mitigation Activities

The best defense for homeowners along Customs Road, Kettle River Road, Kroupa Road, and Toroda Creek Road is the construction of a defensible space around homes. Homesites surrounded by fire resistant landscaping have a much better chance of surviving a flame front than those who do not. Many of the homes in these areas are reached by one-way in, one-way out roads; making it difficult for fire suppression vehicles to safely access the area. Providing pullouts and turnaround areas as well as reducing roadside fuels drastically improves the safety of both residents and firefighters.

4.7.5.3 Neighborhoods of Curlew and Danville

The neighborhoods of Curlew and Danville encompass the communities of Curlew and Danville, respectively, and extend westward several miles into the Colville National Forest. Little Goosmus Creek, Big Goosmus Creek, and Fourth of July Creek make up the main drainages in this area, all of which lie within the Danville neighborhood and contain several individual and clusters of homes.

The town of Curlew is located along the Kettle River at the junction of Kettle River Road and State Route 21. There are homes scattered throughout the area, with the downtown area along the east bank of the river and a scattering of homes on a bench west of the river and west of Highway 21. This housing cluster is adjacent to Curlew Fire Station #1. Much of the area to the west, south, and north is rolling grasslands with only occasional patches of ponderosa pine and Douglas-fir, but the west aspect slope rising directly to the east of town is covered with forestland fuels.

Danville is a small community located on State Route 21 just south of the Canadian border. Much of this area is fairly open and grassy with some agricultural development along the river, particularly to the northwest of town. The Kettle River runs along the eastern edge of town and supports black cottonwoods and birch, as well as several other riparian grasses and shrubs. Timbered areas on the west side of the State Route 21 are limited to the drainages and a few patches along the roadway.

Little Goosmus Creek is a small drainage on the west side of State Route 21 about half way between Curlew and Danville. There are only a few structures located in this drainage, however many of them occur in the forested area near the western extent of the main Little Goosmus Creek Road. The northern slope falling into the creek is primarily grass with only patchy timber in the draws while the southern side is fairly densely forested other than a few natural openings along the roadway.

The Big Goosmus Creek drainage is located about one mile north of Little Goosmus Creek also on the west side of State Route 21. The north side of the drainage is characterized by open grassy hillsides, but the south side is densely forested. There are a few homes scattered throughout this drainage; however, several more occur in the forestlands along the connection road between Big Goosmus Creek Road and Fourth of July Creek Road to the north.

The Fourth of July Creek drainage extends to the west of Danville. The landscape around the mouth of this drainage is primarily grassy, rolling hills with sparse timber occurring only along the edges of the creek bed. The grassland extends about two miles west on the Fourth of July Creek Road before hitting the timberline. There are numerous homes in this interface area, most of which are surrounded by timber type fuels.

4.7.5.3.1 Fuels Assessment

The grassland fuels surrounding much of the Curlew area have high wildfire risk. Fires in these types of fuels typically move very quickly, but burn at relatively low intensities. The slope rising from the east edge of town is forested with primarily Douglas-fir and ponderosa pine that would likely burn at a much higher intensity. Due to the location of the townsite at the base of the slope, it can be protected from wildfire fairly effectively through wildfire suppression techniques. There is also a high probability that a human-caused ignition originating from Curlew would spread either to the western grasslands at the foot of Little Vulcan Mountain or to the forested area to the east.

Fuels around the community of Danville are limited to grasslands with patchy timber along the Kettle River. Fires in this type of vegetation tend to move very quickly, but burn at relatively low intensities. Vegetation can be modified around homes or groups of homes by discing or plowing to expose mineral soil and create a fuel break. During usual summer conditions, the wetland area near the Kettle River becomes available to burn. Fires in wetland habitats can be very damaging to the ecosystem and often threaten many homes as they burn through the corridor.

The fuels in Big and Little Goosmus Creek are very similar. Fuels along the south side of the drainages are relatively dense forest fuels made up of Douglas-fir and ponderosa pine with an abundant amount of regeneration and dead and down material in the understory. The north sides are mostly grass with only occasional sparse patches of ponderosa pine. The drainages meet with continuous forestland fuels on both sides within approximately two miles of State Route 21 (near the Colville National Forest boundary). Fires in this type of forestland would most likely burn at varying intensities depending on fuel loading, fuel moisture, and topography. This creates a mosaic of dead, scorched, and unscathed timber.

Timber fuels near the mouth of the Fourth of July Creek drainage are limited to sparse ponderosa pine and Douglas-fir pockets within the creek bottom surrounded by open, rolling hills. This type of fuel loading would be expected to produce fires that spread very quickly, but remain surface fires. The ponderosa pine and Douglas-fir type forest fuels occurring farther west in this drainage are continuous, but somewhat sparse. Fires in these fuels tend to burn through an area fairly rapidly with occasional “jackpotting” and torching of individual trees or groups of trees.

4.7.5.3.2 Ingress-Egress

State Highway 21 is the main access route for the Curlew and Danville areas. This is a two-lane, paved highway running along the Kettle River. Individual drainages are accessed via secondary roads such as Fourth of July Creek Road, Little Goosmus Creek Road, Big Goosmus Creek Road, which are typically two lane, graveled routes that either dead end or becoming limiting surfaces as they near the National Forest boundary. The Deer Creek – Boulder Creek Road and the Kettle River Road are paved, two-lane roadways that provide additional escape routes for residents of the town of Curlew. The Customs Road also offers additional access. All of these routes are well maintained and planned escape routes noted by local emergency services.

There is also a 4X4 track leading from Little Goosmus Creek Road to the Vulcan Mountain Road and the Big Goosmus Creek Road, which could be developed to serve as an additional escape route. Big Goosmus Creek Road connects to the Fourth of July Creek Road to the north via Hennessy Road, providing an alternative escape route for residents.

4.7.5.3.3 Infrastructure

The town of Curlew maintains a small municipal water system; however, rural residents and the community of Danville rely on personal well systems for water resources.

The Kinross Gold Mine manages an operation just south of Kettle River Road about three miles west of Curlew.

Above ground public transmission lines crisscross western Ferry County; however, the sole high tension BPA power line feeding the local lines roughly parallels Highway 20 over Sherman Pass. Many past fires (including the recent White Mountain Fire) have occurred along this corridor; thus, there is a high probability of the main high tension power lines being compromised due to a wildfire. There is a primary PUD power line serving northern Ferry County paralleling State Highway 21 between Republic and Curlew with a PUD substation located in Curlew. Additionally there is a primary PUD power line in the western Kettle River Valley between Curlew and the USDA Job Corps with a PUD substation at the Job Corps. The primary above ground PUD transmission line also routes to Danville from Curlew.

4.7.5.3.4 Fire Protection

Ferry/Okanogan Fire Protection District #14 provides both structural and wildland fire protection to the Curlew and Danville neighborhoods. FY/OK FPD #14 recently built a new base station in Curlew, which provides heated storage for their equipment as well as a meeting area and training room.

All of the private lands within the three fire protection districts of Ferry County have joint jurisdiction with the Washington Department of Natural Resources (DNR). Under joint jurisdiction, it is recognized that the fire district has primary responsibility for structure protection and the DNR will have primary responsibility for wildland fire suppression on state and private lands. The DNR provides wildfire protection during fire season between April and October with varying degrees of available resources in the early spring and late autumn months. U.S. Forest Service responds to all wildland fires on their jurisdiction and may also respond to wildland fires on private or state lands based on a closest forces, reciprocal agreement with the DNR when resources are available.

4.7.5.3.5 Community Assessment

Homes in the Curlew neighborhood, including the community of Curlew are at high risk of experiencing a wildland fire due to the receptive ignitability of grassland fuels present. Homes are generally easy to defend due to the fuel component, the availability of a steady water supply, and the proximity of the local firefighting resources. Homes should maintain a clean and green defensible space due to the possibility of a fast moving grass fire sweeping through the area. The timbered area abutting the eastern edge of the townsite could be a potential fire risk; however, if the Curlew community keeps this area thinned and fuels pulled back from the roadway, this risk should be reasonably mitigated.

The community of Danville has a moderate risk of wildfire due to the lack of continuous forestland fuels and the nearby supply of water resources from the Kettle River. This area does; however, lack a good alternative escape route other than State Route 21. It may be important to work with the U.S. Border Patrol in order to insure a safe evacuation of the town in the event of a fire and to coordinate emergency response procedures.

Big and Little Goosmus Creeks have a moderate to high fire risk. There are only a few homes in each drainage and most are near the main roads. Little Goosmus Creek Road turns into a 4X4

route just west of the national forest boundary, which elevates the fire risk to homeowners in this area. There are also several homes surrounded by forestland fuels on the connection road between Big Goosmus Creek Road and Fourth of July Creek Road. These homeowners, in particular, should maintain a clean and green defensible space. It is also important that these roads be maintained regularly as escape routes, which may mean conducting roadside thinning operations to widen the road and lessen the fire risk.

Residents near the mouth of Fourth of July Creek are surrounded by lower risk grassland fuels. Grassland fires around homes or communities can be effectively suppressed by plowing or discing to expose mineral soil and, thus, creating a fuel break. Homes located in the forestland fuels further to the west, have a much higher risk of fire. Many of these homes lack a defensible space and/or alternate escape routes to the main road. The timber type fuels surrounding these homes form a continuous fuel bed to the west extending into the Colville National Forest.

4.7.5.3.6 Mitigation Activities

The slope to the east of the Curlew townsite presents the most wildfire risk to the Curlew neighborhood; thus, ensuring that the fuels along this slope are actively managed should be a priority. Working with and encouraging landowners to reduce fuels along the roadway edge, thinning upslope, and using prescribed burning would go a long way towards improving the safety of residents.

The best defense for homeowners in the Curlew and Danville communities and along State Route 21, Little Goosmus Creek Road, Big Goosmus Creek Road, and others is the construction of a defensible space around homes. Many of the homes in these neighborhoods are reached by one-way in, one-way out roads; making it difficult for fire suppression vehicles to safely access the area. Homesites surrounded by fire resistant landscaping have a much better chance of surviving a flame front than those who do not.

The Hennessy Road may become an important escape route for residents in either the Big Goosmus Creek area or the Fourth of July Creek area, thus, landowners along this road should be encouraged to keep the route well maintained at all times. Local fire and county officials should consider working with local landowners for fuel reduction projects along this route in order to improve the safety.

4.7.5.4 Neighborhoods of Lone Ranch, Boulder, and Malo East

The Lone Ranch, Boulder, and Malo East neighborhoods are located along the east side of State Route 21 and extend from the Canadian border all the way to the community of Malo. These neighborhoods encompass the main populated drainages of Lone Ranch Creek in the Lone Ranch neighborhood, Deer Creek-Boulder Creek, Long Alec Creek, and Tonasket Creek in the Boulder neighborhood, and Aeneas Creek, Art Creek, and St. Peter's Creek in the Malo East neighborhood. These neighborhoods are very rural with homes scattered throughout the drainages and along State Route 21.

The Lone Ranch Creek drainage is located to the southwest of Danville and State Route 21 and is very typical of many of the drainages in Ferry County. There are several homes scattered along Lone Ranch Creek Road, some exhibiting an adequate defensible space and some not. Fuels on the north side of the roadway are characteristic of a south aspect slope; mostly open and grassy with patches and stringers of ponderosa pine. The south side of the road has a much more dense forest type with abundant regeneration and dead and down fuels in the understory.

The Deer Creek - Boulder Creek Road begins in Curlew and heads east over the Kettle River Range to U.S. Highway 395 near Orient. This road climbs from 1,800 feet elevation in Curlew to 4,200 elevation at the summit 12 miles east of town and provides an alternative path over the mountains to Sherman Pass on State Route 20. There are several homes along this corridor up to the National Forest boundary. There are also a few structures located in the First Creek and Day Creek drainages along the north side of the Deer Creek – Boulder Creek Road.

The Long Alec Creek drainage flows out of the Colville National Forest into the Kettle River at Curlew. The Long Alec Creek Road is in the bottom of a tight mountainous valley and travels approximately seven miles eastward before hitting the National Forest boundary and has structures scattered along the road and the slopes throughout its entirety. Both sides of this drainage are forested, although there are some natural openings along the northern side.

The Tonasket Creek drainage is located on the east side of State Route 21 about two miles south of Curlew. This west facing drainage is a mixture of open grasslands with patches of timber. The upper reaches of Tonasket Creek have a cluster of scattered homes in small meadows surrounded by timber.

Aeneas Creek is located about two miles north of Malo also on the east side of State Route 21. The Aeneas Creek Road, which travels directly up the draw, runs into the Colville National Forest boundary within about one mile of leaving State Route 21; however, there are still multiple homes along this roadway and higher up on the slopes extending about three miles past the border. Once within the National Forest, the slopes on both sides of the creek are covered in large patches of sparse timber.

The Art Creek drainage lies on the east side of State Route 21 about one mile north of Malo. This is a relatively small drainage containing several homesites. The Art Creek Road climbs its way east through the foothills for about one and one-half miles before it meets the actual creek bed and dead ends about one mile further to the east. This area is a mixture of grassland and patchy timber.

The St. Peter's Creek drainage lies just to the southeast of Malo on the east side of State Route 21. The main drainage consists of a North Fork St. Peter's Creek and a South Fork St. Peter's Creek that flow together about two miles east of Malo. There are many homes scattered throughout this watershed; however, most are concentrated in the North Fork along North St. Peter's Creek Road and the main St. Peter's Creek Road.

4.7.5.4.1 Fuels Assessment

The fuels in the Lone Ranch, Boulder, and Malo East neighborhoods are mostly forest land with several natural meadows or patches of grassland intermixed, particularly along much of State Route 21. The populated drainages typically have an east-west orientation. Due to increases solar exposure and therefore less moisture availability, fuels on the south aspect slope on the north side of the drainage are predominantly grassland types with scattered ponderosa pine and Douglas-fir, especially in the draws. The north aspect slopes on the south side of these drainages is made up dense stands of mixed conifers including ponderosa pine, lodgepole pine, western larch, Douglas-fir, subalpine fir, and even western red cedar and Engelmann spruce in draws and frost pockets.

Fuels in the Lone Ranch drainage consist of a mostly grass covered south aspect slope with occasional ponderosa pine and a north aspect slope covered by fairly thick stands of ponderosa pine, Douglas-fir, and western larch. Fuels on the north aspect would tend to support a much more intense, wildfire with difficult to contain fire behavior elements. The 2001 Togo Fire (5,200 acres) spotted over one mile ahead of itself and actively burned in a crown fire configuration

throughout the first day of the fire. Fires on the south aspect slope would be expected to spread very rapidly, but burn at lower intensities due to the flashy nature of the fuels.

Large patches of natural grassy openings occur along the north side of Deer Creek – Boulder Creek Road. Timber in this area is limited to the upper slopes and the draws and generally consists of Douglas-fir and ponderosa pine. The south side of the road supports much denser stands of Douglas-fir, ponderosa pine, western larch, and lodgepole pine. There is also an increased amount of regeneration and dead and down woody material in the understory. Much of the fuels along the roadway have been thinned by logging, farming and other landowner activities. Remaining snags and other evidence of the 1932 Dollar Mountain fire indicate fires in this type of fuel on a north aspect burn very intensely resulting in high mortality of vegetation. The grassland fuels along the lower slopes on the north side of Deer Creek – Boulder Creek Road would spread very rapidly, but likely at a lower intensity. The Deer Creek – Boulder Creek Road travels through the Deer Creek drainage (on the west side of the Kettle River Range), and is the widest of the eight western slope drainage valleys to reach the crest of the Kettle Range.

Fuels along the entrance of Long Alec Creek Road, as it climbs the west aspect slope, are primarily grasses with very few trees. Once the road begins to parallel Long Alec Creek, the forestland fuels dominate both sides of the road. There are a few fairly large natural, grassy openings in the timber; but, for the most part, the north side of the drainage is characterized by sparse Douglas-fir and ponderosa pine with a grassy understory. The south side of the road is dominated by thick stands of Douglas-fir, ponderosa pine, western larch, and lodgepole pine with an abundance of regeneration and dead and down fuels in the understory. A fire in this drainage would be expected to burn at a high intensity funneling hot gases, toxic fumes, and probably fire brands up the canyon. Because of this and very limited ingress/egress into the upper Long Alec Creek drainage there is an increased risk to residents and an intensified need to evacuate the area well before a flame front moves into the valley.

The lower slope of Tonasket Creek drainage is a narrow strip of timber that gives way to primarily grasslands. Progressing up Tonasket Creek drainage, fuels are scattered through grassy meadows and heavy timber pockets finally giving way to the thick forested slopes of Tonasket Mountain. The intensity of wildfires would vary depending on elevation and fuel beds in this drainage. This drainage could act as a funnel for hot gases and toxic fumes during a wildfire. This significantly increases the risk to residents and intensifies the need to evacuate the area well before a flame front moves into the area.

Fuels in Art Creek consist of patchy stands of ponderosa pine and Douglas-fir mixed with open grasslands. Fuels in the Aeneas Creek drainage about one mile to the north are very similar. Large patches of ponderosa pine and Douglas-fir mixed with open areas dominated by grass. This type of fuel bed would tend to support fast moving fires with occasional “jackpotting” and torching of individual or groups of trees. Grasslands can become tinder dry during the late summer and early fall making them highly prone to ignition by natural or human-caused sources. Aeneas Creek Fire of 1988 spotted ½ mile ahead of main blaze and resulted in a sustained crown fire replacing timber stands within the perimeter of the blaze.

Fuels along the north side of St. Peter’s Creek Road and North St. Peter’s Creek Road are primarily grasses with a few patches of timber in the draws and along the ridge tops. Fires in this type of fuel would be expected to burn very quickly and spread very rapidly, particularly upslope. Fuels along the south side of these roads and in the South Fork of St. Peter’s Creek are made up Douglas-fir and ponderosa pine forestlands. These stands are slightly overstocked for this habitat type with an increasing amount of regeneration and dead and down fuels in the understory. During normal periods of high fire danger, fires in this area will move rapidly and burn at varying degrees of intensity depending on the aspect and fuel loading.

4.7.5.4.2 Ingress-Egress

The main access routes in the Lone Ranch, Boulder, and Malo East neighborhoods are State Route 21 and the Deer Creek-Boulder Creek Road. These are both two-lane, paved highway routes that have been identified as escape routes by area emergency services or as alternate routes in the event an evacuation on State Highway 20 over Sherman Pass is compromised.

The Lone Ranch Creek Road provides a graveled, two-lane access route into the Lone Ranch Creek drainage, but turns into a one lane forest road which connects to Deer Creek – Boulder Road at several points. Day Creek Road (Forest Route 6120) splits from the main Lone Ranch Creek Road within about 3 miles of the river and continues to the south eventually connecting with the Boulder Creek Road. This is a graveled, one-lane road that currently is currently maintained and available for use as an escape route.

The Long Alec Creek Road provides two-lane, gravel access into the Long Alec Creek drainage. This road is connected to the Deer Creek – Boulder Creek road by a four wheel drive track through the Colville National Forest. Homes in Tonasket Creek are accessed via the Tonasket Creek Road, which is a one lane, gravel route with turn-outs. There is also a very narrow 4X4 track leading to Aeneas Creek.

In recent years evacuations due to wildland fire have occurred on Long Alec Creek, Tonasket Creek and along Highway 21 south of Curlew.

The Aeneas Creek Road, Art Creek Road, and St. Peter's Creek Road, which access their respective drainages, are typically two-lane, gravel routes. These are generally well maintained roads that pass through both grassland and timbered areas. Fuels reduction projects may be necessary to improve safety in areas where forestland fuels directly abut the road right-of-ways.

In recent years evacuations have occurred in the Long Alec Creek, Tonasket Creek, Aeneas Creek, North Fork of Saint Peters Creek, South Fork of Saint Peters Creek, and Highway 21 corridor.

4.7.5.4.3 Infrastructure

Residents of in the Lone Ranch, Boulder, and Malo East neighborhoods rely on personal or multiple home well systems.

The primary above ground PUD transmission line routes to along Highway 21, while many "feeder" power lines crisscross this area. All of the western Ferry County electrical power grid is dependant on the BPA high tension power line which accesses parallel to Highway 20 over Sherman Pass. Many past fires (including the recent White Mountain Fire) have occurred along this corridor; thus, there is a high probability of the main high tension power lines being compromised due to a wildfire.

4.7.5.4.4 Fire Protection

Ferry County Joint Fire Protection District #14 provides both structural and wildland fire protection to the neighborhoods of Lone Ranch, Boulder, and Malo East.

All of the private lands within the three fire protection districts of Ferry County have joint jurisdiction with the Washington Department of Natural Resources (DNR). Under joint jurisdiction, it is recognized that the fire district has primary responsibility for structure protection and the DNR will have primary responsibility for wildland fire suppression on state and private lands. The DNR provides wildfire protection during fire season between April and October with varying degrees of available resources in the early spring and late autumn months. U.S. Forest

Service responds to all wildland fires on their jurisdiction and may also respond to wildland fires on private or state lands based on a closest forces, reciprocal agreement with the DNR when resources are available.

4.7.5.4.5 Community Assessment

The Lone Ranch, Boulder, and Malo East neighborhoods are a rural part of Ferry County. Many of the residents live in the major drainages with limited access and surrounded by high risk vegetation as well as steep topography. These factors combined with a region exhibit historically high fire frequency put these residences and their way of life at high risk.

The Lone Ranch Creek drainage in the Lone Ranch neighborhood has a moderate to high risk of wildfire. Homes are typically widely scattered and many are accessed by narrow private drives. Not only are the fuels in this neighborhood conducive to rapidly spreading and high intensity fires, but the drainage itself may act as a funnel for hot gases and toxic fumes, which further exacerbates the situation. Fire suppression techniques with this type of topographic characteristics are often difficult and potentially dangerous. Additionally, many homes in Lone Ranch Creek were built using wood siding, decking, and roofing, which are not fire resistant. Day Creek Road (Forest Route 6120) does provide an alternate escape route to the lower Lone Ranch Creek Road residents; however, this a narrow road that travels through continuous forest land fuels. In the event of a fire threatening residents of Lone Ranch Creek, Forest Route 6120 has a high probability of being threatened as well.

Homes accessed by the Deer Creek – Boulder Creek Road in the Boulder neighborhood have a high risk of experiencing a wildland fire. Those homes built on the mid and upper slopes have a very high risk of fire. The potential for an ignition stemming from vehicles on the roadway is high. In many cases, homes are located at the end of dead end private driveways that may or may not be accessible with a fire response vehicle. Homeowners should make an effort to maintain clean defensible spaces, particularly on the downhill side of their properties.

The Long Alec Creek drainage in the Boulder neighborhood is also at high risk; not only because of the fuels, but also because of the lack of an alternate escape route. The Long Alec Creek Road travels westward for several miles before turning into a limited travel route (possibly 4X4 only) just inside the Colville National Forest boundary. Many of the homes in this area have been built using non-fire resistant construction materials and are located on one-way in, one-way out driveways, which also adds to the potential risk. Not only should residents maintain clean defensible spaces, but they should also implement a pre-approved evacuation plan and have a designated safety zone in the event of a compromised evacuation.

Tonasket Creek, also located in the Boulder neighborhood, has a very high risk of wildfire. A fire in this area would spread very rapidly; thus, residents should have a pre-approved evacuation protocol as well as a designated safety zone in the event of a compromised evacuation. Homeowners should also maintain a clean defensible space in order to protect their structures and way of life.

People with homes in the Art Creek drainage have a high risk of wildland fire. Residents in the Aeneas Creek area have a high risk of wildfire. Fires in these drainages would be expected to move very quickly through the grasslands and light timber; thus, increasing the risk of entrapment. Creating an adequate defensible space around structures and developing an emergency evacuation plan are imperative to improving the safety of residents in Art Creek and Aeneas Creek, both of which are located in the Malo East neighborhood.

Residents in the St. Peters Creek drainage in Malo East neighborhood have a high risk of experiencing a wildland fire, particularly those in the forestland fuels. Not only do the fuels in this

watershed pose a great risk to residents, but in the event of a fire, smoke and toxic gases may be funneled through the narrow draws. The main St. Peters Creek Road splits off into the North and South St. Peter's Creek Roads. Additionally, many individual homes are accessed via private driveways that may or may not be accessible with large emergency response equipment. The lack of safe, alternative escape routes puts residents at an increased risk of entrapment. All homeowners in this drainage should maintain a clean and green defensible space by clearing vegetation and other fire conduits away from their homes. Additionally the area has a history of wildfires moving out of the Kettle Range uplands and burning towards this neighborhood (Mount Leona Fire 2001, 4,820 acres and the Copper Butte Fire 1994, 10,473 acres) putting the community at greater risk.

