# FERRY COUNTY, WASHINGTON

# NATURAL HAZARD

# MITIGATION PLAN

## 2019

## REVISION

## FINAL

Prepared By

Northwest Management, Inc.

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# Foreword

"Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Mitigation activities may be implemented prior to, during, or after an incident. However, it has been demonstrated that hazard mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs."[1]

The previous version of the Ferry County, Washington Multi-Hazard Mitigation Plan was developed in 2004 by the Ferry County MHMP Planning Team in cooperation with GeoEngineers, Inc. of Spokane, WA. In 2008, Ferry County contracted Northwest Management, Inc. (NMI) to update the plan. The 2008 updated plan was never officially approved or adopted. The county received funding in 2017 to update the hazard mitigation plan. The 2019 update process was conducted by NMI in collaboration with Ferry County Emergency Management and the Planning Team. The updated document is now referred to as the Ferry County, Washington Natural Hazard Mitigation Plan and includes the Community Wildfire Protection Plan update.

This Plan satisfies the requirements for a local hazard mitigation plan and a flood mitigation plan under 44 CFR Part 201.6 and 79.6.

[1] Federal Emergency Management Agency. "Local Multi-Hazard Mitigation Planning Guidance." July 1, 2008.

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**U.S. Department of Homeland Security**
FEMA Region 10
130 – 228th Street, SW
Bothell, Washington 98021

FEMA

October 18, 2019

Mr. Tim Cook
State Hazard Mitigation Officer
Washington State Emergency Management Division
Building 20, MS TA-20
Camp Murray, Washington 98430-5122

Dear Mr. Cook:

The Federal Emergency Management Agency (FEMA) Region 10 completed a pre-adoption review of the draft *Ferry County Natural Hazard Mitigation Plan*. The attached Mitigation Plan Review Tool documents the Region's review and compliance with all required elements of 44 CFR Part 201.6, as well as identifies the jurisdictions participating in the planning process. This letter serves as Region 10's commitment to approve the plan upon receiving documentation of its adoption by participating jurisdictions.

Formal adoption documentation must be submitted to FEMA Region 10 by at least one jurisdiction within one calendar year of the date of this letter, or the entire plan must be updated and resubmitted for review. Once FEMA approves the plan, the jurisdictions are eligible to apply for FEMA Hazard Mitigation Assistance grants.

Please contact John Schelling, Regional Mitigation Planning Program Manager, at (425) 487-2104 or john.schelling@fema.dhs.gov with any questions.

Sincerely,

X Tamra Biasco

Tamra Biasco
Chief, Risk Analysis Branch
Mitigation Division

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# Table of Contents

# Section 1 – Introduction

## Introduction

This plan was prepared to guide hazard mitigation to better protect the people, property, community assets and land from the effects of natural hazards. This Plan demonstrates the community's commitment to reducing risks from natural hazards and serves as a tool to help decision makers direct mitigation activities and resources. This Plan was also developed to make the participating communities eligible for certain types of Federal disaster assistance and hazard mitigation grant funding.

## Overview of this Plan and its Development

This regional Multi - Hazard Mitigation Plan is the result of analyses, professional cooperation and collaboration, assessments of hazard risks and other factors considered with the intent to reduce the potential for hazards to threaten people, structures, infrastructure, and unique ecosystems in Ferry County, Washington. The Ferry County Multi-Hazard Mitigation Plan was originally approved by Washington Emergency Management Division and the Federal Emergency Management Agency in 2004. The County attempted to update the original plan in September of 2006 but the plan failed initial review by the State. The comments by the State were never incorporated into the update and thus the plan was not approved nor adopted. This document serves as the required 5-year update of the Multi-Hazard Mitigation Plan under the Pre-Disaster Mitigation program and will be in effect until 2023. This update will also include the County's Community Wildfire Protection Plan update as a chapter within the main document. This document assists with the identification and assessment of various potential hazards and helps maintain the County's eligibility for grants and other funding.

Ferry County Emergency Management led the planning team throughout the update process. Agencies and organizations that participated in the planning process included:

- Ferry County Commissioners
- Ferry County Planning Department
- Ferry County Public Utilities District
- Republic/Curlew School District
- Ferry County Health
- Ferry County Fire Districts
- Ferry County Sheriff's Department
- Ferry County Public Works
- Ferry County EMS 1
- Northeast Tri-County Health District
- US Border Patrol
- City of Republic

In the winter of 2017, Ferry County Emergency Management contracted services to update the Ferry County Multi-Hazard Mitigation Plan to Northwest Management, Inc. of Moscow, Idaho.

# *Goals and Guiding Principles*

## *Federal Emergency Management Agency Philosophy*

Effective November 1, 2004, a Multi - 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 programs provide funding, through state emergency management agencies, to support local mitigation planning and projects to reduce potential disaster damages.

The new local Multi - 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 Multi - 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.

To be eligible for project funds under the Flood Mitigation Assistance (FMA) program, communities are required under 44 CFR Part 79.6(d)(1) to have a mitigation plan that addresses flood hazards. On October 31st, 2007, FEMA published amendments to the 44 CFR Part 201 at 72 Federal Reg. 61720 to incorporate mitigation planning requirements for the FMA program (44 CFR Part 201.6). The revised Local Mitigation Plan Review Crosswalk (October 2011) used by FEMA to evaluate local hazard mitigation plans is consistent with the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by Section 322 of the Disaster Mitigation Act of 2000, the National Flood Insurance Act of 1968, as amended by the National Flood Insurance Reform Act of 2004 and 44 Code of Federal Regulations (CFR) Part 201 – Mitigation Planning, inclusive of all amendments through July 1, 2008, was used as the official guide for development of a FEMA-compatible Ferry County, Washington Multi-Hazard Mitigation Plan. [2]

FEMA will only review a local Multi - Hazard Mitigation Plan submitted through the appropriate State Hazard Mitigation Officer (SHMO). Draft versions of local Multi - 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.

In Washington, the SHMO is:

Washington Military Department
Emergency Management Division
1 Militia Drive, Bldg. 1
Camp Murray, WA 98430-5000

A FEMA designed plan will be evaluated on its adherence to a variety of criteria, including:

[2] Federal Emergency Management Agency. "Local Multi-Hazard Mitigation Planning Guidance." July 1, 2008.

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

## *United States Government Accountability Office (GAO)*

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. Although losses from fires made up only 2.2 percent of all insured catastrophic losses from 1991 to 2010[3], fires can result in billions of dollars in damages.

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.

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 flammable vegetation and other objects are reduced; and (2) using fire-resistant roofs and vents. In addition to roofs and vents, other technologies – such as fire-resistant windows and building materials, surface treatments, 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

[3] Rocky Mountain Insurance Information Association website at, http://www.rmiia.org/Catastrophes_and_Statistics/Wildfire.asp accessed in November, 2013.

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[4].

## *State and Federal CWPP Guidelines*

This Multi-Hazard Mitigation Plan update includes compatibility with Washington Department of Natural Resources (DNR) requirements for a Community Wildfire Protection Plan, while also adhering to the guidelines proposed in the National Fire Plan, and the Healthy Forests Restoration Act (2003). This Multi-Hazard Mitigation 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 (December 2006).
Healthy Forests Restoration Act (2003).
National Cohesive Wildland Fire Management Strategy (March 2011). The Cohesive Strategy is a collaborative process with active involvement of all levels of government and non-governmental organizations, as well as the public, to seek national, all-lands solutions to wildland fire management issues.
The Federal Emergency Management Agency's Region 10 guidelines for a Local Hazard Mitigation Plan as defined in 44 CFR parts 201 and 206, and as related to a fire mitigation plan chapter of a Multi-Hazard Mitigation Plan.
National Association of State Foresters – guidance on identification and prioritizing of treatments between communities (2003).

## *Update and Review Guidelines*[5]

*Deadlines and Requirements for Regular Plan Reviews and Updates*: In order to apply for a FEMA PDM project grant, Tribal and local governments must have a FEMA-approved mitigation plan. Tribal and local governments must have a FEMA-approved mitigation plan in order to receive HMGP project funding for disasters declared on or after November 1, 2004. States and Tribes must have a FEMA-approved Standard or Enhanced Mitigation Plan in order to receive non-emergency Stafford Act assistance (i.e., Public Assistance categories C-G, HMGP, and Fire Management Assistance Grants) for disasters declared on or after November 1, 2004. State mitigation plans must be reviewed and reapproved by FEMA every three years. Local Mitigation Plans must be reviewed and reapproved by FEMA every five years.

*Plan updates*. In addition to the timelines referenced above, the Rule includes the following paragraphs that pertain directly to the update of State and local plans,
§201.3(b)(5) [FEMA Responsibilities] Conduct reviews, at least once every three years, of State mitigation activities, plans, and programs to ensure that mitigation commitments are fulfilled….
§201.4(d) Review and updates. [State] Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities and resubmitted for approval…every three years.

[4] United States Government Accountability Office. Technology Assessment – Protecting Structures and Improving Communications during Wildland Fires. Report to Congressional Requesters. GAO-05-380. April 2005.
[5] Federal Emergency Management Agency. Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000. Original Release March, 2004 With revisions November, 2006, June, 2007 & January 2008.

§201.6(d) [Local] plans must be reviewed, revised if appropriate, and resubmitted for approval within five years to continue to be eligible for project grant funding.

Plan updates must demonstrate that progress has been made in the past five years (for local plans), to fulfill commitments outlined in the previously approved plan. This will involve a comprehensive review and evaluation of each section of the plan and a discussion of the results of evaluation and monitoring activities detailed in the Plan Maintenance section of the previously approved plan. FEMA will leave to State discretion, consistent with this plan update guidance, the documentation of progress made. Plan updates may validate the information in the previously approved plan or may involve a major plan rewrite. In any case, a plan update is NOT an annex to the previously approved plan; it must stand on its own as a complete and current plan.

The objective of combining these complementary 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.

## *Incorporation of Existing Plans, Studies, Reports and Technical Information*

Much of the information used within this update was derived from a variety of sources that are referenced at the bottom of the page of which the information was used. Some of the primary sources used are listed below.

**Ferry County Comprehensive Plan (2012)**

The Ferry County Comprehensive Plan is a method of deciding between the available choices, and of bringing about the sorts of changes Ferry County residents want. The plan rests on the belief that it is wise to look ahead, foresee change, and take charge of the future. It covers decisions regarding Ferry County's growth that are best made in common. These decisions include the following planning concerns: the overall land use pattern, how to serve the county with adequate housing and community facilities (such as streets, sewer, and water), and how to protect natural resources. Within this overall guide, there is still much room for individual discretion.

The Comprehensive Plan was used to analyse the development trends within the County and how natural hazards might affect new development. The Comprehensive Plan was also utilized to confirm some of the background/history of the County and its communities.

**Washington State Enhanced Hazard Mitigation Plan (2013 & 2018)**

The Washington State Enhanced Hazard Mitigation (SEHMP) Plan profiles hazards, identifies risks and vulnerabilities and proposes strategies and actions to reduce risks to people, property, the economy, the environment, infrastructure and first responders. The Washington SEHMP is a multi-agency statewide document. It incorporates best practices, programs and knowledge from multiple state agencies, tracks progress in achieving mitigation goals through state and local programs and strategies. It also communicates that progress among agency partners and elected leadership.

The Ferry County Natural Hazard Mitigation Plan update was started prior to the SEHMP 2018 update being finished, therefore some of the 2013 version was used in the risk assessments. Once the 2018 update was released, portions of it were used to update things such as the potential funding sources.

# Section 2 – Community Profile

## Ferry County Characteristics

The following information also describes the jurisdictions of Ferry Conservation District, Ferry County Public Utility District and Northeast Tri County Health District, which are all adopting jurisdictions of this plan.

Ferry County was created on February 21, 1899.[6] The county was split from Stevens County which is east of Ferry County. Ferry County was named after Elisha P. Ferry, the state's first governor.

### *Description of the Region*

*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.

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.

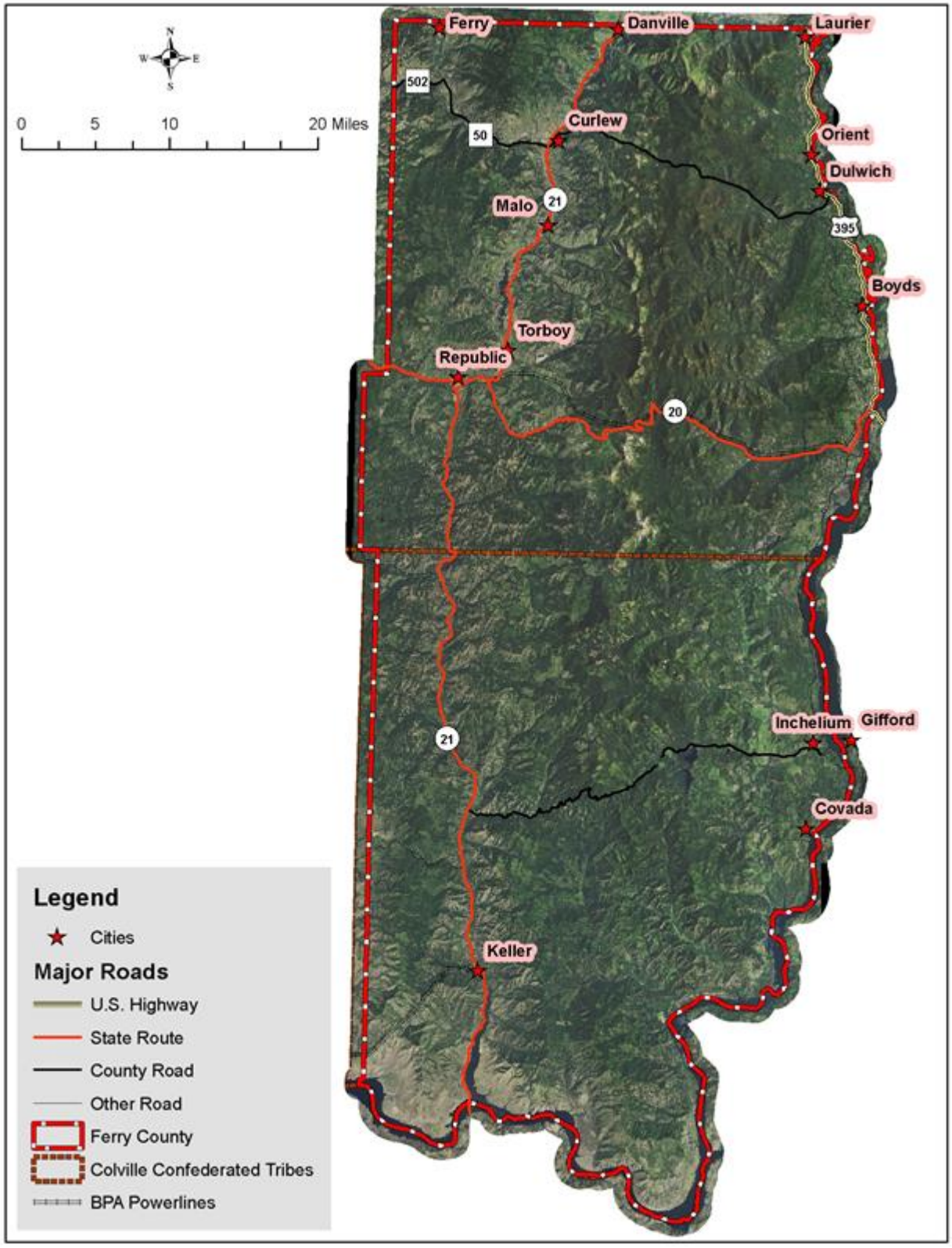
The chief industries are timber, mining, and ranching. The major timber types are Douglas-fir, western larch, and ponderosa pine. Several mountains in the area contain, deposits of gold, copper, iron, silver, lead, and other ores. Breeding and raising beef cattle are the chief ranching enterprise. Hay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

**Table 2.1. Land Ownership Categories in Ferry County**

| Entity | Acres | Percent of Total Area |
|---|---|---|
| Tribal | 716,288 | 50% |
| US Forest Service | 474,629 | 33% |
| Private | 198,913 | 14% |
| WA Department of Natural Resources | 28,855 | 2% |
| US Bureau of Land Management | 8,955 | <1% |
| Water | 8,741 | <1% |
| WA Department of Fish and Wildlife | 6,928 | <1% |
| WA State Parks | 124 | <1% |
| Local Government | 3 | <1% |
| Federal Government | 3 | <1% |

[6] HistoryLink.org website at http://www.historylink.org/index.cfm?DisplayPage=output.cfm&File_Id=5380. Accessed February, 2018.

**Figure 2.1. Ferry County Map.**



## *Transportation & Infrastructure*

The transportation system within the County is comprised of a significant number of roads, several airports, a rail line and an extensive trail system. The road system is comprised of state highways, Washington State Department of Natural Resources (DNR) roads, County roads, USFS or BIA roads, and private roads. Roads are important in hazard mitigation planning because they provide a means of escape and emergency access.

Almost all the roads in the County were originally built to facilitate logging and mining activities. As such, these roads can support the emergency response equipment referenced in this document. However, many of the new roads have been built for home site access, especially for new subdivisions. In many cases, these roads are adequate to facilitate emergency response equipment as they adhere to County road standards. Nevertheless, construction of substandard access roads, particularly in subdivisions, can become a major safety issue and severely hinder the ability of emergency response personnel.

Transportation networks in the County have been challenged because a number of communities have only one or two access points suitable for use during an emergency. The communities of Orient and Laurier are prime examples. Other communities that may be at risk because of limited access include Malo, Keller, Inchelium and Danville.

State Route 21 travels north and south near the county's western border and State Route 20 cuts east and west across the county traveling over Sherman Pass, elevation 5,575 feet. Highway 395 joins State Route 20 at Barney's Junction and travels along the northeastern county border. State Routes 20 and 21 intersect at the City of Republic.

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. The segment between Grand Forks, B.C. and Republic has been abandoned and is now a rail trail.

## *Demographics and Socioeconomics*

Table 3.1 shows historical changes in population in Ferry County and among the various communities within the County.

**Table 2.2. Historical and Current Population by Community.**

| | 1970 | 1980 | 1990 | 2000 | 2010 | 2017 (est.) |
|---|---|---|---|---|---|---|
| Ferry County | 3,655 | 5,811 | 6,295 | 7,260 | 7,551 | 7,594 |
| Republic | 862 | 1,018 | 940 | 954 | 1,073 | not available |
| Curlew | not available | not available | not available | not available | 118 | not available |

Since 1980, Ferry County has been steadily growing following several decades of decrease population between 1930 and 1970. Since the 1970's the county's population has grown, on average by over 20%. With the closing of the mine it appears that the population has plateaued at just under 7,600 residents.

Of the county's residents, about 14% (1,073) live in Republic. Most of the remaining residents (6,478) are concentrated in unincorporated parts of Ferry County as well as some of the smaller communities such as Inchelium.

The 2010 Census reported that ethnicity in Ferry County is comprised of 77% white, 17% American Indian, 0.5% African American, 1% Asian, and 4.8% people reporting two or more races. Approximately 48% of residents are female. There are 4,408 housing units (71.4% homeownership rate) in Ferry County.[7]

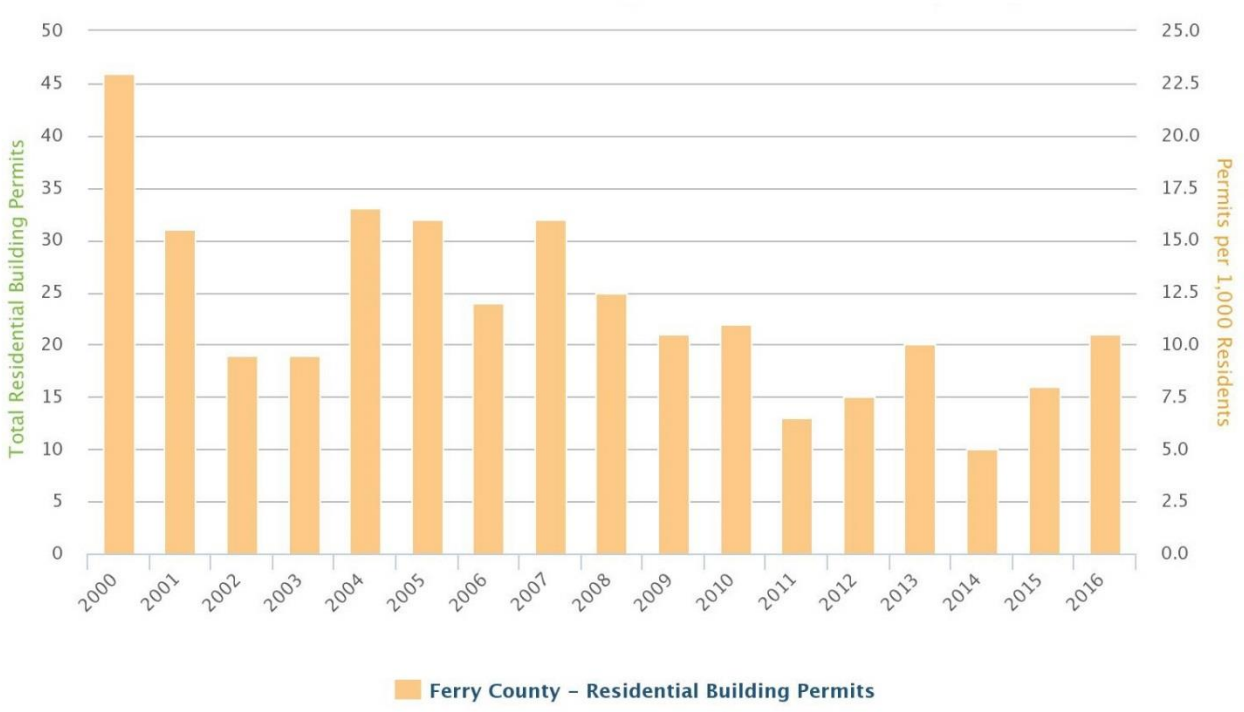
## *Development Trends*

The following section was taken from the Northeast Washington Trends website.[8]

Residential building permits are an important subset of total construction permits, and hence activity, in a regional economy. An increase in these permits reflects an increase in population growth or a desire by current residents to change their dwelling, usually the most important financial asset of a family or household.

As in the case of general construction, changes in these permits signal the direction of near-term activity to the construction trades and real estate industry. The direction of building permit trends also informs local government about future sales tax revenues, since residential building leads to taxable sales.

**Figure 2.2. Ferry County Building Permits.**




During 2016 in Ferry County, the total number of residential building permits issued was 21, decreasing by 45.6% since 2000 when there were 46. During 2016, the number of residential building permits issued per

[7] US Census Bureau. State & County QuickFacts. Available online at https://www.census.gov/quickfacts/fact/table/ferrycountywashington,US/PST045217 Accessed February, 2018.
[8] Northeast Washington Trends website available at: http://www.northeastwashingtontrends.ewu.edu/. Accessed February, 2018. Provided by Eastern Washington University.

1,000 residents in Ferry County was 2.7, decreasing from 6.3 per 1,000 residents in 2000. Meanwhile, Washington State was 6.1, decreasing from 6.6 per 1,000 residents in 2000.

### *Geography and Climate*

The **Okanogan Highlands** province is situated east of the Cascade Range and north of the Columbia Basin. To the east and north, the highlands extend into northern Idaho and southern British Columbia, respectively. They are characterized by rounded mountains with elevations up to 8,000 feet above sea level and deep, narrow valleys. The Columbia River divides the Okanogan Highlands into two geographic regions: to the east of the river are the Selkirk, Chewelah, and Huckleberry Mountains; to the west are the Kettle, Sanpoil, and other mountains.

Ferry County's topography ranges from 1,400 feet in the lowland areas along the Columbia River corridor to a high point on Copper Butte with an elevation of 7,140 feet. Besides being bordered for much of the County's perimeter by the Columbia River, the County has several rivers that provide a range of recreational opportunities including; the Kettle River, the Sanpoil River, and Curlew Creek as well as Curlew Lake.

The climate of Ferry County is influenced by elevation, topography, distance and direction from the ocean, prevailing westerly winds and the position and intensity of the high- and low-pressure centers in the western Pacific Ocean. Temperature ranges can vary noticeably between the lowland river corridor areas and the plateau, but they generally average between 30 degrees in January, to 85 degrees in the summer months. Average annual precipitation totals about 16 inches, with the heaviest precipitation occurring during the winter months and late spring.[9]

## *Natural Resources*

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. Nearly a century of wildland fire suppression coupled with past land-use practices (primarily timber harvesting, agriculture, and mining) has altered plant community succession and has resulted in dramatic shifts in the fire regimes and species composition. As a result, some forests 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 plant populations. High-intensity, stand-replacing fires have the potential to seriously damage soils, native vegetation, and fish and wildlife populations. 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.

### *Fish and Wildlife*

There are many species of wildlife that inhabit the forested region of northcentral Washington. Some of the species present even rely on this type of ecosystem to survive. Lynx and grizzly bears once heavily populated this region of Washington, however due to habitat loss and overharvest; these populations have been

[9] Western Regional Climate Center website. Available online at http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?warepu Accessed February, 2018.

drastically reduced in numbers. There has been a significant effort by federal, state, and private landowners in recent years to increase the available preferred habitat.[10]

## *Vegetation*

An evaluation of satellite imagery of the region provides some insight to the composition of the forest vegetation of Ferry County. The full extent of the county was evaluated for cover type as determined from Landsat 7 ETM+ imagery in tabular format and is presented in Table 2.3.

Ferry County supports a landscape of primarily forested ecosystem with a mosaic of native steppe and shrub-steppe vegetation. Ponderosa pine occurs on southerly aspects and at lower elevations, while Douglas fir and western larch dominate all other aspects and the higher elevations with lodgepole pine. Other species that exist at the higher elevations include; Engelmann spruce, alpine fir, and hemlock. Cottonwood trees and deciduous shrubs primarily occur in the riparian areas. The scattered shrubs that occur in patches throughout the county are typically ninebark and snowberry with a bunchgrass cover. Grass cover includes; bluebunch wheatgrass, Idaho fescue, and Sandberg bluegrass in areas without dense tree cover, while pinegrass is common under the tree canopy. Cheatgrass occurs where native species are sparse, particularly in disturbed areas, and can increase the length of the fire season in the county because of how quickly this species matures and then cures.

**Table 2.3. Vegetative Cover Types in Ferry County**

| Land Cover | Acres | Percent of Total Area |
|---|---|---|
| Conifer | 1,011,414 | 70% |
| Exotic Herbaceous | 121,874 | 8% |
| Grassland | 115,061 | 8% |
| Shrubland | 84,270 | 6% |
| Riparian | 52,200 | 4% |
| Non-vegetated | 35,364 | 2% |
| Sparsely Vegetated | 10,343 | 1% |
| Agricultural | 6,959 | <1% |
| Developed | 3,990 | <1% |
| Hardwood | 2,400 | <1% |

The most represented vegetation cover type is forest occurring on over 70% of the total acres in the county which is followed by grassland (16% with exotic herbaceous included), shrubland (6%), and riparian (4%) areas.

## *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.

[10] Washington Department of Fish and Wildlife website. http://wdfw.wa.gov/ Accessed February, 2018.

The state may assign or designate beneficial uses for certain 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 Support:** cold water biota, seasonal cold-water biota, and warm water biota;
**Contact Recreation:** primary (swimming) and secondary (boating);
**Water Supply:** domestic, agricultural, and industrial; and
**Wildlife Habitat and Aesthetics**
While there may be competing beneficial uses in streams, federal law requires to protect 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 this watershed 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 low. The bedrock is typically well fractured and moderately soft. This fracturing allows excessive soil moisture to rapidly 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) and wildland fire (especially hot fires that increase soil hydrophobic characteristics), can lead to increased surface runoff and debris flow to stream channels.

Of critical importance to Ferry County will be the maintenance of the domestic watershed supplies in the Colville River Watershed (Watershed Resources Inventory Area 59), Upper Lake Roosevelt Watershed (Watershed Resources Inventory Area 61), and the Middle Lake Roosevelt Watershed (Watershed Resources Inventory Area 58).

Riparian function and channel characteristics have been altered by ranch and residential areas by removing streamside shade and changing historic sediment deposition. The current conditions of wetlands and floodplains are variable because some wetlands and floodplains have been impacted by past management activities.

## *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.[11]

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, the Organization for Air Quality Protection Standards (OAQPS) is responsible for setting the NAAQS standards 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

[11] 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.

cooperation with state, Tribal, and local governments) through national standards and strategies to control pollutant emissions from automobiles, factories, and other sources.[12]

Smoke emissions from fires potentially affect an area and the airsheds that surround it. Climatic conditions affecting air quality in 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. 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.

**Washington Department of Ecology**[13]

The Washington Department of Ecology Air Quality Program protects public health and the environment from pollutants caused by vehicles, outdoor and indoor burning, and industry. The DOE oversees permitting for non-forested (i.e. agriculture and rangeland) burning. Ferry County falls under the jurisdiction of the Eastern Regional Office (ERO). The ERO can be reached at: 509-329-3400.

**Washington State Smoke Management Plan**[14]

The DNR, Department of Ecology (DOE), U.S. Forest Service (USFS), National Park Service (NPS), BLM, U.S Fish and Wildlife Service (USFWS), 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.

The purpose of the Washington State Smoke Management 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.

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

[12] 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. Idaho Department of Environmental Quality. Feb. 2001. As GIS Data set. Boise, Idaho.

[13] Washington Department of Ecology website http://www.ecy.wa.gov/air.html Accessed March, 2014.

[14] Washington State Department of Natural Resources, Smoke Management Plan 1993. http://www.dnr.wa.gov/Publications/rp_burn_smptoc.pdf Accessed March, 2014.

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.

The Smoke Management 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).

Additionally, the Federal Air Rules for Indian Reservations (FARR) in Idaho, Oregon, and Washington is a set of air quality regulations established under the Clean Air Act. The FARR creates rules to manage activities that cause air pollution.

The FARR applies to all residents (both tribal members and non-tribal members) and businesses located within the exterior boundaries of reservations in Idaho, Oregon, and Washington. The ownership status of land on the reservation does not affect how the rules apply.

The Rule for Forestry and Silvicultural Burning Permits sets up a permit program for forestry and silvicultural burning on the Colville Indian Reservation. People on the reservation who want to perform forestry and silvicultural burning will need to get a permit. Forestry and silvicultural burning is the burning of vegetation that comes from the growing and harvesting of trees and timber. This type of burning includes slash burning, burning for reducing fire hazards, and burning for managing the forest environment. Burning may also be performed to prevent disease, to control pests, and for forest reproduction.

# Jurisdictional Overviews

The following are brief overviews for each of the participating jurisdictions in the Plan.

## *Republic*

Republic was founded by gold prospectors in the late 19th century and is the County Seat. Noted for its fossils, natural beauty and recreational possibilities, it is nestled in a valley between Wauconda and Sherman Passes at the intersection of Washington State Routes 20 and 21 in the north central part of the state.

The Mining District of Eureka was established after gold was found on Eureka Creek. Philip Creasor platted a townsite to be named Eureka. Another strike was made nearby on Granite Creek. The Great Republic claim, found by Thomas Ryan and Philip Creasor on March 5, 1896, was the highest producer of gold. By 1900 the settlement was booming. A post office was established but postal authorities rejected the name Eureka because there was already a town by that name in Clark County, Washington. The citizens then decided to honor the Great Republic mining claim by proposing the name Republic. This name was accepted, and the settlement was incorporated as a city on May 22, 1900.

Republic's prominence, initially brought on by the gold rush, started to fade as prospectors and those who supported the mining industry moved away. During the years between 1900 and 1910, the town lost over half its population. Despite this, mining has continued to be an important part of life in Republic, as gold is still mined for in the mountains surrounding the town. Mining is celebrated in the local Prospector's Days, held during the second weekend in June, where locals honor their prospector roots by competing in mining and logging competitions, panning for gold, and watching an old west gun fight. Today, the town of 1,100 is mainly sustained by those people in surrounding farms and ranches, miners who work at the local mine, and tourists looking for a quieter, slower pace of life.

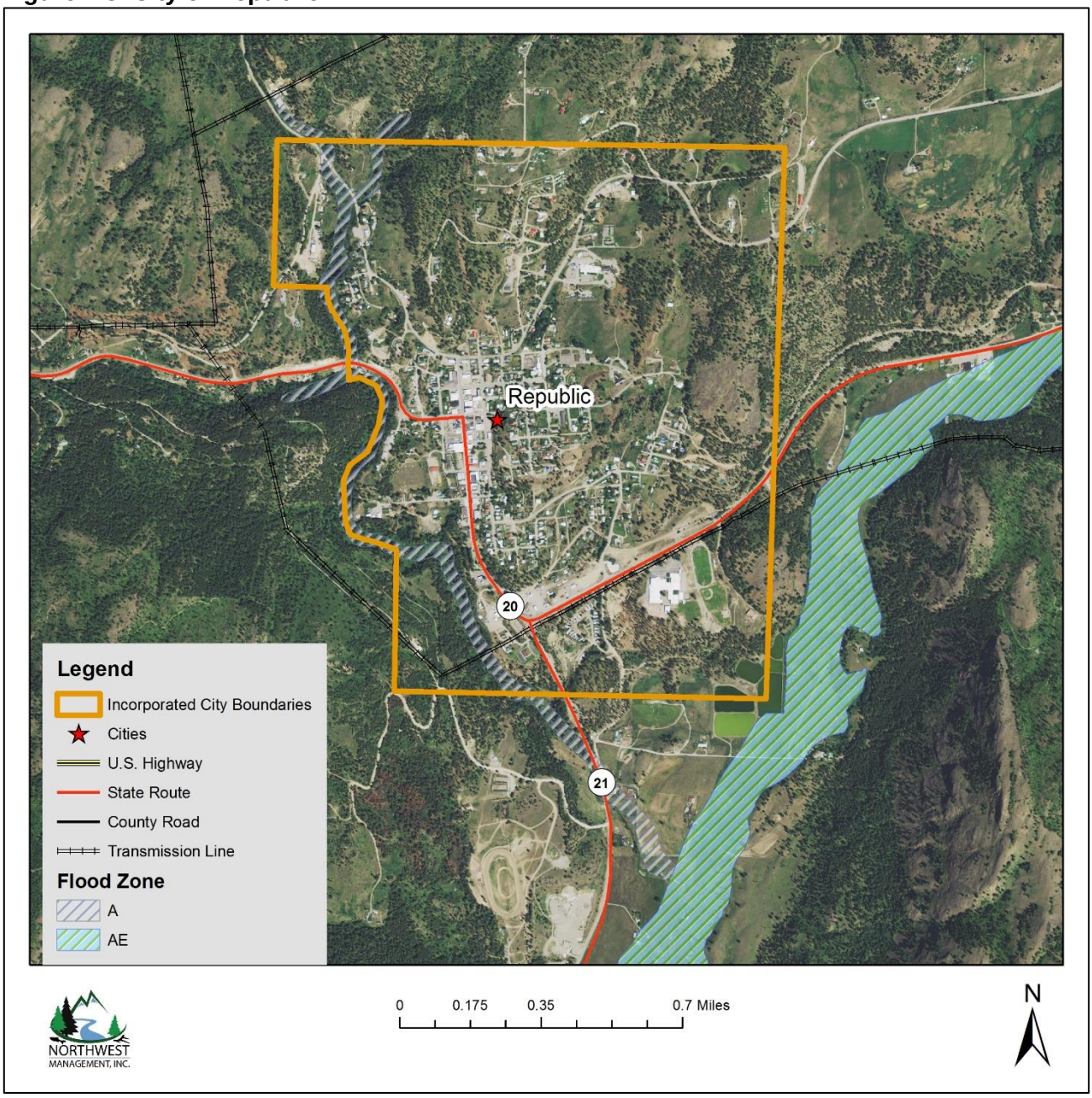
Republic is located near the source of the Sanpoil River in a long valley bordered by the Okanagan Highlands to the west and the Kettle mountain range to the east. Curlew Lake, 7 miles long at an elevation of 2,400 feet, provides fishing and boating to summer visitors northeast of Republic. Republic is surrounded by the Colville National Forest and to the south is the Colville Indian Reservation.

Republic experiences four seasons of weather. With the mountains being a big influence, along with the Pacific Ocean 275 miles to the west, winters are snowy and wet. Sometimes it snows and rains the same day. Spring is beautiful with longer days and cool rain. Summers are dry and warm. A great feature of summer is that the evenings are still quite cool, often near 55 degrees, making sleeping great. The daylight runs from 5 am to 10 pm in June.

### *Development Trends*

The City of Republic remains in a relatively steady state of population within the city limits. Most of the growth in this area occurs outside the city limits.

