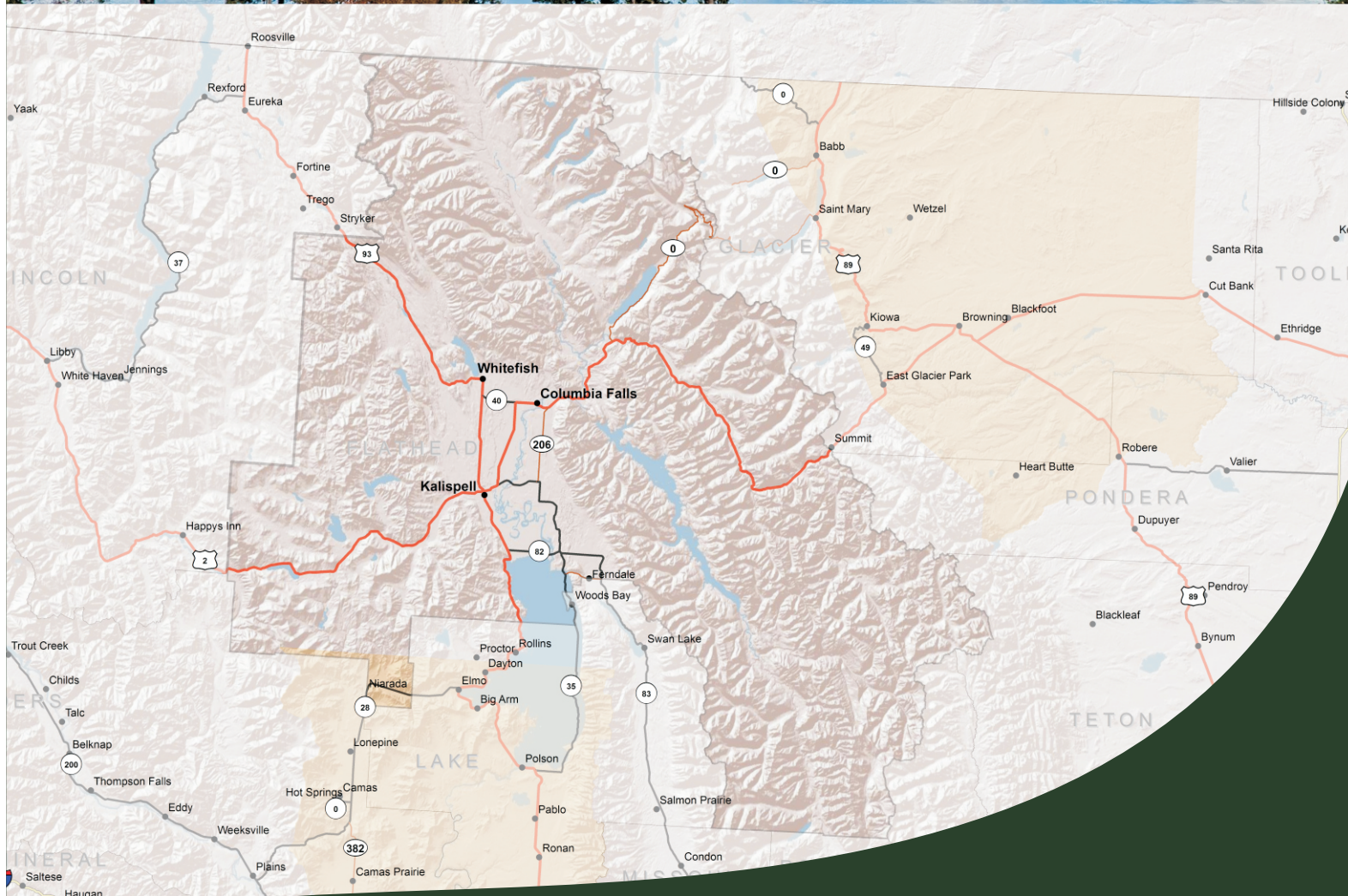


# Pre-Disaster Mitigation Plan 2014 Update

*Flathead County, Montana*



*And the Incorporated Communities of Columbia Falls, Kalispell, and Whitefish*



**TETRA TECH**

September 2014

**PRE-DISASTER MITIGATION PLAN**

**FOR**

**FLATHEAD COUNTY MONTANA**

**AND**

**THE INCORPORATED COMMUNITIES OF  
COLUMBIA FALLS, KALISPELL, AND WHITEFISH**

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**September 2014**



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Appendix B	Planning Documentation
	<ul style="list-style-type: none"> <li>• Planning Team &amp; Project Stakeholders</li> <li>• Meeting Announcements</li> <li>• Meeting Sign-In Sheets</li> <li>• Meeting Summaries/Presentations</li> <li>• Planning Team Conference Call Notes</li> </ul>

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## Appendix C      Risk Assessment Documentation

- CPRI Summary Table
- Critical Facilities
- Vulnerability Assessment Documentation

## Appendix D      Mitigation Documentation

- Example Mitigation Projects
- Mitigation Action Plan

## Appendix E      Relevant Plans

- Flathead County Community Wildfire Protection Plan, 2012



**LIST OF ACRONYMS**

AADT	Average Annual Daily Traffic
BNSF	Burlington Northern-Santa Fe (Railroad)
BLM	Bureau of Land Management
CDBG	Community Development Block Grant
CDP	Census Designated Place
CEIC	Census and Economic Information Center
CPRI	Calculated Priority Risk Index
CRP	Conservation Reserve Program
CRS	Community Rating System
DEM	Digital Elevation Model
DES	Disaster and Emergency Services
DEQ	Department of Environmental Quality
DFIRM	Digital Flood Insurance Rate Map
DMA	Department of Military Affairs
DMA	Disaster Mitigation Act
DNRC	MT Department of Natural Resources and Conservation
DOI	U.S. Department of Interior
DPHHS	Montana Department of Health and Human Services
EAP	Emergency Action Plan
EMS	Emergency Medical Service
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
FEPC	Flathead Economic Policy Center
FEI	Fire Effects Index
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FRI	Fire Risk Index
FTI	Fire Threat Index
FWS	U.S. Fish and Wildlife Service

**LIST OF ACRONYMS (continued)**

GIS	Geographic Information Systems
HMGP	Hazard Mitigation Grants Program
IBC	International Building Code
IRC	International Residential Code
LEPC	Local Emergency Planning Committee
MDOR	Montana Department of Revenue
MDT	Montana Department of Transportation
NCDC	National Climatic Data Center
NFIP	National Flood Insurance Program
NID	National Inventory of Dams
NOAA	National Oceanic and Atmospheric Administration
NRC	National Response Center
NRIS	Natural Resource Information System
NWS	National Weather Service
OES	Office of Emergency Services
PDM	Pre-Disaster Mitigation
PDMC	Pre-Disaster Mitigation Competitive (grants program)
RFA	Rural Fire Assistance
SERC	State Emergency Response Commission
SFHA	Special Flood Hazard Area
SHELDUS	Spatial Hazard Events and Losses Database for the United States
SHMO	State Hazard Mitigation Officer
TRI	Toxic Release Inventory
USACE	United States Army Corps of Engineers
USDA	United State Department of Agriculture
USFS	United States Forest Service
WUI	Wildland Urban Interface



## **1.0 INTRODUCTION**

The effects from several natural and man-made hazards may directly impact the safety and well-being of residents of Flathead County. Historically, Flathead County residents have dealt with floods, wildfire, harsh winter storms with extreme cold and blizzards, severe summer storms with damaging thunderstorms, and hazardous material incidents. While most hazards cannot be eliminated, the effects from them can be mitigated.