4.7.5.4.6 Mitigation Activities

Homesite defensibility in the Lone Ranch, Boulder, and Malo East neighborhoods is the best way to protect structures and families in the area. All homeowners should be encouraged to maintain a clean and green defensible space around structures. Access roads such as State Route 21, Lone Ranch Creek Road, Deer Creek-Boulder Creek Road, Long Alec Creek Road, Tonasket Creek Road, St. Peters Creek Road, Art Creek Road, and Aeneas Creek Road should be maintained as potential escape routes by reducing high risk forest land fuels along the right-of-way and ensuring through access.

Residents in the St. Peters Creek, Tonasket Creek, Long Alec Creek, Lone Creek, and Deer Creek-Boulder Creek drainages have a high risk of experiencing a wildland fire, particularly those in the forestland fuels. Not only do the fuels in these watersheds pose a great risk to residents, but in the event of a fire, smoke and toxic gases may be funneled through the narrow draws. The main St. Peters Creek Road splits off into the North and South St. Peter's Creek Roads, which are both dead ends. Additionally, many individual homes in these neighborhoods are accessed via private driveways that may or may not be accessible with large emergency response equipment. The lack of safe, alternative escape routes puts residents at an increased risk of entrapment. All homeowners in these drainages should maintain a clean and green defensible space by clearing vegetation and other fire conduits away from their homes. Additionally the area has a history of wildfires moving out of the Kettle Range uplands and burning towards this area (Mount Leona Fire 2001, 4,820 acres and the Copper Butte Fire 1994, 10,473 acres) putting the community at greater risk.

People with homes in the Art Creek and Aeneas Creek drainages have a high risk of wildland fire. Fires in these drainages would be expected to move very quickly through the grasslands and light timber; thus, increasing the risk of entrapment. Creating an adequate defensible space around structures and developing an emergency evacuation plan are imperative to improving the safety of residents in Art Creek and Aeneas Creek.

4.7.5.5 Ferry County Strategic Planning Area #3

Portion of the fuels assessment, community assessment, and mitigation activities sections in Ferry County Strategic Planning Area #3 were transcribed from similar segments in the Lower Kettle River (LKR) Community Wildfire Protection Plan. The remaining sections were added by the Ferry County Community Wildfire Protection Plan committee in order to supplement this information.

4.7.5.6 Little Boulder Neighborhood (LKR)

The Little Boulder Neighborhood is bordered by the Canadian border to the north, the Kettle River to the east, the mouth of Boulder Creek to the south, and extends into Forest Service lands to the west. The communities of Laurier and Orient and residences in the Little Boulder Creek, Martin Creek, and East Deer Creek are encompassed in this neighborhood.

Much of the Colville National Forest lands in this area are very steep and show signs of past logging activity and associated road systems. The Washington Department of Natural Resources and many private landowners have also conducted harvest operations in this area.

Laurier, the border community, is back dropped by a sheer cliff face west of town. The north side of Laurier is characterized by scattered residences most in cleared areas with a defensible space. The south end of Laurier has more residences located on subdivided, wooded parcels along the Kettle River.

Little Boulder Creek has scattered residences along the lower reaches of the creek and the Kettle River flat. Vegetation consists of a mix of forest and agricultural lands. The Burlington Northern railroad roughly parallels the highway corridor throughout the strategic planning area.

4.7.5.6.1 Fuels Assessment

The vegetation type and fuel loading in the Little Boulder Neighborhood is directly tied to elevation. Most of the structures are located along the valley bottom primarily due to the steep rise of the slope along the west side of Highway 395. This east aspect slope is nearly vertical in some areas with numerous rock outcroppings. The timber type bordering the valley and at the lower elevations is primarily thick Douglas-fir, grand fir, western larch, and some ponderosa pine. As the elevation increases, the species composition makes a fairly rapid transition to a mixture of lodgepole pine, Douglas-fir, subalpine fir, and Engelmann spruce. Much of this area is inaccessible to vehicles due to the ruggedness of the terrain; thus, forest management practices on any of the land ownerships has been limited to the few flatter benches and more accessible drainages. In these areas, past logging activities are evident by the mosaic of different harvest regimes. Fires in the higher elevations would be expected to burn intensely, most likely resulting in high mortality of the current vegetation. Currently, forest stands at the lower elevations are overstocked with increased amounts of dead and down fuels due to successful fire suppression. Fires in this area will likely burn at variable intensities depending on several factors including, but not limited to the presence of ladder fuels and steepness of the slope.

4.7.5.6.2 Ingress-Egress

U.S. Highway 395 is the main access route for all communities in the Little Boulder neighborhood. This is a paved, two-lane highway that goes directly through the communities of Orient and Laurier. The Little Boulder Creek Road provides access to residents in the Little Boulder Creek drainage and is a two-lane, graveled route that continues westward through the Colville National Forest for several miles before dead ending near Green Mountain. A bridge across the Kettle River at Orient provides an additional access route into the area from neighboring Stevens County. There are several secondary roads stemming from these main routes that provide access to individual homesites or groups of homes. Secondary roads are typically one or two-lane, gravel routes.

4.7.5.6.3 Infrastructure

The community of Orient has a small municipal water system. Other residents in Strategic Planning Area #3 rely on personal well systems. Orient also provides the services of a school, store, fire hall, park, and a limited medical clinic.

Eastern Ferry County is serviced by several above ground public transmission lines; however, the sole high tension power line feeding the local lines roughly parallels Highway 20 over Sherman Pass to the west and into Kettle Falls to the east. Many past fires (including the recent White Mountain Fire) have occurred along the Highway 20 corridor; thus, there is a high probability of the main high tension power lines being compromised due to a wildfire.

4.7.5.6.4 Fire Protection

Ferry County Joint Fire Protection District #3 provides both structural and wildland fire protection to communities in Ferry County Strategic Planning Area #3.

All of the private lands within the three fire protection districts of Ferry County have joint jurisdiction with the Washington Department of Natural Resources (DNR). Under joint jurisdiction, it is recognized that the fire district has primary responsibility for structure protection and the DNR will have primary responsibility for wildland fire suppression on state and private lands. The DNR provides wildfire protection during fire season between April and October with varying degrees of available resources in the early spring and late autumn months. U.S. Forest Service responds to all wildland fires on their jurisdiction and may also respond to wildland fires on private or state lands based on a closest forces, reciprocal agreement with the DNR when resources are available.

4.7.5.6.5 Community Assessments

Bordered by the Canada to the north, the Kettle River to the east, and the USFS to the west, the Little Boulder neighborhood includes Little Boulder Creek, Martin Creek, and the East Deer Creek drainage. Most of the private property is located within Ferry County Fire District #3 along the Kettle River valley, which is narrow on the north end, but wider south of Orient. Some private land is in Lower Little Boulder Creek and Martin Creek and some parcels are outside of the Fire District. Structure density and fuel loading varies in this neighborhood. Much of the USFS forest land is very steep coming up off the valley to higher elevations. Some areas in Little Boulder Creek and East Deer Creek have had past logging activity with the associated roads. The State Department of Natural Resources has had past logging activity on the Martin Creek school parcel. Some industrial forest land is in the southern portion, with past logging activity. The town of Orient provides some services: school, store, fire hall, park, and a limited medical clinic service.

The community of Laurier has a high fire risk. The more northern region has scattered residences; however, most are in cleared areas with a reasonable defensible space. The southern region of Laurier has more residences located on subdivided, wooded parcels along the river with major fuels buildup leftover from past logging. Access routes are also a concern in this area.

The fire risk in Little Boulder Creek is moderate. There are scattered residences along the lower Little Boulder Creek Road and the Kettle River flat intermixed with forest and agricultural land. The primary concerns in this area are the lack of defensible space around homes, ingress/egress issues, and fuel build ups in adjacent forest lands.

Orient has a moderate fire risk. This area is characterized by scattered and clustered residences intermixed with forest and agricultural land. Defensible space around homes, ingress/egress issues, infrastructure for the town of Orient, forest health issues in the Orient water supply, and fuel build up on adjacent forest lands are the primary concerns for this area.

4.7.5.6.6 Mitigation Activities

Assessing and mapping individual structures for defensible space treatments and roads for access and egress is a priority for this neighborhood. Reducing fuels around homes and creating buffers along roads will also help improve the safety of residents. Other mitigation measures may include: installing or improving water access points, establishing visible address numbering system, and assessing adjacent forest land for fuel reduction needs.

4.7.5.7 Boulder – Deadman Neighborhood

The Boulder – Deadman neighborhood ranges from the Boulder Creek drainage south to the Deadman Creek drainage near Boyds. This area has a significant amount of housing development along the river corridor, particularly near the community of Barstow. Agricultural fields and livestock pasture have been developed, where possible, along the river and on a few of the flatter benches in the mountains to the west. There is a fairly large piece of private inholdings surrounded by the Colville National Forest in the Deadman Creek area and extending to the north. This private land has been extensively developed by mostly larger acreage landowners. The Lake Roosevelt National Recreation Area is a narrow strip of land along the banks of the Kettle River Arm of Franklin D. Roosevelt Lake, which borders the Boulder – Deadman neighborhood and also forms part of the Ferry and Stevens County boundary. The Burlington Northern railroad roughly parallels the highway corridor throughout the strategic planning area.

4.7.5.7.1 Fuels Assessment

Fuels in the Boulder – Deadman neighborhood are similar to those in the Little Boulder neighborhood. Most of the structures are located along the valley floor surrounded by agricultural or riparian type vegetation. The east aspect slope rising along Highway 395 is typically very steep with abundant rock outcroppings. Fuels in along the roadway are generally Douglas-fir, grand fir, western larch, and ponderosa pine at occurring in varied densities depending on the availability of soil. Beyond this initial ridge, the forestlands form a much more continuous fuel bed. The species mix is highly dependent on aspect and elevation; however, Douglas-fir, grand fir, western larch, and ponderosa dominate the lower elevations while lodgepole pine, Douglas-fir, subalpine pine, and Engelmann spruce are more commonly found at higher elevations. Fires in these fuel types would be expected to burn at moderate to high intensities due to the accumulation ladder fuels and dead and down material in the understory. Past logging activity and development, particularly around Davis Lake and in the Deadman Creek watershed, have changed the continuity of the forest fuels. Harvest units and developed property may help slow the spread of wildfire and give firefighters an opportunity to set up fuel breaks and anchor points.

4.7.5.7.2 Ingress-Egress

U.S. Highway 395 is the main access route for all communities in the Boulder - Deadman neighborhood. This is a paved, two-lane highway that goes directly through the communities of Barstow and Boyds. The Deer Creek – Boulder Creek Road and Deadman Creek Road provide

access to residents in the Boulder Creek and Deadman Creek, respectively. Deer Creek – Boulder Creek Road is a paved, two lane route that crosses the Kettle River Range to the west and culminates in the town of Curlew. The Deadman Creek Road is a two-lane, graveled route that continues westward through the Colville National Forest eventually becoming Forest Route 9565, which connects to State Route 20 to the south and the South Fork Boulder Creek Road to the north. There are several secondary roads stemming from these main routes that provide access to individual homesites or groups of homes. Secondary roads are typically one or two-lane, gravel routes.

4.7.5.7.3 Infrastructure

Eastern Ferry County is serviced by several above ground public transmission lines; however, the sole high tension power line feeding the local lines roughly parallels Highway 20 over Sherman Pass to the west and into Kettle Falls to the east. Many past fires (including the recent White Mountain Fire) have occurred along the Highway 20 corridor; thus, there is a high probability of the main high tension power lines being compromised due to a wildfire.

4.7.5.7.4 Fire Protection

Ferry County Joint Fire Protection District #3 provides both structural and wildland fire protection to communities in Ferry County Strategic Planning Area #3.

All of the private lands within the three fire protection districts of Ferry County have joint jurisdiction with the Washington Department of Natural Resources (DNR). Under joint jurisdiction, it is recognized that the fire district has primary responsibility for structure protection and the DNR will have primary responsibility for wildland fire suppression on state and private lands. The DNR provides wildfire protection during fire season between April and October with varying degrees of available resources in the early spring and late autumn months. U.S. Forest Service responds to all wildland fires on their jurisdiction and may also respond to wildland fires on private or state lands based on a closest forces, reciprocal agreement with the DNR when resources are available.

4.7.5.7.5 Community Assessment

There is mostly National Forest land to the west of a ½ to 2 mile wide strip of private land along the Kettle River. This includes the North Fork and South Fork Boulder Creek to the north and west and is bordered by the Kettle River to the east and the Deadman Creek drainage to the south and west. The Boulder – Deadman neighborhood is primarily forestland with a mix of agricultural land along the Kettle River and on higher benches and valleys. Residences are scattered along and off of county roads and Highway 395 with some substandard access. Much of the private land, with the exception of Deadman Creek, is within Fire District #3. Highway 395, Deer Creek-Boulder Creek road, and Deadman Creek Roads are the main access routes with the Burlington Northern railroad paralleling Highway 395. The towns of Boyds and Barstow provide limited services. Past forest management has occurred on some of the National Forest land in this neighborhood; however, fuels buildup issues exist. Most of the industrial, NIPF, and state forest land has also experienced past logging activity. The National Park Service manages the uplands along Kettle River below the Barstow Bridge.

The Boulder area has a moderate fire risk with scattered residences along the lower Boulder Creek, the Kettle River, and several of the benches to the west. The Burlington Northern railway is located between Highway 395 and the Kettle River, which prevents easy access to the river.

Many residences in the Boulder area are surrounded by a mix of forest and agricultural lands and; thus, have created defensible spaces around structures to aid fire protection.

The community of Barstow has a moderate risk of experiencing a wildfire. Most of the residences are scattered along the Kettle River flats, on the steeper forest land west of Highway 395, and in areas like Matsen Creek, many of which have constructed some kind of defensible space. The primary concerns in the Barstow area are defensible space projects for homes adjacent to forestland fuels, ingress/egress issues, protection of Barstow community infrastructure, and fuels build up on National Forest, industrial, and non-industrial private forest owners.

The community of Boyds in the Boulder-Deadman neighborhood has a moderate fire risk. There are many homes intermixed with forest and agricultural type fuels along both sides of Highway 395. Defensible space projects, ingress/egress improvements, and fuels build ups on forest land are priorities in Boyds.

The fire risk in Deadman Creek is moderate to high due to its location outside of the fire district as well as the limited access. There are many homes in this area surrounded by industrial, state, and private forest lands. Past logging activity in Deadman Creek has resulted in varying degrees of forest health and fuel buildup. Constructing defensible spaces around homes will help protect residents and their property from wildfire in this area.

4.7.5.7.6 Mitigation Activities

Mitigation measures for the Boulder-Deadman neighborhood will include assessing and mapping individual structures for defensible space treatments and roadways for fuel reduction projects, installing or improving water access points, establishing a visible address numbering system, and assessing adjacent forest land for fuel reduction needs.

4.7.5.8 Sherman Neighborhood

The Sherman neighborhood begins just south of the Deadman Creek drainage and continues to the south until meeting the Colville Indian Reservation boundary. Much of the housing development has occurred along the river corridor; however, several of the drainages such as Nancy Creek, Sherman Creek, Roper Creek, and Martin Creek have been developed to varying degrees as well. Also included in this neighborhood are the Sherman Creek Wildlife Area and the Lake Roosevelt National Recreation Area. The Sherman Creek Wildlife Area is a large acreage that encompasses the mouth of Sherman Creek and extends north almost to Bisbee Mountain. The Lake Roosevelt National Recreation Area is a narrow strip of land all along the banks of Franklin D Roosevelt Lake, which borders the Sherman Strategic Planning Area and also forms the Ferry and Stevens County boundary.

4.7.5.8.1 Fuels Assessment

The intensity of the development along the Kettle River Arm and the Columbia River increases significantly in the Sherman neighborhood primarily due to the wider flood plain and more gentle rise in the east aspect slope. The valley floor is characterized by agricultural development and riparian vegetation while the slope to the west is primarily forested by Douglas-fir and ponderosa pine, which occurs in increasingly more open stands as you travel south through the Sherman neighborhood. The higher elevations and several of the drainages, particularly the Nancy Creek drainage, are dominated by a mixture of Douglas-fir, ponderosa pine, grand fir, lodgepole pine, western cedar, and some subalpine fire and Engelmann spruce at the highest elevations. Fuels in this area would tend to burn at moderate to high intensities depending on

the density of ladder fuels and accumulation of dead and down fuels in the understory among many other factors. South of State Route 20, forest fuels along the river's edge are almost entirely made up of open ponderosa pine and Douglas-fir stands with predominantly grass in the understory. Fires in this type of fuel would be expected to burn at much lower intensities with little mortality.

4.7.5.8.2 Ingress-Egress

U.S. Highway 395 and State Route 20 are the main access routes through the Sherman Strategic Planning Area. These are both two-lane, paved routes. Highway 395 comes across the bridge at Barny's Junction from Kettle Falls, and then turns north paralleling the Kettle River to the Canadian border. State Route 20 heads south from Barny's Junction to Sherman Creek at which point it turns westward and continues over Sherman Pass to Pine Grove and Republic in western Ferry County. The Kettle Falls Road splits from State Route 21 near Sherman Creek and heads south along Roosevelt to Inchelium within the Colville Indian Reservation. This two-lane, paved route is well traveled, especially during the summer months due to the recreational opportunities offered along the lake front. The Nancy Creek drainage is accessed by Nancy Creek Road, which is a two-lane, graveled route that eventually dead ends near Hoodoo Mountain in the Colville National Forest.

4.7.5.8.3 Infrastructure

Eastern Ferry County is serviced by several above ground public transmission lines; however, the sole high tension power line feeding the local lines roughly parallels Highway 20 over Sherman Pass to the west and into Kettle Falls to the east. Many past fires (including the recent White Mountain Fire) have occurred along the Highway 20 corridor; thus, there is a high probability of the main high tension power lines being compromised due to a wildfire.

4.7.5.8.4 Fire Protection

Ferry County Joint Fire Protection District #3 provides both structural and wildland fire protection to communities in Ferry County Strategic Planning Area #3.

All of the private lands within the three fire protection districts of Ferry County have joint jurisdiction with the Washington Department of Natural Resources (DNR). Under joint jurisdiction, it is recognized that the fire district has primary responsibility for structure protection and the DNR will have primary responsibility for wildland fire suppression on state and private lands. The DNR provides wildfire protection during fire season between April and October with varying degrees of available resources in the early spring and late autumn months. U.S. Forest Service responds to all wildland fires on their jurisdiction and may also respond to wildland fires on private or state lands based on a closest forces, reciprocal agreement with the DNR when resources are available.

4.7.5.8.5 Community Assessment

The Sherman neighborhood encompasses the Nancy Creek and Sherman Creek drainages on the north and west side, including land owned by the State of Washington Department of Wildlife (Sherman Creek Wildlife Area) and the area south to the Colville Indian Reservation boundary. The Columbia River is the boundary on the east side. With the exception of Nancy Creek, private and some state lands are included within Fire District #3. Some isolated private and state parcels are located west in Sherman Creek off of Highway 20. The National Park Service manages uplands and leased homesites adjacent to Lake Roosevelt and the shorelines

up to 3,110 feet in elevation. Scattered residences and developments are located on private and National Park Service lands. Barny's Junction provides limited services including the Fire District #3 station.

The Nancy Creek drainage has a moderate wildfire risk; however, there is a much lower risk along the Kettle River and the shores of Lake Roosevelt. There are many homes scattered throughout the mixed forest and agricultural land along lower Nancy Creek and the Kettle and Columbia Rivers. There is also a cluster of homes about four miles up Nancy Creek that are not only outside of the fire district, but they also have limited access, which drastically increases their fire risk. Creating and maintaining a defensible space around homes and conducting fuels reduction projects along roadway would help reduce the fire risk in this area.

There are more and more structures being built in the Kiefer Quarry area; many on private drives off of the county road. The primary concerns in this area are creating and maintaining defensible space around homes, reducing fuels along roadways, improving water resources, and reducing fuel build up in adjacent forest stands.

Barny's Junction has a low risk of wildfire due to the developed residential and business area along Highway 20. There are some scattered residences along Lake Roosevelt, on National Park Service lease ground, off of Highway 20, but many of these homeowners maintain an adequate defensible space and fire resistant roadways. Maintaining these conditions is the primary mitigation strategy near Barny's Junction.

Lower Sherman Creek is within Fire District #3, which has a fire station in the vicinity. There are many scattered residences with varying degrees of risk. Many homes are surrounded by lower risk agricultural ground, while others are adjacent to much higher risk forest areas. Upper Sherman Creek is outside of Fire District #3. There are a few scattered residences approximately nine miles up Highway 20, most of which are surrounded by National Forest. The primary concerns in this area are creating and maintaining defensible space around at risk homes and reducing fuel build ups along Highway 20 and the high tension power lines.

The wildfire risk in the Roper Creek – Martin Creek area is highly variable. There has been an increasing amount of development in these drainages both in forested areas and on open agricultural ground. There has been an abundance of past logging activity on nearby private forest land. The primary mitigation activities in this area will be to conduct defensible space projects around at risk homes, improve the access particularly on private driveways, improve or develop water access points, and reduce fuel build up on nearby forest land, especially on National Park Service managed shorelines.

The fire risk in the LaFleur – French Point area is low to moderate. There are scattered residences throughout the area surrounded by a mixture of forest and agricultural land. National Forest land abuts the LaFleur – French Point area along its west side. Mitigation concerns in this area involve maintaining defensible space, increasing public awareness about wildfire safety, improving access, improving water access points, and reducing fuel build up on adjacent forestlands.

4.7.5.8.6 Mitigation Activities

The priority mitigation activities in the Sherman neighborhood are assessing and mapping individual structures for defensible space treatments and roadways for hazardous fuel reduction projects. Other priorities will be installing or improving water access points, establish a visible address numbering system, and assessing adjacent forest land for fuel reduction needs. Working with the National Park Service to identify and reduce hazardous fuels on their lands adjacent to structures will also help improve the safety of residents in this neighborhood.

4.7.6 Strategic Planning Area #4

4.7.6.1 Colville Indian Reservation

No assessments specific to communities within the Colville Indian Reservation were completed. It is the understanding of the Ferry County Community Wildfire Protection Plan core team that assessments for these communities have been completed by the Tribe and will be included in a wildfire mitigation planning document written by Confederation Tribes of the Colville Reservation.

4.8 Firefighting Resources and Capabilities

Fire district personnel are often the first responders during emergencies. In addition to structure fire protection, they are called on during wildland fires, floods, landslides, and other events. There are many individuals in Ferry County serving fire protection districts in various capacities. The following is a summary of the departments and their resources.

The Firefighting Resources and Capabilities information provided in this section is a summary of information provided by the Fire Chiefs or Representatives of the Wildland Firefighting Agencies listed. Each organization completed a survey with written responses. Their answers to a variety of questions are summarized here. These synopses indicate their perceptions and information summaries.

4.8.1 Stevens/Ferry County Joint Fire Protection District #3

4.8.1.1 Equipment Resource Lists

Table 4.15. Equipment Resources at Orient Station.

ID #	Type	Make/Model	Year	Tank Size	GPM
3810	Transport	Dodge Caravan	1992		
3811	Brush	Dodge Custom 300 4x4	1978	300	90
3812	Brush	Ford F450	2005	500	90
3813	Brush	Chevy Cheyenne 4x2	May 1992	220	160
3814	Engine	Ford Darley	1981	1000	1006
3815	Rescue	Chevy Amulance	Dec 1976		
3818	Tender	White Westernstar	1973	4200	120
3819	Support	Chevy 4x4	1985		

Table 4.16. Equipment Resources at Barney's Junction Station.

ID #	Type	Make/Model	Year	Tank Size	GPM
3821	Brush	Dodge Power 350 4x4	July 1981	400	90
3824	Engine	Ford Pierce	1974	1000	1000
3828	Tender	White Transtar	1976	3000	600

Table 4.17. Equipment Resources at Hagg's Cove Station.

ID #	Type	Make/Model	Year	Tank Size	GPM

Table 4.17. Equipment Resources at Hagg's Cove Station.

ID #	Type	Make/Model	Year	Tank Size	GPM
3831	Brush	Ford F350	2004	400	90
3835	Rescue	Ford Econoline	March 1988		

Table 4.18. Equipment Resources at Barstow Station.

ID #	Type	Make/Model	Year	Tank Size	GPM
3841	Brush	Humvee Hummer	1985	250	600
3842	Brush	Ford Super Duty 4x2	May 1991	220	160
3844	Engine	Mack Tele Squirt	1982	500	1250
3845	Rescue	Chevy Ambulance	1983		
3847	Tender	GMC General	1984	5000	800
3848	Tender	Ford F900	1980	5000	800
3849	Support	Chevy Custom 4x2			800
3849	Pump	Hale Pump			1000

Table 4.19. Equipment Resources at Tipton Station.