**Figure 2.3. City of Republic.**



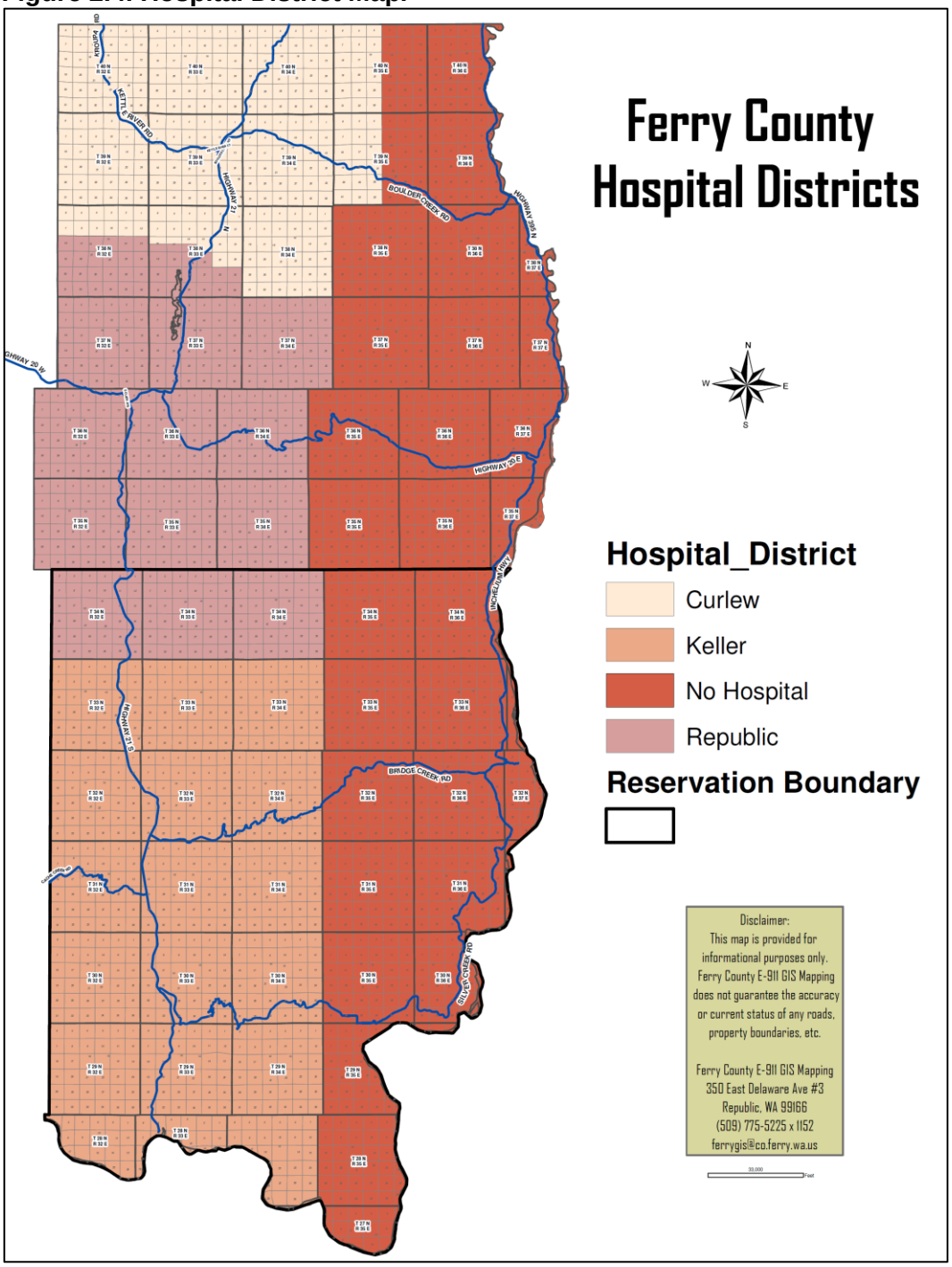

## *Ferry County Health*

Ferry County Health is a Public Hospital District (for more information about what a PHD is http://www.awphd.org) serving the entire county plus the eastern edge of Okanogan County which is five miles to the west. Ferry County Health is composed of a Critical Access Hospital (known as a CAH), a Rural Health Clinic (Republic Medical Clinic), an assisted living facility (Klondike Hills), a rehab clinic, and an emergency department (ED) which is available to the community 24/7. The hospital has a level 5 trauma designation. The hospital houses 14 long-term care patients as the community is unable to support a skilled nursing facility. The clinic sees over ten thousand patients a year while the ED sees just under two thousand patients annually. The hospital serves just under eighty inpatients annually and has robust swing bed program

to help rehab patients returning from surgery in other communities. The Public Hospital District's annual gross income is nearly sixteen million. The District has approximately 100 full-time equivalent employees overseen by a five-member community elected Board via a superintendent and CEO (who becomes a municipal officer upon appointment by the Board). For more information go to www.fcphd.org.

Ferry County Health was formerly known as Ferry County Public Hospital District #1. The Hospital District changed names during the planning process. The Hospital Taxing District is everything in the county west of the Kettle Range (does not include towns in the east like Orient, Inchelium and Barney's Junction).

**Figure 2.4. Hospital District Map.**



### *Development Trends*

The District has seen growth in numbers from 2017 to 2018 due to improvements in services (roughly 1K more clinic visits '18 vs '17, significant increase in use of our PT/OT services, flat for inpatient and ED visits). Growth is expected to decrease.

## *Ferry County Public Utilities District*

The following sections was taken from the Ferry County Public Utility District's website.[15]

Electricity was first introduced to the City of Republic in 1901. After contracts with three different companies failed to produce power, the Town Council granted Patrick H. Walsh the franchise to produce and transmit electricity for the area.

Walsh's company, The Republic Light & Power Company, built its generation plant on O'Brien Creek, about three miles northeast of Republic. With winter temperatures dropping to -30F, it was not possible for a hydroelectric system to operate year-round, so, during the months when the creek was flowing, it operated as a hydroelectric plant. During the winter months, power was supplied by a wood-fired steam generator. This method of producing electricity was used for over thirty years.

By 1933, the town of Republic had outgrown its Light and Power company. Power outages due to generation failures prompted residents to seek out a new source of electricity. P.D. Snyder of the San Poil Power and Light Company proposed a plan for a power plant which was driven by two large surplus diesel submarine engines. He was given a franchise to produce electricity in April 1933 but didn't receive the first engine until February 1934. The 350-horsepower submarine engine weighed over 18 tons and drove a 200 Kilowatt generator that weighed almost five and a half tons. It took almost a week to move both pieces of machinery into the old mill building which housed them. The San Poil Power and Light Company almost lost its franchise when power generation was unpredictable and slow in coming. It was saved when the Company purchased a second engine and generator. Snyder's generators did not begin to produce commercial power until June 1934. Then, three months later, an exhaust pipe on one of the generators caught the power plant's roof on fire and the building burned to the ground destroying all its contents.

The Republic Light and Power Company was forced to reopen to supply power to the town. However, the San Poil Power and Light Company ordered a new engine and generator and was producing power again by November 1. Both power companies continued to produce electricity until April 1936, when the San Poil Power and Light Company was forced to shut down due to financial hardships.

In 1935, plans had already been made to link Republic to the Washington Water Power lines located 40 miles west of Republic in Tonasket. Work on the project began in August 1936 and was completed in March 1937. This link was the first consistent source of electricity that the town of Republic ever had.

Soon after the transmission lines were put in place, a public utility district (P.U.D.) was created for Ferry County. In 1942, the Ferry County P.U.D. contacted the Rural Electrification Administration asking for a loan to buy the Republic Light and Power Company. The company was sold to the P.U.D. in August 1945. Soon

[15] Ferry County Public Utility District #1 website. Available online at: http://www.ferrycountypud.com/pud-news/history/. Accessed January 2019.

after, the P.U.D. contracted with the Bonneville Power Administration and began taking power from the Northwest regional power grid. The entire County comprises the PUD's jurisdiction.

### *Development Trends*

Development within the PUD's jurisdiction is like the County as a whole (see County description). The trends of development in Ferry County show minimal growth if not contracting a bit in some areas of the County.

## *Ferry Conservation District*

The Ferry Conservation District (FCD) operates with boundaries of Ferry County. This includes area within the Confederated Tribes of the Colville Reservation. The District provides private landowners solutions to natural resource issues.

The Ferry Conservation District (FCD) is a public subdivision of the State of Washington. Its authorities, powers and structure contained in RCW 89.08. Ferry Conservation District was formed in 1947. It is locally governed and led by a five-member Board of Supervisors.

The Ferry Conservation District works directly with landowners to conserve and promote healthy soils, water, forests and wildlife. The District coordinates assistance from all available sources - public and private, local, state and federal - to develop locally-driven solutions to natural resource concerns.

In addition to serving as a coordinator for conservation in the field, the District:

- Implement farm, ranch and forestland conservation practices to protect soil productivity, water quality and quantity, air quality and wildlife habitat;
- Conserve and restore wetlands, which purify water and provide habitat for birds, fish and other animals;
- Protect groundwater resources;
- Assist communities and homeowners in planting trees and other land cover to hold soil in place, clean the air, provide cover for wildlife, and beautify neighborhoods;
- Help developers control soil erosion and protect water and air quality during construction; and
- Reach out to communities and schools to teach the value of natural resources and encourage conservation efforts.

*The Mission of the FCD is to safeguard the rural lifestyle and sustainable use of natural resources of Ferry County for present and future landowners and residents by offering technical and financial assistance, outreach, and education.*

### *Development Trends*

The Ferry Conservation District plans to maintain the current level of staffing with the intention of expanding services as opportunities become available. Implementation of the Voluntary Stewardship Program, which tracks and offers cost-share funding for mitigation for how agriculture interacts with Critical Areas as defined by the County, represents an expansion of services by the FCD.

# *Northeast Tri-County Health District*

Northeast Tri-County Health District covers the entire Ferry County, as well as, Stevens and Pend Oreille Counties. A variety of preventive services are provided to the residents of these Counties by public health staff. The programs and services are delivered by screening, intervention, education, preventive action and epidemiology or investigation activities.

Other services are designed to prevent disease or illness from environmental sources such as food, water, solid waste, sewage and vectors. In addition to conducting routine inspections and issuing permits, staff also respond to complaints and provide technical assistance to residents in a variety of areas where environmental factors may affect the public.

## *Development Trends*

Development within the Northeast Tri-County Health District's jurisdiction is like the County as a whole (see County description). The trends of development in Ferry County show minimal growth if not contracting a bit in some areas of the County.

# Section 3 – Planning Process

## Documenting the Planning Process

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

### *The Planning Team*

Ferry County Emergency Management and Northwest Management, Inc. led a team of resource professionals that included county and city elected officials and staff, fire protection districts, law enforcement, hospital and public health districts.

The planning Team met with many residents of the County during the community risk assessments and at public meetings. Additionally, the press releases encouraged interested citizens to contact their county Emergency Management coordinator or attend planning Team meetings to ensure that all issues, potential solutions, and ongoing efforts were thoroughly discussed and considered by the Team. When the public meetings were held, many of the Team members were in attendance and shared their support and experiences with the planning process and their interpretations of the results.

The planning philosophy employed in this project included 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 Team were held throughout the planning process to facilitate a sharing of information between cooperators.

### *Description of the Planning Process*

The Ferry County Multi - Hazard Mitigation Plan was developed through a collaborative process involving all the organizations and agencies detailed in Section 1 of this document. The planning effort began by organizing and convening a countywide planning Team.

Ferry County utilized the LEPC Planning Team to begin the update process. Once the meetings began in December of 2017, the Team identified other individuals/agencies that should be invited to participate. Ferry County Emergency Management invited representatives from the Forest Service and the Colville Confederated Tribes to participate.

The planning process included seven distinct phases which were in some cases sequential (step 1 then step 2) and in some cases intermixed (step 5 completed throughout the process):

**Organization of Resources** – Ferry County and NMI worked together to develop a comprehensive list of potential participants as well as a project timeline and work plan. The 2017-18 Planning Team served as the basis for identifying stakeholders; however, that list was expanded in order to provide a comprehensive review and update of the risk assessments and mitigation strategies during the update process.

**Collection of Data –** NMI coordinated with the planning team to gather any new data and information about the extent and periodicity of hazards in Ferry County to ensure a robust dataset for making inferences about hazards.

**Field Observations and Estimations –** NMI and the planning team developed risk models and identified problem areas in order to better understand risks, juxtaposition of structures and infrastructure to risk areas, access, and potential mitigation projects. Many of the analyses used in the 2017-18 plan were reviewed and updated to incorporate new hazard vulnerabilities or changes in development. Additionally, several new risk models and analyses were included in the 2018 update process to better represent actual conditions in Ferry County.

**Mapping –** NMI developed a comprehensive database and map files relevant to pre-disaster mitigation control and mitigation, structures, resource values, infrastructure, risk assessments, and other related data. All the maps and databases were updated as part of the 2018 plan update.

**Public Involvement –** NMI and Ferry County developed a plan to involve the public from the formation of the planning Team to news releases, public meetings, public review of draft documents, and acknowledgement of the final updated plan by the signatory representatives.

**Strategies and Prioritization** – NMI and the planning team representatives worked together to review the risk analyses and develop realistic mitigation strategies. As part of the 2018 plan update, a record of completed action items as well as a "2018 status" report of projects was included in the revised mitigation strategies for each jurisdiction.

**Drafting of the Report –** NMI drafted a final update report and worked with members of the planning team to review each section, incorporate public comments, proceed with the state and federal review processes, and adopt the final document.

## *Multi-Jurisdictional Participation*

CFR requirement §201.6(a)(4) calls for multi-jurisdictional planning in the development of Hazard Mitigation Plans that impact multiple jurisdictions. To be included as an adopting jurisdiction in the Ferry County Multi-Hazard Mitigation Plan jurisdictions were required to sign a MOA and participate in at least four planning Team meetings or meet with planning team leadership individually, provide a goals statement, submit at least one mitigation strategy, and adopt the final Plan by resolution.

The following is a list of jurisdictions, and points of contact, that have met the requirements for an adopting jurisdiction and are thereby included in the Multi - Hazard Mitigation Plan:

**Ferry County**
Steven Bonner
Emergency Management
emdirector@co.ferry.wa.us

**Northeast Tri County Health District**
Matt Schanz
Administrator
mschanz@netchd.org

**Ferry County Public Utility District**
Ed Forsman
Engineering Technician
eforsman@FCPUD.com

**Ferry Conservation District**
Lloyd Odell
Manager
Lloyd.odell@conservewa.net

**City of Republic**
Jim Burnside
City Council
Council5@republicwa.org

**Ferry County Health**
Aaron Edwards
Chief Executive Officer
Aaron.edwards@fcphd.org

Five of these jurisdictions also participated in the 2004 Ferry County Multi-Hazard Mitigation Plan. The Northeast Tri County Health District is a new adopting jurisdiction in this update. These jurisdictions were either represented on the Planning Team, at public meetings or reviewed their respective hazard profiles, risk assessments, and action plan.

The monthly Planning 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:

Planning Team leadership attended local government meetings where planning updates were provided, and information was exchanged. Additionally, representatives on the Planning Team periodically attended city council meetings to provide municipality leadership with updates on the project and to request reviews of draft material. All the adopting jurisdictions maintained active participation in the monthly Planning Team meetings.

One-on-one correspondence and discussions between the planning Team leadership and the representatives of the municipalities and special districts was facilitated as needed to ensure understanding of the process, collect data and other information, and develop specific mitigation strategies. NMI representatives emailed and/or called each jurisdiction individually at least once during the planning process to answer questions and request additional information.

Public meetings were hosted by the communities of Republic and Barstow. Each meeting involved elected officials, county and municipality representatives, local volunteers, and local citizenry were invited to attend.

Written correspondence was provided at least monthly between the Planning Team leadership and each participating jurisdiction updating the cooperators on the document's progress, making requests for information, and facilitating feedback. NMI representatives used an email distribution list of all the stakeholders to announce meetings, distribute meeting minutes, provide draft sections for review, and request information. All the participating jurisdictions provided comments to the draft document during the data gathering phase as well as during the various Team and public review processes.

## *Planning Team Meetings*

The Planning Team consisted of resource professionals from various backgrounds and are listed in the table below. This planning effort was led by Ferry County Emergency Management and Northwest Management, Incorporated.

The following list of people participated in at least one of the Planning Team meetings and volunteered time or responded to elements of the Multi - Hazard Mitigation Plan's preparation. A few participants served on the Team as dual representatives of more than one jurisdiction. None of the participants were part of the original 2004 planning Team. The update process captured a wider variety of stakeholders than the original version of plan including the transportation department and health district representatives. A record of sign-in sheets is included in the Appendices.

**Ferry County Participants:**

*Indicates Adopting Jurisdiction

| Name, Representing | Name, Representing |
|---|---|
| *Matt Schanz, Northeast Tri-County Health District | Phillip Starr, Ferry County EMS District #1 |
| *Cherie Hanning, Ferry Co. Public Hospital District | *Aaron Edwards, Ferry County Health |
| Mac McElheran, US Border Patrol | John Glenewinkel, Republic/Curlew School District |
| Mary Kalinowski, Ferry County Planning Dept. | Ken Kerr, Stevens/Ferry Fire District 3 & 8 |
| *Ray Maycumber, Ferry County Sheriff's Office | *Amy Rooker, Ferry County Sheriff's Office |
| *Ed Forsman, Ferry County Public Utility District | *Ron Charlton, Ferry County Public Works |
| *Nathan Davis, Ferry County Commissioner | *Johnna Exner, Ferry County Commissioner |
| Mike Shick, US Border Patrol | *Lloyd Odell, Ferry County Conservation District |
| Will Rowton, Ferry County Public Works | John Foster Fanning, Okanogan/Ferry Fire District 14 |
| Melissa Rose, Ferry County EMS District #1 | *Jim Burnside, City of Republic |

In addition to these Team members, the emergency management directors from Okanogan and Stevens Counties, as well as the Confederated Tribes of the Colville Reservation were extended invitations to participate.

### *Team Meeting Minutes*

Planning Team meetings were held from December 2017 through September 2018. The minutes and attendance records for each planning Team meeting are included in the Appendices.

## *Public Involvement*

Public involvement in this plan was made a priority from the inception of the project. There were several 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.

## *News Releases*

Under the auspices of the Ferry County Commissioners, periodic press releases were submitted to The Ferry County View, Statesman Examiner and Omak Chronicle. The first press release informed the public that the Multi-Hazard Mitigation Plan process was taking place, who was involved, why it was important to Ferry County, and who to contact for more information. The second press release was in the form of a flyer announcing the public meeting dates and venues, which was distributed to local businesses by Team members. The third press release provided information regarding the public comment period including where hardcopies of the draft could be viewed, the availability of the draft on the (website) and instructions on how to submit comments. A record of published articles regarding the Multi-Hazard Mitigation Plan is included in the Appendices.

### Figure 3.1. Press Release #1 – Planning Process Announcement

**Ferry County**

**Media Release**

**From:** **Ferry County Emergency Management**

**Date:** **February 1, 2018**

**RE:** **Ferry County Multi-Hazard Mitigation Plan Update**

**Ferry County Set to Update Hazard Risk Plans**

**Republic, Wa. Ferry County has launched a project to update the Ferry County Multi-Hazard Mitigation Plan. This update will include an update of the Ferry County Community Wildfire Protection Plan as well. Local agencies and organizations in Ferry County have created a Team to complete the required 5-year updates of these documents as part of the FEMA Pre-Disaster Mitigation program and National Fire Plan and Healthy Forests Restoration Act. The project is being funded through a grant from FEMA.**

**The planning update will include risk analyses, vulnerability assessments, and mitigation recommendations for the hazards of flood, landslide, earthquake, severe weather, wildland fire and others.**

**Ferry County has retained Northwest Management, Inc. to provide risk assessments, hazard mapping, field inspections, interviews, and to collaborate with the planning Team to update the plan. The Team includes representatives from local communities/municipalities, Republic Police Department, rural and wildland fire districts, Sheriff's Department, Washington Department of Natural Resources, U.S Forest Service, public works, highway districts, private landowners, area businesses, various Ferry County departments, and others.**

**One of the goals of the planning process will be to increase the participating jurisdictions' eligibility for additional grants that will help minimize the risk and potential impact of disaster events, thus making a more resilient county. The planning team will be conducting public meetings to discuss preliminary findings and to seek public input on hazard mitigation recommendations. A notice of the dates and locations of these meetings will be posted in local newspapers. Once completed, the updated draft plan will also be available for public review and comment.**

**For more information on the Ferry County Multi - Hazard Mitigation Plan update, or if you would like to attend the meeting, contact Amy Rooker, Ferry County Emergency Management, at 509-775-3132.**

## *Public Meetings*

Public meetings were scheduled in a variety of communities during the hazard assessment phase of the planning process. Venues for meetings were chosen by the planning team and located in each geographical area in order to provide an adequate opportunity for members of every community to attend without considerable travel. Public meetings focused on sharing information regarding the planning process, presenting details of the hazard assessments, and discussing 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.

Public meetings were held in September. The first meeting was held in Republic at a County Commissioners' meeting. The meeting was attended by the County Commissioners and other individuals there in official capacity. The meeting minutes are included in the Appendices. The second meeting was held in Barstow and was attended by Ferry County Chief Civil Deputy and members of the local fire district. The slideshow presentation used during the public meetings is also included in the Appendices.

The public meeting announcement was distributed throughout each community by Team members in the form of a flyer. A sample of the flyer is included below in Figure 3.2.

## *Public Comment Period*

A public comment period was conducted from April 24 thru May 23, 2019 to allow members of the public an opportunity to view the full draft plan and submit comments and any other input to the Team for consideration. A press release was submitted to the local media outlets announcing the comment period, and instructions on how to view the plan and submit comments. A hard Copy of the draft plan is available at the Ferry County Court house in the Emergency Management Office. The draft plan was posted for public review on the Ferry County website www.ferry_county.com . A record of published articles regarding the public comment period and public comments received are included in the Appendices.

**Figure 3.2. Press Release #2 - Public Meeting Flyer.**

# Ferry County

## Multi—Hazard Mitigation Plan

# Public Meeting!

**September 24th — 2:00 pm**

**Ferry County Commissioners' Office**
**290 E Tessie Blvd**

**September 28th — 6:30 pm**

**Barstow Training Center**
**25266 Hwy 395 N**

This meeting will address the Hazard Mitigation Plan being updated for Ferry County. The Plan's revision is required every 5 years and is being funded through a grant from FEMA. These meetings are open to the public and will include a slideshow presentation from Northwest Management, Inc. and the planning team on the identified hazards and potential improvement and risk reduction projects in Ferry County. Public input is being sought in order to better frame the region's efforts for hazard mitigation projects, wildland fire protection, resource enhancements, and emergency preparedness.

Learn about the assessments for floods, landslides, severe weather, wildland fire, and earthquakes in Ferry County. Discuss **YOUR** priorities for how local communities can best reduce the impacts of these events.

**This topic is on the agenda of the Ferry County Commissioners.**

For more information on the Ferry County Hazard Mitigation Plan, please contact Ferry County Emergency Management at (509)-775-3132.

**Figure 3.3. Press Release #3 – Public Comment Period**

# Media Release

## Ferry County Hazard Mitigation Plan Available for Public Review

The Ferry County Multi-Hazard Mitigation Plan update has been completed in draft form and is available to the public for review and comment at the locations listed below. The public review phase of the planning process will be open from April 24th, 2019 thru May 23rd, 2019.

| Ferry County Website |
| --- |
| www.ferry-county.com |

The purpose of the Ferry County Natural Hazard Mitigation Plan (NHMP) is to reduce the impact of hazards such as floods, landslides, severe weather, wildfire, and drought, on Ferry County residents, landowners, businesses, communities, local governments, and state and federal agencies while maintaining appropriate emergency response capabilities and sustainable natural resource management policies. The NHMP identifies high risk areas as well as structures and infrastructure that may have an increased potential for loss due to a hazard event. The document also recommends specific projects that may help prevent disasters from occurring altogether or, at the least, lessen their impact on residents and property. The NHMP is being developed by a committee of city and county elected officials and departments, local and state emergency response representatives, land managers, highway district representatives, and others.

The Ferry County NHMP includes risk analysis at the community level with predictive models for where disasters are likely to occur. This plan will continue to enable Ferry County and its communities to be eligible for grant dollars to implement the projects and mitigation actions identified by the committee. Although not regulatory, the NHMP will provide valuable information as we plan for the future.

Comments on the NHMP must be submitted to the attention of Steven Bonner, Ferry County Emergency Management Director. at emdirector@co.ferry.wa.us or mailed to 290 E Tessie Avenue, Republic, WA 99166 by close of business on May 23rd, 2019. For more information on the Ferry County NHMP update process, contact Ferry County Emergency Management at 509-775-5225 ext. 1112.

## *Documented Review Process*

Reviews and comments on this Plan have been provided through several avenues for the Team members as well as for members of the public. A record of the document's review process has been established through email correspondence, press releases, published articles, meeting minutes, and meeting sign-in sheets. Proof of these activities is recorded in the Appendices.

During regularly scheduled Team meetings in 2017-18, the Team members 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.

Sections of the draft Plan were delivered to the planning Team members during the regularly scheduled Team meetings. The completed first draft of the document was presented to the Team during the month of July for full Team review. The Team spent a couple of weeks proofreading and editing sections of the draft. Many jurisdictions met individually to review and revise their specific risk assessment and mitigation strategy including the prioritization of action items. Once the Team's review was completed, the draft document was released for public review and comment. The public review period remained open from April 24, - May 23, 2019.

# Section 4 – Risk Assessment

## Hazard Summary

The Multi - Hazard Mitigation Plan is developed in accordance with the requirements of the Federal Emergency Management Agency (FEMA) and Washington State Emergency Management Division for a county level pre-disaster mitigation plan. The State of Washington identifies nine natural hazards and eight technological hazards affecting the State. To be consistent, the planning Team chose seven natural and five anthropogenic hazards that pose the highest risk for Ferry County. The hazards addressed in this Plan are:

| **Natural Hazards** | **Other** |
|---|---|
| Flood | Hazardous Materials |
| Earthquake | Infrastructure Failure |
| Landslide | Epidemic |
| Severe Weather | Displaced Population |
| Wildland Fire | Terrorism and Civil Unrest |
| Drought | |

The natural hazards listed above have been assessed for each adopting jurisdiction. Some of the hazards listed as 'other' have been discussed in the natural hazard assessments but not all have been included in this plan. Additional hazard annexes may be added to this Plan as funding allows. The highest priority hazards to be considered for future evaluation are:

Volcano
Pandemic
Erosion

A hazard summary worksheet was facilitated with the county planning Team to determine the relative frequency of a hazard's occurrence and the potential impact a hazard event could have on people, property, infrastructure, and the economy based on local knowledge of past occurrences. The results of the hazard summary can be found in Table 4.1.

**Figure 4.1. Hazard Summary Worksheet**

## Definitions for Classifications

**Location (Geographic Area Affected)**

- **Negligible:** Less than 10 percent of planning area or isolated single-point occurrences
- **Limited:** 10 to 25 percent of the planning area or limited single-point occurrences
- **Significant:** 25 to 75 percent of planning area or frequent single-point occurrences
- **Extensive:** 75 to 100 percent of planning area or consistent single-point occurrences

**Maximum Probable Extent (Magnitude/Strength based on historic events or future probability)**

- **Weak:** Limited classification on scientific scale, slow speed of onset or short duration of event, resulting in little to no damage
- **Moderate:** Moderate classification on scientific scale, moderate speed of onset or moderate duration of event, resulting in some damage and loss of services for days
- **Severe:** Severe classification on scientific scale, fast speed of onset or long duration of event, resulting in devastating damage and loss of services for weeks or months
- **Extreme:** Extreme classification on scientific scale, immediate onset or extended duration of event, resulting in catastrophic damage and uninhabitable conditions

| Hazard | Scale / Index | Weak | Moderate | Severe | Extreme |
|---|---|---|---|---|---|
| Drought | Palmer Drought Severity Index[3] | -1.99 to +1.99 | -2.00 to -2.99 | -3.00 to -3.99 | -4.00 and below |
| Earthquake | Modified Mercalli Scale[4] | I to IV | V to VII | VII | IX to XII |
| | Richter Magnitude[5] | 2, 3 | 4, 5 | 6 | 7, 8 |
| Hurricane Wind | Saffir-Simpson Hurricane Wind Scale[6] | 1 | 2 | 3 | 4, 5 |
| Tornado | Fujita Tornado Damage Scale[7] | F0 | F1, F2 | F3 | F4, F5 |

**Probability of Future Events**

- **Unlikely:** Less than 1 percent probability of occurrence in the next year or a recurrence interval of greater than every 100 years.
- **Occasional:** 1 to 10 percent probability of occurrence in the next year or a recurrence interval of 11 to 100 years.
- **Likely:** 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years
- **Highly Likely:** 90 to 100 percent probability of occurrence in the next year or a recurrence interval of less than 1 year.

**Overall Significance**

- **Low:** Two or more criteria fall in lower classifications or the event has a minimal impact on the planning area. This rating is sometimes used for hazards with a minimal or unknown record of occurrences or for hazards with minimal mitigation potential.
- **Medium:** The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating. This rating is sometimes used for hazards with a high extent rating but very low probability rating.
- **High:** The criteria consistently fall in the high classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area.

A scoring system (shown above) was used to categorize the geographic area affected (location), relative magnitude (max probable extent) and the probability of future events (frequency) that each hazard may have on a community. The categories were then given a numerical value and then totaled to show the overall significance ranking for each hazard.[16] This process was conducted for each adopting jurisdiction.

[16] Hazard Summary Worksheet. Local Mitigation Planning Handbook. 2013. Pp A-29, A-30.

The following table summarizes the results of the Hazard Summary exercise for Ferry County. Flooding, severe weather, landslides and wildland fires were considered key hazards affecting Ferry County in the 2004 plan. Landslide increased in magnitude and frequency while severe weather increased in magnitude in the 2018 update plan. Terrorism/ civil unrest, infrastructure failure, epidemic, drought, displaced population and hazardous materials spills are new hazards that have been ranked by the 2018 Team.

**Table 4.1. Ferry County Hazard Summary**

| Hazard | Location | Max Probable Extent | Probability of Future Events | Overall Significance Ranking |
|---|---|---|---|---|
| **Flood** | Significant (3) | Extreme (4) | Highly Likely (4) | High (11) |
| **Landslide** | Significant (3) | Severe (3) | Highly Likely (4) | High (10) |
| **Earthquake** | Limited (2) | Weak (1) | Occasional (2) | Low (5) |
| **Severe Weather** | Extensive (4) | Extreme (4) | Highly Likely (4) | High (12) |
| **Wildland Fire** | Extensive (4) | Extreme (4) | Highly Likely (4) | High (12) |
| **Terrorism/ Civil Unrest** | Limited (2) | Moderate (2) | Occasional (2) | Low (6) |
| **Infrastructure Failure** | Extensive (4) | Extreme (4) | Highly Likely (4) | High (12) |
| **Epidemic** | Limited (2) | Moderate (2) | Occasional (2) | Medium (6) |
| **Drought** | Extensive (4) | Severe (3) | Likely (3) | High (10) |
| **HazMat** | Limited (2) | Moderate (2) | Occasional (2) | Medium (6) |
| **Displaced Population** | Limited (2) | Severe (3) | Occasional (2) | Medium (7) |

Table 4.2 shows the totals (overall significance value) for each adopting jurisdiction within the plan. Red cells indicate a hazard that received the highest ranking in each category of the worksheet for that jurisdiction.

**Table 4.2. Overall Significance Summary**

| Hazard | Ferry County | NE Tri-County Health District | Ferry County Health | Ferry County Public Utilities District | Ferry County Conservation District | City of Republic |
|---|---|---|---|---|---|---|
| **Flood** | High | Medium | Low | High | High | Low |
| **Landslide** | High | Low | Low | High | High | Low |
| **Earthquake** | Low | Low | Low | Low | Low | Low |
| **Severe Weather** | High | High | Medium | High | High | High |
| **Wildland Fire** | High | High | Medium | High | High | High |
| **Terrorism/Civil Unrest** | Low | Medium | High | Low | Low | Medium |
| **Infrastructure Failure** | High | High | Medium | High | High | High |

| Table 4.2. Overall Significance Summary | | | | | | |
|---|---|---|---|---|---|---|
| Hazard | Ferry County | NE Tri-County Health District | Ferry County Health | Ferry County Public Utilities District | Ferry County Conservation District | City of Republic |
| **Epidemic.** | Medium | High | High | Medium | Medium | Medium |
| **Drought** | High | High | Low | High | High | Low |
| **HazMat** | Medium | Medium | High | Medium | Medium | Medium |
| **Displaced Population** | Medium | Medium | Low | Medium | Medium | Medium |

# Hazard Risk Profiles

## *Flood*

### *Description*

The magnitude of most floods in Washington depend on the particular combinations of intensity and duration of rainfall, pre-existing soil conditions, area of a basin, elevation of the rain or snow level, and amount of snow pack. Man-made changes to a basin also can affect the size of floods. Although floods can happen at any time during the year, there are typical seasonal patterns for flooding in Washington State, based on the variety of natural processes that cause floods:

- Heavy rainfall on wet or frozen ground, before a snowpack has accumulated, typically cause fall and early winter floods;
- Rainfall combined with melting of the low elevation snowpack typically cause winter and early spring floods;
- Late spring floods in Eastern Washington result primarily from melting of the snowpack; and
- Thunderstorms typically cause flash floods during the summer in eastern Washington; on rare occasions, thunderstorms embedded in winter-like rainstorms cause flash floods in western Washington

The Columbia River forms much of the eastern and southern border of the County; however, due to several downstream dams and the backwater storage of Lake Roosevelt, the Columbia River is not a significant risk of causing flood damage along the Ferry County shoreline. Riverine floods along the Kettle and Sanpoil Rivers have the most prolonged impact on Ferry County. Flash flooding can and has occurred throughout the county on smaller streams and tributaries. Erosion and transported sediment are major secondary hazards of flooding. The intense runoff can strip away topsoil and deposit it elsewhere, usually where the flow is impeded, such as bridge abutments. Sediment deposits have been a major effect of flooding in several Ferry County communities. The erosion can deposit sediment in river and creek beds, decreasing their capacity to transport water.

Flash flooding can and has occurred on smaller streams, particularly those in narrow canyons such as the Gold Creek drainage. Severe flash flooding of the rivers and streams occur, by definition, very rapidly usually following a heavy rainfall event. Ice jams and plugged or undersized culverts can exacerbate the impact of this type of flooding. Although infrequent, flash flooding typically causes more damage and loss of life than normal high-water events because they happen very quickly and often catch communities unprepared. Due to the high density of structures and; therefore, people in the 100-year floodplain, there is a high probability of significant damage and potential loss of life due to flash flooding.

Ferry County has been assessed by FEMA's National Flood Insurance Program. There are approximately 5,042 assessed buildings in Ferry County; 147 or about 3% of these are in the FEMA identified floodplain. A 100-year flood is calculated to be the maximum level of flood water expected to occur in a 100-year period. The 100-year flood is sometimes referred to as the 1% flood because there is a 1% chance of it occurring in any year. A 500-year flood has a 0.2% chance of occurring in any year (100 divided by 500).

These flood zone maps will serve as the basis for the analysis of assets of risk to flooding in Ferry County.

## *History*

Ferry County has experienced a long history of high magnitude floods since first written records in the early 1900s, typically 50 and 100-year levels. The diverse landscape and weather patterns within Ferry County are the triggers for those high magnitude floods. Rain on snow events and above normal seasonal temperatures occur throughout the county in the fall, winter and spring.

The following events are some of the more significant flooding events that have occurred in Ferry County.

2018 Flooding

The Kettle River near Curlew reached its highest level on record. The flooding caused portions of Highway 21 between Curlew and the Canadian Border. At least three individuals had to be rescued by Ferry County with assistance from the Spokane County Swift Water Rescue team.

2017 Flood and Landslides

An extremely wet winter and spring, high elevation snowpack and frozen ground led to some of the worst flooding and landslides in decades in Ferry County. Highway 395 washed out in the northeast portion of the county and Highway 21 bridge washed out about 15 miles south of Republic.

The Conservation District aided landowners in the form of fence replacement, streambank stabilization and facilitating bridge replacement for land access.

1998 Flooding

Nearly four inches of precipitation fell in Ferry County on May 26$^{th}$ and 27$^{th}$. These heavy rains combined with mild temperatures and melting snows to cause the last round of inundation that resulted in the worst flooding in 100 years. The widespread damage that resulted from the stream runoff was officially declared a disaster area in October 1998. Substantial portions of State Route 20 on both sides of Sherman Pass were devasted along with several sections along State Route 21 near mileposts 153, 159, 172, 173, 175, and 181. The only access in and out of Republic for a period of time was westbound toward Okanogan County. Sections of State Route 21, the main north-south route in Ferry County, were closed for several weeks. The road going out of the north end of Republic toward the unincorporated village of Curlew was cleared within a week, while it took three weeks to open up State Route 21 south of Republic. The route

over Sherman Pass was a different story; however. The Sherman Creek Bridge on the east side of the pass was washed out along with other sections of the highway, effectively closing the pass until August. According to the Washington State Department of Transportation, the cost of repairs of those two highways along (SR 20 and 21) as of June 30, 1998 totaled $2.7 million.

Main thoroughfare closures were not the only indicators of damage in Ferry County. History repeated itself from the 1990 flood as raging floodwaters of O'Brien Creek swept down the steep slopes east of the City of Republic and into the flats just above the county fairgrounds, leaving tons of sediment throughout the area. The upper end of the fairgrounds was left with about five feet of rocks and other material, turning into a graduated deposition of sand at the far end. In all, 1,000 truckloads of gravel were hauled away.

By the time September rolled around, fully one-third of the fair's operation was shut down due to the far-reaching damage to barns, the racehorse facility, and other buildings. The fact that the county fair was even held in 1998 is a testament to the tremendous volunteer efforts on the part of the community. Although the county fair was back in full operation in 1999, the memory of the extensive damage still lingers among the residents.

1990 Flooding and Landslides

After several weeks and nearly eight inches of rain in the spring of 1990, heavy rains and snow suddenly pummeled Ferry County. 1990 marked the rainiest May in the recorded history of the City of Republic. On the first day of June, rainfall in the city totaled 1.34 inches. Eighteen inches of new snow that day was reported at the top of Sherman Pass. The pass was closed temporarily due to many stalled vehicles. Many live, green trees were uprooted as large amounts of rain saturated the soil around the trees' roots. The heavy snows collected in their limbs and tipped them over.

Streams overflowed their banks creating turmoil on state, county, and private roads. Water overflowed culverts and ditches as it cut through the roads. The Torada Creek Road was badly hit and the Sanpoil Highway (SR 20) was closed intermittently. The Kettle River was running full and overflowing in the lower areas. There was water over the highway between the unincorporated villages of Curlew and Danville at the Big Goosmus Road intersection. Near the city of Republic, O'Brien Creek overflowed its banks and flooded the county fairgrounds. At times that creek was more than 300 feet wide inside the fairgrounds. The water wiped out bridges, poured into buildings, and left about a foot of gravel on the lawns.

1948 Flooding

Records from the 1948 flood are sparse. However, some of Ferry County's senior citizens remember the events accurately. As had previously occurred in 1898, three circumstances converged to cause flooding: high snowpack in the Kettle River Watershed up in British Columbia, large amounts of rain, and hot weather. Temperatures approached nearly 90 degrees Fahrenheit just prior to the May 1948 episode. Since then, there have been heavier snows and periods of prolonged rain, but without the associated hot weather.

The village of Curlew probably suffered the greatest damage due to the high-water level of the Kettle River, but it was not severe. Water approached the back of several buildings as it threatened but did not cause heavy injury. There were no serious problems between the City of Republic and the village of Curlew. O'Brien Creek did not experience extensive flooding.

There was only one airstrip in the county since the Ferry County airport near the village of Curlew had not been built by then. Also, the one good road in the county at the time went from the City of Republic to ten miles south along the Sanpoil River. Small ponds appeared along the side of the road during runoff, but the road was not closed during major flooding. Despite serious flooding in many areas around the State of Washington that year, the City of Republic and much of Ferry County was spared from the significant damage that was seen elsewhere across the state in 1948 and what would eventually occur locally in 1998.