Flathead County completed and adopted a Pre-Disaster Mitigation (PDM) Plan in 2009 to help guide and focus hazard mitigation activities. The County, working together with Tetra Tech Inc., has prepared this update to their PDM Plan update to satisfy the requirement that PDM Plans be updated every five years. The updated Flathead County PDM Plan profiles significant hazards to the community and identifies mitigation projects that can reduce those impacts. The purpose of the updated PDM Plan is to promote sound public policy designed to protect residents, critical facilities, infrastructure, private property, and the environment from natural and man-made hazards. The updated Flathead County PDM Plan includes resources and information to assist residents, organizations, local government, and others interested in participating in planning for natural and man-made hazards. This 2014 updated PDM Plan supersedes the 2009 PDM Plan.

### **1.1 AUTHORITY**

The Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390) provides an opportunity for States and local governments to take a new and revitalized approach to mitigation planning. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Act) by repealing the previous Mitigation Planning section (409) and replacing it with a new Mitigation Planning section (322). This new section emphasizes the need for State and local entities to closely coordinate mitigation planning and implementation efforts. To implement the DMA 2000 planning requirements, the Federal Emergency Management Agency (FEMA) published an Interim Final Rule in the Federal Register on February 26, 2002. This rule (44 CFR Part 201) established the mitigation planning requirements for States and local communities.

The Flathead County PDM Plan update has been developed pursuant to the requirements in the Interim Final Rule for hazard mitigation planning and the guidance in the State and Local Plan Interim Criteria under DMA 2000. The Plan also meets guidance developed by FEMA in June of 2008 for Multi-Jurisdictional Mitigation Planning.

The Flathead County Board of County Commissioners has adopted this PDM Plan. Also adopting the Plan are the incorporated communities of Kalispell, Whitefish, and Columbia Falls. These governing bodies have the authority to promote sound public policy regarding natural and man-made hazards in their jurisdictions. Copies of the signed resolutions are included as **Appendix A** to this plan. The PDM

Plan was adopted at the regularly scheduled County Commission and City Council meetings, which were open to the public and advertised through the typical process the jurisdictions use for publicizing meetings.

Flathead County will be responsible for submitting the adopted PDM Plan to FEMA for review. Upon acceptance by FEMA, Flathead County and the incorporated communities of Kalispell, Whitefish, and Columbia Falls will remain eligible for mitigation project grants and post-disaster hazard mitigation grant projects.

## **1.2 ACKNOWLEDGEMENTS**

Many groups and individuals have contributed to development of the Flathead County PDM Plan. The Flathead County Office of Emergency Services (OES) provided support for all aspects of plan development including providing digital locations and insurance values for the critical facilities and infrastructure used in the PDM analysis. The PDM Planning Team met on a regular basis to guide the project, identify the hazards most threatening to the County, develop and prioritize mitigation projects, review draft deliverables and attend the public meetings. The local communities participated in the planning process by attending public meetings and contributed to plan development by reviewing and commenting on the draft plan.

## **1.3 SCOPE AND PLAN ORGANIZATION**

The process followed to prepare the Flathead County PDM Plan update included the following:

- Review and prioritize disaster events that are most probable and destructive,
- Update and identify new critical facilities,
- Review and update areas within the community that are most vulnerable,
- Update and identify new goals for reducing the effects of a disaster event,
- Review and identify new projects to be implemented for each goal,
- Review and identify new procedures for monitoring progress and updating the PDM Plan,
- Review the draft PDM Plan, and
- Adopt the updated PDM Plan.

The PDM Plan is organized into sections that describe the planning process (Section 2), community profile (Section 3), risk assessment (Section 4), mitigation strategies (Section 5), a capability assessment (Section 6), and plan maintenance (Section 7). Appendices containing supporting information are included at the end of the plan.

## 2.0 PLANNING PROCESS

The updated Flathead County PDM Plan is the result of a collaborative effort between Flathead County, the incorporated communities of Kalispell, Whitefish, and Columbia Falls, utilities, local agencies, non-profit organizations, businesses, and regional, state and federal agencies. The planning effort was facilitated by the contractor, Tetra Tech. Public participation played a key role in development of goals and mitigation projects, as outlined below. For the purposes of this planning effort, the public is defined as residents of Flathead County, local departments, state and federal agencies that support activities in the County, neighboring communities and local partners.

### 2.1 PDM PLANNING TEAM

The Flathead County Emergency Manager requested a committee of local government leaders and interested members of the public to assist with development of the PDM Plan. These individuals are listed in **Appendix B**. Participants involved with the PDM Planning Team are presented in **Table 2.1-1**.

TABLE 2.1-1 AGENCIES REPRESENTED ON THE PDM PLANNING TEAM	
Organization	Type of Organization/Position
Flathead County	Planning & Zoning, Floodplain Administrator
Flathead County	Office of Emergency Services
Flathead County	City-County Health Department
Flathead County	Road & Bridge Department
City of Columbia Falls	Public Works Department
City of Kalispell	Fire Department, Haz-Mat Team
City of Whitefish	Fire Department
Community of Bigfork	Fire Department
Floodco	Flathead County Business
Glacier International Airport	Fire Department
North Valley Hospital	Whitefish Medical

Responsibilities of the Planning Team included attending conference calls to discuss plan development, providing data for analysis in the risk assessment, attending public meetings, providing input and feedback on mitigation strategies, review of the draft plan document, and supporting the plan throughout the adoption process. The PDM Planning Team will assist the Flathead County Emergency Manager in updating the plan in the future.

Conference calls were held with the Planning Team while the plan was being drafted. In advance of each meeting, an agenda and/or materials to be discussed (i.e. example mitigation strategies, examples of projects eligible for FEMA funding, etc.) were sent to meeting participants. Conference call minutes are presented in **Appendix B**.

During the initial conference calls and first public meeting, the Planning Team reviewed and analyzed each section of the 2009 PDM plan, as described in **Table 2.1-2**.