ID #	Type	Make/Model	Year	Tank Size	GPM
3851	Brush	Chevy Cheyenne 4x2	1992	220	160
3854	Engine	Ford Pierce	1985	750	
3857	Tender	Mack		5000	600
3859	Support	John Deere Pump Trailer			1000

4.8.2 Ferry/Okanogan County Fire Protection District #13

Fire Chief: Tom Lindsey
Telephone: 509-775-3604
e-Mail: tlindsey@republic.wednet.edu
Address: Ferry/Okanogan Fire Protection District #13
350 E Delaware #5
Republic, WA 99166

Fire Commissioners: Reed Heckly 509-775-2234
Robert Fields 509-775-3548
John Jensen 509-775-3065

District Secretary: Gae Lembcke 509-775-3521

District Summary:

The Ferry/Okanogan Fire Protection District #13 is authorized and guided by Title 52 of the Revised Code of Washington for Fire Protection Districts. Its primary responsibility is the protection of structural improvements and developments on lands within its district. It also has joint protection responsibilities with the Washington State Department of Natural Resources for protection from wildland fires.

The fire district boundary generally coincides with that of the Republic School District #309, with the addition of an annexed portion extending westward from Ferry County into Okanogan

County along the state highway route 20 corridor. The district area is approximately 140 square miles with a population of approximately 3300.

Fire district staffing consists of:

- 35 – Firefighters (volunteer)
- 3 - Fire Commissioners (volunteer)
- 1 - District Secretary (part-time paid)
- 1 – Maintenance Worker (part-time paid)

The fire district is generally situated within the wooded valleys of the San Poil River and

the Curlew Lake valley, including their tributaries. The valley bottoms are typically open and grassy where agriculture and development has cleared the forests. Uplands are generally wooded. Natural vegetation throughout the district creates a widespread Wildland/urban interface fire threat potential.

Approximately 1/3 of fire district values lie within the city limits of Republic, Wa., with remaining values existing in the rural areas of the district.

The local area has an active fire history. Large wildfires have been documented throughout Ferry County. When large fires occur, citizens are reminded of the threat to their homes, and awareness of hazard fuels peaks for a time. However, the mental vividness of evacuations, warning bulletins, and firefighters and equipment pouring into the community to render assistance dulls with time. It is important for residents to understand the vulnerability of living within dense vegetation where dry summers create the potential for catastrophic fire events.

Trends

1. Shift in Property Ownership

Property ownership within the fire district has been in transition for the last several decades away from traditional agricultural uses.

For many years prior to this trend, the majority of property values were settled within the City of Republic as businesses and concentrations of homes. However, as second or third generation rural homesteaders have aged, it has been common for ranches and small farms to be sold and subdivided. New property owners buy the small acreages often for recreational or retirement use. As rural lots and acreages continue to be developed, the net distribution of property values has shifted away from the centralized town of Republic into the rural areas. The immediate geography in and around the City of Republic has contributed to this shift since the steepness of the topography in and around the City of Republic is limiting to additional business and residential growth within the city limits.

This trend has pushed the distribution of homes (and resultant property values) into the rural areas, and a slow increase in rural business development is occurring also. This has in turn created a need to shift fire protection distribution strategies. Therefore, the fire district has begun a program to establish satellite fire halls to bring fire protection closer to rural properties.

2. Shift in Natural Vegetation

Forested vegetation throughout the western states is experiencing a general increase in density. As the country has developed in the past century, public demands for general suppression of wildland fires is recognized as having a significant effect upon the vegetation composition of forests and range lands. No longer are natural lightning fires or Native American burning allowed to ramble across the landscape throughout the summer months. The vegetation that was historically consumed in these more frequent, lower-intensity fires now accumulates,

resulting in thicker stands of trees and heavier loads of surface fuels. This trend equates simply to a net increase in available fuel for the next wildfire that might occur. These fuels present an additional hazard to rural properties.

Fires occurring where hazardous natural fuels have increased tend to be more intense and more difficult to suppress. An abundance of ladder fuels and interlocking tree canopies and brush enhance the chance of torching and crown fires. Firefighters are limited in their effectiveness when fires move into aerial fuels, and safety concerns for firefighters and the public quickly become the primary concern when such scenarios develop. Homes and businesses built in close proximity to hazard fuels may not be defendable.

This fuels trend is subtle and continuous. Summer lightning ignitions will always occur. Populations will continue to live in the midst of this flammable environment. A greater effort must be made toward awareness and management of natural fuels and mitigating their hazard potential.

3. Shift in Firefighter Availability

Recruiting volunteer firefighters is more difficult than in the past. Volunteer firefighters were traditionally recruited from among the businesses within the City of Republic. Business owners and store employees made up the bulk of firefighters for many years. The fire hall was centrally located, and the bulk of the homes and the population was situated in or near town. When the fire alarm sounded, a good turnout of firefighters could be depended upon.

However, recent recruitment efforts have raised concerns for the future. Several reasons may be contributing to this:

- The spirit of volunteerism is seemingly not as strong as in the past.
- Additional mandatory training requirements take away from the social aspects of meetings.
- Mounting liability concerns inhibit volunteers from taking on heavy responsibilities.
- Fewer businesses in a declining business district can arrange for employee coverage while an employee responds to a fire.
- Satellite halls in the rural areas limit recruitment to sparsely populated rural areas.
- More women-owned businesses and female employees exist in town than in the past that may not be interested in volunteering in what may be viewed as a male activity.
- A shift in age demographics, reflective of the influx of retirement building, toward older citizens that may not be interested in the rigors of firefighting.

This trend is subtle and may require a program of incentives to attract and recruit firefighters.

Priority Areas

Neighborhoods:

- Fire leaders have analyzed the fire district and divided the district into 11 neighborhoods. These neighborhoods have some commonalities such as transportation routes, fuel types, or topographic boundaries that are important from a fire suppression standpoint. Firefighters have prioritized these neighborhoods by level of concern and have identified, concerns, and recommendations for a variety of actions that would enhance the fire safeguarding of those neighborhoods. Those neighborhoods are: East Lake, West Lake, Granite, Hadley-Walker, North Republic, Southwest Republic, Southeast Republic, Klondike-Pine Grove, San Poil Valley, West Fork, Sweat Creek.

Residential Growth:

- Fire prone developments in subdivisions surrounding Curlew Lake and up tributary creek drainages.
- Fire prone developments and subdivisions adjacent to and north of the City of Republic on Klondike Mountain.

Communications:

- Establish another repeater for fire/ems to cover the dead spots around the boundary area between Curlew Lake and Malo.

***Firefighting Vehicles*:**

- The district will need an additional structural engine for the planned satellite station on the west side of Curlew Lake.
- The district will need to upgrade the old tender stationed at the East Lake Hall. The tank leaks and the pump is too small for efficient use of the vehicle.
- Some of the older vehicles in the fleet are higher maintenance than the newer vehicles, and also do not provide as many efficiencies and safety features for firefighters as newer models that are up to the latest standards. Replacement or refurbishment of older apparatus must be an ongoing program as funding opportunities develop.

***Burn Permit Regulations*:**

- The fire district does not administer a burn permit system. The fire district has relied upon a system established by the Washington State Department of Natural Resources (DNR) that allows outdoor burning under certain times of the year according to particular rules.
- During times of the year when DNR burning rules are relaxed, usually early spring and late fall, the fire district is frequently called out to suppress escaped fires started by homeowners burning grass and debris. Escape fire incidents have a negative impact upon the time and patience of volunteer firefighters. The volunteers are willing to help those in genuine need when fire threatens the community due to accidental reasons, but their enthusiasm wanes when their personal lives are interrupted by fires that have escaped due to poor planning or carelessness. Because of escaped burning incidents, there is a need to develop further cooperation and education between local law enforcement and Fire Chiefs to cooperatively enforce current laws regarding reckless and negligent fire use.

Effective Mitigation Strategies

Programs to promote defensible space fuel reduction around fire prone structures is a valuable effort. Since the entire landscape is mostly vegetated with flammable material during the summer months, there is no single program that can reasonably mitigate the fire threat. Targeted fuel reduction programs focused around structures, utilities, critical infrastructure, and strategic fuel break corridors are a good step towards mitigating an overwhelming hazard fuel landscape.

Education and Training

The extensive training requirements for firefighters is a large burden on volunteer departments. Even though the pool of firefighters contains many very experienced firefighters, documentation to prove the most basic of qualifications for either structural or wildland firefighting is slim. Training Officers are faced with a heavy workload and large liabilities. Firefighters are reluctant to commit to additional evenings for training on top of their fire responses. The training and qualifications issue is the largest challenge the fire district faces. While financial solutions do

exist, the fire district cannot currently afford to fund financial remuneration for fire leadership and volunteers.

Cooperative Agreements

The fire district has agreements in place with the following agencies:

- Washington State Department of Natural Resources
- Ferry/Okanogan Fire Protection District #14
- Ferry 3/Steven 8 Joint Fire Protection District
- Okanogan County Fire Districts Mutual Aid Agreement
- City of Republic

The fire district could benefit from agreements to clarify the relationships with the following agencies:

- Ferry County Sheriff
- Ferry County Public Utility District #1
- Republic Ambulance District
- Confederated Tribes of the Colville Reservation
- Bureau of Indian Affairs

The fire district would benefit from fire protection service contracts with the following agencies whose facilities are protected by the fire district without providing tax support:

- Republic School District #309
- Ferry County Public Utility District #1
- Ferry County
- USDA-Forest Service, Republic Ranger District
- City of Republic
- State of Washington Department of Transportation

Current Resources

The fire district is on a measured expansion program to realign facilities and equipment to the changing distribution of development within a Wildland/urban interface fire environment.

A “measured” expansion translates into a decided policy of avoiding debt if at all possible. Since the area is considered an economically depressed area, the fire district desires to build and expand only as the funds are accumulated from annual tax revenues. There is no desire to increase taxes upon a citizenry where financial difficulties are common and employment opportunities are very limited.

Station #1 - Republic Fire Station, 645 S Keller, Republic, WA

Table 4.20. Fire District #13 Station #1 Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
2001	Ford	F-550	500 gal	250 gpm
2000	Ford	F-450	300 gal	100 gpm
1986	Ford	F-350	300 gal	125 gpm
1978	Ford	F-650	750 gal	750 gpm
1996	Kenworth	W900	3600 gal	650 gpm
1978	Kenworth	W900	4000 gal	650 gpm
1995	Ford	F-350	Crew Cab Pickup	

The following equipment is available at the Republic Station or on trucks stationed at Republic.

- 4 - 2500 gal collapsible snap tanks
- 1 – 2.5” stationary monitor
- 1 – 8 hp floata-pump
- 1 – 15 cfm Breathable Air Compressor
- 1 – Dual SCBA air cylinder containment fill station
- 1 – 30’ Indoor maintenance lift
- 25 – 5 gal Class A foam

Station #2 – East Lake Fire Station, 17123 Highway 21 N, Republic, WA

Table 4.21. Fire District #13 East Lake Fire Station Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
1982	Chevrolet	C-30	300 gal	125 gpm
1978	Kenworth	W900	3800 gal	250 gpm
2000	International	4800	1800 gal	650 gpm
1965	Ford	F-650	1000 gal	1000 gpm
1972	International	?	300 gal	50 gpm

Future Considerations:

The trend of dwindling industrial activity in the fire district will degrade the tax revenues over time. Poor economics will continue to be a limiting factor in providing adequate fire protection unless business and industry can be attracted to the area.

Needs:

Fire district leaders have developed a list of general issues and considerations that pertain to multiple neighborhoods or the district in general, which have been incorporated into the Chapter 5 of this document.

4.8.3 Ferry/Okanogan County Fire Protection District #14

Chief: John Foster Fanning

District Summary

Location: NW Ferry County and NE Okanogan County of Washington State.

Size: 79,953 private acres (124 square miles; 77,733 acres FY CO, 2,220 acres OK CO).

Serving: approximately 1,700 citizens with an estimated 800 structures.

Tax Revenue: 2005 (estimated) - $61,000.

Assessed value real property: $60,975,333.

Topography: Mountainous with three primary, narrow valleys and many steep drainages.

Demographics: Unchecked development of interface neighborhoods in narrow, mountainous valleys. Small ranches and farms in larger valley bottoms and some uplands. Isolated mountain homes and cabins.

Approximately 80% of land in the 'north-half’ of Ferry County is under governmental management of Forest Service, Washington Department of Natural Resources or the Bureau of Land Management.

Strategic Layout: FPD #14 has one primary station (town of Curlew) and three 'satellite' stations in the communities of Danville, Malo and Toroda.

FPD #14 Operations: FPD #14 is divided into two operation divisions; Fire and Medical. Each division has a commanding chief.

Responses: Average of thirty fire responses (wildland and structural) and 100+ emergency medical responses annually. (Two recent state mobilizations – Mount Leona 2001 and Curlew Complex 2002).

Jurisdiction boundaries: Northern boundary is approximately 9 miles of east/west international border with the closest Canada fire station 14 miles from Curlew. Eastern boundary is USFS lands of the Kettle Range, we respond to highway accidents and medical incidents to summit of Boulder/Deer Creek Pass within USFS boundary with the nearest FPD #3 station 27 miles from Curlew. Western boundary is along Toroda Creek with the closest Okanogan County fire station 29 miles from Curlew. Southern boundary is near the junction of Hwy 21 and the W Curlew Lake road with the nearest FPD #14 station 22 miles from Curlew.

Wildland fuel composition: A fire-adapted ecosystem of dry site ponderosa pine, Douglas-fir and associated vegetation. Historically, the fire regime was frequent, low-severity wildfires. Successful fire suppression, coupled with the various land management practices have led to overstocking of small trees (doghair thickets) and an excess of surface debris and brush. This overstocking of vegetation and buildup of surface fuels has led to conditions with high potential to result in frequent moderate to high-severity wildfires. These fires come with an elevated potential for negative effects to our communities.

Fire ignitions & Risk Assessment: Our area is fire prone with a high frequency of lighting ignitions in June, July, August and September. Additionally there are frequent human fire starts throughout the region. The WA DNR Urban Interface Risk Assessment program lists our 'neighborhoods' fire risk as high.

Current Resources

Two verified ambulances, seven initial attack fire engines, and one command car.

Table 4.22. Fire District #14 Equipment List.

Station	Make/Model	Drive	Type	Tank Capacity (GPM)	Pump Capacity (GPM)
Curlew		4X4	Wildland T6	300	120
Curlew	1999 Ford	4X4	Wildland T6	300	120
Danville	Jeep	4X4	Wildland T6	250	100
Toroda	Ford	4X4	Wildland T3	1,000	240
Malo	International	6X6	Wildland T4	1,000	120
Toroda	Ford		Structural	1,000	
Curlew	Ford		Structural	750	

Twenty-three volunteer EMS providers and 30 volunteer Firefighters of which six members are cross-trained in both response disciplines. The District is governed by an elected three-member Board of Commissioners. There is also an auxiliary support unit made up of a dozen private citizens.

All firefighters are on schedule or currently trained at basic firefighter 1 level for both structural and wildland firefighter (Red Card). One commander is certified at Incident Command Type 3 and Division Group Supervisor. No other certified line rated staff.

Cooperative Agreements

Formal Mutual-aid agreements exist between FPD #14 and WA DNR and FPD #13. Currently Mutual-aid agreements are in draft stages with local USFS Job Corps compound, Grand Forks British Columbia, Canada and FPD #3. Between 2000 and 2004 FY/OK FPD #14 responded to 34 calls for assistance from Washington State DNR.

FPD #14 is a founding member of NE-WA-CO (Northeast Washington Coalition of fire suppression agencies). Two of the seven initial attack engines are non-tax based allowing FPD #14 a history of responding to mobilization calls outside jurisdictional boundaries; some examples of which are 1991 Firestorm, 1994 Tyee & Rat Creek Complex fires, 1994 Copper Butte, 1994 Palmer Complex fires, 1994 Spokane Riverside fire, 1996 Bowie Road, 1999 Lemansky Pines fire, 2000 Cayuse Cooker and Rocky Hull, 2001 Mount Leona, Tonasket Complex, 2003 Togo fire. Additionally numerous minor responses have occurred supporting the WA DNR during lightning bust ignitions.

FPD #14 is active on a regional basis with members serving on various emergency management boards, i.e. Chair of FY CO E-911 Governing Board, Chair and Secretary of FY CO Trauma Care Council, Alternate representative to East Region Trauma Care Council, Chair and Secretary of FY CO Fire Prevention Cooperative, Coordinator of NE-WA-CO, Regional EMS trainer, representative on Five Star Enterprise Community, representative to regional disaster preparedness committee.

Needs Assessment

While only one member is certified in a line rated position for wildland fire, we have many long term members who have skills, knowledge, and abilities at Resource Boss, Strike Team Leader, and other advanced levels. The primary obstacle for obtaining this training is unpaid time commitments for the several weeks of required training at the ISC 230, 231, & 232 plus ISC 290 and leadership courses.

An aging fleet of apparatus is our primary limitation. The newest vehicle of our fleet is a 1999 F-450 Ford which came to the District surplus from the USFS Colville National Forest in 2005. Much of our heavy rolling stock is late 1960 vintage and up for replacement.

Additionally, the District currently has no water tenders on inventory. This is a gaping hole in our water transport and portable hydrant ability. We have recently acquired one surplus Kenworth tractor truck for building a tender but have not yet amassed the funding to do so.

While the primary station of the District is new (2004/05) five bay facility located in the town of Curlew, we are still in need of additional development of stations. The two bay, three apparatus station in Toroda (1998) is adequate for current needs. The single bay, single apparatus stations in Malo and Danville are much less than adequate for current needs. Stations similar to the Toroda station need to be built in both the Danville and Malo locations.

4.9 Wildland Fire Districts

4.9.1 Washington Department of Natural Resources

4.9.1.1 Highlands District

This document contains three segments pertaining to wildland fire suppression capabilities. The segments are as follows:

1. Geopolitical profile of WA DNR Highlands District
2. Staffing and Apparatus
3. Historic perspective of wildland fire within Highlands District

PROFILE OF HIGHLANDS DISTRICT FIRE PROTECTION AREA

Location: Northwest Ferry County and north Okanogan County of Washington State. From the Canadian Border south to the boundary of the Colville Confederated Tribes reservation. From the foothills of the Cascade Range, east to the Kettle Range;

Size: Highlands District spans a 1,330,000 acre mosaic of ownerships and jurisdictions.

Topography: Primarily mountainous with three narrow, agricultural valleys. Topographic variations range from 900' to 8,000'. Uplands are a mixture of very rugged, often rocky slopes giving way to either rolling highlands or partially timbered rounded mountains.

Demographics: Inside the DNR District are portions of Ferry and Okanogan counties with two E-911 Dispatching Centers and Emergency Service Operations. Three incorporated cities; Oroville, Tonasket and Republic, all have WUI neighborhoods developing outside their city boundaries. Additionally six towns and numerous communities provide a multiplex of rural/urban interface neighborhoods developing in mountainous drainages within perennial fire ecology with a history of complex, costly wildfires.

State Lands with wildfire protection within Highlands District

Ferry County - 26,785 DNR Acres
Okanogan County - 178,711 DNR Acres

Forest Patrol Assessments:

Forest Patrol assessed tax private lands within Highlands District	601,193 acres

Fire Protection Districts within WA DNR Highlands District:

Okanogan County FPD #1 (Oroville)	15,240 acres
Okanogan County FPD #4 (Tonasket)	32,480 acres
Okanogan County FPD #10 (Loomis)	4,380 acres
Okanogan County FPD #11 (Chesaw/Molson)	63,000 acres
Okanogan County FPD #12 (Swanson Mill Road)	9,400 acres
Ferry/Okanogan County FPD #13 (Republic)	80,460 acres
Ferry/Okanogan County FPD #14 (Curlew)	77,233 acres

Collectively 282,193 FPD acres are in Highlands District 90% of which pay forest patrol assessment.

Additionally Okanogan County has approximately 319,750 acres of private land (approximately 2,700 homes) in Highlands District, paying forest patrol assessment without fire protection district coverage.

WA DNR Highlands District reciprocal coverage on U.S. Forest Service:

WA DNR / USFS Reciprocal Agreement in Okanogan County	181,120 acres.
WA DNR / USFS Reciprocal Agreement in Ferry County	104,960 acres.

HIGHLANDS DISTRICT STAFFING & APPARATUS

Highlands District of the Washington State, Department of Natural Resources has a Resource Protection & Services (RP&S) group who work in wildfire prevention, presuppression and suppression.

Work Stations & Resource Base Areas:

The district has one primary and one secondary workstation with locations as follows:

> **Highlands Fire Camp** - on the western side of the district near Loomis WA, west of Tonasket. This facility and base for and houses firefighting inventory of the Highlands 20 person crew and several Highland's fire command staff. The facility is also capable of housing a Type 2 Incident Management Team (IMT).
>
> **Kellogg Work Center** – on the eastern side in the town of Curlew. This facility is base for and houses the inventory of the six Highlands Engine Companies and serves as base for one of Highlands's fire command staff.

PERSONNEL

The Highlands District fire program staff totals 42 individuals, including 3 permanent employees, 6 career-seasonal employees who work up to nine months each year, and 33 seasonal employees on staff from roughly June to September. These are all paid staff members trained in wildland fire, but not in structure protection.

An additional 8 other employees work within the district in other programs, but frequently assist in the fire program.

Highlands 20 Crew: The Highlands District is home to the Highlands 20 Person Crew based out of Highlands Fire Camp. This crew has the following resources:

1. Crew Supervisor is certified Division/Group Supervisor and Incident Commander Type 3 (IT)
2. Two Assistant Crew Supervisors are certified Single Resource Boss (IT)
3. Seventeen other wildland firefighters range in certification from firefighter 1 & 2.

Highlands Engine Companies: The Highlands District seasonally staffs six Type 6 brush engines with a three-person firefighting crew in each engine. Engine staffing is on a varied schedule that provides seven day per week coverage June through September. The DNR utilizes a "home guard" approach in that the seasonal engine drivers park their assigned engines at their residence within their assigned geographic area of the district.

Highlands Engine Company Command:

Crew Supervisor is certified Division/Group Supervisor, Incident Commander Type 3, Wildland Fire Investigator & Safety Officer Type 2 (IT).

> **Highlands Engine 121** – based in the Oroville area. The engine leader is certified Single Resource Boss Engine, Dozer, Crew and Initial Attack Incident Commander Type 4.
>
> **Highlands Engine 122** – based in the Curlew area
>
> **Highlands Engine 123** – based in the Tonasket area. The engine leader is certified Single Resource Boss Engine, Dozer, Crew and Initial Attack Incident Commander Type 4.
>
> **Highlands Engine 124** – Molson/Chesaw area. The engine leader is certified Single Resource Boss Engine, Dozer, Crew and Initial Attack Incident Commander Type 4.
>
> **Highlands Engine 125** – based in the Republic area. The engine leader is certified Single Resource Boss Engine, Dozer, Crew and Initial Attack Incident Commander Type 4.

Highlands Engine 126 – based in the Aeneas Valley area (leader is IT SRB)

Other Highlands District Staffing:

- District Manager – Task Force Leader
- Fire Control Unit Forester –Safety Officer Type 2, Incident Commander Type 3, Division/Group Supervisor, Wildland Fire Investigator.
- Grazing/Rec Land Manager – Incident Commander Type 3, Division/Group Supervisor,
- General Repairer/ Maintenance Mechanic – I. C. Type 3, Division/Group Supervisor
- Recreation NRW2 – Single Resource Boss Dozer, Wildland Fire Investigator
- Timber Sales Unit Forester – Incident Commander Type 3 (IT), Div/Group Supervisor (IT)
- Four State Lands Foresters – all working toward Single Resource Boss certification.

Other Resources Available

The DNR maintains call when needed contracts for dozers and operators trained and equipped for fire suppression throughout the district.

Disclaimer

- Structural Fire Suppression - DNR crews are not trained or equipped for structure suppression. Primary protection responsibilities are on private and state forest land throughout Northeast Washington and the DNR also responds to fires off of DNR jurisdiction which threaten DNR protection.

Emergency Medical Services - The DNR does not provide formal EMT services. The crews are trained in first-aid, and some staff members have EMT and first-responder training, but this is not a service the DNR provides as part of it's organization.