**Figure 4.2. Images of Recent Flooding in Ferry County**

Gold Creek

Matsen Creek

Inchelium Highway

Highway 395

Railroad Tracks

Sanpoil River

## *Probability and Magnitude*

For the purposes of this Plan, the probability and magnitude of flood hazards in Ferry County jurisdictions are based on the 100-year flood or 1% probability floodplains delineated on FEMA Flood Insurance Rate Maps (FIRMs), plus any provisional floodplains delineations used for in-house purposes by participating jurisdictions. FEMA has not updated the FIRM maps in Ferry County since 2006. Most of the flood zones occur in the unincorporated areas of the County, and therefore falls within the Conservation District, Hospital District, Tri-County Health District, and PUD jurisdictions. The City of Republic does not have an identified flood zone.

### Vulnerability

**Table 4.3. Vulnerability - Overall Flood Significance Summary**

| Hazard | Ferry County | NE Tri-County Health District | Ferry County Health | Ferry County Public Utilities District | Ferry County Conservation District | City of Republic |
|---|---|---|---|---|---|---|
| **Flood** | High | Medium | Low | High | High | Low |

### Vulnerability - Loss Estimations

There are approximately $154.6 million of improvements and 3,270 structures in Ferry County, yielding an average structure value of $47,291. The average damage to structures was estimated based on the structure's location as either in or out of the flood zone. The damage to the contents of the structures was estimated at ½ the losses to the structures. The damages will most likely not be equally distributed between buildings based on building materials, building location, and flood location. Moreover, these are only estimates that provide guidance to community planners.

Approximately 198 structures are located within the flood zones of Ferry County. Based on the valuation of structures developed for Ferry County and summarized in Table 4.4, the estimate of value of structures and contents within the flood zone has been made (Table 4.4).The following list of structures/infrastructure all occur within the adopting jurisdictions of the County, Hospital District, Tri-County Health, and the Conservation District.

**Table 4.4. Structures and Infrastructure located in the 100 Year Flood Zone**

| Category | Number of Structures [3] | Value of Structures [1, 4] | Value of Contents [2, 5] | Total Value |
|---|---|---|---|---|
| Residential | 198 | $ 9,363,618 | $ 4,681,809 | **$ 14,045,427** |
| Critical Structures | | | | |
| Curlew Lake Water Supply Well | 1 | $ 10,000 | $ 5,000 | **$ 15,000** |
| Curlew Water Supply Well | 1 | $ 10,000 | $ 5,000 | **$ 15,000** |
| Danville Water Supply Well | 1 | $ 10,000 | $ 5,000 | **$ 15,000** |
| Curlew Oil & Gas Storage | 1 | $ 25,000 | $ 18,000 | **$ 43,000** |
| Curlew Landing Strip | 1 | $ 5,000 | -- | **$ 5,000** |
| Orient Waste Water Treatment | 1 | $ 500,000 | $ 500,000 | **$ 1,000,000** |

| | | | | |
|---|---|---|---|---|
| McMann Creek Bridge | 1 | $ 100,000 | -- | **$ 100,000** |
| Municipal Water Systems | | | | |
| Kettle Court Water System | 1 | $ 10,000 | $ 5,000 | **$ 15,000** |
| Lakecrest Water System | 1 | $ 10,000 | $ 5,000 | **$ 15,000** |
| KPM Water System | 1 | $ 10,000 | $ 5,000 | **$ 15,000** |
| Curlew Water District Well | 1 | $ 10,000 | $ 5,000 | **$ 15,000** |
| Curlew Water District Well Field | 1 | $ 40,000 | $ 20,000 | **$ 60,000** |
| Danville U.S. Border Station Well | 1 | $ 10,000 | $ 5,000 | **$ 15,000** |
| Tiffany's Resort Well | 1 | $ 10,000 | $ 5,000 | **$ 15,000** |
| **Total** | **212** | **$ 10,123,618** | **$ 5,264,809** | **$ 15,388,427** |

[1] Values represent structure estimates based on the average value per structure in Ferry County.

[2] The value of contents is equal to ½ the listed value of the structure losses.

[3] Number of structures determined from aerial photography.

[4]An estimated value of $10,000 was given to a single well, $25,000 for an above ground gas and oil storage facility, $5,000 for an unpaved landing strip, $500,000 for a small waste water treatment facility, and a value of $100,000 was given to a secondary access road bridge.

[5]The contents of two 3,000-gallon oil and gas storage tanks was estimated at $3 per gallon.

Based on this summary (Table 4.4) approximately $10.1 million of improvements and $5.3 million of contents is located within the 100-year flood zone. This total value of resources at risk is approximately $15.3 million affecting nearly 6,000 acres in Ferry County.

The City of Republic has a low direct risk of experiencing major flood damage and a potential long-term disruption of business. Flooding could affect the residents of Republic due to road system failures that access the area.

Roads or railroads that are blocked or damaged can prevent access throughout the County and can isolate residents and emergency service providers needing to get to vulnerable populations or to make repairs. Bridges washed out or blocked by floods or debris from floods also can cause isolation. Culverts can be blocked by debris from flood events, also causing localized flooding problems. Water and sewer systems can be flooded or backed up, causing further health problems. Flood waters can get into drinking water supplies causing contamination. Underground utilities can also be damaged during flood events. As is noted several times in the accounts of past events, damage to infrastructural elements, particularly roadways, is the most widely felt impact from floods. After major floods, it may take weeks to repair damaged road surfaces and bridges to restore the County's ability to import supplies and materials needed by residents.

Most of the farmland in the County is adjacent to rivers, creeks and lakes. Flooding renders this land unusable because of the actual water level, debris left behind, destruction of fences and damage or loss of irrigation equipment. These problems can persist for years after the flooding subsides and many landowners rely on the Conservation District to assist with post disaster efforts.

The other adopting jurisdictions have similar loss estimations to what is described for the County as a whole.

### Vulnerability - Repetitive Loss Properties

Repetitive Loss (RL) and Severe Repetitive Loss (SRL) properties are those NFIP-insured properties that have experienced multiple flood losses since 1978. FEMA tracks RL properties to identify SRL properties. RL properties demonstrate a record of repeated flooding for a certain location and are one element of the vulnerability analysis. RL properties are also important to the NFIP since structures that flood frequently put a strain on the National Flood Insurance Fund. According to a report run by the Washington Department of

Ecology, there has only been 1 non-RL claim submitted totaling $11,770.96 under this program within unincorporated Ferry County and is still privately owned.

### NFIP Participation

Participation in the NFIP is a key element of any community's local floodplain management and flood mitigation strategy. Ferry County and the City of Republic both participate in the NFIP. Joining the NFIP requires the adoption of a floodplain management ordinance that requires jurisdictions to follow established minimum standards set forth by FEMA and the State of Washington when developing in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by the 100-year flood (1% flood), and that new floodplain development will not aggravate existing flood problems or increase damage to other properties. As a participant in the NFIP, communities also benefit from having Flood Insurance Rate Maps (FIRM) that show flood hazard areas and can be used to assess flood hazard risk, regulate construction practices, and set flood insurance rates. FIRMs are also an important source of information to educate residents, government officials and the private sector about the likelihood of flooding in their community. Table 4.5 summarizes the NFIP status and statistics for each of the jurisdictions participating in this Program.

**Table 4.5. NFIP Policy Statistics as of 5/31/2017 in Ferry County.**

| Community Name | Policies In-Force | Insurance In-Force | Written Premium In-Force | NFIP Entry Date | Floodplain Ordinance/ Manager | CRS Ranking |
|---|---|---|---|---|---|---|
| Ferry County | 30 | $7,322,800 | Not available | 4/17/1985 | Mary Kalinowski plan@co.ferry.wa.us | unknown |
| Republic | 0 | $0 | Not available | 5/2/2006 | Margo Sattler Cor2@rcabletv.com | unknown |

### Community Rating System

The Community Rating System (CRS) is a voluntary program for NFIP participating communities. The goals of the CRS are to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management. The CRS has been developed to provide incentives in the form of premium discounts for communities that go beyond the minimum floodplain management requirements and develop extra mitigation measures that reduce flood risk to insured properties, thus reducing the overall tax on the Program nationally.

There are 10 CRS classes; Class 1 provides the most credits and gives the greatest premium discount, Class 10 identifies a community that does not apply for the CRS discount, or that does not obtain a minimum number of credit points therefore receives no discount. Activities recognized as measures for reducing exposure to floods and worth CRS points are organized under four main categories; Public Information, Mapping and Regulation, Flood Damage Reduction, and Flood Preparedness. Currently, Ferry County and the city of Republic are not enrolled in the CRS program.

## *Second Order Hazard Events*

Apart from dam failure, flood events are typically caused by severe weather events such as thunderstorms or rapid spring runoff. Ferry County has a high risk of major flood damages; however, flood events can trigger other types of hazard events that may be more damaging than the flood itself. The following chart outlines the interconnection between flood and other types of hazard events.

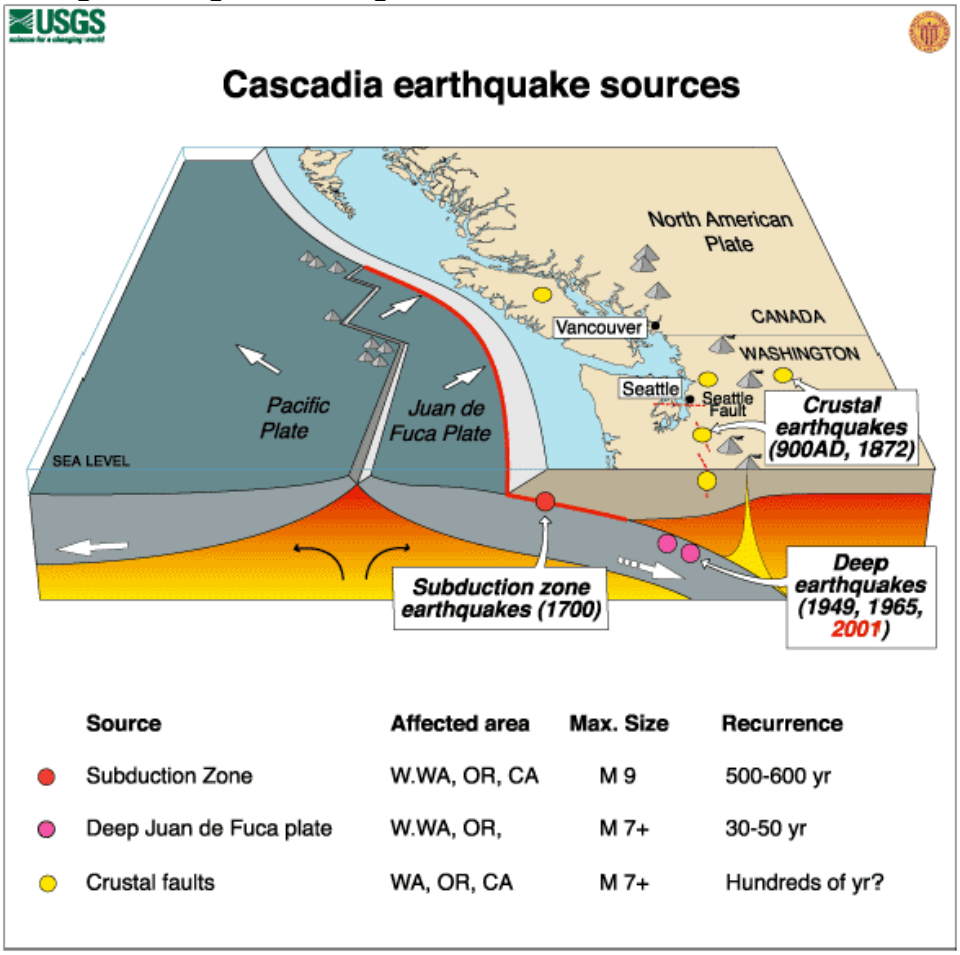
| Table 4.6. Second-Order Hazards Related to Flood Events. | |
|---|---|
| **Related Causal Events** | **Related Effects** |
| Severe Weather | Landslide |
| Dam Failure | Dam Failure |
| | Transportation Systems |
| | Infectious Disease/Epidemic/Pandemic |
| | Crop Loss |
| | Power Outage |
| | Hazardous Materials |
| | Drinking Water Contamination |

# *Earthquake*

## *Description*

More than 1,000 earthquakes occur in the state annually. Washington has a record of at least 20 damaging earthquakes during the past 125 years. Large earthquakes in 1946, 1949, and 1965 killed 15 people and caused more than $200 million (1984 dollars) in property damage. Most of these earthquakes were in western Washington, but several, including the largest historic earthquake in Washington (1872), occurred east of the Cascade crest. Earthquake histories spanning thousands of years from Japan, China, Turkey, and Iran show that large earthquakes recur there on the order of hundreds or thousands of years. Washington's short historical record (starting about 1833) is inadequate to sample its earthquake record. Using a branch of geology called paleoseismology to extend the historical record, geologists have found evidence of large, prehistoric earthquakes in areas where there have been no large historic events, suggesting that most of the state is at risk (Walsh *et al.* 2006).

**Figure 4.3. Geologic Setting in Washington.**




Washington is situated at a convergent continental margin, the collisional boundary between two tectonic plates. The Cascadia subduction zone, which is the convergent boundary between the North America plate and the Juan de Fuca plate, lies offshore from northernmost California to southernmost British Columbia. The two plates are converging at a rate of about 3-4 centimeters per year (about 2 inches per year); in

addition, the northward-moving Pacific plate is pushing the Juan de Fuca plate north, causing complex seismic strain to accumulate. Earthquakes are caused by the abrupt release of this slowly accumulated strain.

Intraplate, or Benioff zone, earthquakes occur within the subducting Juan de Fuca plate at depths of 15 to 60 miles, although the largest events typically occur at depths of about 25 to 40 miles. The largest recorded event was the magnitude 7.1 Olympia quake in 1949. Other significant Benioff zone events include the magnitude 6.8 Nisqually quake of 2001, the magnitude 5.8 Satsop quake in 1999, and the magnitude 6.5 Seattle-Tacoma quake in 1965. Strong shaking lasted about 20 seconds in the 1949 Olympia earthquake and about 15 to 20 seconds during the 2001 Nisqually earthquake. Since 1900, there have been five earthquakes in the Puget Sound basin with measured or estimated magnitude 6.0 or larger, and one of magnitude 7. The approximate rate for earthquakes similar to the 1965 magnitude 6.5 Seattle-Tacoma event and the 2001 Nisqually event is once every 35 years. The approximate reoccurrence rate for earthquakes similar to the 1949 magnitude 7.1 Olympia earthquake is once every 110 years.

Subduction zone, or interpolate, earthquakes occur along the interface between tectonic plates. Scientists have found evidence of great magnitude earthquakes along the Cascadia Subduction Zone. These earthquakes were very powerful (magnitude 8 to 9 or greater) and occurred about every 400 to 600 years. This interval, however, has been irregular, as short as 100 years and as long as 1,100 years. The last of these great earthquakes struck Washington in 1700.

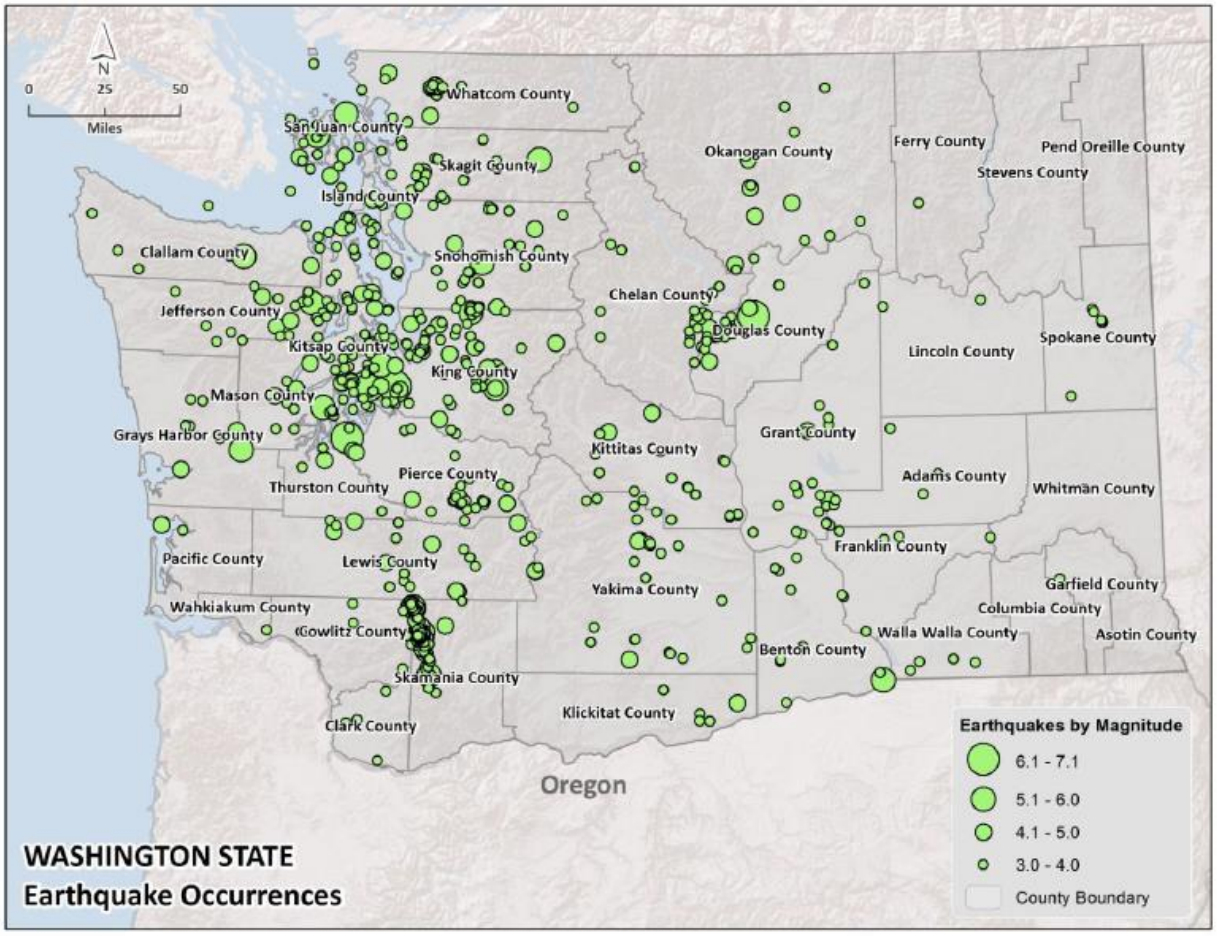
Shallow crustal earthquakes occur within about 20 miles of the surface. Recent examples occurred near Bremerton in 1997, near Duvall in 1996, off Maury Island in 1995, near Deming in 1990, near North Bend in 1945, just north of Portland in 1962, and at Elk Lake on the St. Helens seismic zone (a fault zone running north-northwest through Mount St. Helens) in 1981. These earthquakes had a magnitude of 5 to 5.5. Scientists believe the 1872 magnitude 6.8 earthquake near Lake Chelan was shallow and may be the state's most widely felt earthquake. The 1936 magnitude 6.1 earthquake near Walla Walla also was shallow. Because of their remote locations and the relatively small population in the region, damage was light from these two quakes. Recurrence rates for earthquakes on surface faults are unknown; however, four magnitude 7.0 or greater events occurred during the past 1,100 years, including two since 1918 on Vancouver Island.

The state's two largest crustal earthquakes felt by European settlers occurred in Eastern Washington – the 1872 quake near Lake Chelan and the 1936 earthquake near Walla Walla. Residents of Spokane strongly felt a swarm of earthquakes in 2001; the largest earthquake in the swarm had a magnitude of 4.0. The recent Spokane earthquakes were very shallow, with most events located within a few miles of the surface. The events occurred near a suspected fault informally called the Latah Fault; however, the relation between the fault and the swarm is uncertain. Geologists have mapped the Spokane area, but none confirmed the presence of major faults that might be capable of producing earthquakes. State geologists continue to investigate the geology and earthquake risk near Spokane.

Elsewhere in Eastern Washington, geologists have uncovered evidence of a number of surface faults; however, they have not yet determined how active the faults are, nor determined the extent of the risk they pose to the public. One fault, Toppenish Ridge, appears to have been the source of two earthquakes with magnitudes of 6.5 to 7.3 in the past 10,000 years (EMD 2004).

## *History*

**Figure 4.4. Historic Earthquake Epicenters with Magnitudes of 3.0 or Greater (1872 – 2011).**[17]



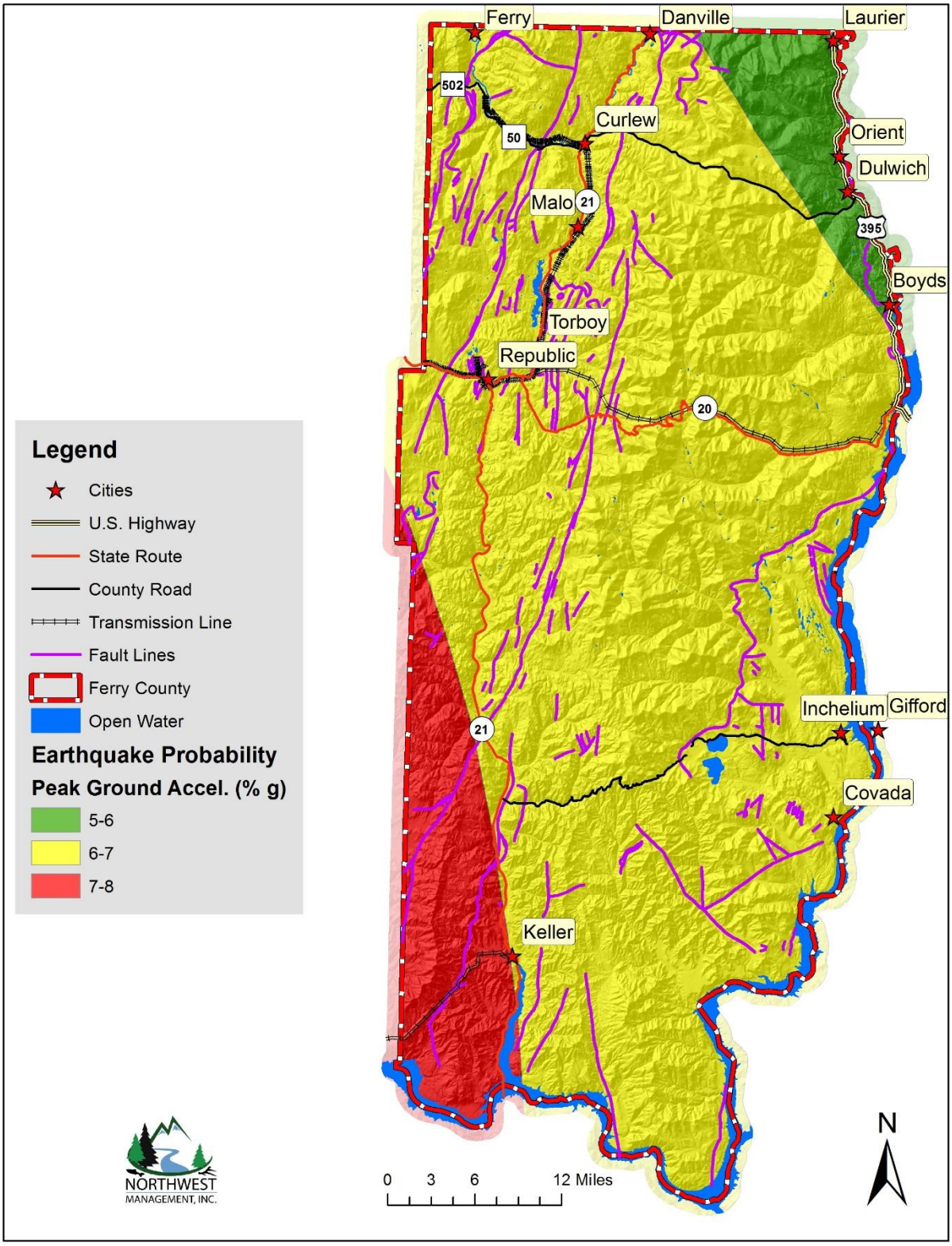

## *Probability and Magnitude*

Washington ranks second in the nation after California among states vulnerable to earthquake damage according to a Federal Emergency Management Agency study. The study predicts Washington is vulnerable to an average annual loss of $228 million per event. Earthquakes in Eastern Washington are typically shallow, crustal type, and are the least understood of all earthquake types. The Okanogan Highlands contain many minor faults; however, Ferry County is not at a high risk of experiencing a damaging earthquake relative to the rest of Washington State.

Figure 4.5 shows that much of the central portion of the County has a Peak Ground Acceleration of 6-7%g while the southwest corner has a 7-8%g and the northeast corner has a 5-6%g. The City of Republic falls into the 6-7%g portion of the range.

[17] Washington State Enhanced Hazard Mitigation Plan. 2014. Available online at: https://mil.wa.gov/other-links/enhanced-hazard-mitigation-plan Accessed April 2018.

**Figure 4.5. Peak Ground Acceleration.**



## Vulnerability

| Table 4.5. Vulnerability - Overall Earthquake Significance Summary | | | | | | |
|---|---|---|---|---|---|---|
| Hazard | Ferry County | NE Tri-County Health District | Ferry County Health | Ferry County Public Utilities District | Ferry County Conservation District | City of Republic |
| **Earthquake** | Low | Low | Low | Low | Low | Low |

### Vulnerability - Loss Estimations

Figure 4.5 shows the Peak Ground Acceleration (PGA) expected for Ferry County with a 2% chance of exceeding these numbers in a fifty-year period. Peak ground acceleration is equal to the maximum ground acceleration that can, or has, occurred during earthquake shaking at a location. This scale is different from the Richter because it does not measure the total energy (magnitude) of the event, but rather how hard the earth shakes at a geographic point. The entire County has a chance to experience PGA between a 5% and 8%. The probability of an earthquake in Ferry County is relatively low compared to that of western Washington State.

Past events suggest that an earthquake in the Ferry County area would cause little to no damage. Most crustal earthquakes are in 5.0 to 5.5 magnitude range, and do not have a history of occurrence in the County. Nonetheless, severity can increase in areas that have softer soils, such as unconsolidated sediments. Damage would be negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; and considerable in poorly built or badly designed structures. Unreinforced masonry structures and unreinforced chimneys of homes will be damaged. There are only a few unreinforced masonry structures in the County, most of which are in located in Republic; however, there are many homes and other buildings throughout the County with unreinforced chimneys. Damaged or collapsed chimneys could result in the secondary hazard of fire. Nonstructural damage caused by falling and swinging objects may be considerable after any magnitude earthquake. Damage to some older, more fragile bridges and land failure causing minor slides along roadways may isolate some residents.

Earthquakes can cause several secondary effects. They can cause large and sometimes disastrous landslides and rock or mud slides. River valleys are vulnerable to slope failure, often because of loss of cohesion in clay-rich soils. Soil liquefaction occurs when water saturated sands, silts or gravelly soils are shaken so violently that the individual grains lose contact with one another and “float” freely in the water, turning the ground into a pudding-like liquid. Building and road foundations lose load-bearing strength and may sink into what was previously solid ground. Unless properly secured, hazardous materials can be released causing significant damage to the environment and people.

It is difficult to estimate potential losses in Ferry County because of the low periodicity of earthquakes and unknown building factors such as year of construction and building materials. Anecdotal evidence suggests that the potential losses would be minimal because of the high percentage of structures which are relatively new wooden frame construction. Key infrastructure buildings such as the County Courthouse, Medical Clinic, and the schools are multi-story buildings with a component of masonry used in construction. Thus, these buildings would be at an increased risk to loss during an earthquake (both in terms of financial loss and loss of life).

The Ferry County GIS department does not have the equipment to map individual structures in the county in tandem with structure values and building materials. Thus, linking structural risk features with the values at risk is not currently possible. However, the Ferry County Assessor has provided the average assessed market value for structures in the County. Using this, and the structure layer developed from aerial photography, we can make relative estimates about the exposure to earthquake losses in Ferry County by community.

There are approximately $154.6 million of improvements in Ferry County. There are approximately 3,270 structures in Ferry County, yielding an average structure value of $47,291 per structure. The average damage to structures was estimated during a magnitude 5.0 earthquake causing damage to all structures at an average of 6.10% of value. The damage to the contents of the structures was estimated at ½ the losses to the structures (3.05%). The damages will most likely not be equally distributed between buildings based on building materials, building location, and epicenter location. However, these estimates provide a basic estimate.

Critical facilities include: medical and health services, including clinics; governmental functions, including executive, legislative, and judicial offices; protective functions, including police and fire stations; and schools, including pre-school, primary, and secondary schools. Table 4.8 provides a summary of the losses to the structures and contents potentially resulting from a magnitude 5.0 earthquake in Ferry County. The estimated losses for unincorporated Ferry County and the city of Republic including damage to structures and loss of contents is approximately $31.9 million and $5.4 million respectively.

**Table 4.6. Loss estimates in Ferry County from a magnitude 5.0 earthquake**

| Neighborhood Name | Number Structures | Ave Value | Total Value | Acres | Damage Ratio to | Damage Ratio to | Structure Damage | Contents Damage | Total Losses |
|---|---|---|---|---|---|---|---|---|---|
| Ferry County | 4,497 | $77,517 | $348,592,000 | -- | 6.10% | 3.05% | $21,264,112 | $10,632,056 | $31,896,168 |
| Republic | 545 | $108,279 | $59,012,200 | -- | 6.10% | 3.05% | $3,599,744 | $1,799,872 | $5,399,616 |
| **Total** | **5,042** | | **$407,604,200** | **--** | | | **$24,863,856** | **$12,431,928** | **$37,295,784** |

Several types of infrastructure are exposed to earthquakes: transportation, water, sewer, communication, and power. A more in-depth analysis of these systems is needed to determine if individual components are seismically sound and can withstand the impacts of an earthquake.

There are many roads that cross earthquake-prone soils in Ferry County. These soils have the potential to be significantly damaged during an earthquake event. Access to the major roadways is crucial to life and safety after a disaster event as well as to response and recovery operations. Bridges are also important in that in some instances they are the only access point to population clusters or individual residences. Most bridges, regardless of their construction material, have some risk of damage due to an earthquake. A key factor in the degree of vulnerability will be the age of the facility, which will help indicate to which standards the facility was built.

Water and sewer infrastructure would likely suffer considerable damage in the event of an earthquake. Republic as well as several of the unincorporated communities in Ferry County have water storage tanks that could be damaged during an earthquake potentially cutting off access to clean drinking water for some residents. In addition, personal well systems could also collapse or become damaged. All or part of the sewer system in Republic could also be damaged causing backups and/or detriment to the surrounding ecosystem.

Without further analysis of the individual components of this type of infrastructure, that all these systems are exposed to potential breakage and failure as a result of earthquake.

Any hazard creating a mass casualty situation would cause a need for transfer from the Hospital in Republic to the nearest available facility. The Hospital District has five ED beds and only one provider (Doctor, ARNP, PA) in the ED/hospital at any given time which limits the ability to handle large numbers of patients arriving at one time. The Hospital does address, and has drilled, the need for a mass evacuation of patients which involves the use of County ambulances, the ALF bus, and school buses should the need arise.

The remaining adopting jurisdictions have a similar loss estimation to that of the entire County.

### *Second-Order Hazard Events*

Earthquake events can result in other types of hazard incidents. In a disaster event, the first hazard event may not be the primary cause of damages or losses within the community. Historical earthquake events have often resulted in structural fires due to broken gas lines, candles, electrical malfunctions, etc. The following chart outlines the interconnection between earthquake hazards and other types of hazard events.

**Table 4.7. Second-Order Hazards Related to Earthquake Events.**

| Related Causal Events | Related Effects |
|---|---|
| None | Dam Failure |
| | Structural/Urban Fire |
| | Wildland Fire |
| | Transportation System |
| | Hazardous Materials |
| | Landslide |
| | Power Outage |
| | Seiche |
| | Volcano |

## *Landslide*

### *Description*

The State of Washington Hazard Mitigation Plan identifies six landslide provinces. Ferry County is part of the Okanogan Highlands Province. This landslide province extends from the slopes of the North Cascades in the west to the Selkirk Mountains in the northeast corner of the state. The primary slope stability problem in this province is in the sediments within and along the boundary of the highlands. Thick sections of sediments along the valleys of the Columbia, Spokane, and Sanpoil Rivers are the result of repeated damming of the Columbia River by lobes of the continental ice sheet and repeated catastrophic floods from breached dams.

The occurrence of new landslides and the reactivation of old landslides increased dramatically with the filling of reservoirs behind the Grand Coulee and Chief Joseph dams. Drawdowns for flood control and power generation also trigger new landslides and/or reactivate and extend old ones. Some of the landslide complexes extend for thousands of feet along the lakeshores, have head scarps in terraces 300 feet or more above reservoir level and extend well below its surface. With landslide activity common along hundreds of miles of shoreline, one hazard in such a setting is water waves generated by fast-moving landslide masses.

Ferry County is identified as one of the jurisdictions that have the greatest vulnerability for landslides in the State of Washington Hazard Mitigation Plan due to its shoreline along Lake Roosevelt and the Columbia River.

The primary factors that increase landslide risk are slope and certain soil characteristics. In general, the potential for landslide occurrence intensifies as slope increases on all soil types and across a wide range of geological formations.

Landslides may occur on slopes steepened by man during construction, or on natural ground never disturbed. However, most slides occur in areas that have had sliding in the past. All landslides are initiated by factors such as weaknesses in the rock and soil, earthquake activity, the occurrence of heavy snow or rainfall, or construction activity that changes a critical factor involved with maintaining stability of the soil or geology of the area. A prime example of this includes previously stable slopes where home construction utilizing independent septic systems are added. The increased moisture in the ground, when coupled with an impermeable layer below the septic systems has led to surface soil movements and mass wasting.

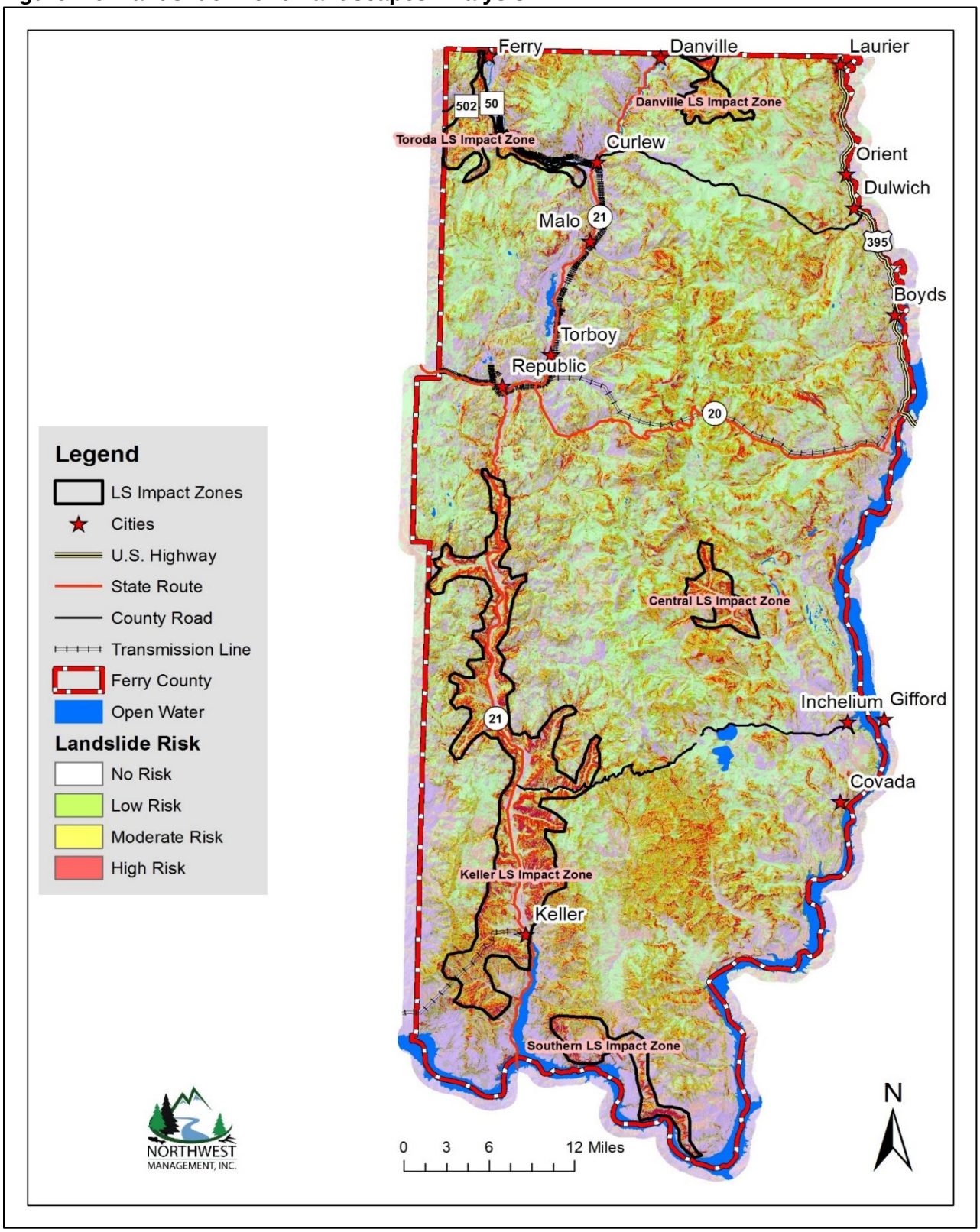
Landslides can be triggered by natural changes in the environment or by human activities. Inherent weaknesses in the rock or soil often combine with one or more triggering events, such as heavy rain, snowmelt, or changes in ground water level. Late spring-early summer is slide season, particularly after days and weeks of greater than normal precipitation. Long-term climate change may result in an increase in precipitation and ground saturation and a rise in ground-water level, reducing the shear strength and increasing the weight of the soil.

Stream and riverbank erosion, road building or other excavation can remove the toe or lateral slope and exacerbate landslides. Seismic or volcanic activity often triggers landslides as well. Urban and rural living with excavations, roads, drainage ways, landscape watering, logging, and agricultural irrigation may also disturb the solidity of landforms, triggering landslides. In general, any land use changes that affects drainage patterns or that increase erosion or change ground-water levels can augment the potential for landslide activity.

Landslides are a recurrent menace to waterways and highways and a threat to homes, schools, businesses, and other facilities. The unimpeded movement over roads—whether for commerce, public utilities, school, emergencies, police, recreation, or tourism—is essential to the normal functioning of Ferry County. The steep slopes of the Sanpoil River valley pose special problems to State Route 21, one of the only intercommunity travel routes between Keller Ferry and the Columbia River and Republic. State Routes 20 and 21 are the main transportation corridors through the county and have been impacted in the past by landslides resulting from heavy precipitation. The disruption and dislocation of these or any other routes caused by landslides can quickly jeopardize travel and vital services. Landslides along the County's road system can limit emergency services/response by first responders to get to victims or get victims to the hospital.