TABLE 2.1-2 REVIEW AND ANALYSIS OF 2009 PDM PLAN	
2009 PDM Sections	How Reviewed and Analyzed
Section 1 - Introduction	Reviewed existing section through discussion at public meeting. No analysis needed.
Section 2 - Planning Process	Reviewed and analyzed existing section through discussion at public meeting. Planning process expanded by utilizing project website and scoring hazards using Calculated Priority Risk Index.
Section 3 – Hazard Evaluation and Assessment	Reviewed and analyzed existing section through discussion during public meeting and Planning Team conference calls. Reviewed and updated hazards, critical facilities and vulnerable populations. Updated section with recent hazard data.
Section 4 - Mitigation Strategy	Reviewed by Planning Team during conference calls, public meeting and subsequent mitigation workshop. New projects developed, existing projects re-worded and/or deleted, completed projects documented.
Section 5 - Plan Maintenance Procedures	Reviewed and analyzed existing section through discussion during Planning Team conference calls. Determined that plan maintenance procedures outlined in previous plan had not been implemented.

## 2.2 PROJECT STAKEHOLDERS

The planning process was initiated by preparing a stakeholders list of individuals whose input was needed to help prepare the PDM Plan. Planning partners on the stakeholders list received a variety of information during the project including meeting notices, documents for review, and the draft mitigation strategy. **Appendix B** presents the stakeholders list for this project.

On the County level, project stakeholders included the County Commissioners, the Emergency Manager, Floodplain Coordinator, Planning and Zoning Department, GIS Program Manager, Public Administrator, Fire Service Area Manager, Search & Rescue, Health Department, Airport Authority, 911 Dispatch, Road & Bridge Department, Sheriff, Clerk & Recorder, Fire Warden, and Superintendent of School. These entities participated in the planning process by either providing data, attending public meetings, and/or reviewing the draft PDM Plan.

Stakeholders from the communities of Kalispell, Whitefish, and Columbia Falls included: the Mayors, City Managers, City Council members, Planning Office, Building Department, Floodplain Coordinator, Public Works Department, Fire Chiefs and the Haz-Mat Team Leader, Chiefs of Police, and Community Development Administration. These entities participated in the planning process by either providing data, attending public meetings, and/or reviewing the draft PDM Plan.

Stakeholders from the unincorporated communities included the rural fire districts. They participated by either attending the public meetings or reviewing the draft plan.



Stakeholders from federal agencies included representatives from: the National Weather Service (NWS), Glacier National Park, the Bureau of Reclamation, Corps of Engineers, Border Patrol, U.S. Forest Service, and Fish and Wildlife Service. These agencies were provided information on plan development, attended public meetings, and/or reviewed the draft PDM Plan.

Stakeholders from state agencies included representatives from: the Montana Department of Natural Resources and Conservation (DNRC), Highway Patrol, Department of Environmental Quality, Department of Transportation, the District Representative from the Montana Disaster and Emergency Services (DES), State Hazard Mitigation Officer, and Hazard Mitigation Grant Program Officer. These entities participated in the planning process by providing data for the plan, attending the public meetings and/or reviewing the draft PDM Plan.

Non-governmental stakeholders including non-profits and other businesses in the community consisted of: NorthWestern Energy, Flathead Electric Cooperative, Kalispell Regional Healthcare, North Valley Hospital, the American Red Cross, Salvation Army, United Way, Burlington Northern-Santa Fe Railroad, Plum Creek, and Flathead Valley Community College. Some of these entities provided information for plan development, attended the public meetings and/or, reviewed the draft PDM Plan update.

Planning partners from adjoining jurisdictions included: the Lincoln, Lake, Sanders, Missoula, Powell, Glacier, Lewis and Clark, Teton, and Pondera County DES Coordinators as well as from the Confederated Salish and Kootenai Tribes. These entities did not offer input on the Flathead County PDM Plan update.

## **2.3 REVIEW OF EXISTING PLANS AND STUDIES**

At the initiation of the PDM updating project, planning documents and studies completed for the project area were provided to the contractor to review in order to determine how mitigation could be integrated into this planning process and future local planning mechanisms and programs. Contributing plans/ordinances provided to the contractor included:

### **DAMS**

- Emergency Action Plan, Bigfork Dam
- Emergency Action Plan, Cedar Creek Dam
- Emergency Action Plan, Hubbart Dam
- Emergency Action Plan, Hungry Horse Dam
- Emergency Action Plan, Jessup Mill Pond Dam
- Emergency Action Plan, Smith Lake Dam

### **EMERGENCY OPERATIONS**

- Flathead County Emergency Operations Plan

### **FLOOD STUDIES**

- Flood Insurance Study - Flathead County and Incorporated Areas, 2013

**GROWTH POLICIES, ORDINANCES, REGULATIONS**

- Flathead County Floodplain and Floodway Management Regulations, 2013
- Flathead County Growth Policy, 2012
- Flathead County Subdivision Regulations, 2005
- Flathead County Zoning Regulations, 2012
- Canyon Area Land Use Regulations, 1994
- Evergreen Enterprise Zoning Overlay, 2014
- Flathead County Lake and Lakeshore Regulations, 2002
- City of Columbia Falls Growth Policy, 2013
- City of Columbia Falls Subdivision Regulations, 2012
- City of Columbia Falls Zoning Regulations, 2012
- City of Kalispell Growth Policy, 2003
- City of Kalispell Subdivision Regulations, 2011
- City of Kalispell Zoning Regulations, 2007
- City of Kalispell Core Area Plan, 2012
- City of Kalispell Floodplain Ordinance, 2010
- City of Whitefish Growth Policy, 2007
- City of Whitefish Subdivision Regulations
- City of Whitefish Zoning Regulations
- City of Whitefish Floodplain Regulations
- City of Whitefish Lakeshore Protection Regulations
- Ashley Lake Neighborhood Plan, 2011
- Bigfork Neighborhood Plan, 2009
- Helena Flats Neighborhood Plan, 2008
- Labrant-Lindsey Neighborhood Plan, 1998
- Lakeside Neighborhood Plan, 2010
- Little Bitterroot Neighborhood Plan, 1996
- North Fork Neighborhood Plan, 2008
- Riverdale Neighborhood Plan, 2008
- Rogers Lake Plan, 2008
- The Canyon Plan, 1994
- Two Rivers Plan, 2012
- West Valley Neighborhood Plan, 1997
- 93 West Corridor Draft Land Use Map, 2013

**HAZARD MITIGATION**

- Flathead County Pre-Disaster Mitigation Plan, 2009
- Flathead County Community Wildfire Protection Plan, 2011

The data obtained from the plan and regulation review was incorporated into various sections of the PDM Plan. *Section 4.0* contains reference to the plans and ordinances affecting management of the hazard. *Section 7.3* includes a discussion on how mitigation can be implemented through existing programs.