4.9.1.2 North Columbia District

North Columbia District provides fire suppression, fire prevention, burning regulation and enforcement on approximately 1.35 million acres of private and state trust land in portions of Stevens, Ferry and Pend Oreille counties. While most of our district lies within Stevens County, a portion of our district encompasses eastern Ferry County as shown in figure 1. Due to the fact that most state trust land lies within Stevens County, the majority of our fire personnel spend most of their time working on projects in Stevens County. We do, however, have an engine crew based in Ferry County. On most summer days, other resources are nearby and can respond to Ferry County in 15 minutes or less. In order to ensure adequate fire response, our district has a large staff of seasonal employees and the equipment necessary to support our firefighters.

4.9.1.2.1 Staffing

North Columbia District has eight full time employees. Two of these employees work primarily in the fire program. The district also has 33 seasonal employees that support the fire program. The majority of these individuals are only employed from June 16 to September 15 of any given year. A handful of seasonal employees, currently five, are employed for a longer period of time. This period of employment averages April 1 to November 15. Most employees are qualified as wildland firefighters only but a handful of others hold a variety of NWCG qualifications such a single resource boss, task force leader and division supervisor. Due to the fact that the North

Columbia work center is co-located with the region office in Colville, we are often able to pull permanent staff from the main office to assist with fires as needed.

4.9.1.2.2 Resources and Crew Configurations

- ***North Columbia Ten Person Crew***. This trail crew travels in two 4x4 type seven engines, each one carrying 150 gallons of water. Other equipment includes various hand tools, chainsaws, portable pumps, fire hose and various fittings.
- ***Five Type 6 Engines***. Each engine is four-wheel drive and is staffed with a crew of three. These engines have 240 gallons of water and assorted equipment comparable to the 10-person crew.
- ***One Type 5 Engine***. This engine is staffed with a crew of three as well. This two-wheel drive engine carries 620 gallons of water is equipped with much the same equipment as our other engines.
- ***One Type 7 Engine***. This 4x4 engine is also staffed with a crew of three and carries 150 gallons of water. It also carries equipment similar to our other engines.
- ***Two mop up trailers***. These trailers are outfitted with several thousand feet of fire hose, portatanks, pumps, various fittings and other equipment.
- ***One 2000 gallon water tender***. This federal excess truck is used to shuttle water to fires as needed. It can be operated by a handful of employees who hold CDL endorsements. It carries some fire hose, fittings and a portatank as well.

In addition to our own local resources, we have the ability to use a variety of other resources. Air resources include the 1500-gallon PBY air tanker based out of Deer Park and several type 2 DNR helicopters based out of Ellensburg. One helicopter is usually moved to northeast Washington during times of high fire danger. We also have the ability to use federal air tankers as well as Canadian air tankers. North Columbia District has fire response agreements with all rural fire districts in Stevens and Ferry counties. Through these agreements, we have the ability to hire fire district resources to supplement our own fire resources as needed. We also hire private contractors for hand crews, engines, water tenders, timber fallers and dozers when needed.

4.9.2 Bureau of Land Management – Spokane District

Chief: Scott Boyd - Fire Management Officer BLM
Telephone: 509-536-1237
e-Mail: sboyd@or.blm.gov
Address: 1103 N Fancher, Spokane, WA 99212

District Summary

The Spokane District BLM has 2 engines. One is located in Spokane and the other is located in Wenatchee. With the District's scattered pattern, the engines are usually on scene after initial attack forces arrive. The engines are available off district and out of state if needed.

Cooperative Agreements

The Spokane Dist. BLM has Coop agreements with the Colville National Forest and DNR.

Current Resources

Station #1 Spokane District Office, Spokane Wa

Table 4.23. Spokane District Office Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
2000	Ford	F 450	309 gal capacity	30 gals / min

Station #2 Wenatchee Field Office, Wenatchee Wa

Table 4.24. Wenatchee Field Office Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
2001	Ford	F 550	309 gal capacity	30 gals / min

4.9.3 USDA Forest Service – Colville National Forest

Republic Ranger District
650 E Delaware
Republic, WA 99166
Tel: 509-775-7400
Fax: 509-775-7401

Fire Management Officer: Karrie Stevens

Fire Management Officer (Operations): Todd Payne

Fire Management Officer (Fuels Planning): Reed Heckly

Three Rivers Ranger District
255 West 11th
Kettle Falls, WA 99141
Tel: 509-738-7780
Fax: 509-738-7780

Fire Management Officer: Acting FMO

Fire Management Officer (Operations): Leon Mitchell

Fire Management Officer (Fuels Planning): Mike Almas

District Summary

The Republic Ranger District manages national forest lands in northwestern Ferry County between the Colville Indian Reservation and the Canadian Border, and between the Ferry/Okanogan County Boundary and the crest of the Kettle Range.

The district is managed by a District Ranger in Republic with a staff of 12 permanent employees and 6 part-time employees. Approximately 15 additional seasonal employees are hired during the summer months at the peak of field season.

The Three Rivers Ranger District manages national forest lands in northeastern Ferry County between the Colville Indian Reservation and the Canadian Border, and between the crest of the Kettle Range to the Columbia River.

The district is managed by a District Ranger in Kettle Falls with a staff of 20 permanent employees and 10 part-time employees. Approximately 25 additional seasonal employees are hired during the summer months at the peak of field season.

The national forest is managed according to a multiple-use mandate which attempts to balance a number of land uses, including timber harvest, grazing, recreational pursuits, and mining; while simultaneously maintaining suitable wildlife habitat, clean water, and visually appealing vistas in a sustainable way.

Priority Areas

Residential Growth: The national forests are experiencing rural development along the national forest boundary in areas that were previously managed as private grazing or timber land. This is impacting management on the national forest since more residents are resistant to change in their “backyards” when forest activities are planned that may represent a change.

A priority for the Forest Service is doing vegetation management treatments on national forest where natural fuels may threaten private improvement if a wildfire occurs. Working with private landowners to resolve issues of road access in order to do hazard fuel treatments will be a critical step to achieve hazard fuel treatment activities.

Communications: The Colville National Forest is served by a network of solar/propane-powered mountaintop radio repeaters through which field coordination and fire dispatching is accomplished. However, interagency fire responses require shared radio frequencies to facilitate a coordinated fire response. Maintaining cooperative frequency agreements between all the fire-fighting agencies; local, state, and federal; could use additional planning and coordination.

Fire Fighting Vehicles: The Republic Ranger District operates two type 6 engines and one five-person hand crew. The Three Rivers Ranger District operates the same equipment plus a 1000 gallon engine.

Burn Permit Regulations: The Colville National Forest uses prescribed fire for reduction of logging slash and natural fuels, as well as enhancement of grazing conditions and wildlife habitat. Burning permits are issued by the Washington State Department of Natural Resources.

Other: The Forest Service operates a coordinated firefighting resource sharing system where trained firefighters and incident management specialists may be requested to respond to an incident anywhere in the United States. Ranger districts that face wildfire threats beyond their capabilities can request personnel and equipment for additional help. This help includes hotshot crews, fire engines, smokejumpers, heli-rappellers, airtankers, helicopters, and incident management personnel. The Forest Service also operates cooperatively with the Washington State Department of Natural Resources through cooperative agreements to share firefighting resources as needed.

Effective Mitigation Strategies

Thinning of dense timbered stands to reduce ladder fuels and crowded tree crowns is effective in reducing the likelihood of a wildfire becoming established in the tops of trees. When a wildfire remains on the ground, it is much easier to suppress.

Education and Training

The Forest Service adheres to a system of wildland fire training as developed by the National Wildfire Coordinating Group. All personnel involved with fire activities must be trained and experienced before they are allowed to function independently on the fireline and must be documented on an Incident Qualifications Card. Federal employees are required to pass a work capacity test to prove their physical fitness according to their particular fireline qualifications.

Cooperative Agreements

The Pacific Northwest Region of the Forest Service has entered into an agreement with the Washington State Department of Natural Resources for cooperative fire control efforts. This agreement states that the DNR will be the primary administrative contact when incidents involve a mix of agencies that include local fire districts when situations of pay and reimbursement develop. The Colville National Forest does not have any contracts or agreements directly with any local fire districts.

The Colville National Forest has an agreement with the Spokane District of the Bureau of Land Management to provide fire suppression on BLM lands within predetermined areas in the vicinity of national forest lands.

As part of their working agreement, the Colville National Forest and the DNR have drawn up what is known as the Reciprocal Agreement. The “Recip Agreement” defines a protocol for closest-forces dispatching to areas where each agency may mutually respond to fires, and outlines how to share the benefits from weather forecasting services, fire detection flights, air tankers and helicopters.

Current Resources

Republic Ranger District, 650 E. Delaware, Republic, Wa.

Table 4.25. Republic Ranger District Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
2005	Ford	F550	300	125
2000	Ford	F450	300	125
5-person hand crew				

Three Rivers Ranger District, 255 West 11th, Kettle Falls, Wa.

Table 4.26. Three Rivers Ranger District Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
2005	Ford	F550	300	125
2001	Ford	F450	300	125
2002	International	?	1000	250
5-person hand crew				

Future Considerations

The traditional concept of the Forest Service "militia" as an agency populated with a reserve of firefighters is fading. Workforce downsizing in the Forest Service has severely shrunk the available pool of firefighters. More reliance is being placed on contract firefighters and equipment. Additional contracted resources require additional agency administrative personnel, which in turn reduces the number of agency personnel available to actually supervise contractors or fight fire themselves. Also, the contract firefighting industry is not particularly stable. Companies rise and fall from year to year, and people work intermittently only to leave when they find a more stable job. Maintaining experience and qualifications in the contract firefighting business is a difficult thing to achieve.

Needs

The Republic Ranger District has had difficulty with adequate storage space for its fire equipment and fire engines. Damage from freezing has been a regular problem in spite of thorough winterization routines. Fire cache remodeling has been approved and designed. The Forest Service needs a budget allocation to accomplish the fire cache remodeling job.

4.10 Issues Facing Ferry County Fire Protection

4.10.1 Wildland Fire Suppression Mobility

An important factor in fire suppression is mobility. The ability to transport personnel and equipment to and from the incident is essentially for firefighting safety and efficiency. Portions of the topography of Ferry County limit access. Some areas are difficult to reach and wildfires will develop before suppression resources arrive. Occasionally, suppression efforts employing defensible roads and topographic breaks as an in-direct strategy are necessary. Making the most of existing road systems is a prudent planning strategy and the effectiveness of those road systems can be maximized if fuel reduction thinning can occur where necessary.

4.10.2 Accessibility

Fire chiefs throughout the County have identified home accessibility issues as a primary concern in some parts of Ferry County. Many homes and driveways have been constructed without regard to access requirements of large emergency vehicles. Lack of accessibility restricts engagement by fire suppression resources. Adoption and enforcement of the International Fire Code, regarding road and driveway construction standards for fire apparatus would prevent accessibility issues in new developments.

4.10.3 Orient Watershed

The community of Orient and the surrounding area is primarily dependent on surface runoff from East Deer Creek Watershed for their water resources. Water is collected along the stream drainage, treated, and then piped to homes and businesses. A severe wildfire in this watershed could cause serious injury to this resource by removing vegetation, creating ash and sediments, and impairing soil properties. Fire mitigation treatments prior to a fire event are a high priority and are imperative to conserving the functionality of the watershed following a wildland fire.

4.10.4 Recruitment and Retention, Funding, Equipment Needs, Etc.

There are a number of pervasive issues that challenge volunteer districts within Ferry County. A short list of such issues include:

- Low tax base funding,
- Recruitment and retention of volunteers,
- Lack of funding for equipment needs, and
- Increases in training requirements.

The members of all fire protection districts should be recognized for the dedication they have shown and the excellent level of protection they provide for residents throughout the county. Volunteers take time out of their lives every day in order to assure the safety of the community.

The demands on volunteer departments are considerable. Keeping pace with ever-increasing training requirements can lead to burn-out of volunteers who are scantly compensated for their time and efforts. Keeping pace with the growing needs of the communities the districts serve is a constant challenge as well. Although there are some potential funding sources available for local districts to acquire equipment and other needs, grant writing and chasing of funding sources takes considerable time and effort. Recommendations that can help to reduce these challenges will be presented in the Chapter 5:

4.10.5 Road Signage and Rural Addressing

The ability to quickly locate a physical address is critical in providing services in any type of emergency response. Accurate road signage and rural addressing is fundamental to assure the safety and security Ferry County residents. Currently, there are numerous areas throughout the county lacking road signs, rural addresses, or both. Signing and addressing throughout the county needs to be brought up to NFPA code in order to assure visibility and quick location.

4.11 Current Wildfire Mitigation Activities in Ferry County.

4.11.1 Granite – Trout Fuel Reduction Project

The Granite – Trout Fuel Reduction Project is located within the watershed drainages of Granite Creek and Trout Creek. This area was chosen because it is adjacent to fuel reduction projects planned on National Forest lands in the same drainages. This strategy attempts to maximize the effects of fuel reduction work across the landscape in a complimentary and cooperative way irrespective of jurisdiction. Properties adjacent to U.S. Forest Service Trout Creek Fuel Reduction Areas, the West Fork and North Fork Trout Creek Roads, Rose Valley, Sheridan Road, Deer Lodge Community, State Route 20 from Republic to Ferry County border, and Swamp Creek – Trout Creek Road corridor are #1 priority areas for this project. Barrett Creek, Flag Hill, Klondike Mountain, Marbelle Road, and West Shore Curlew Lake are the #2 and #3 priorities. The goals of the Granite – Trout Fuel Reduction Project are to:

- Improve public and firefighter safety from the threat of wildfires
- Extend the effectiveness of fuels treatments of the Colville National Forest's Trout Project outward to involve private lands
- Reduce ability of large fires to spread unimpeded across the landscape

Areas with Priority Level 1 within the project are: properties adjacent to USFS Trout Creek fuel reduction areas, West Fork & North Fork Trout Creek Roads, Rose Valley, Sheridan Road, Deer Lodge Community, Republic to Ferry County line State Route 20 corridor, and Swamp Creek – Trout Creek Road corridor. Priority Level 2 areas include: Barrett Creek, Flag Hill, and Klondike Mountain.

Chapter 5: Treatment Recommendations

5 Administration & Implementation Strategy

Critical to the implementation of this Community Wildfire Protection Plan will be the identification of, and implementation of, an integrated schedule of treatments targeted at achieving a reduction in the number of human caused fires and overall impact of wildland fires on Ferry County. As there are many land management agencies and thousands of private landowners in Ferry County, it is reasonable to expect that differing schedules of adoption will be made and varying degrees of compliance will be observed across all ownerships.

Ferry County encourages the philosophy of instilling disaster resistance in normal day-to-day operations. By implementing plan activities through existing programs and resources, the cost of mitigation is often a small portion of the overall cost of a project's design or program.

The federal land management agencies in Ferry County, specifically the USDA Forest Service, the State, and the Colville Indian Reservation, are participants in this planning process and have contributed to its development. Where available, their schedule of land treatments have been considered in this planning process to better facilitate a correlation between their identified planning efforts and the efforts of Ferry County.

All risk assessments were made based on the conditions existing during 2005 - 2006, thus, the recommendations in this section have been made in light of those conditions. However, the components of risk and the preparedness of the county's resources are not static. It will be necessary to fine-tune this plan's recommendations annually to adjust for changes in the components of risk, population density changes, infrastructure modifications, and other factors.

5.1 Monitoring and Maintenance

As part of the policy of Ferry County in relation to this planning document, this entire Community Wildfire Protection Plan should be reviewed annually (from date of adoption) at a special meeting of the planning committee, open to the public and involving all municipalities/jurisdictions, where action items, priorities, budgets, and modifications can be made or confirmed. The Ferry County Homeland Security Coordinator (or an official designee of the Ferry County Commissioners) is responsible for the scheduling, publicizing, and leadership of the annual review meeting. During this meeting, participating jurisdictions will report on their respective projects and identify needed changes and updates to the existing plan. Maintenance to the plan should be detailed at this meeting, documented, and attached to the formal plan as an amendment to the community Wildfire Protection Plan. Re-evaluation of this plan should be made on the 5th anniversary of its acceptance, and every 5-year period following.

5.2 Prioritization of Mitigation Activities

The prioritization process will include a special emphasis on cost-benefit analysis review. The process will reflect that a key component in any funding decision is a determination that the project will provide an equivalent or more in benefits over the life of the project when compared with the costs. Projects will be administered by county and local jurisdictions with overall coordination provided by the County Homeland Security Coordinator.

County Commissioners and the elected officials of all jurisdictions will evaluate opportunities and establish their own unique priorities to accomplish mitigation activities where existing funds and resources are available and there is community interest in implementing mitigation

measures. If no federal funding is used in these situations, the prioritization process may be less formal. Often the types of projects that the County can afford to do on their own are in relation to improved codes and standards, department planning and preparedness, and education. These types of projects may not meet the traditional project model, selection criteria, and benefit-cost model. The County will consider all pre-disaster mitigation proposals brought before the County Commissioners by department heads, city officials, fire districts and local civic groups.

When federal or state funding is available for hazard mitigation, there are usually requirements that establish a rigorous benefit-cost analysis as a guiding criterion in establishing project priorities. The county will understand the basic federal grant program criteria which will drive the identification, selection, and funding of the most competitive and worthy mitigation projects. FEMA's three grant programs (the post-disaster Hazard Mitigation Grant Program, the pre-disaster Flood Mitigation Assistance and Pre-Disaster Mitigation grant programs) that offer federal mitigation funding to state and local governments all include the benefit-cost and repetitive loss selection criteria.

The prioritization of new projects and deletion of completed projects will occur annually and be facilitated by the County Homeland Security Coordinator to include the County Commissioner's Office, City Mayors and Councils, Fire District Chiefs and Commissioners, agency representatives (USFS, WA DNR, etc.). The prioritization of projects will be based on the selection of projects which create a balanced approach to pre-disaster mitigation which recognizes the hierarchy of treating in order (highest first):

- People
- Infrastructure
- Local and Regional Economy
- Traditional Way of Life
- Ecosystems

5.2.1 Prioritization Scheme

A numerical scoring system is used to prioritize projects. This prioritization serves as a guide for the county when developing mitigation activities. This project prioritization scheme has been designed to rank projects on a case by case basis. In many cases, a very good project in a lower priority category could outrank a mediocre project in a higher priority. The county mitigation program does not want to restrict funding to only those projects that meet the high priorities because what may be a high priority for a specific community may not be a high priority at the county level. Regardless, the project may be just what the community needs to mitigate disaster. The flexibility to fund a variety of diverse projects based on varying reasons and criteria is a necessity for a functional mitigation program at the County and community level.

To implement this case by case concept, a more detailed process for evaluating and prioritizing projects has been developed. Any type of project, whether county or site specific, will be prioritized in this more formal manner.

To prioritize projects, a general scoring system has been developed. This prioritization scheme has been used in statewide all hazard mitigations plans. These factors range from cost-benefit ratios, to details on the hazard being mitigated, to environmental impacts.

Planning projects are generally focused on developing policy or educational material delivery related to hazard mitigation issues. Non-planning projects are generally focused on other types of projects such as fuels reduction, resources and capabilities enhancement, or infrastructure hardening (detailed below). Since planning projects are somewhat different than non-planning

projects when it comes to evaluation criteria, different criteria will be considered, depending on the type of project.

The factors for the non-planning projects include:

- Benefit / Cost
- Population Benefit
- Property Benefit
- Economic Benefit
- Project Feasibility (environmentally, politically, socially)
- Hazard Magnitude/Frequency
- Potential for repetitive loss reduction
- Potential to mitigate hazards to future development
- Potential project effectiveness and sustainability

The factors for the planning projects include:

- Benefit / Cost
- Vulnerability of the community or communities
- Potential for repetitive loss reduction
- Potential to mitigate hazards to future development

Since some factors are considered more critical than others, two ranking scales have been developed. A scale of 1-10, 10 being the best, has been used for cost, population benefit, property benefit, economic benefit, and vulnerability of the community. Project feasibility, hazard magnitude/frequency, potential for repetitive loss reduction, potential to mitigate hazards to future development, and potential project effectiveness and sustainability are all rated on a 1-5 scale, with 5 being the best. The highest possible score for a non-planning project is 65 and for a planning project is 30.

The guidelines for each category are as follows:

5.2.1.1 Benefit / Cost

The analysis process will include summaries as appropriate for each project, but will include benefit / cost analysis results. Projects with a negative benefit / cost analysis result will be ranked as a 0. Projects with a positive Benefit / Cost analysis will receive a score equal to the projects Benefit / Cost Analysis results divided by 25. Therefore a project with a BC ratio of 175:1 would receive 5 points, a project with a BC ratio of 250:1 (or higher) would receive the maximum points of 10.

FEMA Requirement §201.4(c)(4)(iii) details criteria for prioritizing communities and local jurisdictions that would receive planning and project grants under available funding programs, which should include consideration for communities with the highest risks, repetitive loss properties, and most intense development pressures. Further, the requirement states that for non-planning grants, a principal criterion for prioritizing grants shall be the extent to which benefits are maximized according to a benefit / cost review of proposed projects and their associated costs. For many of the initiatives identified in this plan, the County may seek financial assistance under FEMA's HMGP or PDM programs. Both of these programs require detailed benefit / cost analysis as part of the FEMA award process. Ferry County is committed to implementing mitigation strategies with benefits which exceed costs. For projects which do not require financial assistance from grant programs that require this type of analysis, the County reserves the right to define "benefits" according to parameters with would otherwise be considered subjective, while still meeting the needs and goals of the plan.

5.2.1.2 Population Benefit

Population Benefit relates to the ability of the project to prevent the loss of life or injuries. A ranking of 10 has the potential to impact 90% or more of the people in the municipality (county, city, or district). A ranking of 5 has the potential to impact 50% of the people, and a ranking of 1 will not impact the population. The calculated score will be the percent of the population impacted positively multiplied by 10. In some cases, a project may not directly provide population benefits, but may lead to actions that do, such as in the case of a study. Those projects will not receive as high of a rating as one that directly effects the population, but should not be considered to have no population benefit.

5.2.1.3 Property Benefit

Property Benefit relates to the prevention of physical losses to structures, infrastructure, and personal property. These losses can be attributed to potential dollar losses. Similar to cost, a ranking of 10 has the potential to save $100,000,000 or more in losses. Property benefit of less than $100,000,000 will receive a score of the benefit divided by $100,000,000, times 10 (for property benefits below $100 million). Therefore, a property benefit of $20,000,000 would receive a score of 2 ([20,000,000÷100,000,000] x 10 = 2). In some cases, a project may not directly provide property benefits, but may lead to actions that do, such as in the case of a study. Those projects will not receive as high of a rating as one that directly effects property, but should not be considered to have no property benefit.

5.2.1.4 Economic Benefit

Economic Benefit is related to the savings from mitigation to the economy. This benefit includes reduction of losses in revenues, jobs, and facility shut downs. Since this benefit can be difficult to evaluate, a ranking of 10 would prevent a total economic collapse, a ranking of 5 could prevent losses to about half the economy, and a ranking of 1 would not prevent any economic losses. In some cases, a project may not directly provide economic benefits, but may lead to actions that do, such as in the case of a study. Those projects will not receive as high of a rating as one that directly affects the economy, but should not be considered to have no economic benefit.

5.2.1.5 Vulnerability of the Community

For planning projects, the vulnerability of the community is considered. A community that has a high vulnerability with respect to other jurisdictions to the hazard or hazards being studied or planned for will receive a higher score. To promote planning participation by the smaller or less vulnerable communities in the state, the score will be based on the other communities being considered for planning grants. A community that is the most vulnerable will receive a score of 10, and one that is the least, a score of 1.

5.2.1.6 Project Feasibility (Environmentally, Politically & Socially)

Project Feasibility relates to the likelihood that such a project could be completed. Projects with low feasibility would include projects with significant environmental concerns or public opposition. A project with high feasibility has public and political support without environmental concerns. Those projects with very high feasibility would receive a ranking of 5 and those with very low would receive a ranking of 1.

5.2.1.7 Hazard Magnitude/Frequency

The Hazard Magnitude/Frequency rating is a combination of the recurrence period and magnitude of a hazard. The severity of the hazard being mitigated and the frequency of that event must both be considered. For example, a project mitigating a 10-year event that causes significant damage would receive a higher rating than one that mitigates a 500-year event that causes minimal damage. For a ranking of 5, the project mitigates a high frequency, high magnitude event. A 1 ranking is for a low frequency, low magnitude event. Note that only the damages being mitigated should be considered here, not the entire losses from that event.

5.2.1.8 Potential for repetitive loss reduction

Those projects that mitigate repetitive losses receive priority consideration here. Common sense dictates that losses that occur frequently will continue to do so until the hazard is mitigated. Projects that will reduce losses that have occurred more than three times receive a rating of 5. Those that do not address repetitive losses receive a rating of 1.