The map shown in Figure 4.6 shows areas that are prone to landslides either due to the steepness of the slope or because of the types of soils that are present. Areas around structures, communities, or transportation routes that contain a risk to landslide are identified in the map below.

**Figure 4.6. Landslide Prone Landscapes Analysis.**



## *History*

Ferry County has numerous landslides annually. The number of annual landslides is expected to increase over the next planning cycle due to recent wildland fires that have occurred within the County. Many of the landslides that have occurred are generally associated with the Lake Roosevelt shoreline or damage and/or blockage of a roadway. However, there are several recent reports of mudslides and landslides along the moderate to steep slopes found along the areas roadways and communities.

**April 2017** - Heavy snow melt caused extensive flooding and landslides through northeast Washington. A landslide in the Deadman Creek area on the eastern boundary of Ferry County closed the road and a detour had to be opened to provide ingress/egress for residents living above the slide. The area around the slide continued to move more than a year after the initial slip.

Numerous roads were damaged as the melting snow saturated soils and over filled creeks and rivers in the area. The County spent nearly $750,000 to repair and/or reroute roads but struggled to find enough funding to properly repair all roads damaged by this event.

**February 1953** - A series of landslides about 100 miles upstream from Grand Coulee Dam generated several waves that crossed the lake and hit the opposite shore 16 feet above lake level. On average, observed waves crossed the 5,000 foot wide lake in about 90 seconds.

**October 1952** - A landslide 98 miles upstream of Grand Coulee Dam created a wave that broke tugboats and barges loose from their moorings at the Lafferty Transportation Company six miles away. It also swept logs and other debris over a large area above lake level.

**April 1952** - A 15 milion cubic yard landslide three miles below the Kettle Falls Bridge created a 65 foot wave that struck the opposite shore of the lake. People observed some waves six miles up the lake.

**February 1951** - A 100,000 to 200,000 cubic foot landslide just north of Kettle Falls created a wave that picked up logs at the Harter Lumber Company Mill and flung them through the mill 10 feet above lake level.

**July 1949** - A two to three million cubic yard landslide near the mouth of Hawk Creek created a 65-foot wave that crossed the lake about 35 miles above Grand Coulee Dam; people 20 miles away observed the wake.

## *Probability and Magnitude*

The Communities of Republic, Pine Grove, Malo, Curlew, and Danville are in small valleys along the Sanpoil River, the Kettle River, or its tributaries. The major access road to these communities is State Highway 20 and 21. These communities are at a low to medium risk of the effects of landslides. The communities themselves are not directly at risk of damage from landslides, but the road and power networks as well as individual or clusters of homes in the many tributaries are much more prone to landslide damage. The disruption of the limited number of access roads and/or the power grid can have a large impact on the communities in the west half of the county.

These communities are at a low risk of direct impacts from landslides. Landslide activity along the major travel corridors that access these communities have a medium risk. This impact on roads and the power supply has and will continue to impact the people living in the area. These impacts have historically been minor, resulting in limited vehicle access or a temporary loss of power.

The communities located along Lake Roosevelt including Laurier, Orient, Barstow, Boyds and Inchelium commonly experience new landslides and the reactivation of old landslides that are exacerbated with the filling of reservoir behind the Grand Coulee, i.e. Lake Roosevelt. Drawdowns for flood control and power generation also trigger new landslides and/or reactivate and extend old ones. Some of the landslide complexes along Lake Roosevelt extend for thousands of feet along the lakeshore and have head scarps in terraces 300 feet or more above reservoir level and extend well below its surface. With landslide activity common along hundreds of miles of shoreline, one hazard in such a setting is seiche, or water wave generated by fast-moving landslide masses.

The communities of Laurier, Orient, Barstow, Boyds, and Inchelium are at a low risk of direct impacts from landslides. Wave effects from landslides along Lake Roosevelt present a low direct risk to the communities

There is a medium risk of landslide activity along the major travel corridors that access these communities. Since State Highway 395 is the only main access route to these communities, a road closure for even a short period of time, can have serious impacts to residents and visitors traveling through the area. The effects of landslides on roads and the power supply has and will continue to impact the people living in the area. These impacts have historically been minor, resulting in limited vehicle access or power loss of hours or possibly up to one day.

The recent wildland fires that have occurred within the County have already caused landslides affecting residents and the local economy and are expected to continue to cause issues until the vegetation returns to the burned slopes.

### Vulnerability

**Table 4.8. Vulnerability - Overall Landslide Significance Summary**

| Hazard | Ferry County | NE Tri-County Health District | Ferry County Health | Ferry County Public Utilities District | Ferry County Conservation District | City of Republic |
|---|---|---|---|---|---|---|
| **Landslide** | High | Low | Low | High | High | Low |

### Vulnerability - Loss Estimations

Although many areas in Ferry County show a high exposure of risk to landslides (Figure 4.5), it is the primary access routes which have experienced the most landslides recently within the County. This fact is mainly attributed to the construction of the highways. The steep topography and development trends of the County require most roads to be built by cutting into toe slopes and; therefore, changing the angle of the hill slopes. Additionally, these roadways receive substantial human interactions with high landslide risk slopes. Most of the slides involve one or more of the following:

- Spring freeze/thaw rockslides;
- Mudslides from one or more tributaries crossing the road;
- Overland flow of water which accumulates debris and washes over the roadway; or
- River and tributary washouts of the main road surface causing road failure; and
- Previously burned areas.

In addition to potential transportation effects, disruption of economic activity and damages to other infrastructure in the region will have direct and indirect economic effects on Ferry County and its residents. It is problematic to estimate total economic impacts resulting from a road closure. Thus, these impacts were excluded from the analysis, but the County acknowledges that these impacts do not estimate the full potential impacts.

Table 4.10 shows a breakdown of the Landslide Impact Zones seen in Figure 4.5. Improvement values were calculated using the average improvement value ($ 77,517) for the unincorporated areas of Ferry County. The value of land was estimated at $ 1,500 per acre throughout the unincorporated Ferry County.

**Table 4.9. Potential Landslide Loss Estimations.**

| Impact Zone | Structures | Potential Impact Value | Acres | Potential Impact Value | **Potential Total Impact Value** |
|---|---|---|---|---|---|
| Keller Impact Zone | 248 | $ 19,224,216 | 84,821 | $ 127,231,500 | **$ 146,455,716** |
| Central Impact Zone | 0 | $ 0 | 9,325 | $ 13,987,500 | **$ 13, 987, 500** |
| Southern Impact Zone | 0 | $ 0 | 14,421 | $ 21,631,500 | **$ 21,631,500** |
| Danville Impact Zone | 0 | $ 0 | 7,312 | $ 10,968,000 | **$ 10,968,000** |
| Toroda Impact Zone | 32 | $ 2,480,544 | 12,219 | $ 18,328,500 | **$ 20,809,044** |

The major impact to the Conservation District would be the destruction of infrastructure needed to conduct business, which includes buildings, fences and equipment.

Road closures anywhere between the hospital and Colville via Sherman Pass would affect the Hospital District's emergency evacuation route. Routes can potentially shift to Tonasket; however, the nearest tertiary hospital would be Seattle which almost triples the travel time. Road closures within the County of course hampers the ability of the community ambulance service to bring patients to the Hospital in Republic which could be quite serious.

Many of the landslides occurring annually throughout the County occur in the unincorporated areas thus impact the other adopting jurisdictions by affecting travel corridors.

### *Second-Order Hazard Events*

Landslide events are often caused by other types of hazard events, but the costs of cleaning up after a landslide including road and other infrastructure repairs can often dwarf the damages of the initial hazard. The following chart outlines the interconnection between landslides and other types of hazard events.

**Table 4.10. Second-Order Hazards Related to Landslide Events.**

| Related Causal Events | Related Effects |
|---|---|
| Flood | Transportation System |
| Earthquakes | Power Outage |
| Wildland Fire | |
| Severe Weather | |

# *Severe Weather*

## *Description*

Severe storms are a serious hazard that can, and do, affect Washington. Severe storms can affect the entire state with varying degrees, due to the complex landscape and the influence from the Pacific Ocean. Washington's climate sees a significant number of severe storms in comparison with the rest of the nation, posing considerable hazard to the state and local communities. Thirty-six storm-related Major Disaster Declarations were made in Washington between 1956 and 2019. In comparison, Idaho had only eleven.

Damaging storms do occur and casualties and extensive property damage result throughout the entire state. Three types of severe weather are of major concern in Washington:

- Winter storms with accumulations of snow and ice, extreme cold and reduced visibility.
- Thunderstorms with hail, lightning, high winds, and flash flooding.
- High wind or tornadoes

No specific jurisdictions or special districts were identified as having differing issues or levels of risk associated with this hazard unless specifically mentioned in the following assessments.

### Winter Storms

All areas of Ferry County are vulnerable to the threat of severe winter storms. Due to topography and climatologic conditions, the higher mountainous areas are often the most exposed to the effects of these storms. Normally the mountainous terrain and the north/south orientation of the Cascades tend to isolate severe storms into localized areas of the County. For example, higher elevations will receive snowfall, while the valley areas may not. Periodically though, individual storms can generate enough force to impact the entire County at one time. From high winds to ice storms to freezing temperatures, there are all types of winter storms that take place during any given year. Winter conditions can change very rapidly. It is not uncommon to have a snowstorm at night with sunshine the next day.

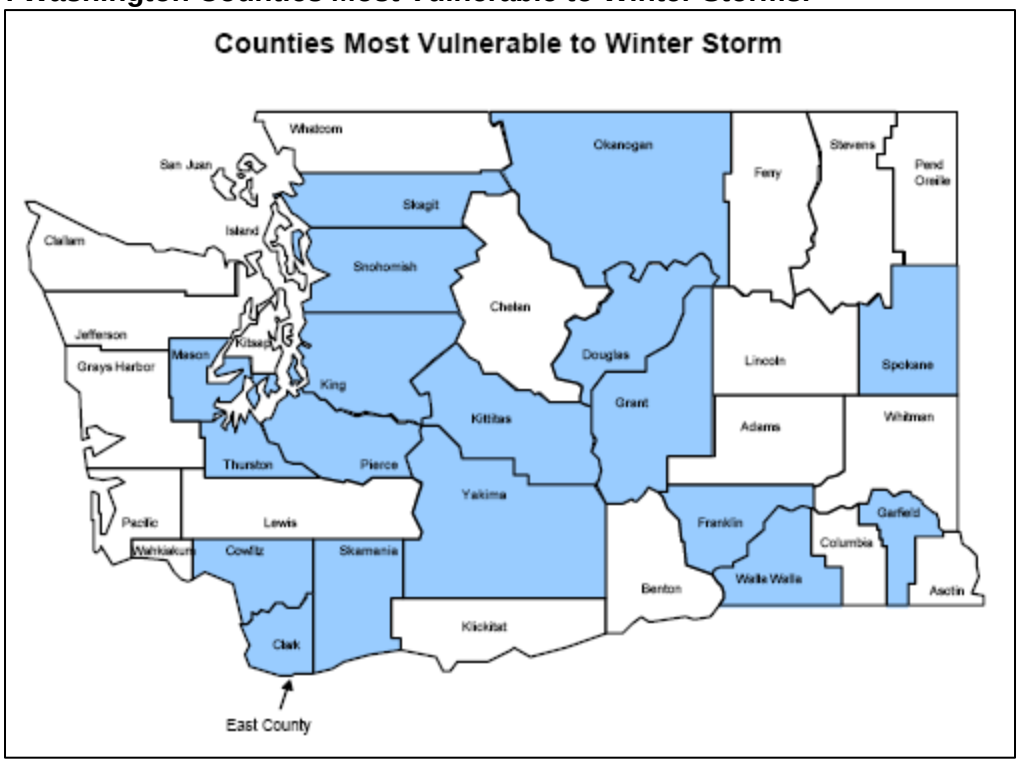
Winter storms with heavy snow, high winds, and/or extreme cold can have a considerable impact on Ferry County; however, most residents are well accustomed to the severe winter conditions in this part of Washington. Power outages and unplowed roads are a frequent occurrence throughout many parts of the County, but most residents are prepared to handle the temporary inconvenience. Nevertheless, Ferry County is at risk to severe winter weather events. Commonly, heavy snow accumulations are the cause of disruptions to normal commuting activities (delays and inability to plow roads and driveways). When coupled with extreme cold weather, severe winter storms have a detrimental impact on residents in Ferry County, particularly the senior population. Severe winter storms also have the potential to cause large losses among livestock and wildlife. Animal losses are usually the result of dehydration rather than cold or suffocation.

Snow loads on roofs, ice-slides off roofs onto vehicles or other buildings, and damaged frozen pipes are also potential hazards associated with winter weather. These events represent a significant hazard to public health and safety, a substantial disruption of economic activity, and a constant threat to structures during the winter months. An average of at least two severe storms is anticipated each winter in Ferry County.

Ferry County is not considered to be one of the Counties most vulnerable to winter storms and blizzards in Washington according to the Washington State Enhanced Hazard Mitigation Plan. Areas most vulnerable to winter storms are those affected by convergence of dry, cold air from the interior of the North American

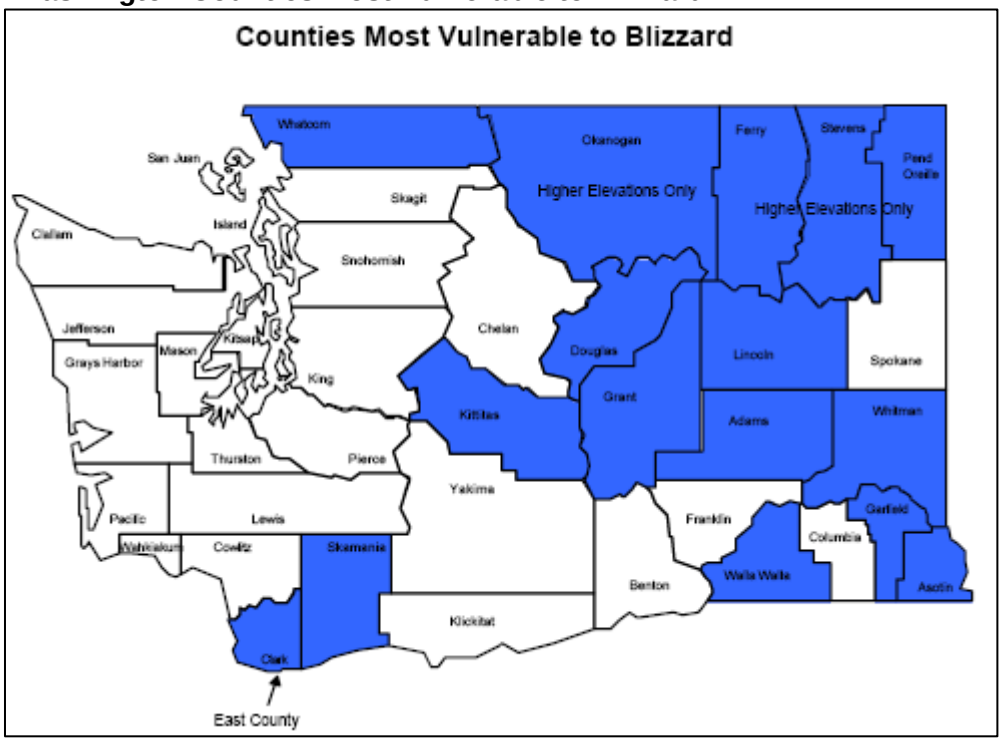
continent, and warm, moist air off the Pacific Ocean. Typically, significant winter storms occur during the transition between cold and warm periods. Counties considered most vulnerable to winter storm are 1) those most affected by conditions that lead to such storms, as described above, and 2) those with a recurrence rate of 50%, meaning the County experiences at least one damaging winter storm event every two years. Counties that meet both criteria are highlighted in Figure 4.7.

**Figure 4.7. Washington Counties Most Vulnerable to Winter Storms.**




Areas most vulnerable to blizzards are those subject to the combination of winter storms and high winds. Counties considered most vulnerable to blizzards are 1) those most affected by conditions that lead to blizzard, as described above, or 2) those with a blizzard recurrence rate of 2.5%, meaning the County experiences at least one damaging high wind event every 40 years. Counties highlighted in Figure 4.8 meet one of the above criteria; counties only need to meet one of the two criteria to be considered most vulnerable due to a lack of data on blizzard events. Higher elevation areas in Ferry County are at high risk to blizzards according to the Washington State Enhanced Hazard Mitigation Plan.

**Figure 4.8. Washington Counties Most Vulnerable to Blizzard.**

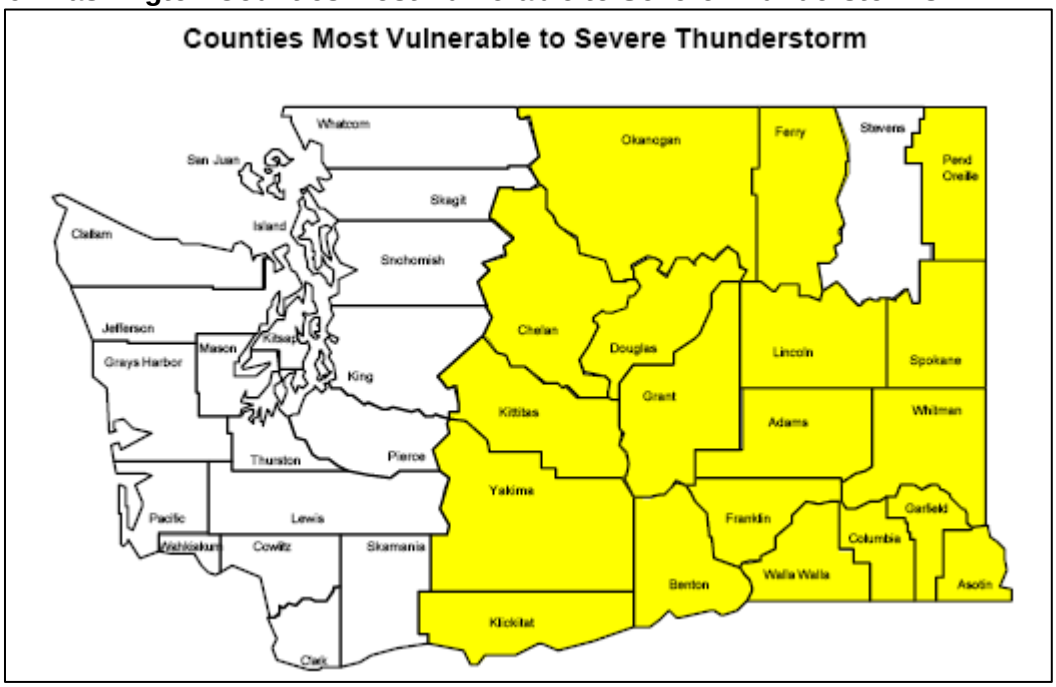



## Thunderstorms

Due to their relative frequency and minimal severity, severe thunderstorms are not well documented in Ferry County. Their impacts are limited and typically do not significantly affect the communities enough to declare a disaster. The secondary impacts of thunderstorms, floods, are emphasized within the flood chapter of this document.

However, Ferry County is not considered to be one of the Counties most vulnerable to severe thunderstorms according to the Washington State Enhanced Hazard Mitigation Plan. Areas most vulnerable to this type of storm are those subject to a strong southwesterly flow of moist, unstable air that generates strong, sometimes violent thunderstorms with one or more of the following characteristics: strong damaging winds, large hail, waterspouts, or tornados. Counties considered most vulnerable to severe thunderstorm are 1) those most affected by conditions that lead to such storms, as described above, or 2) those with a recurrence rate of 20% or greater, meaning the County experiences one damaging severe thunderstorm event at least once every five years. Counties highlighted in Figure 4.9 meet both criteria.

**Figure 4.9. Washington Counties Most Vulnerable to Severe Thunderstorms.**




## Hail

Hail can occur in any strong thunderstorm, which means hail is a threat everywhere. Hail is precipitation that is formed when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere. Large hail stones can fall at speeds faster than 100 miles per hour.

The potential impacts of a severe hail storm in Ferry County include crop damage, downed power lines, downed or damaged trees, broken windows, roof damage, and vehicle damage. Hail storms can, in extreme cases, cause death by exposure. The most common direct impact from ice storms to people is traffic accidents. Over 85% of ice storm deaths nationwide are caused by traffic accidents. Hail storms also have the potential to cause losses among livestock.

The highest potential damage from hail storms in Ferry County is the economic loss from crop damage. Even small hail can cause significant damage to young and tender plants and fruit. Trees can also be severely damaged by hail as was seen in the 1996 ice storm. Even larger diameter trees can be stripped of their foliage and limbs. This debris stays on the ground for many years inviting insects and disease infestations.

## Windstorms and Tornadoes

Windstorms are frequent in Ferry County and they have been known to cause substantial damage. The predicted wind speed given in wind warning issued by the National Weather Service (NWS) is for a one-minute average; gusts may be 25 to 30 percent higher. Under most conditions, the County's highest winds come from the south or southwest. Due to the abundance of agricultural development in Ferry County, crop damage due to high winds can have disastrous effects on the local economy. In the case of extremely high winds, some buildings may be damaged or destroyed. Wind damages will generally be categorized into four groups: 1) structure damage to roofs, 2) structure damage from falling trees, 3) damage from windblown dust on sensitive receptors, or 4) wind driven wildfires.

Structural injury from damaged roofs is uncommon in Ferry County. Many homes in the area have metal roof materials (for better snow shedding) which fare better than asphalt shingles during high winds but are still at risk to damage.

Structural damage from falling trees is also very common in some parts of the County. Many homeowners have planted ornamental trees for shade and windbreak protections. However, many of these trees are located near, and upwind of homes putting them at risk to falling trees which could cause substantial structural damage and potentially put lives at risk.

Air borne particulate matter increases during high wind events. When this occurs, sensitive receptors including the elderly and those with asthma are at increased risk to complications. Emergency response to these events has included assistance with daily activities such as shopping and medical assistance.

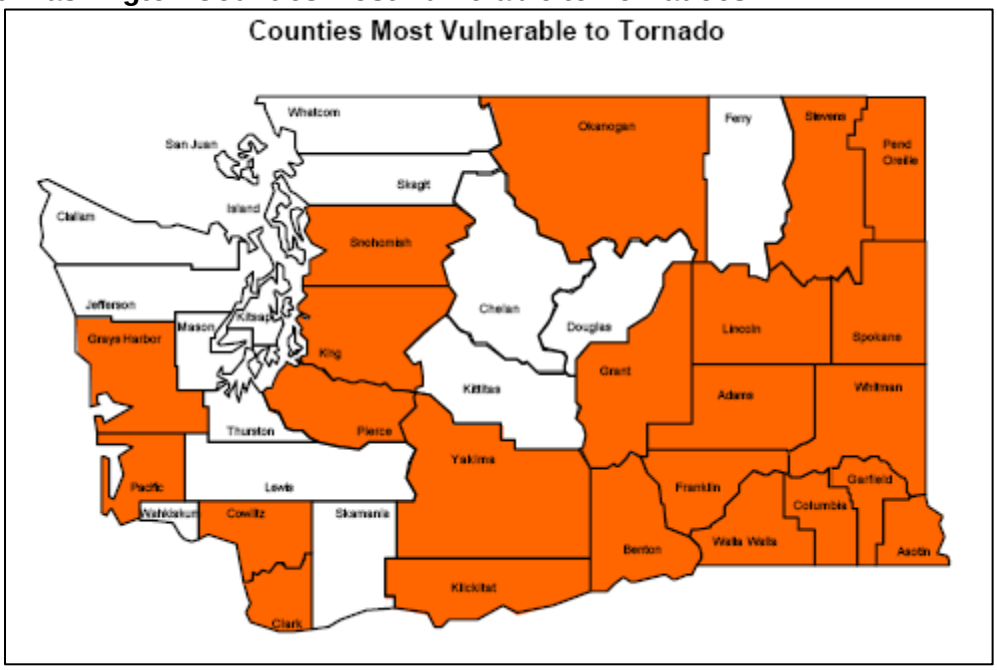
The National Weather Service defines high winds as sustained winds of 40 mph or gusts of 58 mph or greater, not caused by thunderstorms, expected to last for an hour or more. Areas most vulnerable to high winds are those affected by a strong pressure difference from deep storms originating over the Pacific Ocean; an outbreak of very cold, Arctic air originating over Canada; or air pressure differences between western and eastern Washington that primarily affect the Columbia River Gorge, Cascade Mountain passes, ridges and east slopes, and portions of the Columbia Basin. Counties considered most vulnerable to high winds are 1) those most affected by conditions that lead to high winds, as described above, and 2) those with a high wind recurrence rate of 100 percent, meaning the County experiences at least one damaging high wind event every year. Ferry County is not considered to be one of the most vulnerable to high winds in Washington State according to the Washington State Hazard Mitigation Plan.

Finally, Ferry County and the entire region are at increased risk to wildfires during high wind events. Ignitions can occur from a variety of sources including downed power lines, lightning, or arson. Once ignited, only wildfire mitigation efforts around the community and scattered homes will assist firefighters in controlling a blaze. Details about wildfire mitigation are discussed in the Community Wildfire Protection Plan, incorporated into this Multi - Hazard Mitigation Plan.

A tornado is formed by the turbulent mixing of layers of air with contrasting temperature, moisture, density, and wind flow. This mixing accounts for most of the tornadoes occurring in April, May, and June, when cold, dry air from the north or northwest meets warm, moister air moving up from the south. If this scenario was to occur and a major tornado was to strike a populated area in Ferry County, damage could be widespread. Businesses could be forced to close for an extended period, and routine services such as telephone or power could be disrupted.

The National Weather Service defines a tornado as a violently rotating column of air that contacts the ground; tornados usually develop from severe thunderstorms. Areas most vulnerable to tornado are those subject to severe thunderstorms, as described above. Counties considered most vulnerable to tornado are 1) those most affected by conditions that lead to such storms, as described above, or 2) those with a recurrence rate of 5 percent or greater, meaning the County experiences one damaging severe thunderstorm event at least once every 20 years. Counties highlighted in Figure 4.10 meet one of the above criteria; counties only need to meet one of the criteria to be considered as most vulnerable because the occurrence of tornados is uncommon in Washington. According to the Washington Department of Emergency Management, Ferry County does not meet these criteria; therefore, is not one of the most vulnerable counties in Washington.

**Figure 4.10 Washington Counties Most Vulnerable to Tornadoes.**




## *History*

**July 20-21, 2012 –Straight-line winds (DR-4083)** - The following is an excerpt taken from the Natural Resource Conservation Service (NRCS) regarding the high wind damage that occurred in Ferry County, and the region, in July of 2012.

"On July 20, 2012, Ferry County and the Colville Indian Reservation were hit with an unusually severe wind storm. Two storm cells collided on the south end of the reservation in the community of Keller. Micro-bursts up to 100 miles per hour ran up the San Poil Valley into Canada. This produced divergent wind shears that touched down sporadically causing pockets of intense damage.

The storm caused destruction to homes, interrupted power by ripping down over 900 miles of power lines, snapped 250 power poles, and devastated the forested ground throughout the valley. The Colville Reservation alone saw 3000 forested acres ruined. Mature trees were uprooted or snapped in half. Governor Gregoire declared a state of emergency for Ferry County."[18]

Damages were estimated at $8.4 million for Ferry County.

During the 2012 wind event, the Hospital District stayed open and was, for the most part, able to use radioes to communicate. However, a lack of communication made operations difficult. Blocked transportation routes made it difficult for staff and patients to come access the hospital.

[18] USDA Natural Resources Conservation Service, Washington website located at: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/wa/people/employees/?cid=nrcs144p2_036520. Accessed April, 2018.

## *Probability and Magnitude*

Severe weather in Ferry County ranges from the commonly occurring thunderstorms to hail, high winds, drought, dense fog, lightning, and snow storms. There have been 122 days with severe weather events in Ferry County from 2004 to 2018 totaling over $4.5 million in property damages, an estimated $4,000 in crop damages and resulting in a few minor injuries and one fatality over that span. By far, the most expensive occurrence of severe weather are wind events. The most expensive severe weather event since the previous hazard plan was adopted occurred in 2017 and caused over $1.5 million in property damages.[19] A complete listing of the storm events database on severe weather in the region can be found in the Appendices.

### Vulnerability

**Table 4.11. Vulnerability - Overall Severe Weather Significance Summary**

| Hazard | Ferry County | NE Tri-County Health District | Ferry County Health | Ferry County Public Utilities District | Ferry County Conservation District | City of Republic |
|---|---|---|---|---|---|---|
| **Severe Weather** | High | High | Medium | High | High | High |

### Vulnerability - Loss Estimations

Given the evidence of past weather patterns and damage caused, the probability of Ferry County continuing to experience severe weather events is very high. Nevertheless, residents in this area are generally aware of the potential hazard; thus, the likelihood of major damage is moderate. Crops are generally the most vulnerable to severe damage and economic loss.

It is difficult to estimate potential losses in Ferry County due to windstorms and high wind events. Construction throughout the County has been implemented in the presence of high wind events, and therefore, the community is at a higher level of preparedness to high wind events than many other areas experiencing lower average wind speeds.

We have estimated losses based on high wind damage as follows:

3% of the parcels damaged causing 50% of value loss (loss could be from downed or damaged trees, damaged outbuildings, damaged fences/poles, damage to siding, damaged landscaping etc.)

5% of the parcels received damage to roof (requiring replacement of roof)

Damages associated with sensitive receptor irritation have not been estimated. We have also not estimated the potential for a large-scale wildfire event associated with high winds.

Based on the data provided by the County Assessor, the total estimate value of structures in Ferry County is approximately $1.5 billion. Using the criteria outlined above, an estimate of the impact of high winds on in the County has been made. The potential wind and tornado damage to all structures was estimated at $2.8 million (Table 4.12).

[19] NOAA National Centers for Environmental Information, Storm Events Database. Located online at: https://www.ncdc.noaa.gov/stormevents/ Accessed April 2018.

| Table 4.12. Loss estimates for windstorms and tornadoes in Ferry County. | | | | | |
|---|---|---|---|---|---|
| Jurisdiction(s) | Number of Structures[1] | Total Estimated Structure Value[2] | Structural Damage [3] | Roof Damage [4] | Estimated Losses |
| County, Conservation District, Hospital District, Tri-County Health, PUD | 2,651 | $125,368,441 | $1,880,527 | $405,000 | $2,285,527 |
| Republic | 619 | $29,273,129 | $439,097 | $93,000 | $532,097 |
| **Totals** | **3,270** | **$154,641,570** | **$2,319,624** | **$498,000** | **$2,817,624** |

[1] Number of structures determined from aerial photography.

[2] Total Estimate Structure Value based on number of structures times the average structure value of $47,291.

[3] Structural damage was calculated as 3% of structures receiving 50% of value damage.

[4] Roof damages were calculated as 5% of structures requiring a $3,000 roof replacement (new roof, disposal of waste).

The Ferry County Public Utility District No. 1 is particularly susceptible to severe local storms, primarily wind because private and public forests often surround the PUD's transmission and distribution lines. In addition, Ferry County PUD relies solely on a radial feed transmission circuit owned by Bonneville Power Administration. Currently, the PUD does not have reliable temporary electric generation capabilities or storage capacity to provide service during interruptions related to hazard events. The PUD's goal is to maintain the reliability of the electrical system while preparing mitigation and hazard response plans to address potential hazards.

The hospital in Republic can be adversely affected when any hazard creates a power outage as the facility has an undersized generator capable of only 200Kw which provides limited power to the emergency department and limited areas in the hospital. Without power, only 1/3 of the heating system is available (patient care areas) which makes the hospital vulnerable in the winter months (certain areas are susceptible to the fire suppression system freezing).

High wind and other severe weather can impact the Conservation District by causing loss of timber, damage to buildings and fences, and restrict access to property.

Severe weather is often widespread and therefore impacts all adopting jurisdictions in similarly.

### *Second-Order Hazard Events*

Severe weather is often the causal factor in damages from other types of hazard incidents such as flood or wildland fire. The following chart outlines the interconnection between severe weather and other types of hazard events.

| Table 4.13. Second-Order Hazards Related to Severe Weather Events. | |
|---|---|
| **Related Causal Events** | **Related Effects** |
| None | Drought |
| | Crop Loss |
| | Tornado |
| | Wildland Fire |
| | Power Outage |
| | Transportation |
| | Flood |

# Drought

## Description

The following section was largely taken from the Washington State Enhanced Hazard Mitigation Plan.[20]

Drought is a prolonged period of reduced precipitation severe enough to reduce soil moisture, water and snow levels below the minimum necessary for sustaining plant, animal, and economic systems. Droughts are a natural part of the climate cycle.

Unlike most states, Washington has a statutory definition of drought (Revised Code of Washington Chapter 43.83B.400). According to state law, an area is in a drought condition when:

The water supply for the area is below 75 percent of normal.
Water uses and users in the area will likely incur undue hardships because of the water shortage.
Drought can have a widespread impact on the environment and the economy, depending upon its severity, although it typically does not result in loss of life or damage to real property, as do other natural disasters.

Unlike most disasters, droughts occur slowly but may last a long time. On average, the nationwide annual economic impacts of drought – between $6 billion and $8 billion annually in the United States – are greater than the impacts of any other natural hazard. They occur primarily in the agriculture, transportation, recreation and tourism, forestry, and energy sectors. Social and environmental impacts are also significant, although it is difficult to put a precise cost on these impacts.

The Washington State's climate and ecology are largely shaped by the interactions that occur between seasonally varying weather patterns and the region's mountain ranges. Approximately two-thirds of the region's precipitation occurs in October-March. Much of this precipitation is captured in the region's mountains. Unlike other parts of the country, snow- rather than man –made reservoirs- is the dominant form of water storage, storing water from the winter and releasing it in spring and early summer, when economic, environmental, and recreational demands for water are greatest throughout the state.

The amount of snow that collects in Washington's mountains largely depends on both precipitation and the temperature during winter months. The El Niño – Southern Oscillation (El Niño/ La Niña) events that occur in the Pacific Ocean affect Washington's winter weather and play a role in whether the region experiences a drought. In El Niño years, winters tend to be drier and temperatures tend to be warmer, the result is lower springtime snowpack and lower stream flow during spring and summer in snowmelt driven rivers.

## History

Washington state has experienced several droughts that have lasted longer than a single season. The two worst on record occurred in 1977 and 2001. The most recent widespread event occurred in 2005. In 2015, the region experienced below average snowpack leading into summer where extended periods of high

[20] Washington State Enhanced Hazard Mitigation Plan. 2012. Washington State Emergency Management Division. Available online at: https://mil.wa.gov/other-links/enhanced-hazard-mitigation-plan. Accessed May 2018.

temperatures contributed to many large wildland fires.[21] The 2015 drought also led to a reduction in crop yields and quality.[22]

In 2019 the Governor declared the County a drought area and the Conservation District was able to offer technical assistance to agricultural producers from irrigation experts.

The widespread nature of droughts affects all the adopting jurisdictions in the County and therefore a specific history for each is not needed.

## *Probability and Magnitude*

"At this time, reliable forecasts of drought are not attainable for temperate regions of the world more than a season in advance. However, based on a 100-year history with drought, the state as a whole can expect severe or extreme drought at least 5 percent of the time in the future, with most of eastern Washington experiencing severe or extreme drought about 10 to 15 percent of the time."[30]

Agriculture is a vital part of Ferry County's economy. Some croplands in Ferry County are irrigated. Prolonged drought, two or more winters of below normal precipitation combined with extreme summer heat, may cause reduced irrigation quotas resulting in some crop loss. Drought can affect the agricultural industry in a number of ways:

It reduces crop production, sometimes for several years.

It reduces availability of food on rangeland for grazing animals, which may result in premature withdrawal of livestock from the range with an eventual sharp increase in forage expense.

It reduces availability of relatively inexpensive hydropower for farmers, processors, and storage facilities, increasing their reliance on more expensive energy sources.

The impact of drought varies by area, by crop, and by the status of the irrigation water right holder (junior or senior). Loss of water is far more damaging to perennial crops, such as fruit trees, grapes, hops, and asparagus, than to annual crops because it takes perennials several years to return to normal production. Reducing irrigation on annuals such as corn, peas, and other vegetables not only results in loss of a crop for a year, but it also may result in the loss of the food-processing infrastructure because of lack of product or higher costs for hydropower or other energy source.

Drought affects more than Ferry County farms and ranches. It also can affect availability and cost of hydropower and of shipping capacity for crops dependent on water transport. The cost of hydropower is critical to food processors; from 30 to 40 percent of the cost of processing and cold storage is for energy. Higher energy costs caused by drought remove local food processors' competitive edge.

[21] The 2015 drought in Washington State: a harbinger of things to come? Marlier *et al* 2017. Environmental Research Letters, Volume 12, Number 11.
[22] Sandison D I 2017 *2015 Drought and Agriculture*(Pullman, WA: Washington State Academy of Sciences).