## **2.4 PROJECT WEBSITE**

A website was set up at the start of the project to provide information to project stakeholders and the citizens of Flathead County. The project website can be viewed at: [www.flathead-pdm.com](http://www.flathead-pdm.com). The website remained active during the course of the project through adoption of the plan and was linked to the Flathead County OES website.

The website contained a Home page and pages for: Contacts, Planning Team, Meetings, Draft PDM Plan, Forms, and References. The Home page contained a letter inviting participation in development of the plan. The Contacts page contained information on Tetra Tech and County personnel involved in management of the project. The Planning Team page contained maps for the Planning Team and other materials for review prior to the conference calls. The Meetings page contained the conference call and public meeting schedule, notes, and PowerPoint presentations from the meetings. The Draft PDM Plan page contained sections from the draft plan for stakeholder review. The References page contained the 2009 Flathead County PDM Plan, FEMA guidance on preparing multi-jurisdictional hazard mitigation plans, the FEMA Region 8 Plan Review Guidance, and links to the State of Montana PDM Plan and FEMA websites.

## **2.5 PROJECT MEETINGS**

Two public meetings were conducted during development of the PDM Plan. At the first public meeting, the 2009 plan was reviewed and hazards identified for the 2014 update. After the meeting, a workshop was held to review the 2009 mitigation strategy and identify progress made on the various projects. New mitigation projects for the 2014 plan were identified and projects no longer deemed important were deleted from the strategy. At the second public meeting, the results of the risk assessment were reviewed. Sign-in sheets, presentation materials and meeting notes are contained in **Appendix B** and posted on the project website.

The first public meeting was held on April 15, 2014 at the Flathead County Emergency Operations Center (EOC) in Kalispell. The meeting was advertised in the April 11<sup>th</sup> and 14<sup>th</sup> edition of the Daily Inter Lake newspaper. A meeting notice was sent via e-mail to all project stakeholders and the meeting was posted on the project website. Tetra Tech made a presentation at the meeting which reviewed each section of the 2009 mitigation plan, outlined the background and rationale for updating the PDM Plan, the process and methodology for the plan update, and the project schedule. The meeting presentation was placed on the project website for stakeholders who could not attend the meeting (**Appendix B**). Approximately 15 individuals participated in the meeting including representatives from the Flathead County OES and Fire Service Area, Cities of Kalispell and Columbia Falls Public Works, the City-County Health Department, Glacier Park International Airport, Montana Department of Environmental Quality, U.S. Forest Service and Border Patrol, private businesses North Valley Hospital and Floodco, and a member of the public.

A second public meeting to review the draft PDM Plan was held on May 28, 2014 at the County EOC in Kalispell. The PDM meeting was held in conjunction with a quarterly meeting of the Flathead County Local Emergency Planning Committee (LEPC). A notice of the meeting was sent via email to the project stakeholders, advertised in the May 23<sup>rd</sup> and 26<sup>th</sup>, 2014 edition of the Daily Inter Lake newspaper, posted on the Flathead County OES Facebook page and listed on the project website. Tetra Tech presented draft results of the risk assessment at the meeting as well as the updated mitigation strategy. Twenty-four (24) individuals attended the public meeting including Flathead County OES, Emergency Medical Services, 911 Dispatch, Search and Rescue Coordinator and Finance Director; the City-County Health Department; the Kalispell, Whitefish, Columbia Falls, Big Mountain, Coram-West Glacier, Glacier Park International Airport Fire Departments; the Columbia Falls Public Works Department; the Fire Mitigation Officer from the Flathead National Forest; hospitals Kalispell Regional Health Center and North Valley Hospital; the Flathead Economic Policy Center, the District Representative of Montana Disaster and Emergency Services; businesses Floodco and Xanterra (Glacier National Park concessions); and, a member of the public. Public meeting attendees networked before and after the meeting, listened to the presentation, and asked questions. Sign-in sheets from these meetings are presented in **Appendix B**.

## **2.5 PLAN REVIEW**

The planning process for the PDM Plan began on January 27, 2014 and lasted approximately six months. The public was provided at least two opportunities for comment prior to adoption of the plan. The first opportunity was during the drafting process. An notice was placed on the Flathead County OES Facebook page notifying the public of the availability of the draft PDM Plan and that review copies were available in hard copy, electronically on compact disk (CD) upon request, or accessible via the project website. A hard copy of the PDM Plan was available for review at the Flathead County OES office. An e-mail announcement was sent to the project stakeholders list announcing the availability of the draft PDM Plan for review with instructions on how to comment.

The draft document was produced with line numbers to aid in the review process. Reviewers were asked to submit their comments on the draft plan to the Flathead County OES office after a 30-day review period. The draft PDM Plan was submitted to the State Hazard Mitigation Officer and FEMA for compliance with the Region 8 Plan Review Guidance concurrently with the public review due to the accelerated project schedule.

Flathead County OES reviewed the comments and in consultation with the Planning Team submitted a consolidated list of comments to the contractor. Comments were incorporated into a final draft document. Comments received from Montana DES and the FEMA were also addressed and the final draft plan document.

At this point a second opportunity was provided to the public to comment on the PDM Plan. The final plan was posted on the project website and stakeholders were notified of its availability via an e-mail message. Final comments were addressed in a second plan revision and the final plan was provided to the Flathead County Commissioners and the incorporated communities of Columbia Falls, Kalispell, and Whitefish for adoption. After adoption, final copies of the plan were submitted to the Montana DES and FEMA.

Future comments on the PDM Plan should be addressed to:

Flathead County Office of Emergency Services  
625 Timberwolf Parkway  
Kalispell, Montana 59901  
(406) 758-5504

### 3.0 COMMUNITY PROFILE

This section of the PDM Plan presents an overview of Flathead County and the incorporated communities of Kalispell, Whitefish and Columbia Falls. It provides baseline information on the characteristics of the county, the communities, economy and land use patterns, and presents the backdrop for this mitigation planning process.

#### 3.1 PHYSICAL SETTING

Flathead County is the third largest county in Montana encompassing approximately 5,098 square miles in northwest Montana. It is bounded by Glacier, Pondera and Teton Counties on the east, Lincoln County on the west, Sanders, Lake, Missoula and Lewis and Clark Counties on the south, and the Canadian Province of British Columbia to the north. Kalispell is the county seat and the county has two other incorporated cities: Columbia Falls and Whitefish. The three cities, along with the County, comprise the jurisdictions for this Plan. **Figure 1** presents a location map of the Flathead County Plan area.