5.2.1.9 Potential to mitigate hazards to future development

Proposed actions that can have a direct impact on the vulnerability of future development are given additional consideration. If hazards can be mitigated on the onset of the development, the county will be less vulnerable in the future. Projects that will have a significant effect on all future development receive a rating of 5. Those that do not affect development should receive a rating of 1.

5.2.1.10 Potential project effectiveness and sustainability

Two important aspects of all projects are effectiveness and sustainability. For a project to be worthwhile, it needs to be effective and actually mitigate the hazard. A project that is questionable in its effectiveness will score lower in this category. Sustainability is the ability for the project to be maintained. Can the project sustain itself after grant funding is spent? Is maintenance required? If so, are or will the resources be in place to maintain the project. An action that is highly effective and sustainable will receive a ranking of 5. A project with effectiveness that is highly questionable and not easily sustained should receive a ranking of 1.

5.2.1.11 Final ranking

Upon ranking a project in each of these categories, a total score can be derived by adding together each of the scores. The project can then be ranking high, medium, or low based on the thresholds of:

Project Ranking Priority Score Non-Planning Projects

- High 40-65
- Medium 25-39
- Low 1-24

Project Ranking Priority Score Planning Projects

- High 18-30
- Medium 12-17
- Low 1-11

5.3 Possible Wildfire Mitigation Activities

As part of the implementation of wildfire mitigation activities in Ferry County, a variety of management tools may be used. Management tools include but are not limited to the following:

- Homeowner and landowner education
- Policy changes for structures and infrastructure in the WUI
- Home site defensible zone through fuels modification
- Community defensible zone fuels alteration
- Access improvements
- Access creation
- Emergency response enhancements (training, equipment, locating new fire stations, new fire districts)
- Regional land management recommendations for private, state, and federal landowners

Maintaining private property rights will continue to be one of the guiding principles of this plan's implementation. Sound risk management is a foundation for all fire management activities. Risks and uncertainties relating to fire management activities must be understood, analyzed, communicated, and managed as they relate to the cost of either doing or not doing an activity. Net gains to the public benefit will be an important component of decisions.

5.4 WUI Safety & Policy

Wildfire mitigation efforts must be supported by a set of policies and regulations at the county level that maintain a solid foundation for safety and consistency. The recommendations enumerated here serve that purpose. Because these items are regulatory in nature, they will not necessarily be accompanied by cost estimates. These recommendations are policy related in nature and therefore are recommendations to the appropriate elected officials; debate and formulation of alternatives will serve to make these recommendations suitable and appropriate.

Table 5.1. WUI Action Items in Safety and Policy.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.1.a: Develop County policy concerning building materials used in high-risk WUI areas on existing structures and new construction.	**Protection of people and structures** by improving the ability of emergency response personnel to respond to threatened homes in high-risk areas. Prioritization Score: 30 Priority: High	**Lead:** County Commissioner's Office **Support:** Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, and Stevens/Ferry County Fire Protection District #3.	Year 1 (2006): Consider and develop policy to address construction materials for homes and businesses located in high wildfire risk areas. Specifically, a County policy concerning wooden roofing materials and flammable siding, especially where juxtaposed near heavy wildland fuels.

Table 5.1. WUI Action Items in Safety and Policy.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.1.b: Begin distributing "New Code of the West"-type pamphlets with building permit requests.	**Protection of people and structures** by improving the ability of emergency response personnel to respond to threatened homes in high-risk areas. Prioritization Score: 25 Priority: Medium	**Lead:** County Commissioners **Support:** City and County Planning Departments and City of Republic.	Year 1 (2006): Obtain copyrights to "New Code of the West" pamphlet. Year 1 (2006): Distribute pamphlets.
5.1.c: Develop City and County policy to include fire protection districts in decision-making process when road and alley vacancy requests are submitted.	**Protection of people and structures** by improving the ability of emergency services personnel to safely and effectively respond to structural fires. Prioritization Score: 30 Priority: High	**Lead:** City of Republic and County Commissioners **Support:** Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, and Stevens/Ferry County Fire Protection District #3.	Year 1 (2006): Consider and develop policy to include fire protection districts' recommendations when road and alley vacancy requests are made due to their use by emergency responders as access routes.
5.1.d: Develop County policy to standardize all water hydrants and fittings in all subdivisions and communities with public water systems.	**Protection of people and structures** by improving the ability of emergency response personnel to respond to threatened homes in high-risk areas. Prioritization Score: 27 Priority: High	**Lead:** County Commissioner's Office **Support:** City and County Planning Departments, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, and Stevens/Ferry County Fire Protection District #3.	Year 1 (2006): Consider and develop policy to address the need for standardized hydrants and fittings, particularly in Curlew Kai, Dollar Bar, Curlew Heights, and Pine Grove.
5.1.e: Rural signage (road signs & house numbers) improvements across the county.	**Protection of people, structures, and infrastructure** by improving the ability of emergency services personnel, residents, and visitors to navigate roads. Prioritization Score: 35 Priority: Medium	**Lead:** County Road Department **Support:** County Commissioners, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, and Stevens/Ferry County Fire Protection District #3.	Can be completed during year 1 (2006) pending funding to implement the project. Estimate $15,000 for signs and posting.
5.1.f: Develop policy on requiring new home and business construction to install underground power lines.	**Protection of people and structures by** reducing the risk of wildfire ignitions. Prioritization Score: 26 Priority: High	**Lead:** County Planning Department **Support:** County Commissioner's Office, Ferry County Public Utilities District and utilities companies.	Year 1 (2006): Implement a policy to require new utility lines to be buried underground. Year 1 (2006): Collaborate with Ferry County Public Utilities District and local utility companies to implement this policy.

Table 5.1. WUI Action Items in Safety and Policy.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.1.g: Develop a policy to enforce burning permits and restrictions throughout the county.	**Protection of people and structures** by reducing the fire ignition risk in high-risk areas. Prioritization Score: 26 Priority: High	**Lead:** County Commissioners **Support:** City and County Planning Departments, Ferry County Sheriff's Department, DNR, City of Republic, and local communities.	Year 1 (2006): Consider and develop policy to address burn permit system and enforcement to help reduce the number of accidental wildfire ignitions.
5.1.h: Develop policy on adoption of International Fire Code.	**Protection of people and structures** by improving the ability of emergency services personnel to safely and effectively respond to home fires. Prioritization Score: 24 Priority: High	**Lead:** County Commissioner's Office **Support:** County Planning Department, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, and Stevens/Ferry County Fire Protection District #3.	Year 1 (2006): Consider and develop policy to adopt the International Fire Code regulations adopted by the State of Washington.

5.5 People and Structures

The protection of people and structures will be tied together closely as the loss of life in the event of a wildland fire is generally linked to a person who could not, or did not, flee a structure threatened by a wildfire. The other incident is a firefighter who suffers the loss of life during the combating of a fire. Many of the recommendations in this section will define a set of criteria for implementation while others will be rather specific in extent and application.

Many of the recommendations in this section involve education and increasing awareness of the residents of Ferry County. These recommendations stem from a variety of factors including items that became obvious during the analysis of the public surveys, discussions during public meetings, and observations about choices made by residents living in the Wildland-Urban Interface. Over and over, the common theme was present that pointed to a situation of landowners not recognizing risk factors:

- Fire District personnel pointed to numerous examples of inadequate access to homes of people who believe they have adequate ingress.
- Discussions with the general public indicated an awareness of wildland fire risk, but they could not generally identify risk factors.
- A large number of the respondents to the public mail survey (62%) indicated that they want to participate in educational opportunities focused on the WUI and what they can do to increase their home's chances of surviving a wildfire.

Residents and policy makers of Ferry County should recognize certain factors that exist today, that in their absence would lead to an increase in the risk factors associated with wildland fires in the WUI of Ferry County. These items listed below should be encouraged, acknowledged, and recognized for their contributions to the reduction of wildland fire risks:

Livestock Grazing in and around the communities of Ferry County has led to a reduction of many of the fine fuels that would have been found in and around the communities and in the wildlands of Ferry County. Domestic livestock not only eat these grasses, forbs, and shrubs, but

also trample certain fuels to the ground where decomposition rates may increase. Livestock ranchers tend their stock, placing additional sets of eyes into the forests and rangelands of the county where they may observe ignitions, or potentially risky activities. Livestock grazing in this region should be encouraged in the future as a low cost, positive tool of wildfire mitigation in the Wildland-Urban Interface and beyond.

Forest Management in Ferry County has not been greatly affected by the reduction of operating sawmills in the region. The active forest management program of the U.S. Forest Service, Washington Department of Natural Resources, Colville Reservation, and many of the private and industrial forestland owners in the region has led to a significant reduction of wildland fuels where they are closest to homes and infrastructure. Nevertheless, forests are dynamic systems that will never be completely free from risk. Treated stands will needed repeated treatments to reduce the risk to acceptable levels in the long term. In addition, forest resource professionals managing these lands are generally trained in wildfire protection and recognize risk factors when they occur.

Agriculture is a significant component of Ferry County's economy. Much of the rangeland interface is made up of a mosaic of agricultural crops, even extending to the forestland interface. The original conversion of these lands to agriculture from rangeland and forestland, was targeted at the most productive soils and juxtaposition to water. Many of these productive rangeland ecosystems were consequently also at some of the highest risk to wildland fires because biomass accumulations increased in these productive landscapes. The result today, is much of the landscape historically prone to frequent fires, has been converted to agriculture, which is at a much lower risk than prior to its conversion. The preservation of a viable agricultural economy in Ferry County is integral to the continued management of wildfire risk in this region.

Table 5.2. WUI Action Items for People and Structures.

Action Item	Goals and Objectives	Responsible Organization	Action Items, Planning Horizon and Estimated Costs
5.2.a: Strengthen the role of the Fire Prevention Co-op to champion wildland fire prevention topics.	**Protection of people and structures** by increasing awareness of WUI risks, how to recognize risk factors, and how to modify those factors to reduce risk.. Prioritization Score: 30 Priority: High	**Lead:** Fire Prevention Co-op **Support:** All local fire agencies. • DNR Highlands District • DNR North Columbia District • USFS Republic Ranger Station • USFS Three Rivers Ranger Station • County Fire Protection Districts • Bureau of Indian Affairs	Year 1 (2006) activity: Pool members of all the local fire agencies to develop a plan to present a unified voice to the County regarding fire prevention and local fire issues.
5.2.b: Implementation of Youth and Adult Wildfire Educational Programs.	**Protect people and structures** by increasing awareness of WUI risks, how to recognize risk factors, and how to modify those factors to reduce risk. Prioritization Score: 30 Priority: High	**Lead:** Fire Prevention Co-op **Support:** Cooperative effort including: • Washington Department of Natural Resources • State and Private Forestry Offices • Bureau of Land Management • Bureau of Indian Affairs • USDA Forest Service • Local School Districts • City of Republic and Communities of Ferry County	To start immediately using existing educational program materials and staffing (e.g. Forest Stewardship class offered by Washington State University). Formal needs assessment should be responsibility of Ferry County Fire Prevention Co-op and include the development of an integrated WUI educational series by year 2 (2007). Costs initially to be funded through existing budgets for these activities to be followed with grant monies to continue the programs as identified in the formal needs assessment.
5.2.c: Wildfire risk assessments of homes in identified neighborhoods.	**Protect people and structures** by increasing awareness of specific risk factors of individual home sites in the at-risk landscapes. Only after these are completed can home site treatments follow. Prioritization Score: 40 Priority: High	**Lead:** Fire Prevention Co-op **Support:** County Commissioners, City of Republic, communities, local homeowners, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, Stevens/Ferry County Fire Protection District #3, Washington Department of Natural Resources, USDA Forest Service, and Bureau of Indian Affairs. Actual work may be completed by Wildfire Mitigation Consultants.	Cost: Approximately $100 per home site for inspection, written report, and discussions with the homeowners. There are approximately 9,394 housing units in Ferry County, roughly 2,818 (30%) of these structures would benefit from a home site inspection and budget determination for a total estimate of $281,800. Action Item: Secure funding and contract to complete the inspections during years 1 & 2 (2006-07) Home site inspection reports and estimated budget for each home site's treatments will be a requirement to receive funding for treatments through grants.

Table 5.2. WUI Action Items for People and Structures.

Action Item	Goals and Objectives	Responsible Organization	Action Items, Planning Horizon and Estimated Costs
5.2.d: Home site WUI Treatments.	**Protect people, structures, and increase firefighter safety** by reducing the risk factors surrounding homes in the WUI of Ferry County. Prioritization Score: 40 Priority: High	**Lead:** Fire Prevention Co-op **Support:** County Commissioners, City of Republic, communities, local homeowners, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, Stevens/Ferry County Fire Protection District #3, Washington Department of Natural Resources, USDA Forest Service, and Bureau of Indian Affairs. *Complete concurrently with 5.2.c.*	Actual cost level will be based on the outcomes of the home site assessments. Estimate that treatments in rangelands will cost approximately $750 per home site for a defensible space of roughly 150'. Estimate that treatments in forestland will cost roughly $1,000 per home site for a defensible space of about 200'. Approximately 1,691 home site treatments (60% of those assessed) throughout the County would add up to an estimated cost of $1,522,000 (60% forestland and 40% rangeland). Home site treatments can begin with the securing of funding for the treatments and immediate implementation in 2006 and will continue from year 1 through 5 (2010).
5.2.e: Community Defensible Zone WUI Treatments.	**Protect people, structures, and increase firefighter safety** by reducing the risk factors surrounding high risk communities in the WUI of Ferry County. Prioritization Score: 35 Priority: Medium	**Lead:** Fire Prevention Co-op **Support:** County Commissioners, City of Republic, communities, local homeowners, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, Stevens/Ferry County Fire Protection District #3, Washington Department of Natural Resources, USDA Forest Service, and Bureau of Indian Affairs.	Actual funding level will be based on the outcomes of the home site assessments and cost estimates. Years 2-5 (2006-10): Treat high risk wildland fuels from home site defensible space treatments to an area extending 400 feet to 750 feet beyond home defensible spaces, where steep slopes and high accumulations of risky fuels exist near homes and infrastructure. Should link together home treatment areas. Treatments target high risk concentrations of fuels and not 100% of the area identified. To be completed only after or during the creation of home defensible spaces have been implemented. Approximate average cost on a per structure basis is $2,800 (average 4 acres per home) depending on extent of home defensibility site treatments, estimate 846 homes (50% of treated homes) in need of this type of treatment for a cost estimate of $2,368,800. Neighborhoods to target: North Republic, Southwest Republic, Southeast Republic, Klondike-Pine Grove, East Lake, West Lake, Lundimo, Empire, Curlew, Danville, Malo East, Little Boulder, and Boulder-Deadman.

Table 5.2. WUI Action Items for People and Structures.

Action Item	Goals and Objectives	Responsible Organization	Action Items, Planning Horizon and Estimated Costs
5.2.f: Maintenance of Home site WUI Treatments.	**Protect people, structures, and increase firefighter safety** by reducing the risk factors surrounding homes in the WUI of Ferry County. Prioritization Score: 41 Priority: High	**Lead:** Fire Prevention Co-op **Support:** County Commissioners, City of Republic, communities, local homeowners, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, Stevens/Ferry County Fire Protection District #3, Washington Department of Natural Resources, USDA Forest Service, and Bureau of Indian Affairs.	Home site defensibility treatments must be maintained periodically to sustain benefits of the initial treatments. Each site should be assessed 5 years following initial treatment Estimated re-inspection cost will be $500 per home site on all sites initially treated or recommended for future inspections ($845,500). Follow-up inspection reports with treatments as recommended years 5 through 10.
5.2.g: Re-entry of Home site WUI Treatments.	**Protect people, structures, and increase firefighter safety** by reducing the risk factors surrounding homes in the WUI of Ferry County. Prioritization Score: 41 Priority: High	**Lead:** Fire Prevention Co-op **Support:** County Commissioners, City of Republic, communities, local homeowners, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, Stevens/Ferry County Fire Protection District #3, Washington Department of Natural Resources, USDA Forest Service, and Bureau of Indian Affairs.	Re-entry treatments will be needed periodically to maintain the benefits of the initial WUI home treatments. Each re-entry schedule should be based on the initial inspection report recommendations, observations, and changes in local conditions. Generally occurs every 5-10 years.

Table 5.2. WUI Action Items for People and Structures.

Action Item	Goals and Objectives	Responsible Organization	Action Items, Planning Horizon and Estimated Costs
5.2.h: Development of community evacuation plans and alternate safety zones for the communities Knob Hill, Trout Creek, Herron Creek, Lambert Creek, Barrett Creek, Rose Valley, Lundimo Meadows, Empire Creek, Little Goosmus Creek, Big Goosmus Creek, Fourth of July Creek, Tonasket Creek, Lone Ranch Creek, Long Alec Creek, St. Peters Creek, Aeneas Creek, Art Creek, Little Boulder Creek, Deadman Creek, Nancy Creek, Sherman Creek, Roper Creek, and Martin Creek.	**Protect people, structures, and increase firefighter safety** by directly increasing the safety of residents and visitors during a wildfire evacuation situation. Prioritization Score: 45 Priority: High	**Lead:** Ferry County Fire Prevention Coop **Support:** Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, and Stevens/Ferry County Fire Protection District #3 in cooperation with community residents, USFS, DNR, BIA, and BLM.	Year 1 (2006): Develop safe evacuation plans for the communities including alternate routes and safety zones. Send information to residents and hold a public meeting to inform communities.
5.2.i: Conduct hazardous fuel reduction projects in area affected by White Mountain Fire and Togo Fire.	**Protection of people, structures, infrastructure, and economy** by decreasing the risk of wildland fire throughout Ferry County. Prioritization Score: 41 Priority: High	**Lead:** U.S. Forest Service **Support:** County Commissioner's Office and City of Republic	Year 1 (2006): Identify areas near critical infrastructure or private property that have the highest potential fire risk and develop a management plan to reduce the hazardous fuels. Year 3 – 10 (2008-16): Implement project plans.

Table 5.2. WUI Action Items for People and Structures.

Action Item	Goals and Objectives	Responsible Organization	Action Items, Planning Horizon and Estimated Costs
5.2.j: Implement proposed home defensible space projects.	**Protect people, structures, and firefighter safety** by decreasing the fire risk around homes and communities.	**Lead:** Fire Prevention Co-op **Support:** County Commissioners, City of Republic, communities, local homeowners, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, Stevens/Ferry County Fire Protection District #3, Washington Department of Natural Resources, USDA Forest Service, and Bureau of Indian Affairs.	Year 1 (2006): Locate funding source and conduct home site evaluations for structures in mapped project areas. Write project plans for individual landowners. Year 2 (2007): Continue to work with landowners to implement agreed upon project plans.

Defensible Space Project Areas	Acres	Project Cost	Priority Ranking
North Fork St. Peters Creek Project Area	473	Approximately 7 structures at $1,000/per structure constitutes an estimated cost of $7,000.	Medium
Aeneas Creek Project Area	1,066	Approximately 17 structures at $1,000/per structure constitutes an estimated cost of $17,000.	Medium
Lundimo Meadows Project Area	519	Approximately 13 structures at $1,000/per structure constitutes an estimated cost of $13,000.	Medium
North Fork Trout Creek Project Area	279	Approximately 8 structures at $1,000/per structure constitutes an estimated cost of $8,000.	Medium
Rose Valley Project Area	1,598	Approximately 68 structures at $800/per structure constitutes an estimated cost of $54,400	High
Barrett Creek Project Area	2,246	Approximately 79 structures at $1,000/per structure constitutes an estimated cost of $79,000.	High
Trout Creek Project Area	2,061	Approximately 112 structures at $1,000/per structure constitutes an estimated cost of $112,000.	High
Sheridan Project Area	514	Approximately 19 structures at $1,000/per structure constitutes an estimated cost of $19,000.	Medium
Republic Project Area	443	Approximately 116 structures at $900/per structure constitutes an estimated cost of $104,400.	High
Knob Hill Project Area	321	Approximately 16 structures at $900/per structure constitutes an estimated cost of $14,400.	Medium
Old Kettle Falls Project Area	1,863	Approximately 37 structures at $1,000/per structure constitutes an estimated cost of $37,000.	Medium
Fish Hatchery Project Area	886	Approximately 44 structures at $1,000/per structure constitutes an estimated cost of $44,000.	High
Herron Creek Project Area	1,931	Approximately 58 structures at $1,000/per structure constitutes an estimated cost of $58,000.	High
Wolfe Camp Project Area	1,034	Approximately 20 structures at $1,000/per structure constitutes an estimated cost of $20,000.	Medium
Lambert Creek Project Area	1,722	Approximately 70 structures at $1,000/per structure constitutes an estimated cost of $70,000.	High
Upper Lambert Creek Project Area	573	Approximately 8 structures at $1,000/per structure constitutes an estimated cost of $8,000.	Medium
Sherman Project Area	3,463	Approximately 198 structures at $1,000/per structure constitutes an estimated cost of $198,000.	High
St. Peters Creek Project Area	1,103	Approximately 58 structures at $1,000/per structure constitutes an estimated cost of $58,000.	High
East Curlew Ridge Project Area	3,353	Approximately 4 structures at $1,000/per structure constitutes an estimated cost of $4,000.	Medium
Park Addition Project Area	84	Approximately 8 structures at $850/per structure constitutes an estimated cost of $6,800.	Medium

Table 5.2. WUI Action Items for People and Structures.

Action Item	Goals and Objectives	Responsible Organization	Action Items, Planning Horizon and Estimated Costs
5.2.k: Implement proposed Community Defensible Zone projects.	**Protect people, structures, and firefighter safety** by decreasing the fire risk around homes and communities.	**Lead:** Fire Prevention Co-op **Support:** County Commissioners, City of Republic, communities, local homeowners, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, Stevens/Ferry County Fire Protection District #3, Washington Department of Natural Resources, USDA Forest Service, and Bureau of Indian Affairs.	Year 1 (2006): Locate funding source and conduct evaluations. Write project plans for identified community and individual landowners. Years 2-5 (2006-10): Treat high risk wildland fuels from home site defensible space treatments to an area extending beyond home defensible spaces, where steep slopes and high accumulations of risky fuels exist near homes and infrastructure. Should link together home treatment areas. Treatments target high risk concentrations of fuels and not 100% of the area identified. To be completed only after or during the creation of home defensible spaces have been implemented.

Community Defensible Zone Project Areas	Acres	Project Cost	Priority Ranking
North Fork St. Peters Creek Project Area	473	Approximately $700/per acre constitutes an estimated cost of $331,100.	Medium
Aeneas Creek Project Area	1,066	Approximately $700/per acre constitutes an estimated cost of $746,200.	Medium
Lundimo Meadows Project Area	519	Approximately $700/per acre constitutes an estimated cost of $363,300.	Medium
North Fork Trout Creek Project Area	279	Approximately $700/per acre constitutes an estimated cost of $195,300.	Medium
Rose Valley Project Area	1,598	Approximately $500/per acre constitutes an estimated cost of $799,000.	Medium
Barrett Creek Project Area	2,246	Approximately $700/per acre constitutes an estimated cost of $1,572,200.	Medium
Trout Creek Project Area	2,061	Approximately $700/per acre constitutes an estimated cost of $1,442,700.	Medium
Sheridan Project Area	514	Approximately $700/per acre constitutes an estimated cost of $359,800.	Medium
Republic Project Area	443	Approximately $700/per acre constitutes an estimated cost of $310,100.	High
Knob Hill Project Area	321	Approximately $700/per acre constitutes an estimated cost of $224,700.	Medium
Old Kettle Falls Project Area	1,863	Approximately $700/per acre constitutes an estimated cost of $1,304,100.	Medium
Fish Hatchery Project Area	886	Approximately $700/per acre constitutes an estimated cost of $620,200.	Medium
Herron Creek Project Area	1,931	Approximately $700/per acre constitutes an estimated cost of $1,351,700.	Medium
Wolfe Camp Project Area	1,034	Approximately $700/per acre constitutes an estimated cost of $723,800.	Medium
Lambert Creek Project Area	1,722	Approximately $700/per acre constitutes an estimated cost of $1,205,400.	High
Upper Lambert Creek Project Area	573	Approximately $700/per acre constitutes an estimated cost of $401,100.	Medium
Sherman Project Area	3,463	Approximately $700/per acre constitutes an estimated cost of $2,424,100.	Medium
St. Peters Creek Project Area	1,103	Approximately $700/per acre constitutes an estimated cost of $2,800.	Medium
East Curlew Ridge Project Area	3,353	Approximately $700/per acre constitutes an estimated cost of $2,347,100.	Medium

Table 5.2. WUI Action Items for People and Structures.