## Vulnerability

**Table 4.14. Overall Drought Significance Summary.**

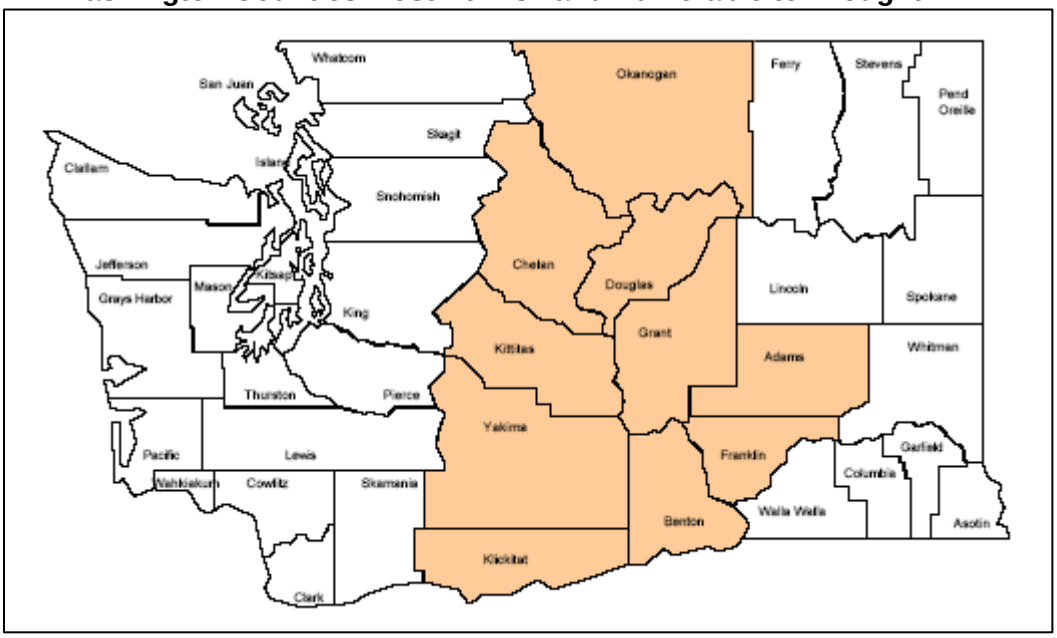
| Hazard | Ferry County | NE Tri-County Health District | Ferry County Health | Ferry County Public Utilities District | Ferry County Conservation District | City of Republic |
|---|---|---|---|---|---|---|
| **Drought** | High | High | Low | High | High | Low |

### Vulnerability - Loss Estimations

Ferry County is not considered to be one of the Counties most vulnerable to drought according to the Washington State Hazard Mitigation Plan (Figure 4.11). Vulnerability to drought is affected by (among other things) population growth and shifts, urbanization, demographics, technology, water use trends, government policy, social behavior, environmental awareness, and economic ability to endure a drought. These factors evolve, and a community's vulnerability to drought may rise or fall in response to these changes. For example, increasing and shifting populations put greater pressure on water and other natural resources – more people need more water. For the State Enhanced Hazard Mitigation Plan, a County is most vulnerable to drought if it meets at least five of the following seven criteria:

- History of severe or extreme drought conditions:
    - The County must have been in serious or extreme drought at least 10-15 percent of the time from 1895 to 1995.
- Demand on water resources based on:
    - Acreage of irrigated cropland. The acreage of the County's irrigated cropland must be in top 20 in the state.
    - Percentage of harvested cropland that is irrigated. The percentage of the County's harvested cropland that is irrigated must be in top 20 in the state
    - Value of agricultural products. The value of the County's crops must be in the top 20 in the state.
    - Population growth greater than the state average. The County's population growth in 1990 – 2000 must be greater than state average of 21.2 percent.
- A County's inability to endure the economic conditions of a drought, based on:
    - The County's median household income being less than 75 percent of the state median income of $45,776 in 1999.
    - The County being classified as economically distressed in 2003 because its unemployment rate was 20 percent greater than the state average from January 2000 through December 2002.

**Figure 4.11. Washington Counties Most At-Risk and Vulnerable to Drought.**




This profile will not attempt to estimate potential losses to County or City facilities due to drought. This hazard poses little threat to people and the built environment but can pose significant damage to the County's economy.

Drought can impact landowners within the Conservation District boundaries by causing a reduction in the water available for farmland irrigation and reduce the productivity of rangeland which both reduce the viability of agricultural producers.

Drought is a widespread hazard that commonly affects all adopting jurisdictions either directly or indirectly.

## *Second-Order Hazard Events*

Drought is caused by natural processes and can last for multiple seasons or years. Drought can also be a secondary effect of another type of hazard. The following chart outlines the interconnection between drought and other types of hazard events.

**Table 4.15. Second-Order Hazards Related to Drought Events.**

| Related Causal Events | Related Effects |
|---|---|
| Global Warming | Crop Loss |
| Severe Weather | Water Supply |
| | Wildland Fire |
| | Hydroelectric Supply |
| | Civil Unrest |
| | |

# *Wildland Fire*

The information used for the wildfire profile was taken from the Ferry County Community Wildfire Protection Plan 2015 update. For more detailed information on wildfire please refer to that plan. The Ferry County Hazard Mitigation Plan 2018 update is officially recognizing the 2015 Ferry County CWPP by annex into this update and therefore will be updated in conjunction with this plan.

## *Description*

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 Okanogan Highlands 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.

Areas that have recently burned, such as the Fish Hatchery, will be at low risk of wildfires starting and spreading for several years because fine fuels were consumed. However, the overall reduction in hazardous fuels in these areas is minimal, particularly in dry Douglas-fir and ponderosa pine forests which were dense, multi-storied stands prior to wildfire. Dense stands of snags will become heavy dead and down branches and logs within 10-20 years. Fine fuels will return to these sites as understory species re-establish and these fuels combined with the accumulated large fuels will provide the opportunity for severe fire in 20-30 years after the initial wildfire.

## *History*

Across the west, wildfires have been increasing in extent and cost of control. Data summaries for 2007 through 2017 are provided to demonstrate the variability of the frequency and extent of wildfires nationally.

**Table 4.16. Statistical Highlights of Wildfires from 2007 -2017 Nationally.**

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Fires | 85,705 | 78,979 | 78,792 | 71,971 | 74,126 | 67,774 | 47,579 | 63,212 | 68,151 | 67,743 | 71,499 |
| 10-year Average ending with indicated year | 80,125 | 79,918 | 78,549 | 76,521 | 80,465 | 74,912 | 74,560 | 73,128 | 73,267 | 63,573 | 68,968 |
| Acres Burned (million acres) | 9.3 | 5.3 | 5.9 | 3.4 | 8.7 | 9.2 | 4.3 | 3.6 | 10.1 | 5.5 | 10 |
| 10-year Average ending with indicated year (million acres) | 7.0 | 6.9 | 6.9 | 6.5 | 7.0 | 7.3 | 7.2 | 6.8 | 6.7 | 6.1 | 6.6 |
| Structures Destroyed | -- | -- | -- | 788 | 5,246 | 4,244 | 2,135 | 1,953 | 4,636 | 4,312 | 12,306 |
| Estimated Cost of Fire Suppression (Federal agencies only) | $1.84 billion | $1.85 billion | $1.24 billion | $1.13 billion | $1.73 billion | $1.9 billion | $1.7 billion | $1.5 billion | $2.1 billion | $1.98 billion | $2.92 billion |

The National Interagency Fire Center and the National Incident Coordination Center maintains records of fire costs, extent, and related data for the entire nation. Tables 4.15 and 4.16 summarize some of the relevant wildland fire data for the nation and some trends that are likely to continue unless targeted fire mitigation efforts are implemented and maintained. According to these data, the total number of fires is trending downward while the total number of acres burned is trending upward. Since 1980 there has been a significant increase in the number of acres burned.[23] In 2017, the Pacific Northwest was slightly above average fire season.[24]

**Table 4.17. Summary of National Ignitions and Acres Burned Annually (1980-2017).**

| Year | Fires | Acres | Year | Fires | Acres |
|---|---|---|---|---|---|
| **2017** | 71,499 | 10,026,086 | **1998** | 81,043 | 2,329,709 |
| **2016** | 67,595 | 5,503,538 | **1997** | 89,517 | 3,672,616 |
| **2015** | 68,151 | 10,125,149 | **1996** | 115,025 | 6,701,390 |
| **2014** | 63,212 | 3,595,613 | **1995** | 130,019 | 2,315,730 |
| **2013** | 47,579 | 4,319,546 | **1994** | 114,049 | 4,724,014 |
| **2012** | 67,774 | 9,326,238 | **1993** | 97,031 | 2,310,420 |
| **2011** | 74,126 | 8,711,367 | **1992** | 103,830 | 2,457,665 |
| **2010** | 71,971 | 3,422,724 | **1991** | 116,953 | 2,237,714 |
| **2009** | 78,792 | 5,921,786 | **1990** | 122,763 | 5,452,874 |
| **2008** | 68,594 | 4,723,810 | **1989** | 121,714 | 3,261,732 |
| **2007** | 85,822 | 9,321,326 | **1988** | 154,573 | 7,398,889 |
| **2006** | 96,385 | 9,873,745 | **1987** | 143,877 | 4,152,575 |
| **2005** | 66,753 | 8,689,389 | **1986** | 139,980 | 3,308,133 |

[23] National Interagency Fire Center. 2017. Available online at http://www.nifc.gov/.

[24] National Interagency Fire Center. Wildland Fire Summary and Statistics Annual Report 2017. Available online at https://www.predictiveservices.nifc.gov/intelligence/2017_statssumm/intro_summary17.pdf.

| | | | | | |
|---|---|---|---|---|---|
| **2004** | 77,534 | 6,790,692 | **1985** | 133,840 | 4,434,748 |
| **2003** | 85,943 | 4,918,088 | **1984** | 118,636 | 2,266,134 |
| **2002** | 88,458 | 6,937,584 | **1983** | 161,649 | 5,080,553 |
| **2001** | 84,079 | 3,555,138 | **1982** | 174,755 | 2,382,036 |
| **2000** | 122,827 | 8,422,237 | **1981** | 249,370 | 4,814,206 |
| **1999** | 93,702 | 5,661,976 | **1980** | 234,892 | 5,260,825 |

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

Recently, the Fish Hatchery Fire that started on August 26, 2010 burned 650 acres and was located about 2 miles southeast of Curlew Lake in Ferry County. The Slide Creek Fire started on the same day, August 26, 2010, and burned 989 acres. It was located near Arden, approximately 6 miles south of Colville, Washington.[25]

Detailed records of wildfire ignitions and extents from the DNR and BLM have been analyzed. In interpreting these data, it is important to keep in mind that the information represents only the lands protected by the agency specified and may not include all fires in areas covered only by local fire departments or other agencies.

The BLM (1982-2016) database of wildfire ignitions used in this analysis includes ignition and extent data within their jurisdictions. During this period, the agencies recorded an average of less than 69 wildfire ignition per year resulting in an average total burn area of 4,948 acres per year. According to this dataset, the human caused and natural/unknown ignitions account for the same number of wildland fires occurring in Ferry County. However, the highest number of acres burned (71%) is attributed to the human caused ignitions.

The highest number of ignitions in Ferry County between 2004 and 2016 was witnessed in 2009 with 132 separate ignitions. The largest amount of area burned in Ferry County during that same time frame occurred in 2014 with over 28,000 acres being burned in a single year.

**Table 4.18. Summary of Cause from State and BLM databases 1982-2016**

| General Cause | Number of Ignitions | Percent of Total Ignitions | Acres Burned | Percent of Total Acres |
|---|---|---|---|---|
| Human-Caused | 1,113 | 46% | 92,652 | 53% |
| Natural Ignition | 1,283 | 53% | 80,529 | 46% |
| Unknown | 17 | <1% | -- | -- |
| **Total** | **2,413** | | **173,181** | |

During this 34-year span, wildland fires burned over 170,000 acres in Ferry County. The human caused ignitions account for just under half of all ignitions reported by state and federal agencies, while natural ignitions make up all but 4% of the other half of ignitions that occur in Ferry County. Human caused ignitions burned over 92,000 acres or 7% more than naturally ignited fires.

[25] Washington Deparment of Natural Resources "ear to the ground" website found at: https://washingtondnr.wordpress.com/category/wildfire/page/21/ accessed June, 2014.

**Figure 4.12. Summary of Ferry County State and Federal Ignitions by Cause.**

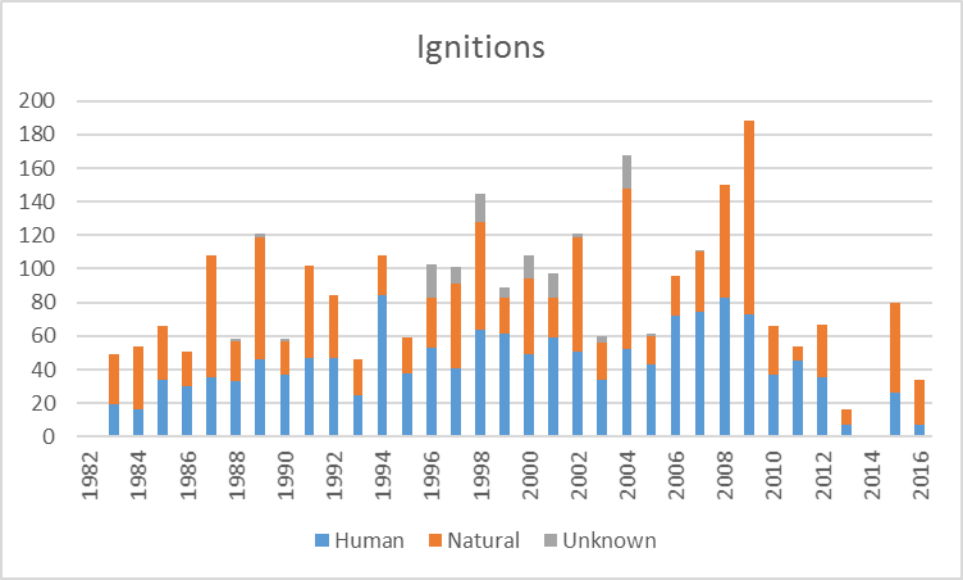
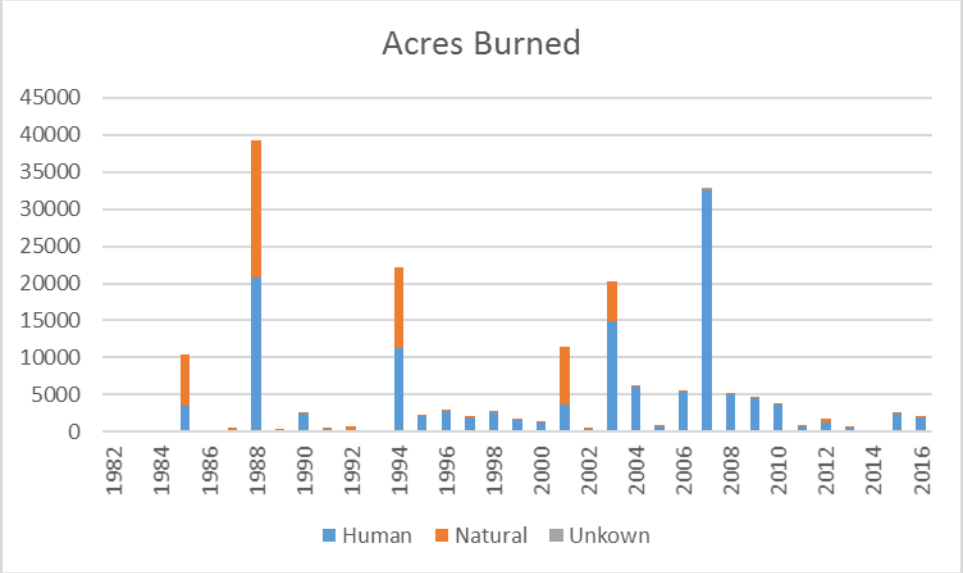



**Figure 4.13. Summary of Ferry County State and Federal Acres Burned by Cause.**




2015 Wildland Fires

The Kettle Complex was made up of four separate fires; Stickpin Fire, Roy Road Fire, Renner Lake Fire and Graves Mountain Fire which burned over 73,000 acres. The North Boulder 2 Fire was ignited by lightning on July 20th and burned 233 acres. The Colville Complex was made up of three separate fires and was reported on August 14th. This complex of fires burned more than 11,500 acres. The North Star Fire occurred on the Colville Indian Reservation. This human caused fire burned more than 218,000 acres before being contained. The Twenty-One Mile Grade Fire also occurred on the Colville Indian Reservation and was also human caused. This fire burned over 2,200 acres.

It should be noted that portions of the fires that burned on the Reservation may have burned in adjacent counties and not completely within Ferry County. Therefore, many of the acres/ignitions detailed in this section may not contribute to the charts above.

A former hospital administration team made the choice to evacuate long term care and assisted living facility and essentially close the hospital and clinic for a time during the 2015 wildfire season. The reason stated was respiratory concerns for the residents that live within the hospital. Hindsight revels though that there was minimal threat to the actual facility, and they should have stayed open for the community and firefighters battling fires in the region. Questionable if the residents should have been sent out as Spokane (where the residents went) was not much different in terms of respiratory concerns.

In recent years the Conservation District there have been multiple events that have impacted the FCD. There have been several wildland fires that have burned both public and private land which the Conservation District has responded to assist public and private landowners with cost-share help replanting trees, fencing, and providing seed to replant rangeland.

## *Probability and Magnitude*

Fire was once an integral function within most ecosystems in Washington. The seasonal cycling of fire across most landscapes was as regular as the July, August and September lightning storms plying across western Washington. 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.[26] These fires burned from 1 to 47 years apart, with most at 5- to 20-year intervals.[27] With infrequent return intervals, plant communities tended to burn more severely and be replaced by vegetation different in composition, structure, and age.[28] 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.

Ideally, pre-European settlement historical fire data would be used to estimate the annual probability for fires in Ferry County. However, current data are not adequate to make credible calculations because the data for local, state, and federal responsibility areas are not reported by the same criteria. Nevertheless, the data reviewed above provides a general picture of the level of wildland-urban interface fire risk for Ferry County overall. Based on the historical information available, Ferry County has a very high probability of wildland fires occurring on an annual basis. Based on the historical data provided by the U.S. Forest Service and BLM, a fire over 25,000 acres should be expected every three to five years.

Ignition potential is also high throughout the County. Recreational areas, major roadways, debris burning, and agricultural equipment are typically the most likely human ignition sources. Lightning is also a significant source of wildfires in Ferry County.

Ferry County was analyzed using a variety of models, managed on a Geographic Information System (GIS) system. Physical features of the region including roads, streams, soils, elevation, and remotely sensed images were represented by data layers. Field visits were conducted by specialists from Northwest Management, Inc. and others. Discussions with area residents and local fire suppression professionals augmented field

[26] Johnson, C.G. 1998. Vegetation Response after Wildfires in National Forests of Northeastern Oregon. 128 pp.
[27] 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.
[28] 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.

visits and provided insights into forest health issues and treatment options. This information was analyzed and combined to develop an objective assessment of wildland fire risk in the region.

### Relative Threat Level

The predicted Wildland Fire Threat layer shown on the map below was produced by combining weighted data sets that relate to wildfire risk in an additive model. Datasets considered for the model included; percent slope, aspect, wildland fire rate of spread, fuel types, ignition probability, average annual precipitation and population. The sources of each dataset are included in Table 4.18.

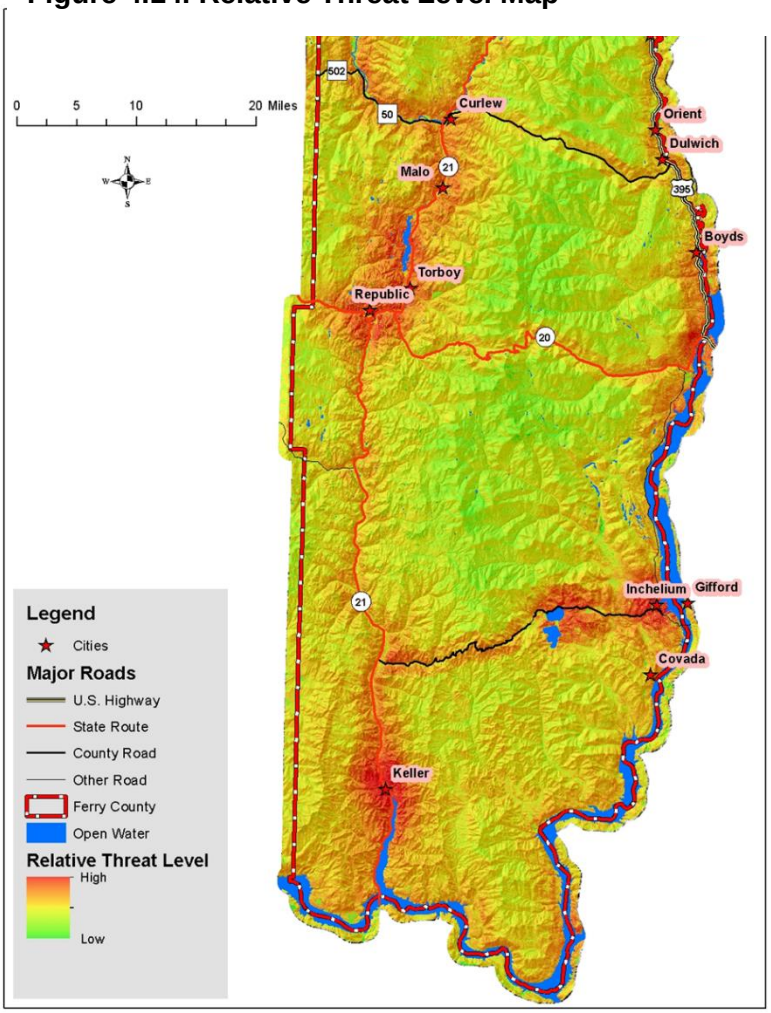
**Table 4.19. Relative Threat Level Map Dataset Sources.**

| Dataset | Source |
|---|---|
| Slope | 10 Meter Digital Elevation Model (DEM) |
| Aspect | 10 Meter Digital Elevation Model (DEM) |
| Precipitation | PRISM Climate Data from Oregon State University |
| Population | 911 Address Points |
| Wildland Fire Rate of Spread | LANDFIRE Wildfire Assessment Tool (WFAT) |
| Ignition Probability | Density of Fire Occurrences |
| Fuel Types | Scott and Burgen 40 Fire Behavior Fuel Model from LANDFIRE |

Each of the datasets were reviewed and their various characteristics were weighted from low to high based on their estimates of relative risk. The datasets were then subjected to a principal component analysis (PCA). A PCA for spatial data determines how much each dataset contributes to a model and if each dataset adds important information to the model. In this case, the PCA determined that all datasets were important for the model.

These layers were then analyzed in Geographical Information System using a Raster Calculator to produce the combined cumulative effects at a 30-meter pixel resolution. For any geographical location on the map, one pixel represents the combined values at that location from all 7 data layers. The results show a range of values from high to low based on the value range for the combined layers. Because agricultural land has a seasonal

**Figure 4.14. Relative Threat Level Map**



variability of wildfire threat, the agricultural lands are masked out with a constant color.

### Wildland-Urban Interface

The data reviewed above provides a general picture regarding the level of wildland-urban interface fire risk within Ferry County. Population growth rates have been minimal with development occurring along the river corridors. The growing appreciation for seclusion has led to significant development in many of the lower elevation forests. 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. Summer tourism in Ferry County can greatly increase the population of the County. 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.

There are several reasons why the fire risk may be even higher than suggested above, especially in developing wildland-urban interface areas.

1) Large fires may occur infrequently, but statistically they will occur. One large fire could significantly change the statistics. In other words, 40 years of historical data may be too short to capture large, infrequent wildland fire events.

2) The level of fire hazard depends profoundly on weather patterns. A several year drought period would substantially increase the probability of large wildland fires in Ferry County. For smaller vegetation areas, with grass, brush and small trees, a much shorter drought period of a few months or less would substantially increase the fire hazard.

3) The level of fire hazard in wildland-urban interface areas is likely significantly higher than for wildland areas due to the greater risk to life and property. The probability of fires starting in interface areas is much higher than in wildland areas because of the higher population density and increased activities. Many fires in the wildland urban interface are not recorded in agency datasets because the local fire department responded and successfully suppressed the ignition without mutual aid assistance from the state or federal agencies.

The wildland-urban interface (WUI) 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 region.

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 such as houses. The WUI encompasses not only the interface (areas immediately adjacent to urban development), but also the surrounding vegetation and topography. Reducing the hazard in the wildland-urban interface requires the efforts of federal, state, and local agencies and private individuals.[29] "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

[29] Norton, P. Bear Valley National Wildlife Refuge Fire Hazard Reduction Project: Final Environmental Assessment. Fish and Wildlife Services, Bear Valley Wildlife Refuge. June 20, 2002.

interface is [largely] the responsibility of Tribal, state, and local governments".[30] The role of the federal agencies in Ferry County is and will be much more limited. 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.[31] 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 treated will be less likely to sustain a crown fire that enters or originates within it. [32]

By reducing hazardous fuel loads, ladder fuels, and tree densities, and creating new and reinforcing existing defensible space, landowners can 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;[33]

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; and

**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.

In addition to these classifications detailed in the Federal Register, Ferry County has included five additional classifications 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.

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[30] 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

[31] 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

[32] Norton, P. Bear Valley National Wildlife Refuge Fire Hazard Reduction Project: Final Environmental Assessment. Fish and Wildlife Services, Bear Valley Wildlife Refuge. June 20, 2002.

[33] McCoy, L. K., et all. Cerro Grand Fire Behavior Narrative. 2001.

**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 or urban growth boundaries; it is set by very high population densities (more than 7-10 structures per acre).

**Infrastructure Area WUI** – those locations where critical and identified infrastructure is located outside of populated regions and may include high tension power line corridors, critical escape or primary access corridors, municipal watersheds, and areas immediately adjacent to facilities in the wildland such as radio repeater towers.

**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. This classification is not considered part of the wildland urban interface.

In summary, the designation of areas by the Ferry County planning Team includes:

Interface Condition: WUI

Intermix Condition: WUI

Occluded Condition: WUI

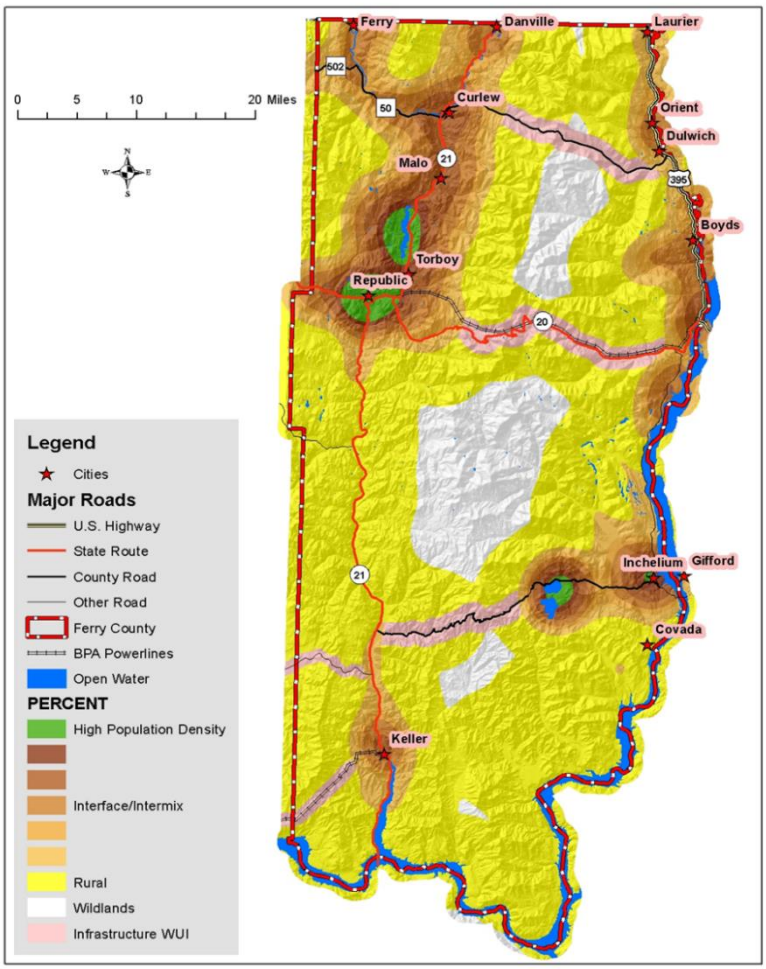
Rural Condition: WUI

High Density Urban Areas: WUI

Infrastructure Areas: WUI

Non-WUI Condition: Not WUI, but present in Ferry County

Prepared By




Ferry County's wildland urban interface (WUI) is mostly based on population density. Relative population density across the county was estimated using a GIS based kernel density population model that uses object locations to produce, through statistical analysis, concentric rings or areas of consistent density. To graphically identify relative population density across the county, structure locations are used as an estimate of population density. The County's 911 address layer (GIS) was used to identify the locations of possible structures. The resulting output identified the extent and level of population density throughout the county.

By evaluating structure density in this way, WUI areas can be identified on maps by using mathematical formulae and population density indexes. The resulting population density indexes create concentric circles showing high density areas, 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 relatively high risk landscapes, limiting infrastructure, and other points of concern.

The WUI, as defined here, is unbiased and consistent, allows for edge matching with other counties, and most importantly – it addresses the entire county, not just federally identified communities at risk. 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.

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 Multi-Hazard Mitigation Plan Planning 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, state and federal agencies, and local fire districts.

**Potential Mitigation Activities**

Ferry County Planning Department should encourage homeowners/builders to use fire resistant materials during the permit process.

Vegetation should be managed to increase the effectiveness of fire suppression equipment in the event of a wildland fire. Plantings near homes should use fire resistant landscaping and be well spaced. Grass surrounding homes and other buildings should be kept short and watered if possible. Other possible management actions include:

Remove weak, dying, and sick trees, thin standing trees to create crown openings spaced to approximately 10 feet between crowns.

Prune trees to a minimum of 12 feet of all branches.

Prune 1/3 of the live crown of smaller trees.

Remove ladder fuels that may carry fire into the crowns of larger, overstory trees.

Dispose of all excess vegetative material by chipping or hand-piling and burning when conditions are favorable.

Many access roads throughout the County require additional treatments to ensure a viable escape route for residents while simultaneously providing for access by emergency vehicles. Most of the homes in the wildland-urban interface (situated within the range and forest lands) have multiple entrances and exits from their homes and businesses. The vegetation surrounding these access points should be trimmed and disposed of in such a way to allow easy access to and from homes. Site specific treatments should be developed for each home and subdivision.

In addition, some housing developments within the County have access roads that cannot support water trucks used by fire fighters (rural and wildland). Some roads have steep adverse grades, while others have turning radii that would be difficult for large trucks to navigate. Some roads have both limitations. Most of the bridges observed in the area would support water-laden trucks. Roads in developments should be signed to allow emergency vehicles to plot a route over navigable roads while responding to an emergency. Ferry

County enforcement of Ordinance 95-05 requiring homeowners to establish high visibility address markers at driveways would improve accurate emergency vehicle response during fire or other incidents.

**Post-fire Rehabilitation**

The first-year post-fire has been shown to be the most critical for erosion and slope stabilization as vegetation attempts to recolonize the slopes. Therefore, every effort should be made, post-fire, to mitigate any further disturbance to affected watersheds. Soils, vegetation, and litter are all critical to the functioning of hydrologic processes. A watershed with good hydrologic conditions typically have 75% ground cover experiences only about 2% or less of rainfall as surface runoff.[34] Conversely, a watershed that has had significant amounts of ground cover removed by a wildland fire can result in a surface runoff increase of 70%.[78]

Slope stabilization treatments often include; grass seeding, reforestation, contour-felled logs, mulch, silt fence construction, placement of straw wattles, and lop and scatter slash. These practices are often implemented as a 'first line of defense' against post-fire sediment movement.

Road treatments such as; out sloping, gravel on road surface, rocks in the ditch, culvert removal, culvert upgrading, overflows, armored stream crossings, rolling dips, and water bars are all meant to mitigate water's erosive force. Increasing the water and sediment processing capabilities of roads and road infrastructure can prevent large cut-and-fill failures and the movement of sediment downstream. Trash racks and storm patrols can be used to reduce culvert blockages that may result in road failure and increased risk to downstream flooding and sediment deposition.

Channel treatments may be utilized to prevent downstream flooding and debris flows. In-channel structures are designed to reduce the rate at which water flows which allows sediment to settle out. As these structures decay, sediment is gradually released downstream. Debris that is currently in the channel may be removed to reduce the likelihood that it will become mobilized during a flood. Temporary dams constructed of straw, logs, or rocks are the most common examples.

There will likely be many private landowners that will require financial and implementation assistance with these activities, as well as, the County. Both public and private infrastructure (i.e. culverts, bridges, road surfaces, etc.) will be affected which can impact the economy of Ferry County. Correcting these issues as soon as possible can reduce the impact on local citizens in the region.

### Vulnerability

**Table 4.20. Vulnerability - Overall Wildland Fire Significance Summary.**

| Hazard | Ferry County | NE Tri-County Health District | Ferry County Health | Ferry County Public Utilities District | Ferry County Conservation District | City of Republic |
|---|---|---|---|---|---|---|
| **Wildland Fire** | High | High | Medium | High | High | High |

[34] Robichaud, Peter R.; Beyers, Jan L.; Neary, Daniel G. 2000. Evaluating the effectiveness of postfire rehabilitation treatments. Gen. Tech. Rep. RMRS-GTR-63. Fort Collins: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 85 p.

### Vulnerability - Loss Estimations

Wildland fires, big and small, are dangerous to both Ferry County residents and emergency response personnel. Wildland fire suppression activities have a very high frequency of injuries, such as heat exhaustion and smoke inhalation, and have caused numerous deaths nationwide. Fire events in Ferry County typically result in a multi-department and agency response effort; thus, coordinating activities and ensuring everyone's safety is paramount.

Residents with property in the path of wildland fire will likely suffer the greatest impacts through loss of structures and/or the value of any timber or agricultural crops on their land. Many fires require an evacuation of nearby residences to ensure the safety of citizens. Evacuation procedures require the coordination of law enforcement and fire service organizations and may involve temporary sheltering in extreme cases.

Ferry County, like most areas, has sensitive populations, such as elderly residents and children, who may be affected by air quality during a wildland fire. Smoke and particulates can severely degrade air quality, triggering health problems. In areas heavily impacted by smoke, people with breathing problems might need additional services from doctors or emergency rooms.

Commerce in Ferry County and the rest of the region may also be interrupted by wildland fires. Transportation corridors will likely be temporarily closed or slowed due to a fire burning in the area. Heavy smoke from a wildfire several miles away could be dense enough to make travel unsafe on roadways.

The Ferry County Public Utility District No. 1 is particularly susceptible to severe local storms, primarily wind and wildfire because private and public forests often surround the PUD's transmission and distribution lines. In addition, Ferry County PUD relies solely on a radial feed transmission circuit owned by Bonneville Power Administration. Currently, the PUD does not have reliable temporary electric generation capabilities or storage capacity to provide service during interruptions related to hazard events. The PUD's goal is to maintain the reliability of the electrical system while preparing mitigation and hazard response plans to address potential hazards.

The environmental impacts from a fire are dependent on the vegetation present and the intensity of the fire. Most of the rangeland and forest ecosystems present in Ferry County are adapted to periodic fire events and benefit from occasional, low intensity burns. On the other hand, overcrowded forest conditions or over mature stands of sage brush will likely burn much more intensely than occurred historically. These types of fires tend to result in a high rate of mortality in the vegetation and often adversely impact soil conditions. High intensity fires are also much more dangerous and difficult to suppress.

Ferry County is actively pursuing funds to help with wildland fire mitigation projects and public education programs. While mitigation efforts will significantly improve the probability of a structure's survivability, no amount of mitigation will guarantee survival.

It is difficult to estimate potential losses in Ferry County due to wildland fire due to the unpredictability of wildfire behavior and the nature of ignition sources. It is impossible to forecast the path a wildfire will take and what type of assets and resources, manmade and ecological, will be at risk. However, one can draw conclusions from the average costs to suppress a wildland fire. Using information from the National Interagency Fire Center's website[35], there were 71,499 wildland fires that federal agencies responded to in 2017. The cost to suppress these fires totaled approximately $2,920,000,000 which averages out to

[35] National Interagency Fire Center website. Federal Firefighting Costs (Suppression Only). https://www.nifc.gov/fireInfo/fireInfo_documents/SuppCosts.pdf Accessed April 2018.

approximately $40,840 per ignition. Large wildland fires can cost hundreds of thousands and even millions of dollars to suppress.

Typically, structures located in forested areas without an adequate defensible space or fire-resistant landscaping have the highest risk of loss. Nevertheless, homes and other structures and infrastructure located in the grasslands or agricultural regions are not without wildfire risk. Grass fires are often the most dangerous due to high rates of spread. Fires in this fuel type are considered somewhat easier to suppress given the appropriate resources, but they can also be the most destructive.

Wildfires can affect the Hospital District by restricting travel in and out of the County for helicopter/fixed wing medical transport and ground transport to and from the area. The hospital is constructed of concrete making it a relatively safe facility during a fire event. The facility has air cleaning equipment that help residents and staff avoid respiratory issues arising from area fires (although more are needed as they've had to borrow from St. Mary's Hospital in Walla Walla during past fire events).

Agricultural producers within the Conservation District jurisdiction can lose resources and access to land that is critical for their economic sustainability. Some examples of this include loss of timber, loss of fences, the need to replant range and suspension of Federal grazing leases. Reduced air quality can reduce the amount of time work can be done outside and can negatively impact livestock. Some of the impacts can carry on for years.

Wildland fire can impact residents and landowners throughout the County. The wildfires themselves have a large impact on landowners in the immediate vicinity of the fire through loss of resources (timber, rangeland, etc.), structures, and displacement. They can also impact County operations, economy, emergency services, and area residents by affecting air quality, travel corridors and other types of indirect impacts.

### *Second-Order Hazard Events*

Wildland fires can be caused naturally by lightning or by various technological sources. Wildland fire can also be a secondary effect of another type of hazard. The following chart outlines the interconnection between wildland fire and other types of hazard events.

**Table 4.21. Second-Order Hazards Related to Wildland Fire Events.**

| Related Causal Events | Related Effects |
|---|---|
| Severe Weather | Structural/Urban Fire |
| Drought | Civil Unrest |
| Earthquake | Landslide |
| Transportation Systems | Transportation Systems |
| Hazardous Materials | Power Outage |
| Structural/Urban Fire | |

# Section 5 – Mitigation Strategy

## Planning Philosophy and Goals

### *Ferry County Planning Philosophy*

This effort will utilize the best and most appropriate science from all partners and will integrate local and regional knowledge about natural hazards while meeting the needs of local citizens and the regional economy.

#### *Mission Statement*

To make Ferry County residents, communities, state agencies, local governments, and businesses less vulnerable to the negative effects of natural and human-caused hazards through the effective administration of pre-disaster mitigation grant programs, hazard risk assessments, wise and efficient mitigation efforts, and a coordinated approach to mitigation policy through federal, state, regional, and local planning efforts. Our combined prioritization will be the protection of people, structures, infrastructure, the economy, and unique ecosystems that contribute to our way of life and the sustainability of the local and regional economy.

#### *Vision Statement*

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

### *Jurisdictional Planning and Mitigation Goals*

As part of the 2017-18 revision process, each participating jurisdiction in Ferry County was asked to develop its own set of planning and mitigation goals to help reflect and keep track of individual priorities and changes in hazard vulnerability over time. During the first planning Team meeting, the group discussed several overall short-term and long-term goals as well as goals for the planning process itself. Members of the Team were given a list of example goals statements and a blank goals worksheet to fill out and return. The following section outlines the goals submitted by each jurisdiction.

#### *Ferry County Planning Goals:*

- To reduce the area of land damaged and losses experienced because of hazards where these risks threaten communities in the county.
- 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 pre-disaster hazard mitigation and post-disaster response.
- Establish mitigation priorities and develop mitigation strategies.
- Strategically locate, plan, and implement hazard reduction projects.