The Flathead County Growth Policy (2012) provides the following description of Flathead County. Flathead County has an abundance of natural resources, with over 40 lakes and 3 major rivers surrounded by or adjacent to public lands. Flathead Lake extends from Flathead County into Lake County, encompassing nearly 200 square miles of surface area and 185 miles of shoreline. Flathead Lake is the largest natural freshwater lake between the Mississippi River and the Pacific Ocean. The surrounding mountains are primarily forest lands managed by the federal and state government. Glacier National Park was established in 1910 and has become Flathead County's most popular tourist destination. The park is split between Flathead and Glacier County and encompasses approximately 1,008,306 acres which include over 200 lakes and streams and over 700 miles of hiking trails.

The Flathead Basin watershed encompasses approximately 8,587 square miles - or six million acres of land that drains water into Flathead Lake and the Flathead River. Running north to south the basin stretches 175 miles, and is 88 miles at its widest point. Water flows from headwaters in Glacier National Park, the Bob Marshall Wilderness and Canada into Flathead Lake. The Flathead Basin encompasses the Swan, Stillwater and the Whitefish Rivers, as well as the North, Middle and South Forks of the Flathead River. The North, Middle and South Forks of the Flathead River drain the eastern portion of the Flathead Basin and merge at Columbia Falls to become the Upper Flathead River; combined, these forks of the Flathead contribute approximately 80 percent of the water entering Flathead Lake. The Whitefish River and Stillwater River drain the northwest part of the Flathead Basin and join the Upper Flathead River below Kalispell. The Upper Flathead River and Swan River are the two main tributaries that empty into the northeast corner of Flathead Lake. Water flow into and through the lake is controlled in part by the Hungry Horse Dam on the South Fork of the Flathead River, and the Kerr Dam near the lake's outlet south of Polson. Hungry Horse Reservoir has a length of 34 miles and impounds nearly three and a half million acre feet of water.

The eastern portion of Flathead County geography is dominated by mountainous, forest-covered terrain of Glacier National Park and the Bob Marshall Wilderness cut by narrow river valleys. The Flathead Valley, in the central portion of the county, is a broad flat plain dominated by the river and by Flathead Lake. The elevation in Flathead County ranges from about 2,900 feet above sea level on the shore of Flathead Lake, to over 10,000 feet in Glacier National Park. The Little Bitterroot and Thompson Rivers are major streams in the western part of Flathead County.

Land in Flathead County is managed by federal, state, local and tribal governments, as well as private property owners. The federal government manages approximately 71.7 percent of the total land in Flathead County including portions of four National Forests (Flathead, Kootenai, Lolo, and Lewis and Clark) and two wilderness areas. The Flathead National Forest, including portions of the Great Bear and Bob Marshall Wilderness Areas, has approximately 1,875,545 acres within Flathead County that comprise nearly 57 percent of the total county acreage.

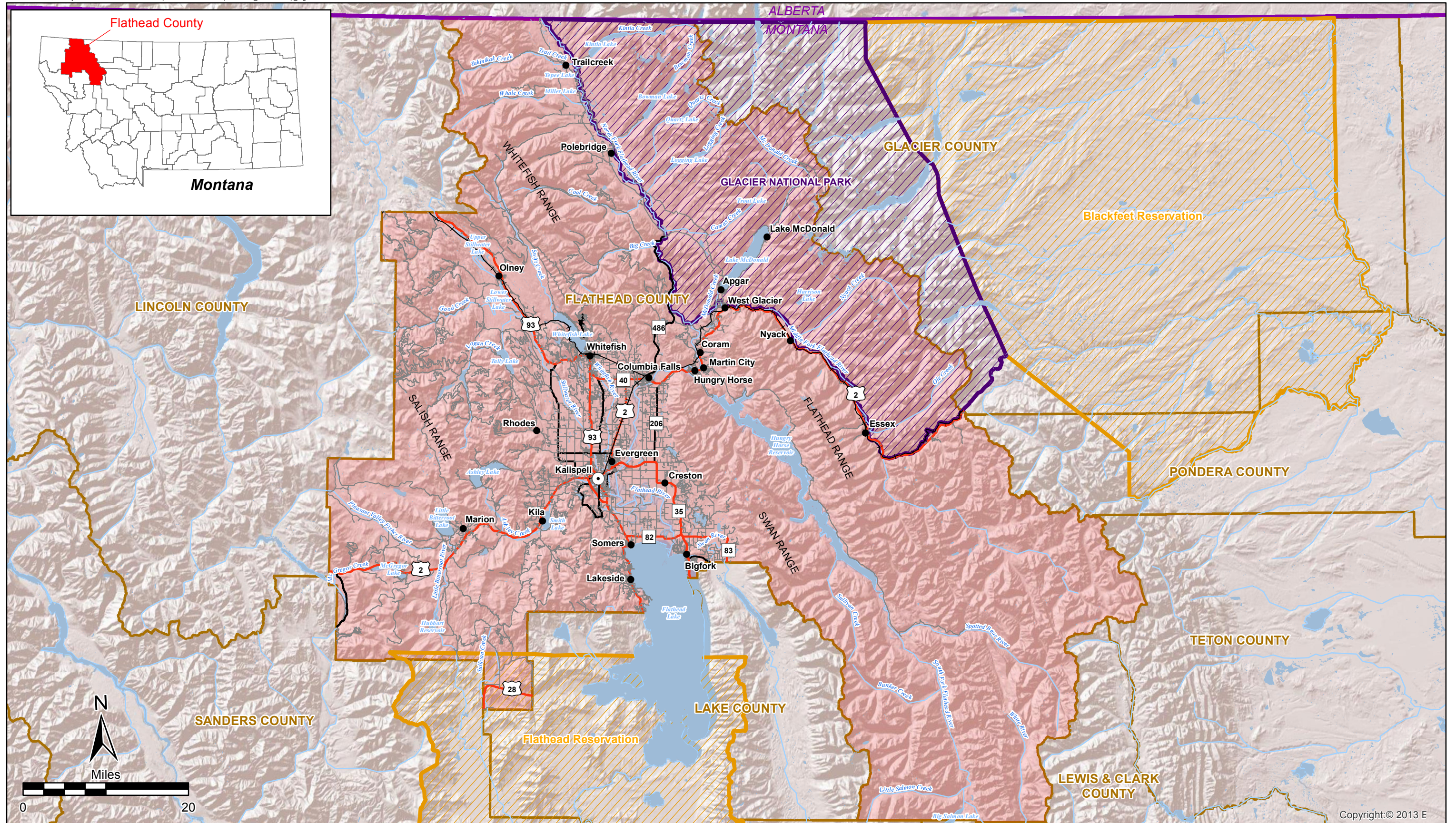
Approximately 635,156 acres of Glacier National Park is located in Flathead County, 19 percent of the total land mass. Other federally managed lands in Flathead County include the Lost Trail National Wildlife Refuge, Swan River National Wildlife Refuge, and the Flathead, Batavia, McGregor Meadows, Smith Lake and Blasdel Waterfowl Production Areas. Combined, Wildlife Refuges and Waterfowl Production Areas comprise an additional 14,642 acres of land in Flathead County.