Action Item	Goals and Objectives	Responsible Organization	Action Items, Planning Horizon and Estimated Costs
Park Addition Project Area	84	Approximately $700/per acre constitutes an estimated cost of $58,800.	Medium
Upper Curlew Lake Project Area	4	Approximately $700/per acre constitutes an estimated cost of $2,800.	Medium
West Kroupa Road Project Area	194	Approximately $700/per acre constitutes an estimated cost of $135,800.	Medium
McMann Project Area	83	Approximately $700/per acre constitutes an estimated cost of $58,100.	Medium
Locke's Trailer Court Project Area	482	Approximately $700/per acre constitutes an estimated cost of $337,400.	Medium

5.6 Infrastructure

Significant infrastructure refers to the communications, transportation (road and rail networks), energy transport supply systems (gas and power lines), and water supply that service a region or a surrounding area. All of these components are important to the eastern Washington area, and to Ferry County specifically. These networks are by definition a part of the Wildland-Urban Interface in the protection of people, structures, **infrastructure**, and unique ecosystems. Without supporting infrastructure a community's structures may be protected, but the economy and way of life lost. As such, a variety of components will be considered here in terms of management philosophy, potential policy recommendations, and mitigation recommendations.

Communication Infrastructure: This component of the WUI seems to be diversified across the county with multiple source and destination points, and a spread-out support network.

Transportation Infrastructure (road and rail networks): This component of the WUI has some significant potential limitations in Ferry County. U.S. Highway 395 and State Routes 20 and 21 are the primary maintained routes linking Ferry County to other major population centers including Spokane and Colville and Grand Forks, British Columbia. Thus, a significant amount of interstate and international traffic travels through the County. Also, State Highways 20 and 21 connect the more remote communities with the commercial hub of Republic. U.S. Highway 395 and State Route 21 also serve as Ports of Entry into British Columbia, Canada. The Deer Creek – Boulder Creek Road is also a maintained highway that is considered a viable evacuation route. Bridge Creek Road, Cache Creek Road, and Manila Creek Road are all paved routes in the southern end of the county that the planning committee has also identified as primary access routes. In the event these highways are disabled, access or evacuation to some areas may become limited to seasonally maintained secondary roads or forest routes.

Other roads in the county have limiting characteristics, such as narrow travel surfaces, sharp turning radii, low load limit bridges and cattle guards, and heavy accumulations of fuels adjacent to, and overtopping some roads. Some of these roads access remote forestland and rangeland areas. While their improvements will facilitate access in the case of a wildfire, they are not the priority for treatments in the county. Roads that have these inferior characteristics and access homes and businesses are the priority for improvements in the county.

Energy Transport Supply Systems (gas and power lines): A number of power lines crisscross Ferry County. Unfortunately, many of these power lines cross over forestland ecosystems. When fires ignite in these vegetation types, the fires tend to be slower moving and burn at relatively high intensities. Additionally, there is a potential for high temperatures and low humidity with high winds to produce enough heat and smoke to threaten power line stability. Most power line corridors have been cleared of vegetation both near the wires and from the ground below. Observations across the county of these high tension power lines lead to the conclusion that the BPA power line crossing over Sherman Pass as well as the main Ferry County Public Utilities District 34.4 kva transmission lines be evaluated for potential widening of the corridor and further removal of brush and other vegetation from the ground below the wires. Nearly all Ferry County residents are dependent on this power grid for electricity. The use of these areas as "fuel breaks" should be evaluated further, especially in light of the treatments enumerated in this plan (e.g., intensive livestock grazing, mechanical treatments, and herbicide treatments).

Water Supply: In many of Washington's communities, water is derived from surface flow that is treated and piped to homes and businesses. When wildfires burn a region, they threaten these watersheds by the removal of vegetation and creation of ash and sediment. As such, watersheds should be afforded the highest level of protection from catastrophic wildfire impacts.

In Ferry County, water is supplied to many homes by single home or multiple home wells. However, the community of Orient depends on the Orient Watershed as its primary water source.

Table 5.3. Infrastructure Enhancements.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.3.a: Post "Emergency Evacuation Route" signs along the identified primary and secondary access routes in the county.	**Protection of people and structures by** informing residents and visitors of significant infrastructure in the county that will be maintained in the case of an emergency. Prioritization Score: 56 Priority: High	**Lead:** County Commissioner's Office **Support:** Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, Stevens/Ferry County Fire Protection District #3, and County Roads Department.	Year 1 (2006): Purchase of signs. Posting roads and make information available to residents of the importance of Emergency Routes.
5.3.b: Thin trees and widen Bonneville Power Transmission Line and main Ferry County Public Utilities District 34.4 kva transmission lines.	**Protection of people and structures** by reducing the risk of an ignition along the line and decreasing the risk of losing these lines in the event of wildland fire in the vicinity. Prioritization Score: 30 Priority: Medium	**Lead:** Ferry County Public Utilities District and Bonneville Power **Support:** County Commissioner's Office	Year 1 (2006): Conduct necessary landowner meetings, feasibility studies, and environmental surveys to determine viability of project and options. Year 2 (2007): Develop forest plan for thinning and widening corridors and hire necessary contractors. Year 3 – 6 (2008-11): Implement project plan.
5.3.c: Create and maintain defensible space around critical infrastructure including communication infrastructure sites, critical structures, petroleum storage sites, water storage sites, and Ferry County PUD Service Stations (e.g. Klondike Mountain, Gold Hill, Chevron bulk plant, City of Republic water storage tank, and Pine Grove water storage reservoir, Curlew High School, Orient Elementary School, and Ferry County Memorial Hospital).	**Protect people, structures, and increase firefighter safety** by decreasing the risk of loss of critical communications infrastructure to wildland fire. Prioritization Score: 57 Priority: High	**Lead:** Ferry County Commissioner's Office **Support:** City of Republic, Pine Grove Water Association, Ferry County Public Utilities District, and various facility/utility owners.	Year 1 (2006): Meet with facility and utility owners operating communications infrastructure in Ferry County and set up a criteria for maintaining a defensible space in these areas. Year 2 (2007): Develop defensible space plans and begin implementing hazardous fuel reduction projects.

Table 5.3. Infrastructure Enhancements.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.3.d: Connect dead end roads in one-way in, one-way out drainages to provide an additional escape route (e.g. South Fork St. Peters Creek Road, Empire Creek Road, and Rose Valley Road).	**Protection of people and structures** by providing better and safer ingress and egress from isolated communities. Prioritization Score: 24 Priority: Low	**Lead:** County Road Department and US Forest Service **Support:** BLM, DNR, BIA, and private landowners.	Year 1 (2006): Conduct full assessment of roads accessing one-way in, one-way out residential areas and determine feasibility of constructing connection roads. Year 2 (2007): Beginning planning and engineering of new roads or rehabilitated roads where determined appropriate. Year 3 (2008): Begin construction or rehabilitation of new connection roads.
5.3.e: Rebuild a two-lane bridge across the Kettle River at Curlew.	**Protection of people and structures** by providing better and safer access between State Route 21 and the community of Curlew. Prioritization Score: 29 Priority: Medium	**Lead:** County Roads Department **Support:** County Commissioner's Office	Year 1 (2006): Locate funding and hire contractor to begin engineering and traffic pattern study. Year 2 – 5 (2007-2010): Locate funding sources and hire a contractor to implement and construct new bridge design.

Table 5.3. Infrastructure Enhancements.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.3.f: Access improvements of bridges, cattle guards, culverts, and limiting road surfaces (e.g. McMann Creek Bridge, McMann Creek Road, Herron Creek Road, Lambert Creek Road, Customs Road, Gold Mountain Road, Gun Club Road, and Kettle River Road).	**Protection of people, structures, infrastructure, and economy** by improving access for residents and firefighting personnel in the event of a wildfire. Reduces the risk of a road failure that leads to the isolation of people or the limitation of emergency vehicle and personnel access during an emergency. Prioritization Score: 44 Priority: High	**Lead:** County Roads Department **Support:** County Commissioner's Office, BLM, State of Washington (Lands and Transportation), USFS, BIA, and industrial forestland owners (e.g., Forest Capital, LLC.).	Year 1 (2006): Update existing assessment of travel surfaces, bridges, and cattle guards in Ferry County as to location. Secure funding for implementation of this project (grants) Year 2 (2007): Conduct engineering assessment of limiting weight restrictions for all surfaces (e.g., bridge weight load maximums). Estimate cost of $1,000,000 which might be shared between County, BLM, USFS, State, and private based on landownership associated with road locations. Year 2 (2007): Post weight restriction signs on all limiting crossings, copy information to rural fire districts and wildland fire protection agencies in affected areas. Estimate cost at roughly $15-$25,000 for signs and posting. Year 3 (2008): Identify limiting road surfaces in need of improvements to support wildland firefighting vehicles and other emergency equipment. Develop plan for improving limiting surfaces including budgets, timing, and resources to be protected for prioritization of projects (benefit/cost ratio analysis). Create budget based on full assessment.
5.3.g: Fuels mitigation of the "Emergency Evacuation Routes" in the county to insure these routes can be maintained in the case of an emergency.	**Protection of people and structures by** providing residents and visitors with ingress and egress that can be maintained during an emergency. Prioritization Score: 51 Priority: High	**Lead:** County Commissioner's Office **Support:** State of Washington (Lands and Transportation), County Roads Department, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, and Stevens/Ferry County Fire Protection District #3.	Year 1 (2006): Full assessment of road defensibility and ownership participation. Implementation of projects (linked to item 5.2.i and 5.2.j.

Table 5.3. Infrastructure Enhancements.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.3.h. Watershed Management Plan development for the Orient Watershed.	**Sustainability** by increasing the probability that communities will have safe drinking water following a wildfire that burns in the community watershed. Prioritization Score: 39 Priority: Medium	**Lead:** County Commissioner's Office **Support:** Orient Community, USFS, and private landowners.	Year 1 (2006): Identify landowners and seek funding to implement the planning process. Implementation of projects based on results of watershed management plans.
5.3.i: Conduct roadside fuels management of Deer Creek – Boulder Creek Highway Infrastructure WUI.	**Protection of people, structures, infrastructure, and economy** by improving access for residents and firefighting personnel in the event of a wildfire. Allows for a road based defensible area that can be linked to a terrain based defensible areas. Prioritization Score: 36 Priority: Medium	**Lead:** Ferry County Road Department **Support:** County Commissioner's Office, USFS, DNR, and private landowners.	Year 1 (2006): Conduct assessment along highway corridor and begin development of a project action plan to reduce fuels and subsequently the potential fire hazard along this corridor. Target at least 200' from each side of the road for an estimated cost of approximately $700 per acre treated. Year 2 (2007): Secure funding and begin laying out specific project areas. Year 3 – 8 (2008-2013): Implement projects.
5.3.j: Conduct roadside fuels management of State Route 20 Infrastructure WUI.	**Protection of people, structures, infrastructure, and economy** by improving access for residents and firefighting personnel in the event of a wildfire. Allows for a road based defensible area that can be linked to a terrain based defensible areas. Prioritization Score: 36 Priority: Medium	**Lead:** State of Washington (Lands and Transportation) **Support:** Ferry County Road Department, USFS, and private landowners.	Year 1 (2006): Conduct assessment along highway corridor and begin development of a project action plan to reduce fuels and subsequently the potential fire hazard along this corridor. Target at least 200' from each side of the road for an estimated cost of approximately $700 per acre treated. Year 2 (2007): Secure funding and begin laying out specific project areas. Year 3 – 8 (2008-2013): Implement projects.

Table 5.3. Infrastructure Enhancements.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.3.k: Conduct roadside fuels management of Bridge Creek Infrastructure WUI.	**Protection of people, structures, infrastructure, and economy** by improving access for residents and firefighting personnel in the event of a wildfire. Allows for a road based defensible area that can be linked to a terrain based defensible areas. Prioritization Score: 36 Priority: Medium	**Lead:** Bureau of Indian Affairs **Support:** County Roads Department, County Commissioner's Office, and private landowners.	Year 1 (2006): Conduct assessment along road corridor and begin development of a project action plan to reduce fuels and subsequently the potential fire hazard along this corridor. Target at least 200' from each side of the road for an estimated cost of approximately $700 per acre treated. Year 2 (2007): Secure funding and begin laying out specific project areas. Year 3 – 8 (2008-2013): Implement projects.
5.3.l: Access improvements through road-side fuels management (e.g. U.S. Highway 395, State Route 21, Swamp Creek Road, Lundimo Meadows Road, Empire Creek Road, Kettle River Road, Customs Road, Toroda Creek Road, Little Goosmus Creek Road, Big Goosmus Creek Road, Fourth of July Creek Road, St. Peters Creek Road, Art Creek Road, and Deadman Creek Road.)	**Protection of people, structures, infrastructure, and economy** by improving access for residents and firefighting personnel in the event of a wildfire. Allows for a road based defensible area that can be linked to a terrain based defensible areas. Prioritization Score: 46 Priority: High	**Lead:** County Roads Department **Support:** County Commissioner's Office, BLM, State of Washington (Lands and Transportation), USFS, and private landowners.	Year 1 (2006): Update existing assessment of roads in Ferry County as to location. Secure funding for implementation of this project (grants). Year 2 (2007): Specifically address access issues to Trout Creek Road, Herron Creek Road, Lone Ranch Creek Road, and others identified in assessment, such as the Highway 395 and 21 corridors. Identify forestland and rangeland fuels difficult to control during wildfire that would also respond well to thinning, pruning, and brush cutting (hand pile and burn or chip), while increasing ingress and egress use in wildfire emergencies. Target 200' from each side of the road for estimated cost of $23,000 per mile of road treated. Year 3 (2008): Secure funding and implement projects to treat road-side fuels.

Table 5.3. Infrastructure Enhancements.

Action Item	Goals and Objectives		Responsible Organization	Action Items & Planning Horizon
5.3.m:Roadside Fuels Treatments Specifically for Project Areas	**Miles**	**Acres**	**Project Cost**	**Priority Ranking**
North Fork St. Peters Creek Project Area	1.2	59	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $40,995 for this project area.	Medium
Aeneas Creek Project Area	4.6	211	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $147,555 for this project area.	Medium
Lundimo Meadows Project Area	3.3	147	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $102,662 for this project area.	Medium
North Fork Trout Creek Project Area	1.0	50	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $34,796 for this project area.	Medium
Rose Valley Project Area	11.2	491	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $344,027 for this project area.	Medium
Barrett Creek Project Area	13.2	562	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $393,699 for this project area.	High
Trout Creek Project Area	14.4	621	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $434,690 for this project area.	High
Sheridan Project Area	3.4	151	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $105,767 for this project area.	Medium
Republic Project Area	5.0	195	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $136,358 for this project area.	High
Knob Hill Project Area	1.3	60	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $41,748 for this project area.	Medium
Old Kettle Falls Project Area	10.6	488	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $341,434 for this project area.	Medium
Fish Hatchery Project Area	3.7	173	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $120,766 for this project area.	High

Table 5.3. Infrastructure Enhancements.

Action Item	Goals and Objectives		Responsible Organization	Action Items & Planning Horizon
5.4.m: Roadside Fuels Treatments Specifically for Project Areas	**Miles**	**Acres**	**Project Cost**	**Priority Ranking**
Herron Creek Project Area	11.7	514	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $360,150 for this project area.	Medium
Wolfe Camp Project Area	5.0	222	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $155,725 for this project area.	Medium
Lambert Creek Project Area	7.6	345	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $241,566 for this project area.	Medium
Upper Lambert Creek Project Area	5.4	236	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $165,289 for this project area.	Medium
Sherman Project Area	19.2	823	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $576,252 for this project area.	Medium
St. Peters Creek Project Area	5.2	242	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $169,739 for this project area.	High
Park Addition Project Area	1.4	42	Commercial and precommercial thinning and pruning within 200 feet from each side of the roadway cost approximately $700 per acre totaling $29,737 for this project area.	Medium

5.7 Resource and Capability Enhancements

There are a number of resource and capability enhancements identified by the rural and wildland firefighting districts in Ferry County. All of the needs identified by the districts are in line with increasing the ability to respond to emergencies in the WUI and are fully supported by the core team.

Specific repeated themes of needed resources and capabilities include:

- Retention and recruitment of volunteers
- Update firefighting equipment countywide
- Improved road and house number signage
- Training and development of rural firefighters in structure and wildland fire

Although additional, and specific, needs were enumerated by the districts in Ferry County, these items were identified by multiple districts and in the public meetings. The implementation of each issue will rely on either the isolated efforts of the rural fire districts or a concerted effort by the county to achieve equitable enhancements across all of the districts. Given historic trends, individual departments competing against neighboring departments for grant monies and equipment will not necessarily achieve countywide equity. However, the County Emergency Management and Homeland Security Department may be an organization uniquely suited to work with all of the districts in Ferry County and adjacent counties to assist in the prioritization of needs across district and even county lines. Once prioritized, the Emergency Management and Homeland Security Department is in a position to assist these districts with identifying, competing for, and obtaining grants and equipment to meet these needs.

Table 5.4. WUI Action Items in Firefighting Resources and Capabilities.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.4.a: Enhance radio availability in each district, link in to existing dispatch, improve range within the region, and conversion to consistent standard of radio types.	**Protection of people and structures** by direct firefighting capability enhancements. Prioritization Score: 57 Priority: High	**Lead:** Homeland Security Coordinator **Support:** Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, Stevens/Ferry County Fire Protection District #3, wildland fire agencies, and Ferry County Commissioners.	Year 1 (2006): Summarize existing two-way radio capabilities and limitations. Identify costs to upgrade existing equipment and locate funding opportunities. Year 2 (2007): Acquire and install upgrades as needed.
5.4.b: Retention of volunteer firefighters.	**Protection of people and structures** by direct firefighting capability enhancements. Prioritization Score: 30 Priority: High	**Lead:** Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, and Stevens/Ferry County Fire Protection District #3 **Support:** Wildland fire agencies working with broad base of county citizenry.	5 Year Planning Horizon, extended planning time frame. Target an increased recruitment (+10%) and retention (+20% longevity) of volunteers. Year 1 (2006): Develop incentives program and implement it.

Table 5.4. WUI Action Items in Firefighting Resources and Capabilities.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.4.c: Establish and map onsite water sources such as hydrants or underground storage tanks and drafting or dipping sites.	**Protection of people and structures** by direct firefighting capability enhancements. Prioritization Score: 43 Priority: High	**Lead:** County Commissioner's Office **Support:** Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, and Stevens/Ferry County Fire Protection District #3.	Year 1 (2006): Identify populated areas lacking sufficient water supplies and develop project plans to develop a permanent water source or drafting/dipping sites. Implement project plans and begin mapping (GPS) known water sources and drafting/dipping sites to be provided to fire response agencies and County offices.
5.4.d: Develop e911 map capabilities to provide travel directions to specific addresses.	**Protection of people and structures** by direct emergency response capability enhancements. Prioritization Score: 40 Priority: High	**Lead:** Ferry County Sheriff's and e911 System **Support:** County Commissioner's Office	Year 1 (2006): Find funding to obtain e911 System and provide training on its use to Ferry County dispatchers and emergency personnel. Year 1 (2006): Install e911 system.
5.4.e: Expand Ferry County's ability to support wildland fire incidents of greater severity and extended attack.	**Protection of people and structures** by direct emergency response capability enhancements. Prioritization Score: 24 Priority: High	**Lead:** Ferry County Homeland Security Coordinator **Support:** Ferry County Sheriff's Office, e911 System, TriCo Economic Development District, Ferry County Chamber of Commerce, Stone Soup, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, Stevens/Ferry County Fire Protection District #3, USFS, DNR, BIA, and BLM.	Year 1 (2006): Develop an expanded dispatch plan with an organization chart, position descriptions, qualification criteria, and training requirements. Year 1 -2 (2006-2007): Develop a system of agreements and MOUs between County government departments as well as with other agencies to facilitate the use of closest resources and training personnel. Year 2 (2007): Develop dispatch protocols for fire reporting and incident locations between Ferry County e911, Northeast DNR dispatch, and Colville National Forest dispatch. Year 2 (2007): Develop a business support program to assist local personnel and equipment operators to meet training and equipment standards to enable them to become available for firefighting dispatch opportunities locally, regionally, and nationally.

Table 5.4. WUI Action Items in Firefighting Resources and Capabilities.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.4.f: Increased training and capabilities of firefighters.	**Protection of people and structures** by direct fire fighting capability enhancements. Prioritization Score: 30 Priority: High	**Lead:** Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, and Stevens/Ferry County Fire Protection District #3/#8 **Support:** BLM, BIA, DNR, USFS, and State Fire Marshall's Office.	Year 1 (2006): Develop a multi-county training schedule that extends 2 or 3 years in advance (continuously). Identify funding and resources needed to carry out training opportunities and sources of each to acquire. Year 1 (2006): Begin implementing training opportunities for volunteers.
5.4.g: Facility, land, and basic equipment for a satellite station in West Lake neighborhood.	**Protection of people and structures** by direct firefighting capability enhancements. Prioritization Score: 33 Priority: Medium	**Lead:** Ferry/Okanogan County Fire Protection District #13.	Year 1 (2006): Verify stated need still exists, develop budget, and locate funding and equipment (surplus) sources. Year 1 or 2 (2006-07): Acquire and deliver needed materials and equipment.
5.4.h: Establish a Fire/EMS Repeater to cover dead spots between Curlew and Malo.	**Protection of people and structures** by direct firefighting capability enhancements. Prioritization Score: 40 Priority: High	**Lead:** Ferry County Homeland Security Coordinator **Support:** County Commissioner's Office, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, Ferry County Sheriff's Office, and Ferry County Dispatch.	Year 1 (2006): Survey area to located exact dead spots and find a repeater location that will cover these areas. Year 2 (2007): Obtain funding and acquire and install needed equipment.
5.4.i: Obtain a newer water tender for the East Lake Fire Station.	**Protection of people and structures** by direct firefighting capability enhancements. Prioritization Score: 26 Priority: Medium	**Lead:** Ferry/Okanogan County Fire Protection District #13.	Year 1 (2006): Verify stated need still exists, develop budget, and locate funding and equipment (surplus) sources. Year 1 or 2 (2006-07): Acquire and deliver needed materials and equipment.
5.4.j: Obtain newer rolling stock to replacing aging equipment at Ferry/Okanogan Fire Protection District #14 stations.	**Protection of people and structures** by direct firefighting capability enhancements. Prioritization Score: 29 Priority: Medium	**Lead:** Ferry/Okanogan County Fire Protection District #14.	Year 1 (2006): Verify stated need still exists, develop budget, and locate funding and equipment (surplus) sources. Year 1 or 2 (2006-07): Acquire and deliver needed materials and equipment.

Table 5.4. WUI Action Items in Firefighting Resources and Capabilities.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.4.k: Obtain a 3,000 gallon water tender for Ferry/Okanogan Fire District #14.	**Protection of people and structures** by direct firefighting capability enhancements. Prioritization Score: 31 Priority: Medium	**Lead:** Ferry/Okanogan County Fire Protection District #14.	Year 1 (2006): Verify stated need still exists, develop budget, and locate funding and equipment (surplus) sources. Year 1 or 2 (2006-07): Acquire and deliver needed materials and equipment.
5.4.l: Annex private lands in the Deadman/Matsen areas into local fire district. This will require a new station, rolling stock, and additional volunteers.	**Protection of people and structures** by direct firefighting capability enhancements. Prioritization Score: 31 Priority: Medium	**Lead:** Stevens/Ferry County Joint Fire Protection District #8/#3 **Support:** County Commissioner's Office and local residents.	Year 1 (2006): Determine interest among affected communities and landowners. Provide materials, resources and assistance for those community members interested in chartering new districts. Year 2 (2007): Complete cost estimates and begin researching funding opportunities and potential locations. Year 3 – 4 (2008-09): Begin construction on new facility. Acquire needed rolling stock, equipment, and volunteers.
5.4.m: Improve safety equipment and PPE's for all Fire Protection Districts in Ferry County.	**Protection of people and structures** by direct fire fighting capability enhancements. Prioritization Score: 45 Priority: High	**Lead:** Homeland Security Coordinator **Support:** County Commissioners, Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, and Stevens/Ferry County Fire Protection District #3.	Year 1 (2006): Complete an inventory of all supplies held by the Fire Protection Districts (boots, turnouts, Nomex, gloves, modern lighting, straps, and hardware), and complete a needs assessment matching expected replacement schedule. Develop countywide re-supply process for needed equipment.
5.4.n: Create a County entity to compile wildfire data from all agencies in the County.	Protection of people and structures by having complete and accurate historical records of fires. Prioritization Score: 31 Priority: Medium	**Lead:** Ferry County Commissioners **Support:** Ferry/Okanogan County Fire Protection District #13, Ferry/Okanogan County Fire Protection District #14, Stevens/Ferry County Fire Protection District #3, USFS, BLM, DNR, and Colville Agency BIA.	Year 1 (2006): Create budget and work plan for new County part time position. Year 2 (2007): Advertise job opening and select best candidate.