- Provide recommendations for alternative treatment methods that can impact the exposure to multiple hazards at one time.
- Meet or exceed the requirements of FEMA for a county level All Hazards Mitigation Plan.

## *Ferry County Mitigation Goals:*

- Establish mitigation priorities and develop mitigation strategies in Ferry County.
- Educate communities about the unique challenges of natural hazard preparedness in the county.
- Identify and implement an integrated schedule of treatments targeted at achieving an elimination of lives lost, reduction in structures destroyed, infrastructure compromised, and unique ecosystems damaged that serve to sustain the way-of-life and economy of Ferry County and the region.

## *County Hazard Mitigation Strategy*

Ferry County has created and attempted to update MHMPs in 2004 and 2006 However these plans were never officially adopted. Ferry County has not created nor amended any County Ordinances during the term of the current mitigation plans eligibility. Therefore, Ferry County has not had the opportunity to incorporate the current mitigation plans information into other planning mechanisms.

Ferry County will, however, utilize the information within this plan update when creating or updating other plans such as Comprehensive Plan, Emergency Operations Plan, Transportation Plan, and Natural Resource Management Plan. The information provided in this plan is based on the best available science and technology at the time of the update and should be utilized to update all other pertinent County plans, Ordinances, Policies, Regulations, etc. scheduled for update within five years from adoption of this Multi-Hazard Mitigation Plan.

**Additional Potential Ferry County Mechanisms**

Subdivision Ordinances

Zoning Ordinances

Departmental Budgets

Site Master Plans (wastewater treatment, landfill, etc.)

Personnel Training Programs

**Table 5.1. Ferry County Local Mitigation Capability Assessment**

| PLANNING and REGULATORY | | |
|---|---|---|
| **PLANS** | **Yes/No<br>Year** | **Does the plan address hazards?<br>Does the plan ID projects to include in the mitigation strategy?<br>Can the plan be used to implement mitigation actions?** |
| Capital Improvements Plan | No | |
| Community Wildfire Protection Plan | Yes/2015 | yes |
| Comprehensive /Master Plan | Yes/2012 | Yes |
| Concurrency | Yes | No |
| Economic Development Plan | No | |
| Emergency Operations Plan | No | |
| Stormwater Management Plan | No | |
| Transportation Plan | No | |
| **BUILDING CODES, PERMITTING, INSPECTIONS** | **Yes/No** | **What type of codes?<br>Are codes adequately enforced?** |
| Building Codes | Yes | |
| Site plan review requirements | Yes | |
| **LAND USE PLANNING & ORDINANCES** | **Yes/No** | **Is the ordinance effective for reducing hazard impacts?<br>Is the ordinance adequately administered and enforced?** |
| Floodplain ordinance | Yes | Yes |
| Subdivision ordinance | Yes | Yes |
| Development regulations ordinance | Yes | Yes |
| **ADMINISTRATIVE and TECHNICAL** | | |
| **ADMINISTRATION** | **Yes/No** | **Describe capability.<br>Is coordination effective?** |
| Mutual aid agreements | | |
| Planning Commission | Yes | Planning Commission writes ordinances |
| **TECHNICAL STAFF** | **Yes/No<br>FT/PT** | **Is staff trained on hazards and mitigation?<br>Is coordination between agencies and staff effective?<br>Have skills/expertise been used to assess/mitigate risk in the past?** |
| Building Official | Yes/FT | |
| Community Planner | | |
| Emergency Manager | Yes/PT | |
| Engineer | | |

| | | |
|---|---|---|
| Floodplain Manager/Administrator | Yes/FT | Yes |
| GIS/HAZUS Coordinator | | yes |
| Grant Writer | | yes |
| **FINANCIAL** | | |
| **FINANCIAL** | **Yes/No** | **Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?** |
| Capital improvements project funding | | |
| Community Development Block Grant | Yes | Yes, for sewer upgrades |
| Authority to levy taxes for specific purposes | | |
| Impact fees for new development | No | |
| Incur debt through special tax bond | | |
| Incur debt through general obligation bonds | | |
| **EDUCATION and OUTREACH** | | |
| **PROGRAM / ORGANIZATION** | **Access / Eligibility (Yes/No)** | **Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?** |
| Firewise Communities certification | | |
| Storm Ready certification | | |
| Citizens group focused on emergency preparedness, environmental protection, etc. | | |
| Public education/information programs (fire safety, household preparedness, responsible water use, etc) | | |
| Public-private partnership initiatives addressing disaster-related issues | | |

The City of Republic has not updated nor created any plans during the term of the current mitigation plans eligibility. The City of Republic did not adopt the 2004 version of the MHMP. The City of Republic has not created nor amended any City Ordinances during the term of the current mitigation plans eligibility. Therefore, the City of Republic has not had the opportunity to incorporate the current mitigation plans information into other planning mechanisms.

The City of Republic will utilize the information within this plan update when creating or updating other plans such as the 2020 version of the City's Comprehensive Plan. The City of Republic will incorporate pertinent information from this Multi-Hazard Mitigation Plan into the 2020 update of the City's Comprehensive Plan. The information provided in this plan is based on the best available science and technology at the time of the update and should be utilized to update all additional pertinent City plans, Ordinances, Policies, Regulations, etc. scheduled for update within five years from adoption of this Multi-Hazard Mitigation Plan.

**Table 5.2. City of Republic Local Mitigation Capability Assessment**

| PLANNING and REGULATORY | | |
|---|---|---|
| **PLANS** | **Yes/No Year** | **Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?** |
| Capital Improvements Plan | yes | Ordinance 88-06. No ordinance establishes just Capital Improvement Funds |
| Community Wildfire Protection Plan | No | |
| Comprehensive /Master Plan | Yes | No |
| Concurrency | Yes | City reviews each new plan for Concurrency. |
| Economic Development Plan | Yes | No |
| Emergency Operations Plan | Yes | Yes, plan addresses hazards |
| Stormwater Management Plan | Yes | Addresses the need to update storm water drainage within city to prevent lagoon overflow. |
| Transportation Plan | Yes | The City will make every effort to ensure that the major routes in the City Limits are engineered and constructed in a manner that will provide for the maximum level of safety for users of the system. |
| **BUILDING CODES, PERMITTING, INSPECTIONS** | **Yes/No** | **What type of codes? Are codes adequately enforced?** |
| Building Codes | Yes | WA state building codes. |
| Site plan review requirements | Yes | Plans need to be signed off on prior to any construction work by building inspector. If work includes road work, or water sewer lines it will also need approval from Public Works Director. Building inspector will check on ongoing construction projects. |
| **LAND USE PLANNING & ORDINANCES** | **Yes/No** | **Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?** |

| | | |
|---|---|---|
| Floodplain ordinance | No | City Complies with Ferry County Plan Regarding flood areas. |
| Subdivision ordinance | Yes | Ordinance 92-07. Any subdivision plan will need approval. |
| Development regulations ordinance | Yes | All of Chapter 17 of the Republic Municipal code is for land development. |
| **ADMINISTRATIVE and TECHNICAL** | | |
| **ADMINISTRATION** | **Yes/No** | **Describe capability.**<br>**Is coordination effective?** |
| Mutual aid agreements | Yes | |
| Planning Commission | Yes | City has a Building/Planning Committee. |
| **TECHNICAL STAFF** | **Yes/No FT/PT** | **Is staff trained on hazards and mitigation?**<br>**Is coordination between agencies and staff effective?**<br>**Have skills/expertise been used to assess/mitigate risk in the past?** |
| Building Official | Yes/PT | |
| Community Planner | No | |
| Emergency Manager | No | |
| Engineer | No | The City has no paid position for an engineer. It does regularly use Varela and Associates for City projects. |
| Floodplain Manager/Administrator | No | |
| GIS/HAZUS Coordinator | No | |
| Grant Writer | Yes/FT | The City has made the Deputy Clerk also assume the role of Grant Writer/Manager. |
| **FINANCIAL** | | |
| **FINANCIAL** | **Yes/No** | **Has the funding resource been used in past and for what type of activities?**<br>**Could the resource be used to fund future mitigation actions?** |
| Capital improvements project funding | Yes | Used to fund the purchase of a backhoe. It could be used in the future. |
| Community Development Block Grant | | |
| Authority to levy taxes for specific purposes | Yes | It could be used in the future, needs to be approved by voters. |
| Impact fees for new development | Yes | Money received from Building Permits. |
| Incur debt through special tax bond | Yes | It could be used in the future. |
| Incur debt through general obligation bonds | | Was used to fund new water lines down Clark Ave. It could be used in the future. |
| **EDUCATION and OUTREACH** | | |
| **PROGRAM / ORGANIZATION** | **Access / Eligibility (Yes/No)** | **Describe program/organization and how it relates to disaster resilience and mitigation.**<br>**Could the program/organization help implement future mitigation activities?** |

| | | |
|---|---|---|
| Firewise Communities certification | No | |
| Storm Ready certification | No | |
| Citizens group focused on emergency preparedness, environmental protection, etc. | No | |
| Public education/information programs (fire safety, household preparedness, responsible water use, etc) | No | |
| Public-private partnership initiatives addressing disaster-related issues | No | |

The Northeast Tri-County Health District continues to update planning mechanisms frequently and will add the Ferry County Multi-Hazard Mitigation Plan in future updates via reference.

**Table 5.3. Northeast Tri-County Health District Local Mitigation Capability Assessment**

| PLANNING and REGULATORY | | |
|---|---|---|
| **PLANS** | **Yes/No<br>Year** | **Does the plan address hazards?<br>Does the plan ID projects to include in the mitigation strategy?<br>Can the plan be used to implement mitigation actions?** |
| Capital Improvements Plan | No | |
| Community Wildfire Protection Plan | No | |
| Comprehensive /Master Plan | Yes/2015 | All Hazard Public Health Response Plan. Does not ID projects or mitigation actions |
| Continuity of Operations Plan | No | |
| Economic Development Plan | No | |
| Emergency Operations Plan | No | |
| Stormwater Management Plan | No | |
| Transportation Plan | No | |
| **BUILDING CODES, PERMITTING, INSPECTIONS** | **Yes/No** | **What type of codes?<br>Are codes adequately enforced?** |
| Building Codes | | |
| Site plan review requirements | Yes | On-Site Wastewater Codes |
| **LAND USE PLANNING & ORDINANCES** | **Yes/No** | **Is the ordinance effective for reducing hazard impacts?<br>Is the ordinance adequately administered and enforced?** |
| Floodplain ordinance | | |
| Subdivision ordinance | Yes | Land use review for new subdivisions for adequacy of water and wastewater |
| Zoning ordinance | | |
| **ADMINISTRATIVE and TECHNICAL** | | |
| **ADMINISTRATION** | **Yes/No** | **Describe capability.<br>Is coordination effective?** |
| Mutual aid agreements | Yes | With other Local Health Jurisdictions within Region 9 |
| Planning Commission | | |
| **TECHNICAL STAFF** | **Yes/No<br>FT/PT** | **Is staff trained on hazards and mitigation?<br>Is coordination between agencies and staff effective?<br>Have skills/expertise been used to assess/mitigate risk in the past?** |
| Building Official | | |
| Community Planner | | |

| | | |
|---|---|---|
| Emergency Manager | Yes/PT | Administer functions as Public Health Local Emergency Response Coordinator |
| Engineer | | |
| Floodplain Manager/Administrator | | |
| GIS/HAZUS Coordinator | | |
| Grant Writer | | |
| **FINANCIAL** | | |
| **FINANCIAL** | **Yes/No** | **Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?** |
| Capital improvements project funding | | |
| Community Development Block Grant | | |
| Authority to levy taxes for specific purposes | | |
| Impact fees for new development | | |
| Incur debt through special tax bond | | |
| Incur debt through general obligation bonds | | |
| **EDUCATION and OUTREACH** | | |
| **PROGRAM / ORGANIZATION** | **Access / Eligibility (Yes/No)** | **Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?** |
| Firewise Communities certification | | |
| Storm Ready certification | | |
| Citizens group focused on emergency preparedness, environmental protection, etc. | | |
| Public education/information programs (fire safety, household preparedness, responsible water use, etc) | Yes | Outreach efforts to prepare, mitigate, and respond to public health emergency events (including fires, floods, drought, extended power outages, and epidemics |
| Public-private partnership initiatives addressing disaster-related issues | | |

The Ferry County Public Hospital District #1 continues to update planning mechanisms frequently and will add the Ferry County Multi-Hazard Mitigation Plan in future updates via reference.

**Table 5.4. Ferry County Health Local Mitigation Capability Assessment**

| PLANNING and REGULATORY | | |
|---|---|---|
| **PLANS** | **Yes/No Year** | **Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?** |
| Capital Improvements Plan | Yes | Yearly budgeting of capital expenditures – monthly financial statements |
| Community Wildfire Protection Plan | NA | |
| Comprehensive /Master Plan | NA | |
| Continuity of Operations Plan | See below | |
| Economic Development Plan | Yes | Work in 5 year strategic plans |
| Emergency Operations Plan | Yes | Have an extensive disaster plan overall with department by department plans |
| Stormwater Management Plan | NA | |
| Transportation Plan | Yes | Included with Emergency Plan |
| **BUILDING CODES, PERMITTING, INSPECTIONS** | **Yes/No** | **What type of codes? Are codes adequately enforced?** |
| Building Codes | yes | We follow Department of Health Construction Review Policy + NFPA regs |
| Site plan review requirements | na | |
| **LAND USE PLANNING & ORDINANCES** | **Yes/No** | **Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?** |
| Floodplain ordinance | na | |
| Subdivision ordinance | na | |
| Zoning ordinance | na | |
| **ADMINISTRATIVE and TECHNICAL** | | |
| **ADMINISTRATION** | **Yes/No** | **Describe capability. Is coordination effective?** |
| Mutual aid agreements | yes | Part of the region 9 hospital council, WSHA, MOU's with neighboring hospitals, skilled nursing facilities, assisted living facilities, school (for bus use + shelter), rural resources |
| Planning Commission | na | |
| **TECHNICAL STAFF** | **Yes/No FT/PT** | **Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?** |

| | | |
|---|---|---|
| Building Official | yes | Have a plant manager that is responsible for work place safety, the plant, water treatment plan, deacon training, and security |
| Community Planner | na | |
| Emergency Manager | Yes | We have an "Environment of Care" chair that is responsible for our emergency plan (updates are done annually with two drills = one table top, one multi agency) |
| Engineer | na | |
| Floodplain Manager/Administrator | na | |
| GIS/HAZUS Coordinator | no | |
| Grant Writer | yes | Part time position |
| **FINANCIAL** | | |
| **FINANCIAL** | **Yes/No** | **Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?** |
| Capital improvements project funding | Kind of | Trying to build reserves to build for the future, we have a funded depreciation account we contribute to |
| Community Development Block Grant | | |
| Authority to levy taxes for specific purposes | yes | We get around 50 cents per $1000 in prop. value |
| Impact fees for new development | no | Good idea |
| Incur debt through special tax bond | yes | Haven't but can |
| Incur debt through general obligation bonds | yes | Haven't but can |
| **EDUCATION and OUTREACH** | | |
| **PROGRAM / ORGANIZATION** | **Access / Eligibility (Yes/No)** | **Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?** |
| Firewise Communities certification | na | |
| Storm Ready certification | na | |
| Citizens group focused on emergency preparedness, environmental protection, etc. | yes | EOC Team meets monthly |
| Public education/information programs (fire safety, household preparedness, responsible water use, etc) | In progress | Med staff is working on the possibility of public workshops |

| | | |
|---|---|---|
| Public-private partnership initiatives addressing disaster-related issues | yes | Too many to list |
| | | |

The Ferry County Public Utilities District

**Table 5.5. Ferry County Public Utilities District Local Mitigation Capability Assessment**

| PLANNING and REGULATORY | | |
|---|---|---|
| **PLANS** | **Yes/No<br>Year** | **Does the plan address hazards?<br>Does the plan ID projects to include in the mitigation strategy?<br>Can the plan be used to implement mitigation actions?** |
| Capital Improvements Plan | Yes | No |
| Community Wildfire Protection Plan | No | |
| Comprehensive /Master Plan | No | |
| Continuity of Operations Plan | No | |
| Economic Development Plan | No | |
| Emergency Operations Plan | Yes | Yes, No, Yes |
| Stormwater Management Plan | No | |
| Transportation Plan | No | |
| **BUILDING CODES, PERMITTING, INSPECTIONS** | **Yes/No** | **What type of codes?<br>Are codes adequately enforced?** |
| Building Codes | No | |
| Site plan review requirements | Yes | L & I approved panels only |
| **LAND USE PLANNING & ORDINANCES** | **Yes/No** | **Is the ordinance effective for reducing hazard impacts?<br>Is the ordinance adequately administered and enforced?** |
| Floodplain ordinance | No | |
| Subdivision ordinance | No | |
| Zoning ordinance | NO | |
| **ADMINISTRATIVE and TECHNICAL** | | |
| **ADMINISTRATION** | **Yes/No** | **Describe capability.<br>Is coordination effective?** |
| Mutual aid agreements | Yes | Statewide, effective |
| Planning Commission | No | |
| **TECHNICAL STAFF** | **Yes/No<br>FT/PT** | **Is staff trained on hazards and mitigation?<br>Is coordination between agencies and staff effective?<br>Have skills/expertise been used to assess/mitigate risk in the past?** |
| Building Official | Yes | Manager Steve Van Slyke |
| Community Planner | No | |
| Emergency Manager | No | |

| | | |
|---|---|---|
| Engineer | Yes | Ed Forsman |
| Floodplain Manager/Administrator | No | |
| GIS/HAZUS Coordinator | Yes | Ed Forsman, Ryan Masingale |
| Grant Writer | No | |
| **FINANCIAL** | | |
| **FINANCIAL** | **Yes/No** | **Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?** |
| Capital improvements project funding | Yes | Yes, Clear RW's. Yes |
| Community Development Block Grant | No | |
| Authority to levy taxes for specific purposes | No | |
| Impact fees for new development | No | |
| Incur debt through special tax bond | No | |
| Incur debt through general obligation bonds | No | |
| **EDUCATION and OUTREACH** | | |
| **PROGRAM / ORGANIZATION** | **Access / Eligibility (Yes/No)** | **Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?** |
| Firewise Communities certification | No | |
| Storm Ready certification | No | |
| Citizens group focused on emergency preparedness, environmental protection, etc. | No | |
| Public education/information programs (fire safety, household preparedness, responsible water use, etc) | No | |
| Public-private partnership initiatives addressing disaster-related issues | No | |

The Ferry County Conservation District does not have many pertinent planning mechanisms to incorporate this MHMP into.

**Table 5.6. Ferry Conservation District Local Mitigation Capability Assessment**

| PLANNING and REGULATORY | | |
|---|---|---|
| **PLANS** | **Yes/No<br>Year** | **Does the plan address hazards?<br>Does the plan ID projects to include in the mitigation strategy?<br>Can the plan be used to implement mitigation actions?** |
| Capital Improvements Plan | | |
| Community Wildfire Protection Plan | | |
| Comprehensive /Master Plan | | |
| Concurrency | | |
| Economic Development Plan | | |
| Emergency Operations Plan | | |
| Stormwater Management Plan | | |
| Transportation Plan | | |
| **BUILDING CODES, PERMITTING, INSPECTIONS** | **Yes/No** | **What type of codes?<br>Are codes adequately enforced?** |
| Building Codes | | |
| Site plan review requirements | | |
| **LAND USE PLANNING & ORDINANCES** | **Yes/No** | **Is the ordinance effective for reducing hazard impacts?<br>Is the ordinance adequately administered and enforced?** |
| Floodplain ordinance | | |
| Subdivision ordinance | | |
| Development regulations ordinance | | |
| **ADMINISTRATIVE and TECHNICAL** | | |
| **ADMINISTRATION** | **Yes/No** | **Describe capability.<br>Is coordination effective?** |
| Mutual aid agreements | | |
| Planning Commission | | |
| **TECHNICAL STAFF** | **Yes/No<br>FT/PT** | **Is staff trained on hazards and mitigation?<br>Is coordination between agencies and staff effective?<br>Have skills/expertise been used to assess/mitigate risk in the past?** |
| Building Official | | |
| Community Planner | | |
| Emergency Manager | | |

| | | |
|---|---|---|
| Engineer | | |
| Floodplain Manager/Administrator | | |
| GIS/HAZUS Coordinator | | |
| Grant Writer | | |
| **FINANCIAL** | | |
| **FINANCIAL** | **Yes/No** | **Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?** |
| Capital improvements project funding | | SCCD has capability to apply for, receive and implement capital improvement projects example would be manmade fish barrier replacements |
| Community Development Block Grant | | |
| Authority to levy taxes for specific purposes | | Conservation Districts have RCW authority to work with county commissioners to assess a rates and charges fee to private land through for programs to protect and improve natural resources |
| Impact fees for new development | | |
| Incur debt through special tax bond | | |
| Incur debt through general obligation bonds | | |
| **EDUCATION and OUTREACH** | | |
| **PROGRAM / ORGANIZATION** | **Access / Eligibility (Yes/No)** | **Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?** |
| Firewise Communities certification | | Can provide assistance to assist communities to become certified. |
| Storm Ready certification | | |
| Citizens group focused on emergency preparedness, environmental protection, etc. | | |
| Public education/information programs (fire safety, household preparedness, responsible water use, etc) | | One of the main functions of the district is public education to both adult and youth on natural resource cycles and how man impacts. This can be focused on prevention and recovery of natural disasters and how land management can reduce severity and occurrence we have focused on flooding and wildfire for many years. |
| Public-private partnership initiatives addressing disaster-related issues | | |

# Administration and Implementation of Action Items

Critical to the implementation of this Multi - Hazard Mitigation Plan will be the identification and implementation of an integrated schedule of action items. These action items are targeted at achieving an elimination of lives lost, a reduction in structures destroyed or compromised, and the preservation of unique ecosystems that serve to sustain the way of life and economic stability in Ferry County, Washington. Since there are many management agencies and thousands of private landowners in this area, it is reasonable to expect that differing schedules of adoption will be made and varying degrees of compliance will be observed across all ownerships.

All risk assessments were made based on the conditions existing during 2018; thus, the recommendations in this section have been made considering 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.

## *Prioritization of Action Items*

The prioritization process includes a special emphasis on benefit-cost analysis review. The process reflects that a key component in 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 local jurisdictions with overall coordination provided by the Ferry County Emergency Management Manager.

County Commissioners and the elected officials of all jurisdictions have evaluated opportunities and established 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 a 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. Ferry County will use this Multi-Hazard Mitigation Plan as guidance when considering pre-disaster mitigation proposals brought before the Board of 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. Ferry County understands 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 Hazard Mitigation Grant Program, the Flood Mitigation Assistance Program, and Pre-Disaster Mitigation Program) 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 Ferry County Emergency Management Director and the joint planning Team. All mitigation activities, recommendations, and action items mentioned in this document are dependent on available funding and staffing.

### *Prioritization Scheme*

All the action items and project recommendations made in this Plan were prioritized by each respective jurisdiction in coordination with their governing body. Each jurisdiction's representative on the planning Team met with their governing bodies and prioritized their own list of projects and mitigation measures through a group discussion and voting process. Although completed individually, each jurisdiction's mitigation strategy was discussed and analyzed on the merits described in the STAPLEE process including the social, technical, administrative, political, legal, economical, and environmental factors associated with each recommended action item. Projects were ranked on a "High", "Moderate", or "Low" scale with emphasis on project feasibility and the benefit/cost correlation. Once completed, the individual jurisdiction's rankings were discussed and approved at the Team level.

## Jurisdictional Mitigation Strategies

The following tables outline all the participating jurisdictions' mitigation strategies for at least the next five-year period. All the action items from the previous plan were carried into the updated mitigation strategies; however, the Team thoroughly reviewed and discussed each proposed project, and in some cases, chose to revise the action item or delete it altogether. The "2018 Status" column in each table highlights the current state of each Action Item.

### *Safety & Policy*

Hazard 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.

## Proposed Activities

**Table 5.7. Action Items in Safety and Policy.**

| Action Item | Mitigated Hazard/Goals Addressed & Priority | Responsible Organization | 2018 Status No Progress In Progress Complete | Jurisdiction & Potential Funding (Appendix 7) | Action Items & Planning Horizon |
|---|---|---|---|---|---|
| **5.7.a. Public education programs.** | All Hazards<br>Mitigation Goals Addressed: P-2, P-3, M-2<br>Priority Rating: Low Cost/High Benefit | **Lead**: Ferry County Emergency Management<br>**Support:** Cooperative effort including Washington State University Cooperative Extension, adopting jurisdictions federal and state agencies. | In Progress | **Jurisdictions:** All<br>**Potential Funding:** Emergency Management Institute Residential Educational Program (#10) | 2019 Identify teaching partners in public education program<br>2007 Locate and adopt training materials appropriate for local conditions<br>2019 Develop budgets and acquire funding for desired programs<br>2020 Begin implementation in schools and through adult education programs. |
| **5.7.b. Participation in National Flood Insurance Program.** | Flood<br>Mitigation Goals Addressed: P-1, P-2, P-7<br>Priority Rating: Low Cost/High Benefit | **Lead**: Ferry County Emergency management<br>**Support:** Ferry County Commissioners, Ferry County Public Works, and City of Republic. | No Progress | **Jurisdiction:** County, City of Republic<br>**Potential Funding:** Hazard Mitigation Grant Program (#13) | Annual: Continued participation in NFIP.<br>2020 Participation in the Community Rating System to lower the costs of NFIP premiums. |
| **5.7.c. Provide funding for a full-time Geographic Information System position at the Ferry County Courthouse.** | All Hazards<br>Mitigation Goals Addressed: P-1,P-2, P-5, P-6<br>Priority Rating: Medium Cost/Medium Benefit | **Lead**: Ferry County Commissioners<br>**Support**: Ferry County Planning and Zoning and Ferry County Assessor. | Complete | **Jurisdiction:** County<br>**Potential Funding:** Annual budget | 2020 Seek funding for full-time GIS staff position. Post job listing for potential candidates and hire most qualified individual. |

**Table 5.7. Action Items in Safety and Policy.**

| Action Item | Mitigated Hazard/Goals Addressed & Priority | Responsible Organization | 2018 Status No Progress In Progress Complete | Jurisdiction & Potential Funding (Appendix 7) | Action Items & Planning Horizon |
|---|---|---|---|---|---|
| **5.7.d. Continued public education and updating of rural addressing system.** | All Hazards<br>Mitigation Goals Addressed: P-3, M-2<br>Priority Rating: Medium Cost/High Benefit | **Lead:** Ferry County Planning and Zoning<br>**Support**: Ferry County Commissioners | In Progress | **Jurisdiction:** County<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2021 Continue support and funding for updating rural addressing system.<br>Ongoing: Continue to educate the public on the importance of rural addressing and the proper techniques for posting address signs. |
| **5.7.e. Incorporate the Ferry County All Hazard Mitigation Plan into the Ferry County Comprehensive Plan, where applicable.** | All Hazards<br>Mitigation Goals Addressed: P-2, P-4, P-5, P-6<br>Priority Rating: Low Cost/Medium Benefit | **Lead**: Ferry County Commissioners<br>**Support**: Ferry County Planning and Zoning<br>Emergency Management | No progress | **Jurisdiction:** County<br>**Potential Funding:** Annual budget | Ongoing: Incorporate the goals and projects outlined in this plan into the updated Comprehensive Plan. |
| **5.7.f. Implement a vegetation management program that includes, but is not limited to, thinning and clearing vegetation under and adjacent to transmission and distribution lines.** | Wildfire and Severe Weather<br>Mitigation Goals Addressed: P-1, P-2, M-3<br>Priority Rating: High Cost/High Benefit | **Lead:** Ferry County Public Utility District<br>**Support**: Ferry County Commissioners | No progress | **Jurisdiction:** County, City of Republic, Conservation District, Utility District<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2019 then annually Develop Vegetation Management Plan for Ferry County.<br>2020 Begin implementing management strategies outlined in the plan. |
| **5.7.g. Recommend adopting Uniform Building Code countywide.** | Wildland Fire<br>Mitigation Goals Addressed: P-1, P-2, P-4<br>Priority Rating: Low Cost/Medium Benefit | **Lead:** Ferry County Planning and Zoning and City of Republic<br>**Support**: Ferry County Commissioners | In progress | **Jurisdiction:** County, City of Republic<br>**Potential Funding:** Annual budget | 2020 Form a Team to help define the necessary standards and requirements for accomplishing this goal.<br>2021 Begin requiring the set standards and requirements for new road construction. |

**Table 5.7. Action Items in Safety and Policy.**

| Action Item | Mitigated Hazard/Goals Addressed & Priority | Responsible Organization | 2018 Status No Progress In Progress Complete | Jurisdiction & Potential Funding (Appendix 7) | Action Items & Planning Horizon |
|---|---|---|---|---|---|
| **5.7.h Incorporate this All Hazard Mitigation Plan as an element of the Ferry County Health's Facilities Master Plan and Emergency Action Plan.** | All Hazards<br>Mitigation Goals Addressed: P-1, P-2<br>Priority Rating:<br>Low Cost/Medium Benefit | **Lead:** Ferry County Health | No progress | **Jurisdiction:** Ferry County Health<br>**Potential Funding:** Annual budget | 2019 then annually Update Facilities Master Plan to incorporate the All Hazards Mitigation Plan. |
| **5.7.i Change Ferry County Health's Emergency Plan to address access during emergencies including response, evacuation, and linkages outside the community.** | All Hazards<br>Mitigation Goals Addressed: P-1, P-2, P4<br>Priority Rating:<br>Low Cost/High Benefit | **Lead:** Ferry County Health<br>**Support**: Ferry County EMS and Curlew/Republic School District | No progress | **Jurisdiction:** Ferry County Health<br>**Potential Funding:** Annual budget | 2019 Form Team to discuss necessary changes to the Emergency Plan.<br>2020 Update the Emergency Plan based on the findings of the Team.<br>Annually Continue to seek outside partners and MOUs. |
| **5.7.j. Incorporate this Hazard Mitigation Plan into the Public Utility District's Emergency and Operating Plans.** | All Hazards<br>Mitigation Goals Addressed: P-1, P-2<br>Priority Rating:<br>Low Cost/Medium Benefit | **Lead:** Ferry County Public Utility District Board of Commissioners | No progress | **Jurisdiction:** Public Utility District<br>**Potential Funding:** PUD operating budget | 2020 Update Emergency and Operations Plans to incorporate the All Hazards Mitigation Plan then on-going. |
| **5.7.k. Incorporate this All Hazard Mitigation Plan into the Ferry Conservation District's Long-Range Plan and Annual Plan of Work.** | All Hazards<br>Mitigation Goals Addressed: P-1, P-2<br>Priority Rating:<br>Low Cost/Medium Benefit | **Lead:** Ferry Conservation District | No progress | **Jurisdiction:** Conservation District<br>**Potential Funding:** Annual budget | 2019 then annually Update Emergency and Operations Plans to incorporate the All Hazards Mitigation Plan. |

## *People and Structures*

The protection of people and structures will be tied together closely as the loss of life in the event of a hazard is generally linked to a person who could not, or did not, flee a structure threatened by a hazard. 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.

### Proposed Activities

**Table 5.8. Action Items for People and Structures.**

| Action Item | Mitigated Hazard/Goals Addressed & Priority | Responsible Organization | 2018 Status<br>No Progress<br>In Progress<br>Complete | Jurisdiction & Potential Funding (Appendix 7) | Action Items & Planning Horizon |
|---|---|---|---|---|---|
| **5.8.a. Assess and hardwire necessary government buildings, emergency facilities, and community shelters for use with a portable generator.** | All Hazards<br>Mitigation Goals Addressed: P-2, P-4, M-3<br>Priority Rating:<br>Medium Cost/High Benefit | **Lead:** Ferry County Emergency Management<br>**Support**: Ferry County Commissioners, Sheriff's Office, PUD and City of Republic. | In progress | **Jurisdiction:** All<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2020 Assess which buildings in the county require alternative power during emergencies.<br>2020 Cost benefit assessment of providing portable power.<br>2021 Secure grant funding through PDM grants or others for the wiring of buildings and purchase of portable generators with capacity to power needed buildings.<br>2021 Implement wiring changes to allow quick connection for off-grid power. |
| **5.8.b. Purchase portable generators to be used at critical facilities during an emergency** | All Hazards<br>Mitigation Goals Addressed: P-2, P-4, M-3<br>Priority Rating:<br>Medium Cost/ High Benefit | **Lead:** Ferry County Emergency Management<br>**Support**: Ferry County Commissioners, Sheriff's Office, PUD and City of Republic. | No progress | **Jurisdiction:** All<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2022 Post facility assessment and wiring secure funding to purchase portable generators |

**Table 5.8. Action Items for People and Structures.**

| Action Item | Mitigated Hazard/Goals Addressed & Priority | Responsible Organization | 2018 Status<br>No Progress<br>In Progress<br>Complete | Jurisdiction & Potential Funding (Appendix 7) | Action Items & Planning Horizon |
|---|---|---|---|---|---|
| **5.8.c. Inspect buildings, particularly un-reinforced masonry, for hazard stability.** | All Hazards<br>Mitigation Goals Addressed: P-2, P-4, M-3<br>Priority Rating:<br>Low Cost/High Benefit | **Lead:** Ferry County Building Department<br>**Support**: Ferry County Commissioners, City of Republic, and Ferry County Homeland Security Coordinator | No progress | **Jurisdiction:** County, City of Republic<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2019 Bi-annual review of older masonry buildings.<br>2020 Education campaign and information dissemination |
| **5.8.d. Assess and, when warranted, retrofit government facilities for increase capacity for snow load.** | Severe Weather<br>Mitigation Goals Addressed: P-2, P-4, M-3<br>Priority Rating:<br>Medium Cost/High Benefit | **Lead:** Ferry County Building Department<br>**Support**: Ferry County Commissioners, City of Republic, and Ferry County Public Hospital District #1. | In progress | **Jurisdiction:** County, City of Republic, Utility District, Conservation District<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2019 Inspect all public buildings for snow load capacity and make a prioritized list of those in need of retrofit.<br>2020 – 2022 Obtain funding for retrofit of high priority structures to increase safety of these buildings. |

## *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 these components are important to the Okanogan Highlands region, and to Ferry County specifically. These networks accomplish the goal of protecting 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 on-the-ground activities.

## Proposed Activities

**Table 5.9. Action Items for Infrastructure Enhancements.**

| Action Item | Mitigated Hazard/Goals Addressed & Priority | Responsible Organization | 2018 Status<br>No Progress<br>In Progress<br>Complete | Jurisdiction & Potential Funding (Appendix 7) | Action Items & Planning Horizon |
|---|---|---|---|---|---|
| **5.9.a. Review and implement all road profiles which are within flooded areas to determine degree of road profile rise needed to elevate it above the flood risk.** | **Flood**<br>Mitigation Goals Addressed: P-1, P-2, P-4, M-3<br>Priority Rating:<br>Low Cost/High Benefit | **Lead**: Ferry County Public Works<br>**Support:** Ferry County Commissioners and Washington Department of Transportation | No progress | **Jurisdiction:** County<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2019-2023 then annually Review road surfaces and complete engineering study.<br>2019 Create a priority list of modifications to road surfaces<br>Work with roads departments to schedule changes. |
| **5.9.b. Prepare and maintain a prioritized list of existing undersized culverts that are in need of repair, replacing or maintenance.** | **Flood**<br>Mitigation Goals Addressed: P-1, P-2, P-4, M-3<br>Priority Rating:<br>Low Cost/Medium Benefit | **Lead**: Ferry County Public Works<br>**Support:** Ferry County Commissioners | In progress | **Jurisdiction:** County, City of Republic<br>**Potential Funding:** Annual budget | 2019 Conduct inventory of undersized culverts in the county.<br>2020 Prepare prioritization of list and begin acquiring funding for replacement costs.<br>2008 Begin replacement process of identified culverts. |
| **5.9.b. Obtain FEMA "Emergency Evacuation Route" signs to be posted on primary and secondary access routes during an emergency.** | **All Hazards**<br>Mitigation Goals Addressed: P-1, P-2, P-4, M-3<br>Priority Rating: Low Cost/Medium Benefit | **Lead**: Ferry County Public Works<br>**Support:** County Commissioners, City of Republic, Ferry County Homeland Security Coordinator Ferry County Fire Districts #3, #13, and #14. | No progress | **Jurisdiction:** County, City of Republic<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2021 Purchase sign and procure a convenient and accessible storage location. |

**Table 5.9. Action Items for Infrastructure Enhancements.**

| Action Item | Mitigated Hazard/Goals Addressed & Priority | Responsible Organization | 2018 Status<br>No Progress<br>In Progress<br>Complete | Jurisdiction & Potential Funding (Appendix 7) | Action Items & Planning Horizon |
|---|---|---|---|---|---|
| **5.9.c. Utilize list of watersheds that require stream bank and channel stabilization to implement plan.** | **Flood, Landslide, Earthquake, and Wildland Fire** Mitigation Goals Addressed: P-1, P-2, P-4, M-3<br>Priority Rating: Medium Cost/Medium Benefit | **Lead;** Ferry Conservation District | No progress | **Jurisdiction:** County, Conservation District<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2019 Develop an implementation plan.<br>2020 Begin acquisition of funding to implement projects.<br>2021-2023: Begin implementation of high priority projects. |
| **5.9.d. Implement a vegetation management program that includes but is not limited to thinning and clearing brush and other vegetation from under and adjacent to transmission and distribution lines.** | **Wildland Fire** Mitigation Goals Addressed: P-1, P-2, P-4, M-3<br>Priority Rating: High Cost/High Benefit | **Lead:** Ferry County Public Utility District<br>**Support:** Ferry County Commissioners | No progress | **Jurisdiction:** County, Conservation District, Utility District<br>**Potential Funding:** Western States Fire Managers Wildland Urban Interface Grant Program (#25) | 2019 Develop a Vegetation Management Plan to deal with high risk fuels under and near power lines.<br>2020 Develop action plan to accomplish goals laid out in the Vegetation Management Plan.<br>2021 Seek funding and begin implementation of projects. |
| **5.9.e. Improve County roads to mitigate for impacts from hazards.** | **Flood, Landslide, and Earthquake** Mitigation Goals Addressed: P-1, P-2, P-4, M-3<br>Priority Rating: High Cost/Medium Benefit | **Lead**: Ferry County Public Works<br>**Support:** Ferry County Commissioners | In progress | **Jurisdiction:** County, City of Republic<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2020 Conduct inventory of needed improvements on these access routes.<br>2021 Develop action plan for implementation of identified projects and begin acquiring funding.<br>Ongoing: Conduct implementation projects on an annual basis. |

**Table 5.9. Action Items for Infrastructure Enhancements.**

| Action Item | Mitigated Hazard/Goals Addressed & Priority | Responsible Organization | 2018 Status<br>No Progress<br>In Progress<br>Complete | Jurisdiction & Potential Funding (Appendix 7) | Action Items & Planning Horizon |
|---|---|---|---|---|---|
| **5.9.f. Improve primary and secondary emergency routes to address access issues including response, evacuation, and linkages outside the County.** | **All Hazards**<br>Mitigation Goals Addressed: P-1, P-2, P-4, M-3<br>Priority Rating: Medium Cost/Medium Benefit | **Lead**: Ferry County Public Works<br>**Support**: Commissioners and Ferry County Homeland Security Coordinator. | No progress | **Jurisdiction:** County<br>**Potential Funding:** Western States Fire Managers Wildland Urban Interface Grant Program (#25) | 2019 Identify areas on the primary and secondary emergency routes that need improvements.<br>2020 Establish an action plan for accomplishing identified improvements.<br>Ongoing: Acquire funding to make needed improvements on an annual basis. |
| **5.9. g. Re-route transmission and distribution lines away from natural hazard areas.** | **Severe Weather and Wildfire**<br>Mitigation Goals Addressed: P-1, P-2, P-4, M-3<br>Priority Rating: Medium Cost/Medium Benefit | **Lead:** Public Utility District | No progress | **Jurisdiction:** Public Utility District<br>**Potential Funding:** PUD operating budget, Hazard Mitigation Grant (#13) | 2021 Develop plan of which lines need to be moved<br>2023 Gain approval by local government and landowners and acquire funding<br>2024 - 2029 Implement plan to move lines |
| **5.9. h. Replace overhead feeders with underground cable to mitigate wind and vegetation damage.** | **Severe Weather and Wildfire**<br>Mitigation Goals Addressed: P-1, P-2, P-4, M-3<br>Priority Rating: High Cost/High Benefit | **Lead:** Public Utility District | No progress | **Jurisdiction:** Public Utility District<br>**Potential Funding:** PUD operating budget, Hazard Mitigation Grant (#13) | 2021 Develop plan of which lines need to be replaced<br>2023 Gain approval by local government and acquire funding<br>2024 - 2029 Implement plan to replaces lines |
| **5.9.i. Treat critical overhead feeder structures with fire retardant.** | **Wildfire**<br>Mitigation Goals Addressed: P-1, P-2, P-4, M-3<br>Priority Rating: Medium Cost/Medium Benefit | **Lead:** Public Utility District | No progress | **Jurisdiction:** Public Utility District<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2020 Develop plan of how retardant will be purchased and applied, identify trigger points of when to apply<br>2020 - 2023 Apply retardant as identified and/or needed. |

## *Resource and Capability Enhancements*

There are several resource and capability enhancements identified by the emergency response organizations in Ferry County. Additionally, many communities have identified additional resources and infrastructure needed to protect people and structures during natural and manmade hazards.