The State of Montana manages a substantial acreage within Flathead County. Lands managed by the Department of Natural Resources and Conservation (DNRC) Trust Lands Management Division and Montana Fish, Wildlife and Parks account for approximately 130,953 acres of Flathead County.

The Flathead Indian Reservation comprises approximately 28,296 acres of Flathead County. Approximately 24,315 acres of this total are owned by the Confederated Salish and Kootenai Tribes. An estimated 3,024 acres of the Flathead Indian Reservation within Flathead County are non-tribal owned private fee lands.

Population density in Flathead County is 17.9 persons per square mile compared to the average 6.8 persons per square mile for the State of Montana. **Figure 2** presents landownership and population density in Flathead County.





- |               |                   |                  |                                 |
|---------------|-------------------|------------------|---------------------------------|
| ○ County Seat | — Primary Route   | — River/Stream   | ▨ Indian Reservation            |
| ● Place Names | — Secondary Route | — Lake/Reservoir | ▨ National Park                 |
| — Other Route |                   |                  | ▨ County                        |
| —+— Railroad  |                   |                  | ▨ United States - Canada Border |







### 3.2 CLIMATE

The original Flathead County PDM Plan (2009) provides the following discussion on climate. Flathead County is located within the region generally classified as a modified west coast marine and continental climate. Summers are generally hot and dry and winters are cold. Mean annual precipitation averages approximately 30 inches for the Flathead River basin, generally increases with increasing altitude, and varies from less than 16 inches/year in the valley bottoms, to as much as 100 or more inches along the Continental Divide in Glacier National Park.

Annual snowfall varies from about 50 inches in the lower valleys to 300 inches or more in the highest mountain areas. Most of the snow falls during the November-March period, but heavy snowstorms can occur as early as September or as late as May. Much of the annual runoff occurs in spring with the snowmelt.

Average high and low temperatures in Kalispell in January are 28.2 degrees F and 12.7 degrees F, respectively. The lowest temperature recorded at Kalispell was -38 degrees F. Often the coldest temperatures occur at sheltered valley locations when winds are light, but extreme wind chill situations occur almost every winter when windy conditions coincide with very low temperatures. Rapid warm-ups during the winter and early spring or rain on snow events can lead to significant snow melt and flooding of small streams and rivers and/or ice jam flood problems.

Average high temperature in July at Kalispell is 80.1 degrees F and the July mean low temperature is 47.1 degrees F. Both summer and winter temperatures vary considerably with elevation and local topography. Brief spells with temperatures above 100 degrees F can occur but are often short lived. The highest temperature recorded in Kalispell was 105 degrees F. Extended periods with temperatures above 90 degrees F occur every few years. Freezing temperatures can occur during any month of the year, but are rare in lower elevations from June through August.

Summer thunderstorm events with heavy precipitation of up to several inches can occur and may be accompanied by high winds, hail and local flooding. Winter storms with heavy snow can occur from October to April. These storms can produce up to several feet of snow and may be most damaging when temperatures are warmer, and the snow is heavier and more difficult to travel in and remove. Winter storms may be accompanied by high winds resulting in blizzard conditions.

For the purposes of this hazard assessment and mitigation plan, weather is of interest when it threatens property or life and thus becomes a hazard. The National Weather Service (NWS) provides short-term forecasts of hazardous weather to the public and also records weather and climatic data. Top weather events at the Glacier International Airport are reported in **Table 3-2.1** below to demonstrate representative weather for the County.

TABLE 3.2-1 TOP WEATHER EVENTS IN KALISPELL (GLACIER INTERNATIONAL AIRPORT), FLATHEAD COUNTY					
Hottest Days		Coldest Days		Wettest Days	
105	8/4/1961	-38	1/31/1950	2.71"	6/29/1982
104	7/19/1960	-38	1/30/1950	2.50"	3/30/1898
103	8/24/1969	-37	1/1/1979	2.18"	6/6/1995
103	8/5/1961	-36	2/1/1950	2.09"	7/22/1987
102	7/6/2007	-35	12/29/90	2.05"	9/1/1896
Wettest Years		Driest Years		Longest Dry Spells (days)	
25.23"	1996	10.39"	1929	52	Ending 11/19/1907
23.93"	1990	10.42"	1944	47	Ending 10/29/1952
23.40"	1993	10.50"	2000	46	Ending 9/13/1955
22.82"	1995	10.97"	1922	45	Ending 8/15/1926
22.36"	1964	11.22"	1967	40	Ending 8/16/1934

Source: National Weather Service, Missoula, MT, 2014

### 3.3 CRITICAL FACILITIES AND INFRASTRUCTURE

Critical facilities are of particular concern because they provide essential products and services that are necessary to preserve the welfare and quality of life and fulfill important public safety, emergency response, and/or disaster recovery functions. Critical facilities include: the 911 emergency call center, emergency operations centers, police and fire stations, public works facilities, sewer and water facilities, hospitals and shelters; and facilities that, if damaged, could cause serious secondary impacts (i.e., hazardous material facilities). Critical facilities also include those facilities that are vital to the continued delivery of community services or have large vulnerable populations. These facilities may include: buildings such as the jail, law enforcement center, public services buildings, senior centers, community corrections center, the courthouse, and juvenile services building and other public facilities such as hospitals, nursing homes and schools.

Critical facilities in Flathead County are identified in **Appendix C**. The size and replacement value were collected where readily available; however, time and resource constraints prohibited the collection of values for all structures. A GIS layer of the critical facilities was used in the hazard risk assessment. This GIS layer should be updated on a regular basis for use in future analysis. Further details on Flathead County's critical facilities and infrastructure are presented below.

#### **Water and Wastewater Services**

The City of Kalispell and Evergreen Water District are the primary providers of the water supply in the Kalispell area (Kalispell Growth Policy, 2003). Municipal water for the City of Whitefish is provided by two surface sources: Haskill Creek and Whitefish Lake, with the majority coming from Haskill Creek (Whitefish Growth Policy, 2007). The City of Columbia Falls relies exclusively on groundwater for their public water supply. The City maintains two deep wells that are capable of pumping 2.52 million gallons per day and maintain a 2 million gallon storage tank (Columbia Falls Growth Policy, 2013). Wastewater services in the incorporated cities are provided by municipal water treatment plants. However, there

are still properties within the incorporated communities that are served by individual wells and septic systems. There are several storm water systems in the city of Kalispell, but few in the unincorporated urban areas of the community. Most storm water is managed using on-site retention methods.