5.8 Regional Land Management Recommendations

Reference has been given to the role that forestry, grazing and agriculture have in promoting wildfire mitigation services through active management. Ferry County is a rural county by any measure. It is dominated by wide expanses of forest and rangelands intermixed with communities and rural houses.

Wildfires will continue to ignite and burn depending on the weather conditions and other factors enumerated earlier. However, active land management that modifies fuels, promotes healthy range and forestland conditions, and promotes the use of these natural resources (consumptive and non-consumptive) will insure that these lands have value to society and the local region. We encourage the US Forest Service, the Bureau of Land Management, the Washington Department of Natural Resources, the Colville Reservation, industrial forestland owners, private forestland owners, and all agricultural landowners in the region to actively manage their wildland-urban interface lands in a manner consistent with reducing fuels and risks in this zone.

5.8.1 National Park Service

5.8.1.1 Haag Cove – 27 Acres

Stand Description: The unit consists primarily of overpopulated Ponderosa pine with a component of Douglas-fir in the overstory. There evidence of Western Pine beetle activity and root diseases resulting in the death of overstory trees and heavy fuel concentrations in the 1000 hr size class. Regeneration in the stand is prolific with an average spacing of less than one feet. These factors of overcrowding combined with insects and disease is leading to an increase in the fuel load. This will continue to happen unless intervention until a wildfire ignites in the area.

Douglas-fir because of its shade tolerance is encroaching in the stand and larger amounts of fir regen-eration are present than would normally be found in a natural fire regime in this plant community type. The plant community type is pinus Ponderosa/symphorocarpus Alba as defined in the Monitoring Plan by Karen Kopper.

Objectives: The primary objective of thinning and burning treatments of this unit is to provide protection from wildfire to the neighboring resort of Whispering Pines. There are structues within 300 feet of the edge of this unit. The risk needs to be mitigated. Management action is directed by the Lake Roosevelt Fire Management plan and required by NPS policy in RM-18.

The secondary objective is to provide for overall forest health by releasing overcrowded trees so they are better able to defend against insects or disease. Prescribed burning will also increase overall forest health by reintroducing the natural fire regime. This will bring the stand back to a more natural condition by reducing fuel load leaving healthier individual trees.

This understory burning will also naturally select for fire resistant species and individuals increasing the health of the stand by giving a nutrient release and beginning reintroduction of fire in the ecosystem.

5.8.1.2 Whispering Pines – 35 Acres

Stand Description: The unit consists primarily of overpopulated Ponderosa pine with a component of Douglas-fir in the overstory. The average crown ratio is on the decline, but still averages over 50 percent with a range of 20 percent to 80 percent. There is recent Western Pine beetle activity in the stand resulting in dying of some of the overstory trees. A pocket of laminated root rot was observed in the stand resulting in the death of all trees in a one-acre

section. A large number of trees in the stand are losing epinastic control. This is occurring with great frequency in the 3-6” diameter age class as a result of overpopulation and interruption in the natural fire regime. These factors of overcrowding combined with insects and disease already present is leading to an increase in the fuel load. This will continue to happen unless intervention or until a wildfire ignites in the area.

Douglas-fir because of its shade tolerance is encroaching in the stand and larger amounts of fir regen-eration are present than would normally be found in a natural fire regime in this plant community type. The plant community type is pinus Ponderosa/symphorocarpus Alba as defined in the Monitoring Plan by Karen Kopper.

Objectives: The primary objective of thinning and burning treatments of this unit is to provide protection from wildfire to the neighboring resort of Whispering Pines. There are about 50 campsites adjacent to and about 5 structures within 30 feet of the edge of this unit. The risk to and by these improvements needs to be mitigated. Management action is directed by the Lake Roosevelt Fire Management plan and required by NPS policy in RM-18.

The secondary objective is to provide for overall forest health by releasing overcrowded trees so they are better able to defend against insects or disease. Prescribed burning will also increase overall forest health by re-introducing the natural fire regime. This will bring the stand back to a more natural condition by reducing fuel load leaving healthier individual trees. This management action is also directed by NPS policy in RM-18.

5.8.1.3 Kettle River Arm – 27 Acres

Description: The stand within the campground is a single storied stand comprised solely of Ponderosa pine with a diameter at breast height range of 8 to 20 inches with and average diameter of 11 inches with no pine regeneration in the understory. As an overstocked single aged stand it is at risk for an entire stand loss.

The remainder of the unit is clearly a two-storied stand primarily of Ponderosa pine (>98%) with a component of Douglas-fir (<2%). The average dbh of the overstory trees is roughly 18 inches. The average diameter of the understory trees is 2 inches. It is a semi-open grown stand with stand structure closer to historic norms than in the campground itself or other stands within the recreation area. This area can be treated with prescribed fire.

Goals: The primary objective of thinning and burning treatments of this unit is to provide protection from wildfire to residences in the area This management action is directed by the National Fire Plan and by NPS policy in DO and RM-18.

An added benefit to this area will be the release of overcrowded trees enabling them to defend against insects and disease. This reduction in insects and disease ensures reduced fire hazard well into the future.

Treatments:

Within Campground

The slash created from thinning will be chipped on site and chips will be cast back into the unit to a depth of less than 2 inches, moving either the hopper or driving forward as work progresses.

Outside of Campground

The polygon between the campground and the marshy opening to the west where the stand is semi-open grown, will be understory burned to return fire into the ecosystem. This fire will

provide the necessary thinning of the stand and select fire resistant species and individuals, reduce fire hazard, increase understory species diversity and thus improve wildlife habitat.

5.8.1.4 Sherman Creek – 10.5 Acres

Fuel Reduction Activities in the vicinity of Special Use Zones will be actively managed for restoration of the naturalized area. In this case however, there are cabins on L. Roosevelt leased lands. These areas cannot be restored completely. Firewise landscapes will be maintained to the extent possible.

5.8.1.5 Napolean to Railroad – 60.1 Acres

Developed Recreation: Fuel Reduction Activities in Developed Recreation Zones will be actively managed for restoration of the naturalized area. In order to maintain these areas, vegetation will be manually thinned in conjunction with prescribed burns, basal area will reflect silvilculture prescriptions. Pre reservoir routes may be used to access these areas. In many cases, routes do not exist, no heavy equipment on slopes greater than 25 percent will be allowed. Skid trails will be water-barred and seeded after skidding operations if necessary.

Slash will be left on site in preparation for prescribed burns through the area. However, the amount of slash left on site should not provide a nursery for IPS. Cooperative association will be sought with the USFS Wenatchee Forest Pest Office. To mitigate any potential impacts to visitor and public enjoyment, informational and interpretive messages would inform and educate visitors and the public about the historic role of fire in these ecosystems and the objectives of fuel reduction techniques.

5.8.2 Washington Department of Natural Resources

5.8.2.1 DNR Projects in Strategic Planning Area #1

5.8.2.1.1 Trout Creek T.S. Area – 654 Acres

Objective: Break up fuels continuity with commercial timber harvest. Create fuels break along roads and property lines by treating created slash within harvest units. In addition, reduce ladder fuels in the leave areas between units but in strategic areas.

Possible Techniques: harvest, thinning, piling, and burning

5.8.2.1.2 Lambert Creek Road

Objective: Create fuels break along mainline road by reducing fuels loading and ladder fuels.

Possible Techniques: thinning, piling, and burning

5.8.2.1.3 Mires Creek T.S. Area – 752 Acres

Objective: Break up fuels continuity with commercial timber harvest. Create fuels break along roads and property lines by treating created slash within harvests units. In addition, reduce ladder fuels in the leave areas between units but in strategic areas. Protect integrity of transmission lines with treatments.

Possible Techniques: harvest thinning, piling, and burning

5.8.2.1.4 North Storm King T.S. Area – 1,772 Acres

Objective: Break up fuels continuity with commercial timber harvest. Create fuels break along roads and property lines by treating created slash within harvests units. In addition, reduce ladder fuels in the leave areas between units but in strategic areas.

Possible Techniques: harvest thinning, piling, and burning

5.8.2.1.5 San Poil T.S. Area – 629 Acres

Objective: Break up fuels continuity with commercial timber harvest. Create fuels break along roads and property lines by treating created slash within harvests units. In addition, reduce ladder fuels in the leave areas between units but in strategic areas.

Possible Techniques: harvest thinning, piling, and burning

5.8.2.1.6 BPA Transmission Line Area – 359 Acres

Objective: Protect critical infrastructure of the power line.

Possible Techniques: harvest, thinning, piling, and burning

5.8.2.1.7 O'Brien Creek Fuels Reduction Area – 659 Acres

Objective: Break up fuels continuity with commercial timber harvest. Create fuels break along roads and property lines by treating created slash within harvests units. In addition, reduce ladder fuels in the leave areas between units but in strategic areas.

Possible Techniques: harvest thinning, piling, and burning

5.8.2.1.8 San Poil Rim Area – 1,587 Acres

Objective: Break up fuels continuity with commercial timber harvest. Create fuels break along roads and property lines by treating created slash within harvests units. In addition, reduce ladder fuels in the leave areas between units but in strategic areas.

Possible Techniques: harvest thinning, piling, and burning

5.8.2.1.9 Swan Lake Road – 233 Acres

Objective: Create fuels break along mainline road by reducing fuels loading and ladder fuels.

Possible Techniques: thinning, piling, and burning

5.8.2.2 DNR Projects in Strategic Planning Area #2

5.8.2.2.1 Graphite Mountain Area – 835 Acres

Objective: Break up fuels continuity with commercial timber harvest. Create fuels break along roads and property lines by treating created slash within harvest units. In addition, reduce ladder fuels in the leave areas between units but in strategic areas.

Possible Techniques: harvest, thinning, piling, and burning

5.8.2.2.2 North Vulcan Mountain Area – 1,031 Acres

Objective: Break up fuels continuity with commercial timber harvest. Create fuels break along roads and property lines by treating created slash within harvest units. In addition, reduce ladder fuels in the leave areas between units but in strategic areas.

Possible Techniques: harvest, thinning, piling, and burning

5.8.2.2.3 Goosmus Area – 2,422 Acres

Objective: Break up fuels continuity with commercial timber harvest. Create fuels break along roads and property lines by treating created slash within harvest units. In addition, reduce ladder fuels in the leave areas between units but in strategic areas.

Possible Techniques: harvest, thinning, piling, and burning

5.8.2.2.4 Lundimo T.S. Area – 607 Acres

Objective: Break up fuels continuity with commercial timber harvest. Create fuels break along roads and property lines by treating created slash within harvests units. In addition, reduce ladder fuels in the leave areas between units but in strategic areas.

Possible Techniques: harvest thinning, piling, and burning

5.8.2.2.5 Boulder Pass Area – 1,030 Acres

Objective: Break up fuels continuity with commercial timber harvest. Create fuels break along roads and property lines by treating created slash within harvests units. In addition, reduce ladder fuels in the leave areas between units but in strategic areas.

Possible Techniques: harvest thinning, piling, and burning

5.8.2.2.6 Long Alec Creek Area – 2,237 Acres

Objective: Break up fuels continuity with commercial timber harvest. Create fuels break along roads and property lines by treating created slash within harvest units. In addition, reduce ladder fuels in the leave areas between units but in strategic areas.

Possible Techniques: harvest, thinning, piling, and burning

5.8.3 USDA Forest Service Projects

Federal laws require the US Forest Service to conduct environmental reviews when undertaking any action on federal land. The National Environmental Policy Act (NEPA) of 1969 is the basic law which mandates the government to conduct an analysis. The level of analysis required is dependent on the action being proposed and what potential effects to the environment may be brought forth by the action.

NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. As part of the Healthy Forests Initiative (HFI), the Forest Service has been granted authority to conduct streamlined analysis if proposed actions fall under certain categories and it has been demonstrated that further analysis is not needed. How the public is involved in the decision making is also different under HFI projects. One of the public involvement strategies includes using a collaborative approach to decision making such as working with County mitigation groups to help define project needs

and priorities. It is the intent of the Forest Service to meet with the Ferry County CWPP core team to seek input on prioritizing Forest Service Projects. The Forest Service feels it is important to keep this group active to help coordinate local state and federal fuels projects.

Table 5.5 shows a tentative list of projects from the Colville National Forest 5 – Year Action Plan and contains a mix of fuels reduction projects and/or timber sales. The type of contracting method will depend on the kind of work that is planned. This list of projects and estimated dates may vary according to recommendations from the Ferry County Community Wildfire Protection Plan and available funding for agency personnel. Each project is likely to involve a mix of treatment options ranging from commercial timber harvest to precommercial thinning, ladder fuel reduction, fuel breaks, mechanical piling, hand piling, and prescribed fire. Treatment options will be chosen based upon the inputs of a team of interdisciplinary specialists and public participants.

Table 5.5. USDA Forest Service List of Proposed Projects in Ferry County as of May 23rd, 2006.

Environmental Analysis Document	Anticipated Project	Estimated Contract Date	Estimated Decision Notice Date	Potential Treatment Acres
Bangs	Bangs Stewardship	2006	2005	4388
Deadman	Deadman Stewardship	2006	2005	1400
Trout Vegetation Management Project	Trout North Timber Sale	2006	2006	2115
Herron Fuel Reduction Project	Herron Stewardship	2007	2006	1092
Trout Vegetation Management Project	Trout West	2008	2006	1399
Ferry County WUI Phase 1 – Malo/East Lake	Malo – Eastlake	2007	2007	3376
Ferry County WUI Phase 2 – Lambert/Karamip	Lambert – Karamip	2010	2008	?
Vulcan	Vulcan	2009	2006	5292

Chapter 6: Supporting Information

6

6.1 List of Tables

Table 2.1. Emergency Services Training received by household. 20
Table 2.2. Percent of homes with indicated fire fighting tools in Ferry County. 20
Table 2.3. Fuel Hazard Rating Worksheet 21
Table 2.4. Percent of respondents in each risk category as determined by the survey respondents. 22
Table 2.5. Public Opinion of Hazard Mitigation Funding Preferences. 22
Table 2.6. Public meeting slide show. 24
Table 3.1. Selected demographic statistics for Ferry County, Washington, from Census 2000. 28
Table 3.2. Income in 1999. 30
Table 3.3. Poverty Status in 1999 (below poverty level). 30
Table 3.4. Employment and Industry. 31
Table 3.5. Class of Worker. 32
Table 3.6. Ownership Categories in Ferry County. 33
Table 3.7. National Register of Historic Places in Ferry County, Washington. 39
Table 3.8. Lookouts, Repeater Towers, and Communication Site Locations. 41
Table 3.9. Vegetative Cover Types in Ferry County. 42
Table 3.10. Monthly climate records for Republic, Ferry County, Washington. 42
Table 3.11. Monthly climate records for Laurier, Ferry County, Washington. 43
Table 3.12. Monthly climate records for Inchelium, Ferry County, Washington. 43
Table 3.13. Municipal Water Sources in Ferry County. 48
Table 4.1. Summary of wildfire ignitions in Ferry County from aggregated DNR, Colville Tribe, and USFS database. 56
Table 4.2. Wildfire Ignition and Extent Summary by Year from aggregated DNR, Tribe, and USFS database 1983-2005. 57
Table 4.3. Fire Calls Recorded by Ferry County Joint Fire Protection District #3. 59
Table 4.4. Fire Calls Recorded by Ferry/Okanogan County Fire Protection District #13. 60
Table 4.5. Fire Calls Recorded by Ferry/Okanogan County Fire Protection District #14. 60
Table 4.6. National Fire Season Summaries. 61
Table 4.7. Total Fires and Acres 1960 - 2004 Nationally. 62
Table 4.8. Suppression Costs for Federal Agencies Nationally. 63
Table 4.9. Fire Prone Landscape rankings and associated acres in each category for Ferry County. 69
Table 4.10. Assessment of Historic Fire Regimes in Ferry County. 70
Table 4.11. Fire Regime Condition Class Definitions. 72

Table 4.12. Assessment of Current Condition Class in Ferry County. 72
Table 4.13. Fire Regime Condition Class by Historical Fire Frequency. 73
Table 4.14. Ferry County Communities. 79
Table 4.15. Equipment Resources at Orient Station. 116
Table 4.16. Equipment Resources at Barney's Junction Station. 116
Table 4.17. Equipment Resources at Hagg's Cove Station. 116
Table 4.18. Equipment Resources at Barstow Station. 117
Table 4.19. Equipment Resources at Tipton Station. 117
Table 4.20. Fire District #13 Station #1 Equipment List. 121
Table 4.21. Fire District #13 East Lake Fire Station Equipment List. 122
Table 4.22. Fire District #14 Equipment List. 123
Table 4.23. Spokane District Office Equipment List. 129
Table 4.24. Wenatchee Field Office Equipment List. 129
Table 4.25. Republic Ranger District Equipment List. 132
Table 4.26. Three Rivers Ranger District Equipment List. 132
Table 5.1. WUI Action Items in Safety and Policy. 140
Table 5.2. WUI Action Items for People and Structures. 144
Table 5.3. Infrastructure Enhancements. 153
Table 5.4. WUI Action Items in Firefighting Resources and Capabilities. 160
Table 5.5. USDA Forest Service List of Proposed Projects in Ferry County as of May 23rd, 2006. 169
Table 6.1. List of Preparers 172

6.2 List of Figures

Figure 2.1. Article in the Republic News-Miner on February 16th, 2006. 17

Figure 2.2. Article in the Republic News-Miner on May 4th, 2006. 18

Figure 2.3. Public meeting announcement for May 2006 meetings. 23

Figure 2.4. Public Meeting Slideshow as presented by NMI. 24

Figure 4.1. Wildfire Ignitions in Ferry County from aggregated DNR, Tribe, and USFS database 1983-2005.. 57

Figure 4.2. Number of Ignitions per Year by Agency 1983 – 2005. 59

Figure 4.3. Total Ferry County Fire Department Calls from 1997 – 2004. 61

Figure 4.4. Acres burned in DNR Protection Areas 1970-2005. 64

Figure 4.5. Distribution of Fire Prone Landscapes in Ferry County by ranking scale 69

Figure 4.6. Fire Regime Condition Class by Historic Fire Regime in Ferry County 74

6.3 List of Preparers

The following personnel participated in the formulation, compilation, editing, and analysis of alternatives for this assessment.

Table 6.1. List of Preparers

Name	Affiliation	Role
William E. Schlosser, Ph.D.	Northwest Management, Inc.	**Lead Author,** Project Co-Manager, GIS Analyst, Natural Resource Economist, Hazard Mitigation Specialist, Regional Planner
Tera R. King, B.S.	Northwest Management, Inc.	Natural Resource Manager, Project Co-Manager, Hazard Mitigation Specialist
Vaiden E. Bloch, M.S.	Northwest Management, Inc.	GIS Analyst
Vincent P. Corrao, B.S.	Northwest Management, Inc.	Resource Management Specialist, Deputy Project Manager
John A. Erixson, M.S.	Northwest Management, Inc.	Range Management, Fire Specialist
Dennis S. Thomas	Northwest Management, Inc.	Fire & Fuels Specialist, Prescribed Burning Manager
Greg Bassler, M.S.	Northwest Management, Inc.	Roads Engineer, Timber Sale Layout & Harvest Manager
Brad Miller	Ferry County Commissioner	Core Team Chairman
John Foster Fanning	Ferry/Okanogan Fire Protection District and Washington Department of Natural Resources	Core Team Coordinator

6.4 Signature Pages

This **Ferry County Community Wildfire Protection Plan** has been developed in cooperation and collaboration with the representatives of the following organizations, agencies, and individuals.

6.4.1 Local Government

6.4.1.1 Resolution of Adoption by Board of County Commissioners

FERRY COUNTY
RESOLUTION NO. 2007-09

ADOPTION OF THE FERRY COUNTY
COMMUNITY WILDFIRE PROTECTION PLAN

WHEREAS, in 2004, the Highlands Fire Defense Tem Local Coordinating Group submitted and application to the National Fire Plan Community Assistance and Wildland Urban Interface Program through the Community Risk Assessment and Mitigation grant program to establish a Community Fire Plan; and

WHEREAS, grant funds were awarded and a committee consisting of 15 agencies and public organizations was established with organizational activities beginning in early 2005; and

WHEREAS, after complying with all federal and state requirements during the process, a final plan was completed; and

WHEREAS, at a Public Hearing held May 23, 2007 the final "draft" was presented for approval by the Board of Ferry County Commissioners; and

WHEREAS, after considering public comment, motion was made by Commissioner Blankenship, seconded by Commissioner Bond with all in favor of accepting the plan as presented.

NOW THEREFORE BE IT RESOLVED that the Board of Ferry County Commissioners hereby officially adopts the Ferry County Community Wildfire Protection Plan.

DATED this 7th day of May 2007.

FERRY COUNTY BOARD OF COMMISSIONERS

BRAD L. MILLER, Chairman

MIKE L. BLANKENSHIP, Vice Chairman

RONALD "JOE" BOND , Member

ATTEST:

for Joy Osterberg, Clerk of the Board

6.4.1.2 Signatures of Participation by County and City Representatives

Brad L Miller — 4/25/07

By: Brad Miller, Chairman — Date
Ferry County Board of Commissioners

(Mayor Pro Temp) — 4/25/07

By: Shirley A. Couse, Mayor — Date
City of Republic

6.4.2 Signature of Participation by Ferry County Fire Districts

This Community Wildfire Protection Plan and all of its components identified herein were developed in close cooperation with fire districts listed.

Tom H. Lindsey — 4-25-07

By: Tom Lindsay, Chief — Date
Ferry/Okanogan County Fire Protection District #13

4-25-07

By: John Foster Fanning, Chief — Date
Ferry/Okanogan County Fire Protection District #14

5-24-07

By: Herb Hippler, Chief — Date
Stevens/Ferry County Joint Fire Protection District #3/#8

6.4.3 Signatures of Participation by other Ferry County Entities

This Community Wildfire Protection Plan was developed in cooperation and collaboration with the additionally listed agencies and organizations. The entities listed below are not elligible to "formally adopt" this plan, but will strive to implement its recommendations.

Linda Fee — 4-25-07

By: Linda Fee, District Ranger — Date
USDA Forest Service Republic Ranger Station

Vicki Christiansen — 3/8/2007

By: Vicki Christiansen, State Forester — Date
Washington Department of Natural Resources

04/25/07

By: Raymond Fry, Superintendant — Date
USDI Bureau of Indian Affairs

Lynne A. Brougher — 04/25/07

By: Lynne Brougher, Acting Superintendent — Date
USDI National Park Service

4-25.07

By: John Foster Fanning, Chair — Date
Highlands Fire Defense Team

By: Mike Marchand, Tribal Chairman — Date
Confederated Tribes of the Colville Reservation

Wm. E. Schlosser — 4-26-07

By: William E. Schlosser, Ph.D. — Date
Northwest Management, Inc.
Project Manager, Ferry County All Hazard Mitigation Plan

6.5 Glossary of Terms

Anadromous - Fish species that hatch in fresh water, migrate to the ocean, mature there, and return to fresh water to reproduce (Salmon & Steelhead).

Appropriate Management Response - Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

Biological Assessment - Information document prepared by or under the direction of the Federal agency in compliance with U.S. Fish and Wildlife standards. The document analyzes potential effects of the proposed action on listed and proposed threatened and endangered species and proposed critical habitat that may be present in the action area.

Backfiring - When attack is indirect, intentionally setting fire to fuels inside the control line to contain a spreading fire. Backfiring provides a wide defense perimeter, and may be further employed to change the force of the convection column.

Blackline - Denotes a condition where the fireline has been established by removal of vegetation by burning.

Burning Out - When attack is direct, intentionally setting fire to fuels inside the control line to strengthen the line. Burning out is almost always done by the crew boss as a part of line construction; the control line is considered incomplete unless there is no fuel between the fire and the line.

Canyon Grassland - Ecological community in which the prevailing or characteristic plants are grasses and similar plants extending from the canyon rim to the river's edge.

Confine - Confinement is the strategy employed in appropriate management responses where a fire perimeter is managed by a combination of direct and indirect actions and use of natural topographic features, fuel, and weather factors.

Contingency Plans: Provides for the timely recognition of approaching critical fire situations and for timely decisions establishing priorities to resolve those situations.

Control Line - An inclusive term for all constructed or natural fire barriers and treated fire edge used to control a fire.

Crew - An organized group of firefighters under the leadership of a crew boss or other designated official.