One important action item includes obtaining portable generators for use in government buildings, emergency facilities, and community shelters during power outages (Action Item 9.5.a). For these buildings to accept a generator, they must first be hardwired specifically for this purpose (see Action Item 9.3.a). In Ferry County, the Ferry County Memorial Hospital is currently the only building hardwired for a generator. The Republic High School and the Curlew School are currently identified in the County Emergency Operations Plan as "community shelters" in the event of an emergency. The All Hazard Mitigation Planning Team feels that these "shelters" as well as the County Courthouse should not only be hardwired to accept a generator but should also have a generator on site or at least readily available.

### Proposed Activities

**Table 5.10. Action Items for Resource and Capability Enhancements.**

| Action Item | Mitigated Hazard/Goals Addressed & Priority | Responsible Organization | 2018 Status<br>No Progress<br>In Progress<br>Complete | Jurisdiction & Potential Funding (Appendix 7) | Action Items & Planning Horizon |
|---|---|---|---|---|---|
| **5.10.a. Obtain portable generators for use during power outages and other emergency situations.** | **All Hazards**<br>Mitigation Goals Addressed: P-1, P-2, P-4, P-5, M-1, M-3<br>Priority Rating:<br>Medium Cost/Medium Benefit | **Lead:** Ferry County Emergency Management<br>**Support:** Ferry County Commissioners, Sheriff's Office, City of Republic, and Ferry County Fire Districts #3, #13, and #14. | No progress | **Jurisdiction:** County, City of Republic, Public Hospital District, Public Utility District<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2019 Coordinate with Item 9.3.a<br>2020 Secure funding or agreement for generator purchase or trade.<br>2022 Determine where generators will be stored and who will maintain. |
| **5.10.b. Install GPS units in all emergency vehicles and link into countywide GIS system.** | **All Hazards**<br>Mitigation Goals Addressed: P-1, P-2, P-4, P-5, M-1, M-3<br>Priority Rating:<br>Low Cost/Medium Benefit | **Lead:** Ferry County Emergency Management / GIS<br>**Support:** Ferry County Commissioners, Bureau of Land Management, Washington Department of Natural Resources, US Forest Service, City of Republic, and Ferry County Fire Districts #3, #13, and #14. | No progress | **Jurisdiction:** County, City of Republic<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2020 Seek funding and purchase necessary units.<br>2021 Provide training to emergency services personnel in Ferry County for effective use of the equipment. |

**Table 5.10. Action Items for Resource and Capability Enhancements.**

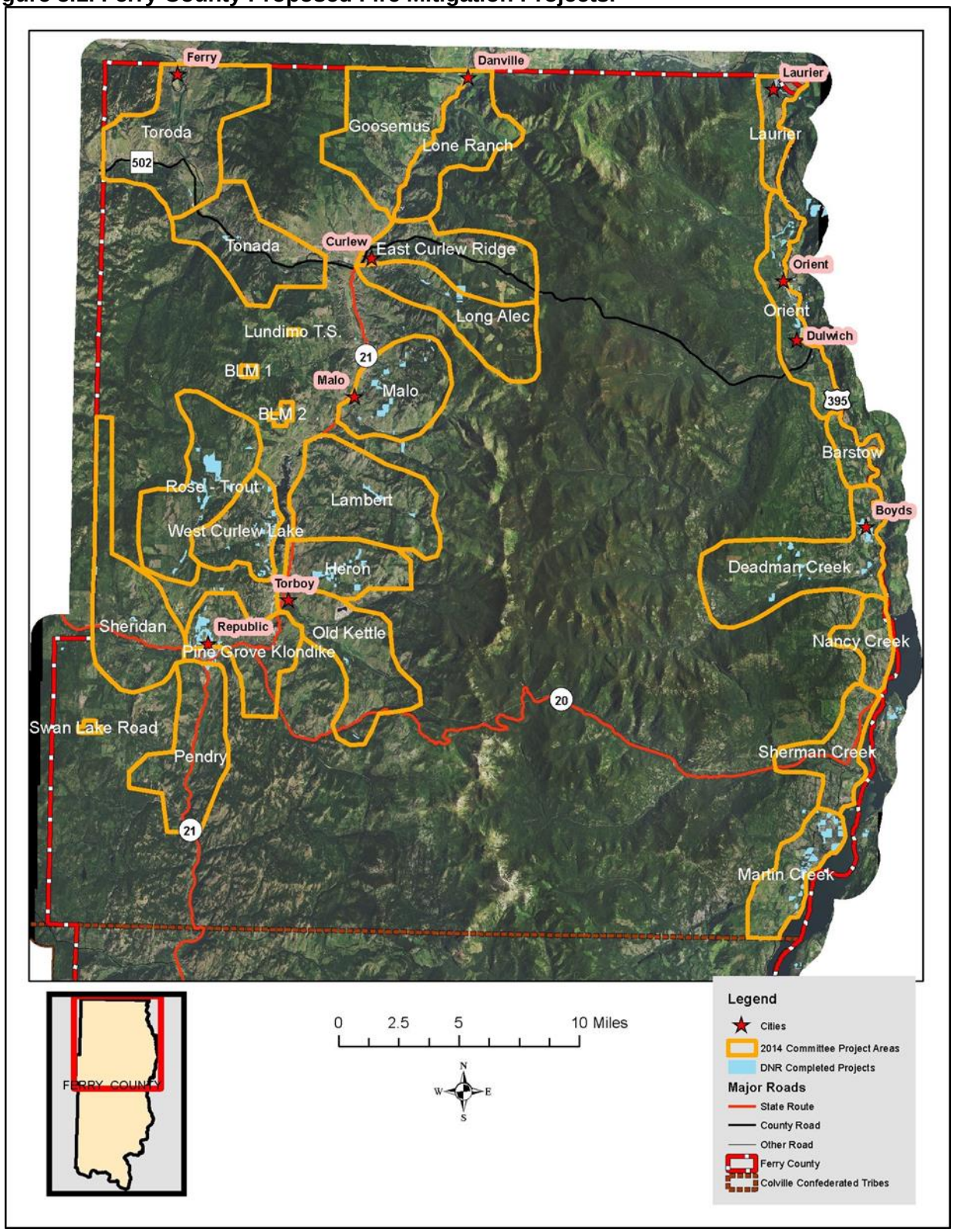
| Action Item | Mitigated Hazard/Goals Addressed & Priority | Responsible Organization | 2018 Status<br>No Progress<br>In Progress<br>Complete | Jurisdiction & Potential Funding (Appendix 7) | Action Items & Planning Horizon |
|---|---|---|---|---|---|
| **5.10.c. Develop and maintain a centralized countywide GIS data system.** | **All Hazards**<br>Mitigation Goals Addressed: P-1, P-2, P-4, P-5, M-1, M-3<br>Priority Rating:<br>Medium Cost/Medium Benefit | **Lead:** Ferry County MIS/GIS<br>**Support**: Ferry County E911, Sheriff's Office, Commissioners and County Assessor. | No progress | **Jurisdiction:** County<br>**Potential Funding:** Annual budget | 2020 Assess the necessary hardware and software needed for a county wide program.<br>Secure both purchasing and operating funds.<br>Implement County GIS program to serve all departments, especially countywide-emergency services. |
| **5.10.d. Identify an Emergency Operations Center and equip it.** | **All Hazards**<br>Mitigation Goals Addressed: P-1, P-2, P-4, P-5, M-1, M-3<br>Priority Rating:<br>High Cost/High Benefit | Lead: Ferry County Emergency Management<br>Support: Ferry County Commissioners, Sheriff's Office, and City of Republic. | No progress | **Jurisdiction:** County, City of Republic<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2020 Identify an appropriate Emergency Operations Center.<br>2021 Identify needed equipment.<br>2022 Secure funding for and purchase needed equipment. |
| **5.10.e. Enhance radio availability in the County.** | **All Hazards**<br>Mitigation Goals Addressed: P-1, P-2, P-4, P-5, M-1, M-3<br>Priority Rating:<br>High Cost/High Benefit | **Lead**: Ferry County Emergency Management<br>**Support:** Ferry County Commissioners, Bureau of Land Management, Washington Department of Natural Resources, US Forest Service, and Ferry County Fire Districts #3, #13, and #14. | In progress | **Jurisdiction:** All<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2020-2023 Summarize existing two-way radio capabilities and limitations. Identify costs to upgrade existing equipment and locate funding opportunities.<br>2023 Acquire and install upgrades as needed link into existing dispatch, improve range within the region, and conversion to consistent standard of radio types or obtain necessary components to link between existing radio types |

**Table 5.10. Action Items for Resource and Capability Enhancements.**

| Action Item | Mitigated Hazard/Goals Addressed & Priority | Responsible Organization | 2018 Status<br>No Progress<br>In Progress<br>Complete | Jurisdiction & Potential Funding (Appendix 7) | Action Items & Planning Horizon |
|---|---|---|---|---|---|
| **5.10.f. Obtain mobile repeater station with backup power source.** | **All Hazards**<br>Mitigation Goals Addressed: P-1, P-2, P-4, P-5, M-1, M-3<br>Priority Rating:<br>Medium Cost/High Benefit | **Lead**: Ferry County Emergency management<br>**Support:** Ferry County Commissioners, Bureau of Land Management, Washington Department of Natural Resources, US Forest Service, and Ferry County Fire Districts #3, #13, and #14. | No progress | **Jurisdiction:** County, City of Republic<br>**Potential Funding:** Hazard Mitigation Grant (#13) | 2020 Seek funding and purchase unit.<br>2021 Provide training to emergency services personnel in Ferry County for effective use of the equipment. |

## *Proposed Fuel Reduction Planning Areas*

**Figure 5.1. Ferry County Proposed Fire Mitigation Projects.**



## *Ferry County Proposed Fire Mitigation Projects*

The following project areas were identified by the CWPP steering Team and from citizens' recommendations during the public meetings. Most of the sites were visited during the field assessment phase. The areas where these projects are located were noted as having multiple factors contributing to the potential wildfire risk to residents, homes, infrastructure, and the ecosystem. Treatments within the project areas will be site specific, but will likely include homeowner education, creation of a wildfire defensible space around structures, fuels reduction, and access corridor improvements. All work on private property will be performed with consent of, and in cooperation with the property owners. Specific site conditions may call for other types of fuels reduction and fire mitigation techniques as well. Defensible space projects may include but are not limited to commercial or pre-commercial thinning, pruning, brush removal, chipping, prescribed burning, installation of greenbelts or shaded fuel breaks, and general forest and range health improvements.

**Table 5.11. Project Areas.**

| Project Name | # of Acres | Parcels | Priority |
|---|---|---|---|
| Barstow | 2,383 | 65 | High |
| BLM 1 | 217 | 0 | High |
| BLM 2 | 398 | 1 | High |
| Deadman Creek | 14,196 | 205 | High |
| East Curlew Ridge | 9,716 | 104 | High |
| Goosemus | 13,088 | 107 | High |
| Heron | 6,716 | 124 | High |
| Lambert | 13,682 | 135 | High |
| Laurier | 2,383 | 44 | High |
| Lone Ranch | 8,629 | 87 | High |
| Long Alec | 9,604 | 64 | High |
| Lundimo T.S. | 74 | 0 | High |
| Malo | 9,139 | 137 | High |
| Martin Creek | 6,483 | 152 | High |
| Nancy Creek | 3,500 | 114 | High |
| Old Kettle | 11,094 | 113 | High |
| Orient | 7,053 | 159 | High |
| Pendry | 10,565 | 108 | High |
| Pine Grove Klondike | 8,329 | 377 | High |
| Rose - Trout | 12,999 | 126 | High |
| Sheridan | 12,902 | 131 | High |
| Sherman Creek | 6,086 | 91 | High |
| Swan Lake Road | 232 | 0 | High |
| Tonada | 10,371 | 132 | High |
| Toroda | 16,155 | 184 | High |
| West Curlew Lake | 6,356 | 224 | High |

# Section 6 – Plan Maintenance

## Plan Monitoring and Maintenance

As part of the policy of Ferry County in relation to this planning document, this entire Multi - Hazard Mitigation Plan should be reviewed annually, from the date of adoption, at a special meeting of a joint planning Team, open to the public and involving all jurisdictions, where action items, priorities, budgets, and modifications can be made or confirmed. Ferry County Emergency Management director (or an official designee of the joint Team) 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 Multi - Hazard Mitigation Plan. Re-evaluation of this plan should be made on the 5th anniversary of its acceptance, and every 5-year period following.

### *Annual Review Agenda*

The focus of the joint planning Team at the annual review meeting should include at least the following topics:

Update historical events record based on any events in the past year.
Review county profile and individual community assessments for each hazard and note any major changes or mitigation projects that have altered the vulnerability of each entity.
Add a section to note accomplishments or current mitigation projects.
All action items in Chapter 6 will need updated as projects are completed, and as new needs or issues are identified.
Address Emergency Operations Plans – how can we dovetail the two plans to make them work for each other? Specifically, how do we incorporate the County's EOP into the action items for the regional MHMP?
Incorporate additional hazard chapters as funding allows.

All meeting minutes, press releases, and other documentation of revisions should be kept on record by Ferry County Emergency Management Office.

### *Five Year Re-evaluation Agenda*

The focus of the planning Team at the five-year re-evaluation should include a

ll of the topics suggested for the annual review in addition to the following items:

Update County demographic and socioeconomic data.
Address any new planning documents, ordinances, codes, etc. that have been developed by the County or cities.
Review listed communication sites.
Review municipal water sources, particularly those in the floodplain or landslide impact areas.

Redo all risk analysis models incorporating new information such as an updated County parcel master database, new construction projects, development trends, population vulnerabilities, changing risk potential, etc.
Update county risk profiles and individual community assessments based on new information reflected in the updated models.

All meeting minutes, press releases, and other documentation of revisions should be kept on record by Ferry County Emergency Management Office.

### *Continued Public Involvement*

Ferry County is dedicated to involving the public directly in review and updates of this Multi - Hazard Mitigation Plan. The County Emergency Management Director, through the planning Team, is responsible for the annual review and update of the Plan as recommended in the "Plan Monitoring and Maintenance" section below.

The public will have the opportunity to provide feedback about the Plan annually on the anniversary of the adoption at a meeting of the County Board of Commissioners. Copies of the Plan will be kept at the Ferry County Emergency Management Office, located in the County Courthouse. The Plan also includes contact information for the Emergency Management Director, who is responsible for keeping track of public comments.

A public meeting will also be held as part of each annual evaluation or when deemed necessary by the planning 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 meetings and maintain public involvement through the County's webpage and local newspapers.

## Mechanisms to Incorporate Mitigation Strategies

Ferry County and the incorporated cities encourage 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. Through their resolution of adoption as well as their participation on the planning Team, each jurisdiction is aware of and committed to incorporating the risk assessments and mitigation strategies contained herein. It is anticipated that the research, local knowledge, and documentation of hazard conditions coalesced in this document will serve as a tool for decision-makers as new policies, plans, and projects are evaluated.

There are several planning processes and mechanisms in Ferry County that will either use the risk assessment information presented in this document to inform decisions or will integrate the mitigation strategy directly into capital improvement, infrastructure enhancement, and training projects; prevention campaigns; and land use and development plans. Although not inclusive, the following is a list of mechanisms available to each jurisdiction for incorporating the mitigation requirements:

**Conservation District**

The Conservation District will incorporate this Plan into their annual and five-year plans. The Conservation District will also develop a procedure on emergency actions related to the Plan.

**Hospital District Mechanisms**

The Board has agreed to incorporate the finished plan into the Hospital District Emergency Plan and will look for opportunities to jointly drill/plan with other jurisdictions within the community. The Hospital District will continue to seek and execute MOU's for sharing resources in times of need and will endeavor to cooperate in all future planning.

**Agencies and other Organization Mechanisms**

Annual Budget

Prevention Programs

Training Programs

Long Term Land Use Plans (Forest Plans, Wildlife Management Area Plans, etc.)

The Ferry County Emergency Management Director is responsible for educating the Board of Commissioners and other County departments as well as city planners on the contents and incorporation requirements of the Multi-Hazard Mitigation Plan. County Emergency Management and other planning Team partners should be aware of the risk assessments and mitigation strategies respective to their jurisdictions to include them in the planning processes and discussions for other types of projects as they come up. Ferry County Emergency Management Office is responsible for ensuring that each participating jurisdiction as well as other partners has a copy of the Multi-Hazard Mitigation Plan readily available for reference purposes. Furthermore, as previously mentioned, Ferry County Emergency Management is responsible for annual and 5-year evaluations of the Multi-Hazard Mitigation Plan. The annual meetings will serve a dual purpose of updating the document and refreshing each jurisdiction's memory of the contents and mitigation requirements of Multi-Hazard Mitigation Plan. Members of the planning Team are also responsible of educating decision-makers in their own jurisdictions on the use and incorporation of mitigation requirements of this document into other planning mechanisms such as those listed above.

# Section 7 – Appendices

## Supporting Information

### *List of Tables*

# *List of Figures*

# Memorandum of Agreement

**Purpose**

A Memorandum of Agreement (MOA) is hereby executed between the participating jurisdictions in the Ferry County Multi-Hazard Mitigation Plan (MHMP) Update. "Participating jurisdictions" in this MOA are as follows:

Ferry County
Ferry County Health
Ferry County Public Utilities District
Ferry Conservation District
Northeast Tri-County Health District
City of Republic
Ferry/Okanogan Fire Protection District #14
The purpose of this MOA is to establish commitment from and a cooperative working relationship between all Participating Jurisdictions in the development and implementation of the Ferry County MHMP Update. In addition, the intent of this MOA is to ensure that the multi-jurisdictional hazard mitigation plan is developed in accordance with Title 44 of the Federal Code of Regulations (CFR) Part 201.6; that the planning process is conducted in an open manner involving community stakeholders; that it is consistent with each participating jurisdiction's policies, programs and authorities; and it is an accurate reflection of the community's values.

This MOA sets out the responsibilities of all parties. The MOA identifies the work to be performed by each participating jurisdiction. Planning tasks, schedules, and finished products are identified in the Work Program and Schedule. The plan created as a result of this MOA will be presented to the governing body (Planning Commission, City Council and or Board of Commissioners) of each participating jurisdiction for adoption.

**Background**

Mitigation plans form the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. The Participating Jurisdictions in a mitigation planning process would benefit by:

Identify cost effective actions for risk reduction;
Directing resources on the greatest risks and vulnerabilities;
Building partnerships by involving people, organizations, and businesses;
Increasing education and awareness of hazards and risk;
Aligning risk reduction with other community objectives; and
Providing eligibility to receive federal hazard mitigation grant funding.
Ferry County has received a grant from the Federal Emergency Management Agency to prepare a multi-jurisdictional hazard mitigation plan in accordance with 44 FEMA requirements at 44.C.F.R. 201.6.

**Planning Team Responsibilities**

Ferry County will act as the Lead Community and will assign a Chairperson of the Planning Team for the Ferry County MHMP Update. The Participating Jurisdictions authorize the Lead Community to manage and facilitate the planning process in accordance with the Work Program and Schedule.

The Participating Jurisdictions understand that representatives must engage in the following planning process, as more fully described in the *Local Mitigation Planning Handbook* (FEMA, 2012), including, but not limited to:

Develop the Work Program and Schedule with the Planning Team.
Organize and attend regular meetings of the Planning Team.
Assist the Planning Team with developing and conducting an outreach strategy to involve other planning team members, stakeholders, and the public, as appropriate to represent their jurisdictions.
Identify community resources available to support the planning effort, including meeting spaces, facilities, and media outlets.
Provide data and feedback to develop the risk assessment and mitigation strategy, including a specific mitigation action plan for their Jurisdiction.
Submit the draft plan to their respective governing body for consideration and adoption.
Work with the Planning Team to incorporate all their Jurisdiction's comments into the draft plan.
Submit the draft plan to their respective governing body for consideration and adoption.
After adoption, coordinate a process to monitor, evaluate, and work toward plan implementation.

**Planning Team**

The following points of contacts and alternatives are authorized on behalf of the governing bodies to participate as members of the Planning Team for the Ferry County MHMP Update:

| | |
|---|---|
| Steven Bonner<br>Emergency Management Director<br>Ferry County Emergency management Office<br>290 E. Tessie Ave<br>Republic, WA 99166<br>509-775-5225 Ext1112<br>emdirector@co.ferry.wa.us | Matt Schanz<br>Administrator<br>NE Tri-County Health District<br>Ferry County<br>240 E Dominion Ave<br>Colville, WA 99114<br>509-684-1301<br>mschanz@netchd.org |
| Aaron Edwards<br>Chief Executive Officer<br>Ferry County Health<br>Ferry County<br>36 North Klondike Road<br>Republic, WA 99166<br>509-775-8242<br>Aaron.edwards@fcphd.org | Ed Forsman<br>Engineering Technician<br>Public Utilities District<br>Ferry County<br>686 S Clark Ave<br>Republic, WA<br>509-775-3325<br>eforsman@FCPUD.com |
| Jim Burnside<br>City Council Member<br>City of Republic<br>987 S Clark Ave<br>Republic, WA 99166<br>509-775-3216<br>Council5@republicwa.org | Lloyd Odell<br>Manager<br>Ferry Conservation District<br>84 E Delaware Ave<br>Republic, WA 99166<br>509-775-3473<br>Lloyd.odell@conservewa.net |
| J. Foster Fanning<br>Fire Chief<br>Ferry/Okanogan Fire Protection District #14<br>509-779-4766<br>fanning@rcabletv.com | Johnna Exner<br>Board of County Commissioners<br>290 E. Tessie Ave<br>Republic WA 99166<br>509-775-5255 ext. 2508<br>jexner@co.ferry.wa.us |

**MOA Implementation**

This MOA will be in effect from the date of signature by all parties, will remain in effect through the duration of the planning process, and will terminate after adoption of the final FEMA-approved mitigation plan by all participating jurisdictions, or 5 years after FEMA approval, whichever is earlier. It may be terminated prior to that time for any Participating Jurisdiction by giving 60 days written notice. This MOA is to be implemented through the attached Work Program and Schedule, and any addendums that describe specific activities, programs, and projects, and if necessary, funding by separate instrument.

Name: Aaron Edwards Date
Title: CEO
Jurisdiction: Ferry County Health

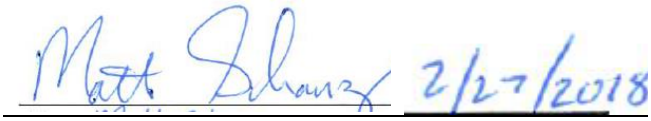
Name: Lloyd Odell Date
Title: Manager
Jurisdiction: Ferry County Conservation District

Name: Johnna Exner Date
Title: Commissioner
Jurisdiction: Ferry County

Name: J. Foster Fanning Date
Title: Fire Chief
Jurisdiction: Ferry/Okanogan Fire Protection District #14

6/20/2018

Name: Ed Forsman Date
Title: Engineering Technician
Jurisdiction: Ferry County PUD



Name: Matt Schanz Date
Title: Administrator
Jurisdiction: NE-Tri County Health District

Name: Jim Burnside Date
Title: Councilmember
Jurisdiction: City of Republic

# Record of Local Adoption

Each participating jurisdiction formally adopted the Ferry County Natural Hazard Mitigation Plan by resolution in an open public hearing. The following is a record of the resolutions passed by the governing body in each represented jurisdiction.

## *Ferry County Resolution of Adoption*

**Ferry County**
**Resolution 2019-36**
**Ferry County Natural Hazard Mitigation Plan Adoption**

**WHEREAS,** The Ferry County Board of Commissioners supports the Ferry County Natural Hazard Mitigation Plan, and

**WHEREAS,** The Ferry County Board of Commissioners has participated in the development of the Ferry County Natural Hazard Mitigation Plan, and

**WHEREAS,** The Ferry County Natural Hazard Mitigation Plan will be utilized as a guide for planning as related to FEMA Pre-Disaster Mitigation and other purposes as deemed appropriate.

**NOW, THEREFORE BE IT RESOLVED,** the Ferry County Board of Commissioners do hereby adopt, support, and will facilitate the Ferry County Natural Hazard Mitigation Plan's implementation as deemed appropriate.

Dated this 25th Day of November 2019

BOARD OF FERRY COUNTY COMMISSIONERS

Attest:

Mike Blankenship, Chairman

Nathan Davis, Vice Chairman

Johnna Exner, Member

Amanda Rowton, Clerk of the Board

RESOLTUION 2019-36
Ferry County Natural Hazard Mitigation Plan Adoption

# Resolution 2019-10

A RESOLUTION OF THE CITY OF REPUBLIC, WASHINGTON DECLARING SUPPORT AND ADOPTION OF THE FERRY COUNTY NATURAL HAZARD MITIGATION PLAN.

**WHEREAS**, the City of Republic supports the Ferry County Natural Hazard Mitigation Plan, and

**WHEREAS**, the City of Republic has participated in the development of the Ferry County Natural Hazard Mitigation Plan, and

**WHEREAS**, the Ferry County Natural Hazard Mitigation Plan will be utilized as a guide for planning as related to FEMA pre-disaster mitigation and other purposes as deemed appropriate.

**BE IT RESOLVED**, that the City of Republic do hereby adopt, support, and will facilitate the Ferry County Natural Hazard Mitigation Plan's implementation as deemed appropriate.

**SECTION 2 – EFFECTIVE DATE**

This resolution shall take effect after its passage by the City Council.

PASSED BY THE CITY COUNCIL of the City of Republic, Washington at its regular meeting on this 18 day of November, 2019.

Elbert Koontz
ELBERT KOONTZ, MAYOR

ATTEST:

NICOLAS OLSEN, CLERK TREASURER

FILED WITH THE CITY CLERK: 11-19-19
PASSED BY THE CITY COUNCIL: 11-18-19
PUBLISHED: _____
EFFECTIVE DATE: 11-18-19
RESOLUTION NO: 2019-10

## Resolution of the Ferry Conservation District, Washington
# 109-2019

A resolution of the Ferry Conservation District Board of Supervisors declaring the Districts support and adoption of the Ferry County Natural Hazard Mitigation Plan.

Whereas, The Ferry Conservation District Board of Supervisors supports the Ferry County Natural Hazard Mitigation Plan, and

Whereas, The Ferry Conservation District Board of Supervisors has participated in the development of the Ferry County Natural Hazard Mitigation Plan, and

Whereas, The Ferry County Natural Hazard Mitigation Plan will be utilized as a guide for planning as related to FEMA Pre-Disaster Mitigation and other purposes as deemed appropriate.

Therefore be it resolved, that the Ferry Conservation District Board of Supervisors do hereby adopt, support, and will facilitate the Ferry County Natural Hazard Mitigation Plan's implementation as deemed appropriate.

Passed and approved this 11 Day of December, 2019

Board of Supervisors of Ferry Conservation District
Ferry County, Washington

By:
FCD Supervisor

Charlotte Coombes

By:
FCD Supervisor

James D. Rochelle

By:
FCD Supervisor

David Hedrick

Attested by:
FCD Staff

Ferry County Health

# RESOLUTION 2019 #13

A resolution of the Ferry County Health Board of Commissioners declaring county support and adoption of the Ferry County Natural Hazard Mitigation Plan.

Whereas, The Ferry County Health Board of Commissioners supports the Ferry County Natural Hazard Mitigation Plan, and

Whereas, The Ferry County Health Board of Commissioners has participated in the development of the Ferry County Natural Hazard Mitigation Plan, and

Whereas, The Ferry County Natural Hazard Mitigation Plan will be utilized as a guide for planning as related to FEMA Pre-Disaster Mitigation and other purposes as deemed appropriate.

Therefore be it resolved, that the Ferry County Health Board of Commissioners do hereby adopt, support, and will facilitate the Ferry County Natural Hazard Mitigation Plan's implementation as deemed appropriate.

RESOLVED, this 26th day of November 2019.

APPROVED at regular meeting of the Commissioners of Ferry County Health, Republic, Washington, this 26th day of November 2019.

Nancy Giddings, Chair — Date

Ronald Bacon, Vice Chair — 11/24/19 — Date

DiAnne Lundgren, Secretary — 11/26/19 — Date

Jody Jannot, Commissioner — 11/26/19 — Date

Sarah Krausse, Commissioner — 11/26/19 — Date

## *Ferry County Public Utilities District*

# RESOLUTION NO. 19-10

## A Resolution of Support and Adoption of the Ferry County Natural Hazard Mitigation Plan

WHEREAS, the purpose of the Ferry County Natural Hazard Mitigation Plan is to reduce the impact of hazards such as floods, landslides, severe weather, wildfire, and drought on the residents of Ferry County, while maintaining appropriate emergency response capabilities and sustainable resource management policies, and

WHEREAS, the Board of Commissioners of Public Utility District No. 1 of Ferry County supports the Ferry County Natural Hazard Mitigation Plan, and

WHEREAS, Public Utility District #1 of Ferry County has participated in the development of the Ferry County Natural Hazard Mitigation Plan, and

WHEREAS, the Ferry County Natural Hazard Mitigation Plan will be utilized as a guide for planning as related to FEMA Pre-Disaster Mitigation and other purposes as deemed appropriate.

NOW THEREFORE BE IT RESOLVED that the Commissioners of Public Utility District No. 1 of Ferry County do hereby adopt, support, and will facilitate the implementation of the Ferry County Natural Hazard Mitigation Plan as deemed appropriate.

ADOPTED at the regular meeting of the Board of Commissioners of Public Utility District No. 1 of Ferry County, Washington, this 18th day of November, 2019.

BOARD OF COMMISSIONERS
PUBLIC UTILITY DISTRICT NO. ONE
FERRY COUNTY, WASHINGTON

(S E A L)

President

Chris Knoepa

Vice-President

ATTEST:

Secretary

**BEFORE THE BOARD OF NORTHEAST TRI COUNTY HEALTH DISTRICT**

| | | |
|---|---|---|
| **IN THE MATTER OF NORTHEAST TRI COUNTY HEALTH DISTRICT DECLARING SUPPORT AND ADOPTION OF THE FERRY COUNTY NATURAL HAZARD MITIGATION PLAN** | ) ) ) | **RESOLUTION 08-2019**<br><br>**NORTHEAST TRI COUNTY HEALTH DISTRICT DECLARING SUPPORT AND ADOPTION OF THE FERRY COUNTY NATURAL HAZARD MITIGATION PLAN** |

**WHEREAS,** the Northeast Tri County Health District supports the Ferry County Natural Hazard Mitigation Plan; **AND**

**WHEREAS,** the Northeast Tri County Health District has participated in the development of the Ferry County Natural Hazard Mitigation Plan; **AND**

**WHEREAS,** the Ferry County Natural Hazard Mitigation Plan will be utilized as a guide for planning as related to the Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation and other purposes as deemed appropriate.

**THEREFORE, IT IS HEREBY RESOLVED,** that the Board of Health of Northeast Tri County Health District do hereby adopt, support, and will facilitate the Ferry County Natural Mitigation Plan's implementation as deemed appropriate.

**Done this 13th day of November 2019 in Colville, Washington and effective immediately upon signatures as of this date.**

**Board Member, Ferry County**

**Board Member, Ferry County**

**Board Member, Pend Oreille County**

**Board Member, Pend Oreille County**

**Board Member, Stevens County**

**Board Member, Stevens County**

**Health Officer**

**Board Member, City of Kettle Falls**

**Board Member, City of Newport**

**Board Member, City of Republic**

# Fire District/Agency Signatures

### Signatures of Participation by Ferry County Fire Protection Districts and Departments

This Community Wildfire Protection Plan and all of its components identified herein were developed in close cooperation with the participating entities listed. These members of the CWPP steering committee formally recommended that this document be adopted by the Ferry County Commissioners.

Chief Neil Hyppa — 6-19-15

Ferry County Fire Protection District #3 / Barstow — Date

Ferry County Fire Protection District #13 / Republic — Date

Ferry County Fire Protection District #14 — 3-11-2015

Date

### Signatures of Participation by other Ferry County CWPP Steering Committee Entities

This Community Wildfire Protection Plan and all of its components identified herein were developed in close cooperation with the participating entities listed. These members of the CWPP steering committee formally recommended that this document be adopted by the Ferry County Commissioners.

1/8/2016

**Aaron Everett**, — Date

State Forester & Policy Director for the Office of the Commissioner of Public Lands,
Washington State Department of Natural Resources

Lindsey Babcock — 4/8/2015

**Lindsey Babcock**, Border Resource Manager — Date

Spokane District Bureau of Land Management

10/23/14

**Tim Sampson**, FMO — Date

Colville National Forest

# Planning Team Minutes

Commissioners Building, Republic, Washington
January 17th, 2018

**Attendees:**

| | |
|---|---|
| Mary Kalinowski, Ferry County Planning Dept. | Ron Charlton, Ferry County Public Works |
| Ed Forsman, Ferry County Public Utility District | Brad Tucker, Northwest Management |
| Phillip Starr, Ferry County EMS 1 | Vaiden Bloch, Northwest Management |
| John Glenewinkel, Republic/Curlew School District | Nathan Davis, Ferry County Commissioner |

**Agenda Item #1 Determine the Planning Area & Resources**

The group discussed including those areas of fire districts and public utility district that occur both within and outside of the county. Brad reviewed the current adopting jurisdictions with the team and it was determined that the NE Tri-Counties Health District would be invited to be an adopting jurisdiction. Brad passed around a draft Memorandum of Agreement for each of the adopting jurisdictions to review and ultimately sign as officially agreeing to participate in the planning process and adopt the plan when finished. Brad will revise the MOA and send out to each jurisdiction to sign.

**Agenda Item #2 Build the Planning Team**

The planning team also discussed the current Mission and Vision statements and it was determined both were still suitable.

The planning team reviewed the proposed schedule set forth by NMI and there were no issues.

**Agenda Item #3 Outreach Strategy**

The team thought that the State Department of Transportation should be invited to be a stakeholder in the planning process.

The group discussed the public outreach strategy. Brad did not get a press release sent out prior to this meeting but intends to get one sent out before the February meeting. The group informed NMI of several media outlets that would reach the most Ferry County residents. NMI was also suggested to have a booth at the Conservation Fair.

**Agenda Item #4 Review Community Capabilities**

Brad passed out a table that is designed for each jurisdiction to summarize their current resources/policies/plans/etc. and allows them to identify gaps or shortcomings to mitigating hazards. NMI will provide this table electronically.

It was determined that Amy Rooker would reach out to the State Water Resource Board to inquire about the County's involvement in the National Flood Insurance Program.

**Agenda Item #5 Hazards Summary Exercise**

This item was skipped due to time constraints. We will go through the hazards summary exercise.

**Agenda Item #6 Timeline**

We are tentatively planning to be finished with the plan by August 31st. The next meeting is February 20th at 4:30pm in the Commissioners' building.

Sheriff's Office, Republic, Washington
February 20th, 2018

**Attendees:**

| | |
|---|---|
| Mary Kalinowski, Ferry County Planning Dept. | Amy Rooker, Ferry County Sheriff's Department |
| Ken Kerr, Stevens/Ferry Fire Districts 3 & 8 | Brad Tucker, Northwest Management |
| Phillip Starr, Ferry County EMS 1 | Vaiden Bloch, Northwest Management |
| John Glenewinkel, Republic/Curlew School District | Mac McElheran, US Border Patrol |
| Matt Schanz, Northeast Tri-County Health District | Cherie Hanning, Ferry County Health |
| Ray Maycumber, Ferry County Sheriff | Aaron Edwards, Ferry County Health |

**Agenda Item #1 Old Business**

Brad discussed the current state of the Memorandum of Agreement that all adopting jurisdictions are being asked to sign. Brad will revise the MOA and get it sent out soon to the necessary individuals.
Brad reminded the adopting jurisdictions that he still needs their capability assessments. Brad has received the Ferry County capability assessment.