Thirty-two (32) water and/or sewer districts have been established to serve larger scale development or rural communities. Seven major water and sewer districts serve entire unincorporated communities, half of which provide both water and wastewater treatment services. These water and sewer districts in the communities of Bigfork, Coram, Evergreen, Hungry Horse, Lakeside, Martin City and Somers each serve between 500 and 8,000 residents and businesses. The Coram, Hungry Horse and Martin City Districts offer public water services only. No public sewer treatment is available. The Bigfork and Lakeside Districts operate their own sewer treatment facilities, while Somers contracts with Lakeside for sewer treatment, and Evergreen contracts with the City of Kalispell for sewer treatment services.

The remaining 25 county water and wastewater treatment systems serve large subdivision areas, not entire communities. Many smaller county water and sewer districts serve one or two large subdivisions and often provide only water services. These systems are often comprised of one or two wells providing drinking water, and several are serviced by a county or city sewer district. Individual wastewater treatment technologies (septic systems) are utilized in a majority of the county because rural development is not often located within a water and sewer district.

### ***Utilities***

County residents rely on many basic services such as utilities that help define their quality of life and maintain their health and wellbeing. The Flathead County Growth Policy (2012) provides the following description.

Flathead Electric Cooperative, Inc. is a locally owned and operated cooperative and is the only supplier of both commercial and residential power to Flathead County. Flathead Electric Coop is the second largest electric utility in Montana with nearly 48,000 members/customers. Over 3,800 miles of line serve the entire Flathead Valley and Libby, as well as several hundred members along the Montana-Wyoming border.

NorthWestern Energy is the only major supplier of natural gas to the Flathead Valley. The company distributes natural gas to approximately 181,300 customers in 105 Montana communities, while also servicing smaller distribution companies that provide service to approximately 31,000 additional customers. NorthWestern Energy transmits natural gas statewide through a distribution system consisting of roughly 4,900 miles of underground pipeline. Pricing for natural gas is approved by the Montana Public Service Commission and is deregulated.

### ***Emergency Services***

The provision of fire, ambulance, law enforcement, and 911 services are the community services most directly related to the health, safety and welfare of the public. The County relies heavily on volunteer fire and ambulance departments and operates under severe budget constraints. The size of the county itself directly impacts the ability to maintain an acceptable level of emergency services in the face of highly dispersed growth. The Flathead County Growth Policy (2012) provides the following description.

#### Emergency 911 Services

The role of public safety (911) communications in emergency services has changed significantly in the last 20 years requiring emergency communications centers to acquire sophisticated equipment and advanced training for their staff. In Flathead County, municipal and county public safety agencies are supported through a fully consolidated 911 dispatch center for all responders in the county. Calls for emergency services are processed and multi-agency responses more easily coordinated through this center. The number of calls for service continues to rise, as does the need for emergency medical services, likely due to the aging population in the county.

#### Fire Services

Fire response in Flathead County is covered by 20 separate fire departments, many of which are staffed solely by volunteers. Fire departments are primarily responsible for responding to fires and medical emergencies. Increased development has resulted in an increasingly high risk of fire in rural areas that are far from public services and facilities. On the opposite end of the spectrum, departments such as Evergreen are responsible for a high density area equivalent to the surrounding municipal departments of Kalispell, Columbia Falls, and Whitefish. In most cases, the municipal and volunteer departments have mutual aid agreements to assist each other in the event of an emergency, providing better coverage to Valley residents.

#### Ambulance Services

Ambulance services are limited in Flathead County due to the size of the county and the location of its population. Transporting patients requires a state license and currently is performed by Kalispell, Whitefish, Evergreen, West Valley, Bigfork, Marion, and Big Mountain Fire Departments as well as the Lakeside Quick Response Unit, Olney Ambulance service, West Flathead EMS and Three Rivers EMS in Columbia Falls. The ALERT helicopter service responds to areas too distant for effective ambulance response or other areas in the county when requested.

### **3.4 POPULATION TRENDS**

Flathead County is the 3<sup>rd</sup> most populous in Montana (out of 56 counties) with a population of 90,928, according to the 2010 U.S. Census. The Census and Economic Information Center estimates that the 2014 population will be around 95,188, a 4.6 percent increase since the 2010 census. Population is

clustered near the three incorporated communities and a few smaller unincorporated towns primarily located in the valley bottoms along the rivers or adjacent to lakes.

**Table 3.4-1** illustrates the change in population in Flathead County compared to the United States and State of Montana.

TABLE 3.4-1 COUNTY, STATE AND NATIONAL POPULATION TRENDS						
Year	Flathead Co. Population	% change from previous census	State of Montana Population	% change from previous census	United States Population	% change from previous census
2010	90,928	22.10%	989,415	9.67%	308,745,538	9.71%
2000	74,471	25.76%	902,190	12.91%	281,424,602	13.15%
1990	59,218	13.96%	799,065	1.57%	248,709,873	9.79%
1980	51,966	31.69%	786,690	13.29%	226,542,199	11.43%
1970	39,460	19.70%	694,409	2.91%	203,302,031	13.37%

Source: Census and Economic Information Center (CEIC), 2013

According to the Flathead County Growth Policy (2012), population growth in the County over the past 100 years has been significant and dynamic. With the exception of the period between 1920 and 1930, growth has generally exceeded 10 percent over the course of each decade. Only the decade between 1950 and 1960 experienced a single digit population growth of 5 percent. In total, population growth over the last 100 years has been approximately 81,553 people, which translates into a nine-fold population increase in the County.

The population boom of recent time began in the 1970s when population growth accelerated dramatically. The largest growth rate for any 10 year period since 1900 was the ten year period between 1970 and 1980 which experienced a 32 percent increase in population from 39,460 to 51,966 residents. This growth lessened during the 1980's to 14 percent as the population increased by 7,252 people. From 1990 to 2000, the growth in population resumed its post 1970 change with a 26 percent increase, resulting in a 2000 population of 74,471 people (Flathead County Growth Policy, 2012).

Several other communities throughout the county are also experiencing growth. These communities are more scattered, and development is less dense. Residents in these communities are self-reliant with individual water and sewer facilities. These communities include Marion, Kila, Ferndale, Creston, and West Glacier. The more remote communities such as Polebridge, Olney, and Essex have not experienced the rapid growth that the more accessible communities in the county are currently undergoing, but have still seen a population increase over the past 10 years (Flathead County Growth Policy, 2012).

**Table 3.4-2** presents population statistics for the incorporated communities and the Census Designated Places (CDP) within Flathead County. Kalispell, the county seat, is the state's 7th largest city, with a population of 10,526 (2010). Whitefish is the 18th largest and Columbia Falls is the 23rd largest in the State of Montana.