Crown Fire - A fire that advances from top to top of trees or shrubs more or less independently of the surface fire. Sometimes crown fires are classed as either running or dependent, to distinguish the degree of independence from the surface fire.

Disturbance - An event which affects the successional development of a plant community (examples: fire, insects, windthrow, timber harvest).

Disturbed Grassland - Grassland dominated by noxious weeds and other exotic species. Greater than 30% exotic cover.

Diversity - The relative distribution and abundance of different plant and animal communities and species within an area.

Drainage Order - Systematic ordering of the network of stream branches, (e.g., each non-branching channel segment is designated a first order stream, streams which only receive first order segments are termed second order streams).

Duff - The partially decomposed organic material of the forest floor beneath the litter of freshly fallen twigs, needles, and leaves.

Ecosystem - An interacting system of interdependent organisms and the physical set of conditions upon which they are dependent and by which they are influenced.

Ecosystem Stability - The ability of the ecosystem to maintain or return to its steady state after an external interference.

Ecotone - The area influenced by the transition between plant communities or between successional stages or vegetative conditions within a plant community.

Energy Release Component - The Energy Release Component is defined as the potential available energy per square foot of flaming fire at the head of the fire and is expressed in units of BTUs per square foot.

Equivalent Clearcut Area (ECA) - An indicator of watershed condition, which is calculated from the total amount of crown removal that has occurred from harvesting, road building, and other activities based on the current state of vegetative recovery.

Exotic Plant Species - Plant species that are introduced and not native to the area.

Fire Adapted Ecosystem - An arrangement of populations that have made long-term genetic changes in response to the presence of fire in the environment.

Fire Behavior - The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire Behavior Forecast - Fire behavior predictions prepared for each shift by a fire behavior analysis to meet planning needs of fire overhead organization. The forecast interprets fire calculations made, describes expected fire behavior by areas of the fire, with special emphasis on personnel safety, and identifies hazards due to fire for ground and aircraft activities.

Fire Behavior Prediction Model - A set of mathematical equations that can be used to predict certain aspects of fire behavior when provided with an assessment of fuel and environmental conditions.

Fire Danger - A general term used to express an assessment of fixed and variable factors such as fire risk, fuels, weather, and topography which influence whether fires will start, spread, and do damage; also the degree of control difficulty to be expected.

Fire Ecology - The scientific study of fire's effects on the environment, the interrelationships of plants, and the animals that live in such habitats.

Fire Exclusion - The disruption of a characteristic pattern of fire intensity and occurrence (primarily through fire suppression).

Fire Intensity Level - The rate of heat release (BTU/second) per unit of fire front. Four foot flame lengths or less are generally associated with low intensity burns and four to six foot flame lengths generally correspond to "moderate" intensity fire effects. High intensity flame lengths are usually greater than eight feet and pose multiple control problems.

Fire Prone Landscapes – The expression of an area's propensity to burn in a wildfire based on common denominators such as plant cover type, canopy closure, aspect, slope, road density, stream density, wind patterns, position on the hillside, and other factors.

Fireline - A loose term for any cleared strip used in control of a fire. That portion of a control line from which flammable materials have been removed by scraping or digging down to the mineral soil.

Fire Management - The integration of fire protection, prescribed fire and fire ecology into land use planning, administration, decision making, and other land management activities.

Fire Management Plan (FMP) - A strategic plan that defines a program to manage wildland and prescribed fires and documents the fire management program in the approved land use plan. This plan is supplemented by operational procedures such as preparedness, preplanned dispatch, burn plans, and prevention. The fire implementation schedule that documents the fire management program in the approved forest plan alternative.

Fire Management Unit (FMU) - Any land management area definable by objectives, topographic features, access, values-to-be-protected, political boundaries, fuel types, or major fire regimes, etc., that set it apart from management characteristics of an adjacent unit. FMU's are delineated in FMP's. These units may have dominant management objectives and preselected strategies assigned to accomplish these objectives.

Fire Occurrence - The number of wildland fires started in a given area over a given period of time. (Usually expressed as number per million acres.)

Fire Prevention - An active program in conjunction with other agencies to protect human life, prevent modification of the ecosystem by human-caused wildfires, and prevent damage to cultural resources or physical facilities. Activities directed at reducing fire occurrence, including public education, law enforcement, personal contact, and reduction of fire risks and hazards.

Fire Regime - The fire pattern across the landscape, characterized by occurrence interval and relative intensity. Fire regimes result from a unique combination of climate and vegetation. Fire regimes exist on a continuum from short-interval, low-intensity (stand maintenance) fires to long-interval, high-intensity (stand replacement) fires.

Fire Retardant - Any substance that by chemical or physical action reduces flareability of combustibles.

Fire Return Interval - The number of years between two successive fires documented in a designated area.

Fire Risk - The potential that a wildfire will start and spread as determined by the presence and activities of causative agents.

Fire Severity - The effects of fire on resources displayed in terms of benefit or loss.

Foothills Grassland - Grass and forb co-dominated dry meadows and ridges. Principle habitat type series: bluebunch wheatgrass and Washington fescue.

Fuel - The materials which are burned in a fire: duff, litter, grass, dead branchwood, snags, logs, etc.

Fuel Break - A natural or manmade change in fuel characteristics which affects fire behavior so that fires burning into them can be more readily controlled.

Fuel Loading - Amount of dead fuel present on a particular site at a given time; the percentage of it available for combustion changes with the season.

Fuel Model - Characterization of the different types of wildland fuels (trees, brush, grass, etc.) and their arrangement, used to predict fire behavior.

Fuel Type - An identifiable association of fuel elements of distinctive species; form, size, arrangement, or other characteristics, that will cause a predictable rate of fire spread or difficulty of control, under specified weather conditions.

Fuels Management - Manipulation or reduction of fuels to meet protection and management objectives, while preserving and enhancing environmental quality.

Gap Analysis Program (GAP) - Regional assessments of the conservation status of native vertebrate species and natural land cover types and to facilitate the application of this information to land management activities. This is accomplished through the following five objectives:

1. Map the land cover of the United States.
2. Map predicted distributions of vertebrate species for the U.S.
3. Document the representation of vertebrate species and land cover types in areas managed for the long-term maintenance of biodiversity.
4. Provide this information to the public and those entities charged with land use research, policy, planning, and management.
5. Build institutional cooperation in the application of this information to state and regional management activities.

Habitat - A place that provides seasonal or year-round food, water, shelter, and other environmental conditions for an organism, community, or population of plants or animals.

Habitat Type - A group of habitats that have strongly marked and readily defined similarities that when defined by its predominant or indicator species incites a general description of the area; *i.e. a ponderosa pine habitat type*.

Heavy Fuels - Fuels of a large diameter, such as snags, logs, and large limbwood, which ignite and are consumed more slowly than flash fuels.

Hydrologic Unit Code - A coding system developed by the U. S. Geological Service to identify geographic boundaries of watersheds of various sizes.

Hydrophobic - Resistance to wetting exhibited by some soils, also called water repellency. The phenomena may occur naturally or may be fire-induced. It may be determined by water drop penetration time, equilibrium liquid-contact angles, solid-air surface tension indices, or the characterization of dynamic wetting angles during infiltration.

Human-Caused Fires - Refers to fires ignited accidentally (from campfires or smoking) and by arsonists; does not include fires ignited intentionally by fire management personnel to fulfill approved, documented management objectives (prescribed fires).

Intensity - The rate of heat energy released during combustion per unit length of fire edge.

Inversion - Atmospheric condition in which temperature increases with altitude.

Ladder Fuels - Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

Landsat Imagery - Land remote sensing, the collection of data which can be processed into imagery of surface features of the Earth from an unclassified satellite or satellites.

Landscape - All the natural features such as grasslands, hills, forest, and water, which distinguish one part of the earth's surface from another part; usually that portion of land which the eye can comprehend in a single view, including all its natural characteristics.

Lethal - Relating to or causing death; extremely harmful.

Lethal Fires - A descriptor of fire response and effect in forested ecosystems of high-severity or severe fire that burns through the overstory and understory. These fires typically consume large woody surface fuels and may consume the entire duff layer, essentially destroying the stand.

Litter - The top layer of the forest floor composed of loose debris, including dead sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Maximum Manageable Area - The boundary beyond which fire spread is completely unacceptable.

Metavolcanic - Volcanic rock that has undergone changes due to pressure and temperature.

Minimum Impact Suppression Strategy (MIST) - "Light on the Land." Use of minimum amount of forces necessary to effectively achieve the fire management protection objectives consistent with land and resource management objectives. It implies a greater sensitivity to the impacts of suppression tactics and their long-term effects when determining how to implement an appropriate suppression response.

Mitigation - Actions to avoid, minimize, reduce, eliminate, replace, or rectify the impact of a management practice.

Monitoring Team - Two or more individuals sent to a fire to observe, measure, and report its behavior, its effect on resources, and its adherence to or deviation from its prescription.

National Environmental Policy Act (NEPA) - This act declared a national policy to encourage productive and enjoyable harmony between humans and their environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and will stimulate the health and welfare of humankind; to enrich the understanding of important ecological systems and natural resources; and to establish a Council on Environmental Quality.

National Fire Management Analysis System (NFMAS) - The fire management analysis process, which provides input to forest planning and forest and regional fire program development and budgeting.

Native - Indigenous; living naturally within a given area.

Natural Ignition - A wildland fire ignited by a natural event such as lightning or volcanoes.

Noncommercial Thinning - Thinning by fire or mechanical methods of pre-commercial or commercial size timber, without recovering value, to meet MFP standards relating to the protection/enhancement of adjacent forest or other resource values.

Notice of Availability - A notice of Availability published in the Federal Register stating that an EIS has been prepared and is available for review and comment (for draft) and identifying where copies are available.

Notice of Intent - A Notice of Intent published in the Federal Register stating that an EIS will be prepared and considered. This notice will describe the proposed action and possible alternatives, the proposed scoping process, and the name and address of whom to contact concerning questions about the proposed action and EIS.

Noxious Weeds – Rapidly spreading plants that have been designated "noxious" by law which can cause a variety of major ecological impacts to both agricultural and wildlands.

Planned Ignition - A wildland fire ignited by management actions to meet specific objectives.

Prescribed Fire - Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and environmental requirements must be met, prior to ignition.

Prescription - A set of measurable criteria that guides the selection of appropriate management strategies and actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations.

Programmatic Biological Assessment - Assesses the effects of the fire management programs on Federally listed species, not the individual projects that are implemented under these programs. A determination of effect on listed species is made for the programs, which is a valid assessment of the potential effects of the projects completed under these programs, if the projects are consistent with the design criteria and monitoring and reporting requirement contained in the project description and summaries.

Reburn - Subsequent burning of an area in which fire has previously burned but has left flammable light fuels that ignites when burning conditions are more favorable.

Riparian Habitat Conservation Areas (RHCA) - Portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. RHCAs include traditional riparian corridors, wetlands, intermittent headwater streams, and other areas where proper ecological functioning is crucial to maintenance of the stream's water, sediment, woody debris, and nutrient delivery systems.

Riparian Management Objectives (RMO) - Quantifiable measures of stream and streamside conditions that define good fish habitat and serve as indicators against which attainment or progress toward attainment of goals will be measured.

Road Density - The volume of roads in a given area (mile/square mile).

Scoping - Identifying at an early stage the significant environmental issues deserving of study and de-emphasizing insignificant issues, narrowing the scope of the environmental analysis accordingly.

Seral - Refers to the stages that plant communities go through during succession. Developmental stages have characteristic structure and plant species composition.

Serotinous - Storage of coniferous seeds in closed cones in the canopy of the tree. Serotinous cones of lodgepole pine do not open until subjected to temperatures of 113 to 122 degrees Fahrenheit causing the melting of the resin bond that seals the cone scales.

Stand Replacing Fire - A fire that kills most or all of a stand.

Sub-basin - A drainage area of approximately 800,000 to 1,000,000 acres, equivalent to a 4th - field Hydrologic Unit Code.

Surface Fire - Fire which moves through duff, litter, woody dead and down, and standing shrubs, as opposed to a crown fire.

Watershed - The region draining into a river, river system, or body of water.

Wetline - Denotes a condition where the fireline has been established by wetting down the vegetation.

Wildland Fire - Any non-structure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Implementation Plan (WFIP) - A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire being managed for resource

benefits. A full WFIP consists of three stages. Different levels of completion may occur for differing management strategies (i.e., fires managed for resource benefits will have two-three stages of the WFIP completed while some fires that receive a suppression response may only have a portion of Stage I completed).

Wildland Fire Situation Analysis (WFSA) - A decision making process that evaluates alternative management strategies against selected safety, environmental, social, economic, political, and resource management objectives.

Wildland Fire Use - The management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in FMP's. Operational management is described in the WFIP. Wildland fire use is not to be confused with "fire use", which is a broader term encompassing more than just wildland fires.

Wildland Fire Use for Resource Benefit (WFURB) - A wildland fire ignited by a natural process (lightning), under specific conditions, relating to an acceptable range of fire behavior and managed to achieve specific resource objectives.

6.6 Literature Cited

Agee, J.K. 1993. Fire ecology of the Pacific Northwest forests. Washington: Island Press.

Agee, J.K. 1998. The Landscape Ecology of Western Forest Fire Regimes. Northwest Science, Vol. 72, Special Issue 1998.

Anderson, H. 1982. Aids to Determining Fuel Models for Estimating Fire Behavior. USDA Forest Service, Intermountain Forest and Range Experiment Station. INT-GTR-122. 22 pp.

Barrett, J.W. 1979. Silviculture of ponderosa pine in the Pacific Northwest: the state of our knowledge. USDA Forest Service, General Technical Report PNW-97. Pacific Northwest Forest and Range Experiment Station, Portland, OR. 106 p.

Brown, J.K. 1995. Fire regimes and their relevance to ecosystem management. Pages 171-178 *In* Proceedings of Society of American Foresters National Convention, Sept. 18-22, 1994, Anchorage, AK. Society of American Foresters, Wash. DC.

Beukema, S.J., D.C. Greenough, C.E. Robinson, W.A. Kurtz, E.D. Reinhardt, N.L. Crookston, J.K. Brown, C.C. Hardy, and A.R. Stage. 1997. An Introduction to the Fire and Fuels Extension to FVS. In: Teck, R., Moeur, and Adams. Proceedings of the Forest Vegetation Simulator Conference, 1997 February 3-7, Fort Collins, Co. Gen. Tech. Rep. INT-373. Ogden UT: USDA Forest Service, Intermountain Research Station.

Dillman, D.A. 1978. Mail and Telephone Surveys: The Total Design Method. Hoboken: John Wiley & Sons, Incorporated. 344 p.

Fiedler, Carl E., Charles E. Keegan III, Chris W. Woodall, Todd A. Morgan, Steve H. Robertson, John T. Chmelik. 2001. A STRATEGIC ASSESSMENT OF FIRE HAZARD IN MONTANA. Report submitted to the Joint Fire Sciences Program, September 29, 2001. Pp. 39.

Final Environmental Impact Statement North-Kennedy Cottonwood stewardship Project Emmett Ranger District, Boise National Forest March 2003.

General Accountability Office. Technology Assessment – "Protecting Structures and Improving Communications during Wildland Fires". GAO-05-380. April 2005.

Graham, W.G. and L.J. Campbell. 1995. Groundwater Resources of Washington. Washington Department of Water Resources, Boise, ID. GIS Data.

Golder Associates. Pend Oreille (WRIA 62) Watershed Management Plan. Washington Department of Ecology. May 2005.

Hammond, C.; Hall, D.; Miller, S.; Swetik, P. 1992. Level 1 stability analysis (LISA) documentation for version 2.0 USDA, Forest Service. General Technical Report INT-285. Intermountain Research Station, Ogden, UT.

Hann, W.J., Bunnell, D.L. 2001. Fire and land management planning and implementation across multiple scales. Int. J. Wildland Fire. 10:389-403.

Hardy, C.C., Schmidt, K.M., Menakis, J.M., Samson, N.R. 2001. Spatial data for national fire planning and fuel management. International Journal of Wildland Fire 10:353-372.

Harris, C., P.S. Cook, and J. O'Laughlin. 2003. Forest Resource-Based Economic Development in Washington: Analysis of Concepts, Resource Management Policies, and Community Effects. Policy Analysis Group, University of Washington, College of Natural Resources, Report № 22. Pp 82.

Holsapple, L.J., Snell, K. 1996. Wildfire and prescribed fire scenarios in the Columbia River Basin: relationship to particulate matter and visibility. In: Keane, R.E., Jones, J.L., Riley, L.S., Hann, W.J., tech. eds. Compilation of administrative reports: multi-scale landscape dynamics in the Basin and portions of the Klammath and Great basins. On file with: U. S. Department of Agriculture, Forest Service, Department of Interior, Bureau of Land Management; Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

Homer, C.G. 1998. Washington/western Wyoming landcover classification report and metadata. Department of Geography and Earth Resources. Utah State University. Logan, UT 84322-9635. chomer@gis.usu.edu

Huff, M.H., Ottmar, R.D., Alvarado, E., et al. 1995. Historical and current forest landscapes in eastern Oregon and Washington. Part II: Linking vegetation characteristics to potential fire behavior and related smoke production. Gen. Tech. Rep. PNW-GTR-355. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 43p. (Everett, Richard L., team leader; Eastside forest health assessment; Hessburg, Paul F., science team leader and tech. ed., Volume III: assessment.).

IDEQ (Washington Department of Environmental Quality). 2003. Rules of the Department of Environmental Quality, IDAPA 58.01.02, "Water Quality Standards and Wastewater Treatment Requirements". Washington Administrative Code (3-20-97), IDAPA 58.01.02, Boise, ID.

Johnson, C.G.; Clausnitzer, R.R.; Mehringer, P.J.; Oliver, C.D. 1994. Biotic and Abiotic Processes of Eastside Ecosytems: the Effects of Management on Plant and Community Ecology, and on Stand and Landscape Vegetation Dynamics. Gen. Tech. Report PNW-GTR-322. USDA-Forest Service. PNW Research Station. Portland, Oregon. 722pp.

Johnson, C.G. 1998. Vegetation Response after Wildfires in National Forests of Northeastern Oregon. 128 pp.

Jones, J. 2003. Fire Risk Modeling GIS data for Washington. USDA Forest Service, Flathead National Forest. Kalispel, Montana.

Levinson, D.H. 2002. Montana/Washington Airshed Group; Operating Guide. Montana / Washington Airshed Group, Missoula, MT 59808

Louks, B. 2001. Air Quality PM 10 Air Quality Monitoring Point Source Emissions; Point site locations of DEQ/EPA Air monitoring locations with Monitoring type and Pollutant. Washington Department of Environmental Quality. Feb. 2001. As GIS Data set. Boise, Id.

McCoy, L., K. Close, J. Dunchrack, S. Husari, and B. Jackson. 2001. May 6 –24, 2001. Cerro Grande Fire Behavior Narrative.

MacDonald, L. H.; Smart, A.W.; and Wissmar, R.C. 1991. Monitoring guidelines to evaluate effects of forestry activities on streams in the Pacific Northwest and Alaska. USEPARegion 10 Report No. 910/9-91-001.

Mill Creek Watershed Assessment Emmett Ranger Districts, Boise National Forest May 2003

National Interagency Fire Center. 2003. Information posted on the Agency's Internet web site at http://www.nifc.gov/

National Register of Historic Places. 2003. Internet web site listings for Ferry County, Washington. On the Internet at www.nationalregisterofhistoricalplaces.com

Norton, P. 2002. Bear Valley National Wildlife Refuge Fire Hazard Reduction Project: Final Environmental Assessment, June 20, 2002. Fish and Wildlife Service, Bear Valley National Wildlife Refuge.

Ottmar, Roger D.; Alvarado, E.; Hessburg, P.F.; [and others]. 1996. Historical and current forest and range landscapes in the interior Columbia River basin and portions of the Klammath and Great basins. Part III: Linking vegetation patterns to potential smoke production and fire behavior. Draft report. On file with: U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, Bureau of Land Management; Interior Columbia Basin Ecosystem Management project, 112 E. Poplar, Walla Walla, WA.

Quigley, T. and S. Arbelbide (Tech. Editors). 1997. An assessment of Ecosystem Components in the Interior Columbia Basin. Pacific Northwest Research Station, Walla Walla, WA. GTR-405. pp. 372, 460, 462, 480-486, 855-869.

Quigley, T.M., R.A. Gravenmier, R.T. Graham, tech. eds. 2001. Interior Columbia Basin Ecosystem Management Project: project data. Station Misc. Portland, OR. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Redmond, R.L. 1997. Mapping existing vegetation and land cover across western Montana and Northern Washington. Wildlife Spatial Analysis Lab. Montana Cooperative Fish and Wildlife Research Unit. University of Montana, Missoula, MT 59812.

Schlosser, W.E., V.P. Corrao, D. Thomas. 2002. Shoshone County Wildland Urban Interface Fire Mitigation Plan, Final Report. Northwest Management, Inc., Moscow, ID.

Schmidt, K.M., Menakis, J.P. Hardy, C.C., Hann, W.J., Bunnell, D.L. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. General Technical Report, RMRS-GTR-87, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO.

Scott, H.S. 1998. Fuel reduction in residential and scenic forests: a comparison of three treatments in western Montana ponderosa pine stand. Res. Pap. RMRS-RP-5. Ogden, UT. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 19 p.

Steele, R.; Arno, S.F.; and Geier-Hayes, K. 1986. Wildfire patterns change in Central Washington's ponderosa pine-Douglas-fir forest.

Swanson, F.J. 1978. Fire and geomorphic processes; in Fire Regimes and Ecosystem Properties. USDA Forest Service Gen. Tech. Rep. WO. 26 pp.

Thompson, R.A., P.H. Skabelund, N.C. Kulesza, E.N. Dean. 1973. Soil - Hydrologic Reconnaissance. New Meadows Ranger District, Payette National Forest. 242 pp.

USDA. 1999. Salmon River Canyon Project Draft Environmental Statement. USDA Forest Service. Nez Perce National Forest.

USDA-Forest Service (United States Department of Agriculture, Forest Service). 2000. Incorporating Air Quality Effects of Wildland Fire Management into Forest Plan Revisions – A Desk Guide. April 2000. - Draft

USFS. 2001. United States Department of Agriculture, Forest Service. Wildland Urban Interface. Web page. Date accessed: 25 September 2001. Accessed at: http://www.fs.fed.us/r3/sfe/fire/urbanint.html

Vogl, R.J. 1979. Some basic principles of grassland fire management. Environmental Management 3(1):51-57, 1979.

Washington State Department of Natural Resources. Washington Forest Health Issues in 2005. Web page. Date accessed July 13, 2006. Available at: http://www.dnr.wa.gov/htdocs/rp/forhealth/2005highlights/index.html .

Wright, H.A. and A.W. Bailey. 1980. Fire ecology and prescribed burning in the Great Plains – A research review. United States Department of Agriculture, Forest Service, Intermountain Forest Range Experiment Station, Ogden, Utah. General Technical Report. INT-77.

Wright, H. A. and Bailey, A.W. 1982. Fire ecology: United States and Southern Canada. John Wiley and Sons, Inc. 501 pp.

This plan was developed by Northwest Management, Inc., under contract with the Ferry County Commissioners with funding provided by the Washington Department of Natural Resources and Ferry County.

Citation of this work:

Schlosser, W. E., T. R. King, and V. Bloch. *Lead Authors.* 2006. Ferry County, Washington, All Hazard Mitigation Plan – Volume I. Northwest Management, Inc., Moscow, Idaho. December 8, 2006. Pp. 144.

Schlosser, W. E., T. R. King, and V. Bloch. *Lead Authors.* 2006. Ferry County, Washington, Community Wildfire Protection Plan – Volume II. Northwest Management, Inc., Moscow, Idaho. December 8, 2006. Pp. 187.

Schlosser, W. E., T. R. King, and V. Bloch. *Lead Authors.* 2006. Ferry County, Washington, Community Wildfire Protection Plan Appendices – Volume III. Northwest Management, Inc., Moscow, Idaho. December 8, 2006. Pp. 47.

Schlosser, W.E. and T.R. King. *Lead Authors.* 2006. Ferry County, Washington, Terrorism and Civil Unrest Mitigation Plan – Volume IV. Northwest Management, Inc., Moscow, Idaho. December 8, 2006. pp 26.

Last Page of Document

Northwest Management, Inc.
233 East Palouse River Drive
PO Box 9748
Moscow ID 83843

208-883-4488 Telephone
208-883-1098 Fax
NWManage@consulting-foresters.com e-Mail
http://www.Consulting-Foresters.com/ Internet

(Remainder Intentionally Blank)