**Agenda Item #2 GIS Models & Maps**

Vaiden from Northwest Management introduced some of the maps that will be used to help analyze those hazards for Ferry County. Vaiden had a short presentation to show how the Ferry County Relative Threat Level map was developed during the recent update of the County Community Wildfire Protection Plan. He also showed maps related to flood, landslide and earthquake.

**Agenda Item #3 Hazards Summary Exercise**

Brad explained that the planning team would need to rely on their experience of living within the region to be the primary tool in "ranking" each hazard. Brad also explained that this exercise is a necessary part of the planning process because we need to show how each hazard was ranked.
The planning team proceeded to assess or rank each hazard that was included in the previous version (2004) of the Ferry County Multi-Hazard Mitigation Plan which included; flood, landslide, severe weather and wildland fire. The team then proceeded to brainstorm for additional hazards to include in this plan update. The additional hazards include; terrorism/civil unrest, infrastructure failure, epidemic, hazmat, drought and displaced population. Some of these hazards were identified in the 2006 plan update that was never fully adopted. These additional hazards were also ranked using the same process.
The following table shows the outcome of the hazard summary exercise.

**Ferry County**

| Hazard | Location (Geographinc Area Affected) | Max Probable Extent (Magnitude/Strength) | Probability of Future Events | Overall Significance Ranking |
|---|---|---|---|---|
| **Flood** | Significant (3) | Extreme (4) | Highly Likely (4) | High (11) |
| **Landslide** | Significant (3) | Severe (3) | Highly Likely (4) | High (10) |
| **Earthquake** | Limited (2) | Weak (1) | Occasional (2) | Low (5) |
| **Severe Weather** | Extensive (4) | Extreme (4) | Highly Likely (4) | High (12) |
| **Wildland Fire** | Extensive (4) | Extreme (4) | Highly Likely (4) | High (12) |
| **Terrorism/Civil Urest** | Limited (2) | Moderate (2) | Occasional (2) | Low (6) |
| **Infrastructure Failure** | Extensive (4) | Extreme (4) | Highly Likely (4) | High (12) |
| **Epidemic** | Limited (2) | Moderate (2) | Occasional (2) | Medium (6) |
| **Drought** | Extensive (4) | Severe (3) | Likely (3) | High (10) |
| **HazMat** | Limited (2) | Moderate (2) | Occasional (2) | Medium (6) |
| **Displaced Population** | Limited (2) | Severe (3) | Occasional (2) | Medium (7) |

**Agenda Item #4 Hazard Description**

Brad asked the planning team for any local photos of hazards occurring since 2004 that could be used in the plan update.

**Agenda Item #5 Fire Service Updates (other Jurisdictions)**

Brad asked for any agency/district within the county that has fire service responsibilities to provide an update to projects and resources that were identified in the recent update of the county's CWPP.

**Agenda Item #6 Timeline**

The next meeting will be in mid-April and you will be notified once a specific date and time are selected.

**Agenda Item #7 Homework**

Adopting jurisdictions need to sign the MOA when available. They also need to fill out their capability assessment and rank each hazard identified in our meeting for their respective jurisdiction. Send photos of hazards to tucker@nmi2.com.

Old Commissioners' Room, Republic, Washington
April 17th, 2018

**Attendees:**

| | |
|---|---|
| John Foster Fanning, Okanogan/Ferry Fire District 14 | Amy Rooker, Ferry County Sheriff's Department |
| Melissa Rose, Ferry County EMS 1 | Brad Tucker, Northwest Management |
| Aaron Edwards, Ferry County Health | Daniel McElheran, US Border Patrol |
| Johnna Exner, Ferry County Commissioner | Ron Charlton, Ferry County Public Works |
| Jim Burnside, City of Republic | |

**Agenda Item #1 Old Business:**

Brad discussed the current state of the Memorandum of Agreement that all adopting jurisdictions are being asked to sign. Brad reminded the adopting jurisdictions that he still needs their capability assessments and hazard summaries.

**Agenda Item #2 Sections 1-4:**

The Planning Team reviewed draft sections 1 thru 4 briefly. NMI asked the team to review the draft sections in more detail and provide comments prior to the next meeting. The representative from the City of Republic asked that we use "City of Republic" any time that the plan referred to the city and be consistent throughout the plan. The Planning Team had some other recommendations on wording and suggest revising the draft. The Team also had questions about the average climate description on page 10 and asked NMI to verify the information with NOAA. Someone suggested that NMI contact Kathleen Rowden with NOAA because she is currently tracking fires and landslides in Ferry County. The Planning Team asked NMI to include frost heaving to the severe weather risk assessment.

**Agenda Item #3 Action Item Reviews:**

NMI had copies of the 2006 Action Items to review, however we did have time at this meeting to update the Action Items. NMI gave copies to the Planning Team members present to review and discuss at the May meeting.

**Agenda Item #4 Homework:**

NMI asked the group to provide comments on the draft prior to our next meeting. NMI also asked for the jurisdiction MOAs, capability assessments and hazard summaries as soon as possible.

**Agenda Item #6 Timeline**

The next meeting will be at 3:00 pm on May 17th. Location is yet to be determined. Ferry County Emergency Management will notify the Planning Team when a location is found.

Old Commissioners' Room, Republic, Washington

June 21st, 2018

**Attendees:**

| | |
|---|---|
| Mike Shick, US Border Patrol | Amy Rooker, Ferry County Sheriff's Department |
| Phillip Starr, Ferry County EMS 1 | Brad Tucker, Northwest Management |
| Aaron Edwards, Ferry County Health | Mac McElheran, US Border Patrol |
| Johnna Exner, Ferry County Commissioner | Lloyd Odell, Ferry County Conservation District |
| Will Rowton, Ferry County Public Works | |

**Agenda Item #1 Old Business:**

Brad reminded the adopting jurisdictions that he still needs their capability assessments and hazard summaries.

**Agenda Item #2 Sections 1-4:**

Brad asked the group if there were any comments or corrections to Chapters 1-4 that were handed out at a previous meeting. There were none.

**Agenda Item #3 Action Item Reviews:**

NMI had copies of the 2006 Action Items to review. The group spent most of the meeting updating these Action Items. NMI asked for folks to be thinking about new items to add to the list.

**Agenda Item #4 Public Meetings:**

The group decided to have a public meeting at a Commissioners' meeting, City Council meeting in Republic and a "stand alone" meeting in Barstow. NMI will coordinate with those entities and determine what days and times and get a press release out announcing the specifics to the residents of Ferry County.

**Agenda Item #5 Homework:**

NMI asked the group to provide comments on the draft prior to our next meeting. NMI also asked for the jurisdiction MOAs, capability assessments and hazard summaries as soon as possible.

**Agenda Item #6 Timeline**

The next meeting will be in August and likely coordinated with a public meeting, so the date/time/location is yet to be determined. Ferry County Emergency Management will notify the Planning Team when specifics are known.

Commissioners' Building, Republic, Washington
September 24th, 2018

**Attendees:**

| | |
|---|---|
| Mike Shick, US Border Patrol | Amy Rooker, Ferry County Sheriff's Department |
| Phillip Starr, Ferry County EMS 1 | Brad Tucker, Northwest Management |
| Aaron Edwards, Ferry County Health | Mac McElheran, US Border Patrol |
| Johnna Exner, Ferry County Commissioner | Lloyd Odell, Ferry County Conservation District |
| Will Rowton, Ferry County Public Works | Matt Schanz, NE Tri County Health District |

**Agenda Item #1 Old Business:**

Brad reminded the adopting jurisdictions that he still needs their capability assessments. The group also discussed the Action Items that were reviewed at the previous meeting. There were no major changes to the list.

**Agenda Item #2 Sections 5-6:**

Brad passed out the draft of sections 5 and 6, Mitigation Strategy and Plan Maintenance respectively. The group spent some time looking at these sections and were asked to review on their own and provide feedback to Brad.

**Agenda Item #3 Public Meeting(s):**

Brad and Amy discussed how the first public meeting went earlier in the day. Brad presented a brief powerpoint at the Commissioners' public board meeting earlier on September 24th to the Board and all attendees. There were no attendees from the general public, everyone in attendance was there on official capacity. The next meeting was scheduled to occur in early October at the Barstow Training Center.

**Agenda Item #4 Homework:**

Brad asked the group to review sections 5 & 6 and provide feedback. Brad also requested Community Capabilities worksheets to be completed and sent to Brad.

**Agenda Item #5 Timeline:**

There is not a planned meeting at this time. The next task for the Team is to review the Final Draft when available.

# Ferry County Multi-Hazard Mitigation Plan Update
## Meeting Minutes

Commissioners' Building, Republic, Washington
April 2nd, 2019

**Attendees:**

| | |
|---|---|
| Steve Bonner, Ferry County Emergency Management | Ron Charlton, Ferry County Public Works |
| Bill Folks, Ferry County Planning and Building | Brad Tucker, Northwest Management |
| Aaron Edwards, Ferry County Public Hospital District | Darald Staley, Resident |
| Johnna Exner, Ferry County Commissioner | Deanna Gill, JobCorps/Safety |
| Will Rowton, Ferry County Public Works | Matt Schanz, NE Tri County Health District |
| Seth Krohn, JobCorps | |

**Agenda Item #1 Introduction:**
Steven introduced himself to the group as the County Emergency Manager. He then asked for everyone to introduce themselves.

**Agenda Item #2 Old Business:**
Steve reviewed where we are with the plan. He then discussed missing information from adopting jurisdictions. It was recommended that Steve contact the City of Republic and get on the agenda for the next city council meeting.

**Agenda Item #3 General Mitigation Plan Final review:**
Steve reviewed changes that have been made to the plan that were requested by the planning team during their review. Steve also pointed out some changes that were still needed. He informed Brad with Northwest Management that he would make those changes and send them to Brad. Steve also asked the planning team that if they still have revisions, to send them to Steve and he will compile and send them to Northwest Management.

The Hospital will investigate how they adopted the plan and send record of it to Steve. Steve will contact Ed Forsman with the PUD to remind him to inform his successor about the plan and what is expected of the PUD.

**Agenda Item #4 Proposed Activities focused review:**
Steve stressed the importance of reviewing any projects that are listed under the various planning team members jurisdictions or departments for accuracy. The lead of any project will be expected to pursue, implement and complete those projects as funding allows. The planning team will meet AT LEAST annually to review and update project status.

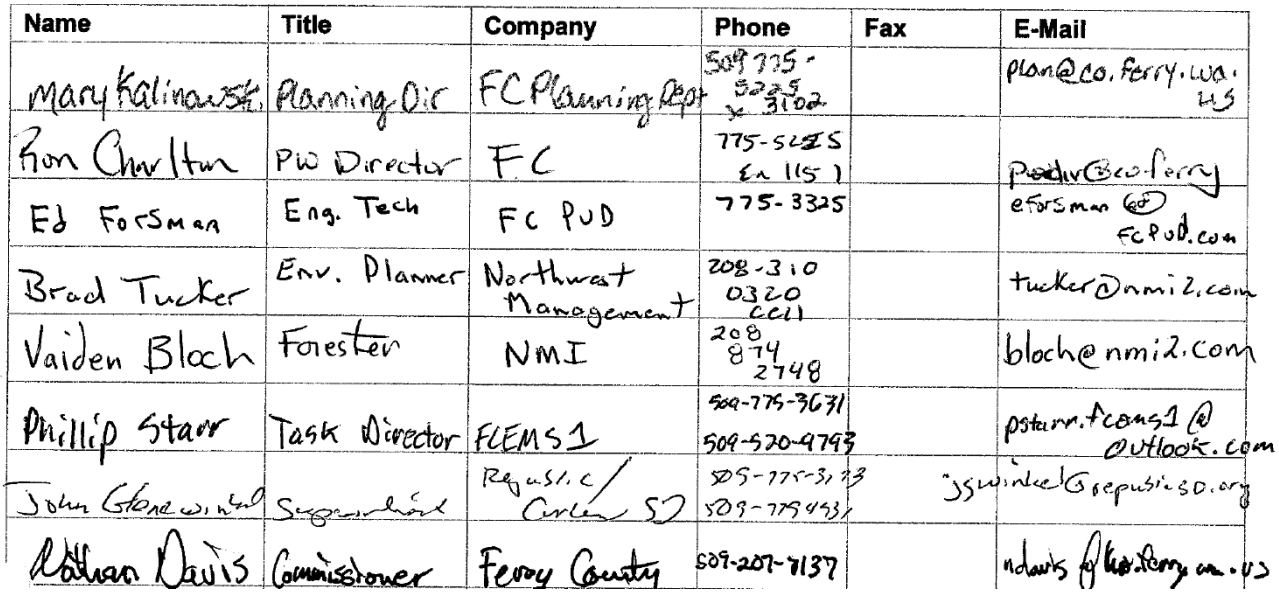
**Agenda Item #5 Coordinate Public Review:**
The planning team determined that we would open the document to the public for 30 days to review starting on April 24th thru May 23rd. The plan will be placed on the County's website and announcements will be placed in the Statesman Examiner, Ferry County View, Omak Chronicle as well as flyers placed around the County.

**Agenda Item #5 Timeline:**
There is not a planned meeting at this time. The next task for the Team is to adopt the Final Plan when available.

# Record of Meeting Attendance

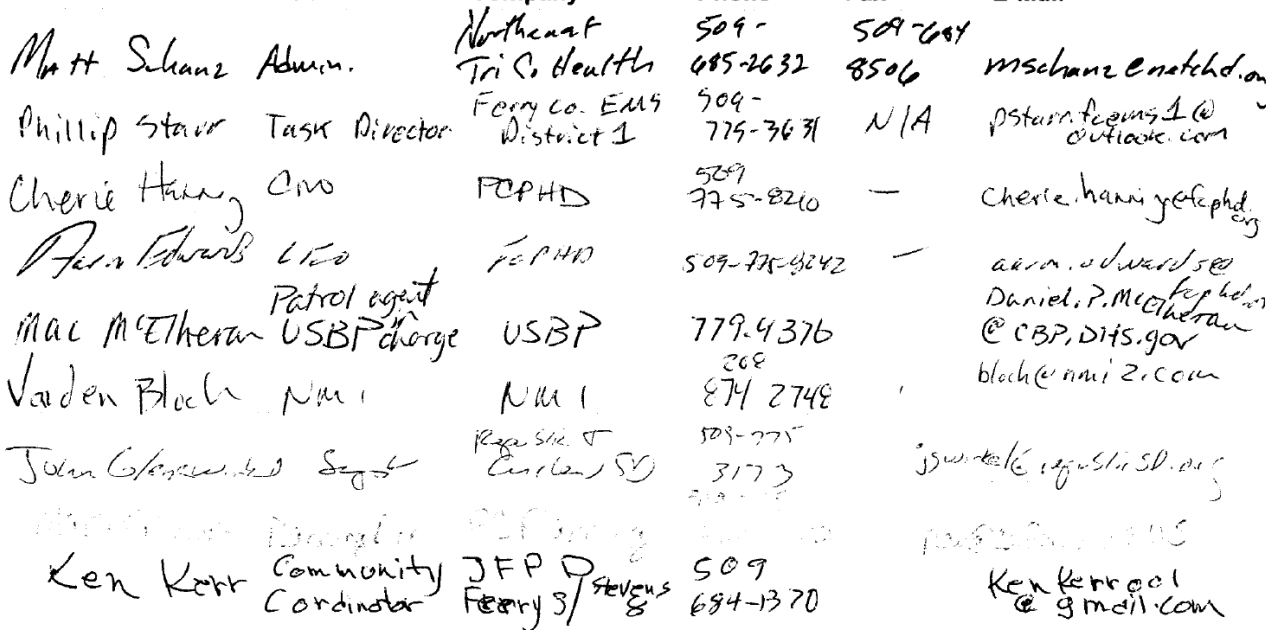
The following is a record of the attendance taken at each of the Team and public meetings held during the Multi-Hazard Mitigation Planning process.

**Figure 7.1. Team Meeting Sign-in Sheet for January 17th, 2018.**



| Name | Title | Company | Phone | Fax | E-Mail |
|---|---|---|---|---|---|
| Mary Kalinowski | Planning Dir | FC Planning Dept | 509 775-5225 x 3102 | | plan@co.ferry.wa.us |
| Ron Charlton | PW Director | FC | 775-5225 Ext 115 | | pwdir@co.ferry |
| Ed Forsman | Eng. Tech | FC PUD | 775-3325 | | eforsman@fcpud.com |
| Brad Tucker | Env. Planner | Northwest Management | 208-310 0320 CCU | | tucker@nmi2.com |
| Vaiden Bloch | Forester | NMI | 208 874 2748 | | bloch@nmi2.com |
| Phillip Starr | Task Director | FLEMS 1 | 509-775-3631 509-520-9793 | | pstarr.fcems1@outlook.com |
| John Glanewinkel | Supervisor | Regional Circle SD | 509-775-3173 509-775-4531 | | jglanewinkel@republicsd.org |
| Nathan Davis | Commissioner | Ferry County | 509-207-7137 | | ndavis@co.ferry.wa.us |

**Figure 7.2. Team Meeting Sign-in Sheet for February 20th, 2018.**



| Name | Title | Company | Phone | Fax | E-Mail |
|---|---|---|---|---|---|
| Matt Schanz | Admin. | Northeast Tri Co. Health | 509-685-2632 | 509-684-8506 | mschanz@nctchd.org |
| Phillip Starr | Task Director | Ferry Co. EMS District 1 | 509-775-3631 | N/A | pstarr.fcems1@outlook.com |
| Cherie Hanni | CNO | PCPHD | 509 775-8210 | — | cherie.hanni@pcphd.org |
| Aaron Edwards | CEO | PCPHD | 509-775-8242 | — | aaron.edwards@ |
| Mac McEtheran | Patrol agent in charge | USBP | 779-4376 | | Daniel.P.McEtheran@CBP.DHS.gov |
| Vaiden Bloch | NMI | NMI | 208 874 2748 | | bloch@nmi2.com |
| John Glanewinkel | Supervisor | Regional Circle SD | 509-775-3173 | | jglanewinkel@republicsd.org |
| Ken Kerr | Community Cordinator | JFP D Ferry S/ Stevens | 509 684-1370 | | Kenkerr001@gmail.com |

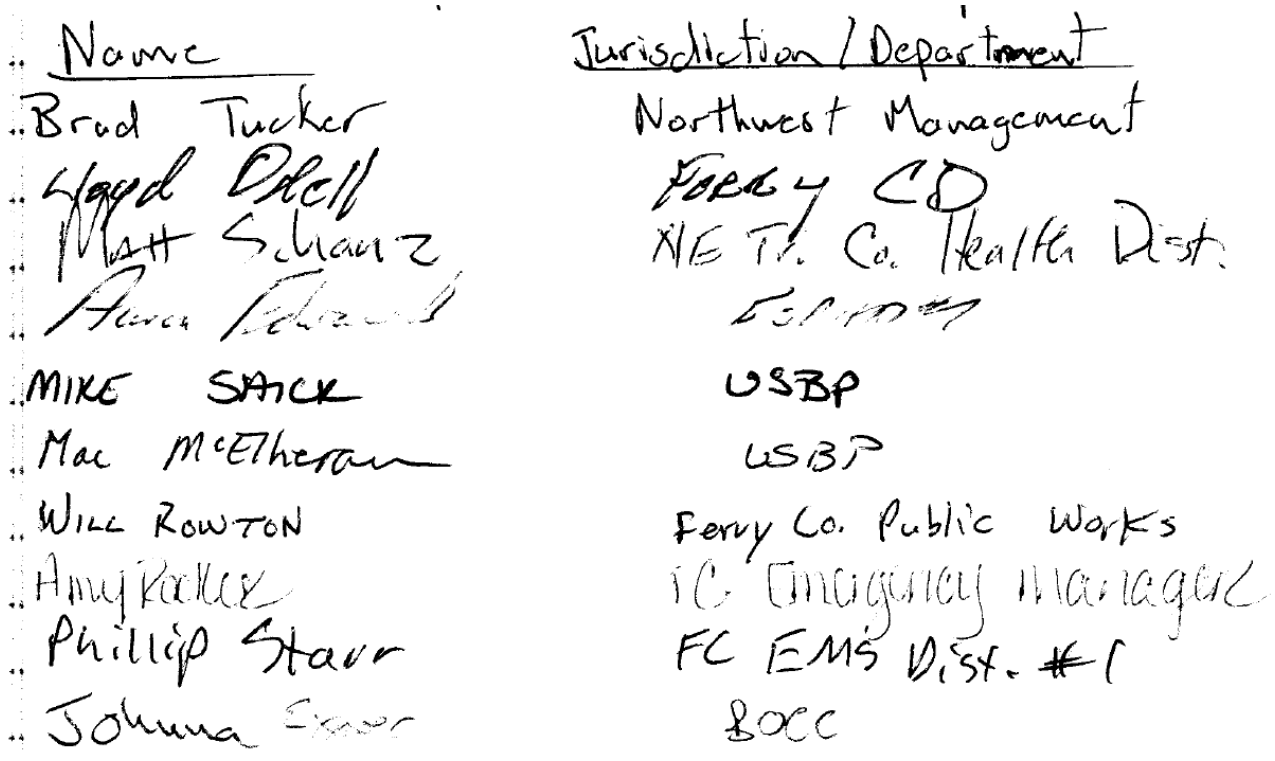
**Figure 7.3. Team Meeting Sign-in Sheet for April 17th, 2018.**

| Name | Title | Company | Phone | Fax | E-Mail |
|---|---|---|---|---|---|
| MIKE SHICK | DPAIC | USBP | 509 217-1151 | | MICHAEL.J.SHICK @CBP.DHS.GOV |
| MAC McEtheran | PAIC | USBP | 509 207-9002 | | Daniel.P.McEtheran @CBP.DHS.GOV |
| WILL ROWTON | Maint. Coord. | Ferry Co Public Works | (509) ext. 131 775-5225 | | maintcoord@ferry.wa.u |
| Aaron Edwards | CEO | FCPHD#1 | 509-775 8242 | | aaron.edwards fcphd.org |
| Johnna Sykes | Commissioner | Ferry | 504-207 0078 | | jexner@co.Ferry wa.us |
| Phillip Starr | Task Director | Ferry Co. EMS Dist. #1 | 509-520-9793 | | pstarr.fcems1@outlook.com |
| Lloyd Odell | Mgr. | Ferry Co | 509-775 3473 | | lloydodell@ferryco.net |
| Brad Tucker | | NMI | | | |

**Figure 7.4. Team Meeting Sign-in Sheet on June 21st, 2018.**

| Name | Title | Company | Phone | Fax | E-Mail |
|---|---|---|---|---|---|
| MIKE SHICK | DPAIC | USBP | 509 217-1151 | | MICHAEL.J.SHICK @CBP.DHS.GOV |
| MAC McEtheran | PAIC | USBP | 509 207-9002 | | Daniel.P.McEtheran @CBP.DHS.GOV |
| WILL ROWTON | Maint. Coord. | Ferry Co Public Works | (509) ext. 131 775-5225 | | maintcoord@ferry.wa.u |
| Aaron Edwards | CEO | FCPHD#1 | 509-775 8242 | | aaron.edwards fcphd.org |
| Johnna Sykes | Commissioner | Ferry | 504-207 0078 | | jexner@co.Ferry wa.us |
| Phillip Starr | Task Director | Ferry Co. EMS Dist. #1 | 509-520-9793 | | pstarr.fcems1@outlook.com |
| Lloyd Odell | Mgr. | Ferry Co | 509-775 3473 | | lloydodell@ferryco.net |
| Brad Tucker | | NMI | | | |

**Figure 7.5. Team Meeting Sign-in Sheet for September 24th, 2018**



| Name | Jurisdiction / Department |
|---|---|
| Brad Tucker | Northwest Management |
| Floyd Dell | Perry CD |
| Matt Schantz | NE Tn. Co. Health Dist. |
| [illegible] | [illegible] |
| MIKE SACK | USBP |
| Mac McElheran | USBP |
| Will Rowton | Perry Co. Public Works |
| Amy Kadlec | TC Emergency Manager |
| Phillip Staver | FC EMS Dist. #1 |
| Johnna Staver | BOCC |

# Ferry County MHMP Update Meeting

April 2nd, 2019

| Name | Jurisdiction/Agency | Phone | Email |
|---|---|---|---|
| Brad Tucker | NMI | 208-310-0320 | tucker@nmi2.com |
| Steve Bonner | Ferry County EMD | 509 775-5225 | emdirector@co.ferry.wa.us |
| Matt Schanz | Northeast Tri Co. Health | 509-563-2262 | mschanz@netchd.org |
| Tchuna Exhor | Ferry County | | |
| Jon Charlton | Ferry County | 509-775-5225 | pwdir@co.ferry.wa.us |
| Bill Folks | Ferry County | Ext 3102 | plan@co.ferry.wa.us |
| Will Rowton | FCPW | Ext 1131 | maintlead@co.Ferry.wa.us |
| David W Staley | Retired | 509.991-3423 | |
| Deanna Gill | JobCorps/Safety | 509.779.0532 | dgill@fs.fed.us |
| Seth Krohn | JobCorps | 509-779-0537 | skrohn@fs.fed.us |
| Aaron Edwards | FCPHD#1 | 509-775-8242 | aaron.edwards@fcphd.org |
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Record of Public Comments

1) *FEMA has online courses available for study and certification. Training courses should be held in Ferry County, Spokane is too far to travel to for training classes*.

Response - Any training that occurs as funding allows will be done in the most efficient means possible. There is a vast amount of training opportunities online, however, at times it is necessary to travel for hands-on training and for working with other agencies.

2) *for fire safety, the Kettle River should be separate from Toroda; Empire Creek and Vulcan Mountain should be included; indeed, every home should be protected*.

Response - The project areas were identified by a team of Fire Districts to help the County and Washington DNR prioritize areas that require fuels reduction or other types of wildfire mitigation activities. We focused on areas that could have an impact on residents should a wildfire were to occur and areas that have had fuels reduction projects completed or planned. These project areas can be revised annually.

3) *flooding and erosion dangers should be mitigated with tree planting before hardscaping is used*.

Response - Post-fire rehabilitation specifications will be site-specific, meaning that some sites may only require grass seeding while others may need multiple techniques performed.

4) *the data from the 2018 flood should be included, only 2017 data is given*.

Response - We added a short description of the flooding that occurred in 2018 to the flood risk assessment section.

# Record of Published Articles

The following is a subset of Multi-Hazard Mitigation-related articles published in local newspapers during the planning process. A total of three specific press releases were sent at critical stages of the process; one to introduce the project and invite interested parties, one to announce the public meetings, and one to announce the availability of the document for public comment. Additionally, during the local adoption phase of the process, Ferry County and city jurisdictions advertised the formal adoption of the Plan by resolution at a public hearing. The agendas for these meetings are published by the jurisdiction in the most appropriate local media outlet.

**Figure 7.5. Omak Chronicle – February 1st, 2018**

## Media Release

From: Ferry County Emergency Management
Date: February 1, 2018
RE: Ferry County Multi-Hazard Mitigation Plan Update

## Ferry County Set to Update Hazard Risk Plans

**Republic, Wa.** Ferry County has launched a project to update the Ferry County Multi-Hazard Mitigation Plan. This update will include an update of the Ferry County Community Wildfire Protection Plan as well. Local agencies and organizations in Ferry County have created a committee to complete the required 5-year updates of these documents as part of the FEMA Pre-Disaster Mitigation program and National Fire Plan and Healthy Forests Restoration Act. The project is being funded through a grant from FEMA.

The planning update will include risk analyses, vulnerability assessments, and mitigation recommendations for the hazards of flood, landslide, earthquake, severe weather, wildland fire and others.

Ferry County has retained Northwest Management, Inc. to provide risk assessments, hazard mapping, field inspections, interviews, and to collaborate with the planning committee to update the plan. The committee includes representatives from local communities/municipalities, Republic Police Department, rural and wildland fire districts, Sheriff's Department, Washington Department of Natural Resources, U.S Forest Service, public works, highway districts, private landowners, area businesses, various Ferry County departments, and others.

One of the goals of the planning process will be to increase the participating jurisdictions' eligibility for additional grants that will help minimize the risk and potential impact of disaster events, thus making a more resilient county. The planning team will be conducting public meetings to discuss preliminary findings and to seek public input on hazard mitigation recommendations. A notice of the dates and locations of these meetings will be posted in local newspapers. Once completed, the updated draft plan will also be available for public review and comment.

For more information on the Ferry County Multi - Hazard Mitigation Plan update, or if you would like to attend the meeting, contact Amy Rooker, Ferry County Emergency Management, at 509-775-3132.

**Figure 7.6. Ferry County View – September 11th, 2018.**

# Ferry County

## Multi—Hazard Mitigation Plan

# Public Meeting!

**September 24th — 2:00 pm**

**Ferry County Commissioners' Office**
**290 E Tessie Blvd**

**September 28th — 6:30 pm**

**Barstow Training Center**
**25266 Hwy 395 N**

This meeting will address the Hazard Mitigation Plan being updated for Ferry County. The Plan's revision is required every 5 years and is being funded through a grant from FEMA. These meetings are open to the public and will include a slideshow presentation from Northwest Management, Inc. and the planning team on the identified hazards and potential improvement and risk reduction projects in Ferry County. Public input is being sought in order to better frame the region's efforts for hazard mitigation projects, wildland fire protection, resource enhancements, and emergency preparedness.

Learn about the assessments for floods, landslides, severe weather, wildland fire, and earthquakes in Ferry County. Discuss **YOUR** priorities for how local communities can best reduce the impacts of these events.

**This topic is on the agenda of the Ferry County Commissioners.**

For more information on the Ferry County Hazard Mitigation Plan, please contact Ferry County Emergency Management at (509)-775-3132.

**Figure 7.7 Ferry County View April 17th, 2019**

## Hazard mitigation plan available for public review

The Ferry County Multi-Hazard Mitigation Plan update has been completed in draft form and is available to the public for review and comment at the location listed below. The public review phase of the planning process will be open from April 24th, 2019 through May 23rd, 2019.

### Ferry County website: www.ferry-county.com

The purpose of the Ferry County Natural Hazard Mitigation Plan (NHMP) is to reduce the impact of hazards such as floods, landslides, severe weather, wildfire, and drought, on Ferry County residents, landowners, businesses, communities, local governments, and state and federal agencies while maintaining appropriate emergency response capabilities and sustainable natural resource management policies. The NHMP identifies high risk areas as well as structures and infrastructure that may have an increased potential for loss due to a hazard event. The document also recommends specific projects that may help prevent disasters from occurring altogether or, at the least, lessen their impact on residents and property. The NHMP is being developed by a committee of city and county elected officials and departments, local and state emergency response representatives, land managers, highway district representatives, and others.

The Ferry County NHMP includes risk analysis at the community level with predictive models for where disasters are likely to occur. This plan will continue to enable Ferry County and its communities to be eligible for grant dollars to implement the projects and mitigation actions identified by the committee. Although not regulatory, the NHMP will provide valuable information as we plan for the future.

Comments on the NHMP must be submitted to the attention of Steven Bonner, Ferry County Emergency Management Director, at emdirector@co.ferry.wa.us or mailed to 290 E Tessie Avenue, Republic, WA 99166 by close of business on May 23rd, 2019. For more information on the Ferry County NHMP update process, contact Ferry County Emergency Management at 509-775-5225 ext. 1112.

# Potential Funding Sources

The following is a list of funding sources that may be available for certain types of mitigation and/or prevention projects recommended in the mitigation strategies. This is not an inclusive list nor is every program on this list available every year. These types of programs typically change in format, requirements, and funding available on an annual basis.

Program: **Rural Fire Assistance**

Source: Bureau of Land Management

Description: BLM provides funds to rural fire departments for wildfire fighting; also provides wildland fire equipment, training and/or prevention materials.

More info: Contact BLM RFA Coordinator

Program: **Communities at Risk**

Source: Bureau of Land Management

Description: Assistance to communities for hazardous fuels reduction projects in the wildland urban interface; includes funding for assessments and mitigation planning.

More info:

Program: **State Fire Assistance**

Source: US Forest Service

Description: USFS grants to state foresters through state and private grants, under authority of Cooperative Forestry Assistance Act. Grant objectives are to maintain and improve protection efficiency and effectiveness on non-federal lands, training, equipment, preparedness, prevention and education.

More info: www.fireplan.gov and www.fs.fed.us

Program: **State Fire Assistance Hazard Mitigation Program**

Source: National Fire Plan

Description: These special state Fire Assistance funds are targeted at hazard fuels treatment in the wildland-urban interface. Recipients include state forestry organizations, local fire services, county emergency planning Teams and private landowners.

More info: www.fireplan.gov and www.fs.fed.us

Program: **Volunteer Fire Assistance**

Source: US Forest Service

Description: Provides funding and technical assistance to local and volunteer fire departments for organizing, training and equipment to enable them to effectively meet their structure and wildland protection responsibilities. US Forest Service grants provided to state foresters through state and private grants under the authority of Coop Forestry Assistance Act.

More info: www.fs.fed.us/fire/partners/vfa

Program: **Forest Land Enhancement Program**

Source: US Forest Service

Description: The 2002 Farm Bill repealed the Forestry Incentives Program (authorized in 1978) and Stewardship Incentive Program (1990) cost share programs and replaced it with a new Forest Land Enhancement Program (FLEP). FLEP purposes include 1) Enhance the productivity of timber, fish and

wildlife habitat, soil and water quality, wetland, recreational resources, and aesthetic values of forest land through landowner cost share assistance, and 2) Establish a coordinated, cooperative federal, state and local sustainable forestry program to establish, manage, maintain, enhance and restore forests on non-industrial private forest land.

More info: www.usda.gov/farmbill

Program: **Federal Excess Property**

Source: US Forest Service

Description: Provides assistance to state, county and local governments by providing excess federal property (equipment, supplies, tools) for wildland and rural community fire response.

More info: Contact Washington Department of Natural Resources

Program: **Economic Action Program**

Source: US Forest Service

Description: A USFS, state and private program with involvement from local Forest Service offices to help identify projects. Addresses long-term economic and social health of rural areas; assists the development of enterprises through diversified uses of forest products, marketing assistance, and utilization of hazardous fuel byproducts.

More info:

Program: **Forest Stewardship Program**

Source: US Forest Service

Description: Funding helps enable preparation of management plans on state, private and tribal lands to ensure effective and efficient hazardous fuel treatment.

More info: Washington Department of Natural Resources

Program: **Community Planning**

Source: US Forest Service

Description: USFS provides funds to recipients with involvement of local Forest Service offices for the development of community strategic action and fire risk management plans to increase community resiliency and capacity.

More info:

Program: **Firefighters Assistance**

Source: Federal Emergency Management Agency and US Fire Administration Program

Description: Financial assistance to help improve fire-fighting operations, services and provide equipment.

More info: www.fema.gov

Program: **Pre-Disaster Mitigation Program**

Source: Federal Emergency Management Agency

Description: Emergency management assistance to local governments to develop hazard mitigation plans.

More info: Washington Military Department Emergency Management Division

Program: **Community Facilities Loans and Grants**

Source: Rural Housing Service (RHS) U. S. Dept. of Agriculture

Description: Provides grants (and loans) to cities, counties, states and other public entities to improve community facilities for essential services to rural residents. Projects can include fire and rescue services; funds have been provided to purchase fire-fighting equipment for rural areas. No match is required.

More info: http://www.rurdev.usda.gov or local county Rural Development office.

Program: **Sale of Federal Surplus Personal Property**

Source: General Services Administration

Description: This program sells property no longer needed by the federal government. The program provides individuals, businesses and organizations the opportunity to enter competitive bids for purchase of a wide variety of personal property and equipment. Normally, there is no use restrictions on the property purchased.

More info: www.gsa.gov

Program: **Reimbursement for Firefighting on Federal Property**

Source: U. S. Fire Administration, Federal Emergency Management Agency

Description: Program provides reimbursement to fire service organizations that have engaged in firefighting operations on federal land. Payments can be for direct expenses and direct losses.

More info: www.fema.gov

Program: **Fire Management Assistance Grant Program**

Source: Readiness, Response and Recovery Directorate, FEMA

Description: Program provides grants to states, tribal governments and local governments for the mitigation, management and control of any fire burning on publicly (nonfederal) or privately owned forest or grassland that threatens such destruction as would constitute a major disaster. The grants are made in the form of cost sharing with the federal share being 75 percent of total eligible costs. Grant approvals are made within 1 to 72 hours from time of request.

More info: www.fema.gov

Program: **Hazard Mitigation Grant Program**

Source: Federal Insurance and Mitigation Administration, FEMA

Description: Provides states and local governments with financial assistance to implement measures to reduce or eliminate damage and losses from natural hazards. Funded projects have included vegetation management projects. It is each State's responsibility to identify and select hazard mitigation projects.

More info: www.fema.gov

Program: **Boise State University Wildland Fire Academy**.

Source: Partnership between BSU and SWIFT (Southwest Idaho Fire Training, a group including the BLM, Forest Service, and the Idaho Department of Lands).

Description: Provides a full range of fire training classes during one week in June at the Selland College of Technology on the BSU campus. Tuition is required. Open to federal, state, local fire fighters, contractors, and the public. Housing is available on campus. (Separate from, but in conjunction with, this academy, BSU recently began offering an associate degree program in fire science.)

More info: BLM training officer at 208-384-3403 or BSU's Selland College at 208-426-1974.

# List of Acronyms

| | |
|---|---|
| **DOH** | Washington Department of Health |
| **EMD** | Washington Military Department Emergency Management Division |
| **FAA** | Federal Aviation Administration |
| **USDA** | United States Department of Agriculture |
| **NRCS** | Natural Resources Conservation Service |
| **NWS** | National Weather Service |
| **NOAA** | National Oceanic and Atmospheric Administration |
| **FEMA** | Federal Emergency Management Agency |
| **DOT** | Washington Department of Transportation |
| **ARES** | Amateur Radio Emergency Services |
| **WSP** | Washington State Police |
| **WSU** | Washington State University |
| **DOE** | Washington Department of Ecology |
| **DNR** | Washington Department of Natural Resources |
| **BLM** | Bureau of Land Management |
| **NPS** | National Park Service |
| **USFS** | United States Forest Service |
| **ROS** | Rate of Spread |
| **WUI** | Wildland Urban Interface |
| **WFI** | Wildland Fire Intensity |
| **HFR** | Historic Fire Regime |
| **VCC** | Vegetation Condition Class |
| **NMI** | Northwest Management, Incorporated |
| **MHMP** | Multi-Hazard Mitigation Plan |
| **NETCHD** | North East Tri-County Health District |

This plan was developed by Northwest Management, Inc. under contract with Ferry County Emergency Management.

**Copies of this Plan can be obtained by contacting:**

Ferry County Board of County Commissioners
290 E. Tessie Ave
Republic, WA 99166
Phone: 509-775-5225 ext. 2508

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