**TABLE 3.4-2**  
**FLATHEAD COUNTY POPULATION TRENDS – CITIES AND CENSUS DESIGNATED PLACES**

City or CDP	1970	1980	% Change Since Last Census	1990	% Change Since Last Census	2000	% Change Since Last Census	2010	% Change Since Last Census
Batavia CDP	--	--	--	--	--	--	--	385	
Bigfork CDP	--	--	--	--	--	1,421	--	4,270	200.49%
Columbia Falls, City	2,652	3,112	17.35%	2,921	-6.14%	3,645	24.79%	4,688	28.61%
Coram CDP	--	--	--	--	--	337	--	539	59.94%
Evergreen CDP	--	--	--	4,109	--	6,215	51.25%	7,616	22.54%
Forest Hill Village CDP	--	--	--	--	--	--	--	206	
Helena Flats CDP	--	--	--	--	--	--	--	1,043	
Hungry Horse CDP	--	--	--	--	--	934	--	826	-11.56%
Kalispell, City	10,526	10,689	1.55%	11,917	11.49%	14,223	19.35%	19,927	40.10%
Kila CDP	--	--	--	--	--	--	--	392	
Lakeside CDP	--	--	--	--	--	1,679	--	2,669	58.96%
Little Bitterroot Lake CDP	--	--	--	--	--	--	--	194	
Marion CDP	--	--	--	--	--	--	--	886	
Martin City CDP	--	--	--	--	--	331	--	500	51.06%
Niarada CDP	--	--	--	--	--	50	--	27	-46.00%
Olney CDP	--	--	--	--	--	--	--	191	
Somers CDP	--	--	--	--	--	556	--	1,109	99.46%
West Glacier CDP	--	--	--	--	--	--	--	227	
Whitefish, City	3,349	3,703	10.57%	4,368	17.96%	5,032	15.20%	4,368	-13.20%

Source: U.S. Census Bureau, 2013. Notes: CDP = Census Designated Place; -- = data not available.

### 3.5 HOUSING STOCK

The U.S. Census estimates in their *2008-2012 American Community Survey* that Flathead County had 47,181 housing units with a median value of \$231,300. A further breakdown of the housing units from the census is presented in **Table 3.5-1**.

<b>TABLE 3.5-1</b>					
<b>U.S. CENSUS HOUSING DATA; FLATHEAD COUNTY</b>					
	<b>Flathead County</b>	<b>Columbia Falls</b>	<b>Kalispell</b>	<b>Whitefish</b>	
Total Number of Housing Units (2012)					
	47,181	1,958	9,321	4,228	
Median Value of Housing Units (2008-2012)					
	\$231,300	\$180,200	\$191,600	\$261,300	
Year Structure Built					
2010 or later	481	0	9	0	
2000 to 2009	10,762	511	1,990	1,181	
1990 to 1999	8,117	225	1,349	782	
1980 to 1989	8,027	180	1,256	515	
1970 to 1979	9,358	344	1,325	395	
1960 to 1969	3,311	310	624	264	
1950 to 1959	1,964	207	864	391	
1940 to 1949	2,495	37	671	331	
1939 or earlier	2,666	144	1,233	369	

As shown by **Table 3.5-1**, above, approximately 32 percent of the housing in the county was constructed prior to 1960. Approximately 8 percent of the homes in the county were constructed between 1960 and 1969, resulting in the least productive era of home construction. It is significant to note that although the majority of housing was built earlier than 1959, this era covers multiple decades. The periods of 1970 to 1979 and 1980 to 1989 witnessed significant home construction, comprising 23 percent and 16 percent of the total housing stock, respectively. Housing construction increased slightly in the 1990s, with 25 percent of homes built during this decade. Over the past ten years nearly 11,000 housing units were constructed in Flathead County, totaling nearly 23 percent of the total number of housing units (Flathead County Growth Policy, 2012).

The largest era of single family home construction occurred prior to 1960. Manufactured or mobile homes peaked in construction during the period of 1970 to 1979, while the majority of condominiums in the county were constructed between 1980 and 1989. Manufactured and mobile homes are often first home purchases. They are an integral part of a viable affordable housing program (Flathead County Growth Policy, 2012).

Demand is strong in the county for second home ownership as well as for seasonal, recreational, occasional use and vacation housing (Flathead County Growth Policy, 2012).

### **3.6 ECONOMY AND SOCIOECONOMICS**

According to the Flathead County Growth Policy (2012), the Flathead Valley and its economy were experiencing significant growth and development in 2007. Traditionally characterized by its diversity, northwest Montana's economy was stable and growing; a 2004 report on the 'State of the Rockies' identified Flathead County as having the most balanced employment composition in the Rocky Mountain West, with no one sector of the economy prevailing over another. That all changed in 2008, when the economic recession affecting the rest of the country began to significantly impact Montana's economy. Numerous reports in the years since have characterized Flathead County as one of the hardest hit economies in the state, with some of the highest long-term unemployment rates and a significant reduction in economic diversity. And while the effects of the recession continue to be felt today, the Flathead Valley is beginning a slow recovery, building upon the natural resources and scenic qualities that have traditionally been part of the economic landscape while embracing new opportunities and supporting those economic sectors that have remained resilient throughout the recession. The County's natural environment has always been one of its chief economic assets, contributing significantly to the high quality of life that draws visitors as well as potential employers and future residents to the Valley. This quality of life is characterized by natural scenic beauty, clean air and water and access to outdoor and recreational opportunities. Region specific export products such as Flathead cherries and timber products, as well as the tourism draw of Glacier National Park and Flathead



Lake are prime examples of how Flathead County's natural environment has contributed significantly to the local economy.

The Flathead Valley was historically a natural resource based economy. Logging, mining and commodities production have decreased over the past decade, and as a result the Flathead economy has had to diversify in order to accommodate this change. The County's economy has experienced significant restructuring over the past 30 years, with significant growth in the retail trade and service industries during the late 1990's and early 2000's. However, the economic downturn has tempered the diversification of the economy in the same way it has affected economic growth and stability. Those industries that experienced enormous increases in employment, labor earnings, and sales over the past decade have since experienced significant losses in these same indicator areas during the recession. The closure of the Columbia Falls Aluminum Company and the Plum Creek mill, coupled with cyclical declines in the wood products and construction industry have added to these losses. However, the natural amenities and quality of life that contribute to the character of Flathead County continue to attract small businesses and technology companies that are becoming more prevalent in light of the new knowledge based, globalized economy. The city of Kalispell's evolution as a regional trade and service center has also contributed to the growth of the County's economic base, even during this period of economic decline (Flathead County Growth Policy, 2012).

**Table 3.6.1** presents economic indicators for Flathead County and for the communities of Columbia Falls, Kalispell, and Whitefish from 2007 to 2012.

TABLE 3.6-1 ECONOMIC & SOCIOECONOMIC DATA; FLATHEAD COUNTY					
Indicator	State of Montana	Flathead County	Columbia Falls	Kalispell	Whitefish
Per capita income (2008-2012)	\$25,002	\$25,616	\$19,659	\$22,134	\$27,235
Median household income (2008-2012)	\$45,456	\$45,545	\$38,456	\$39,371	\$43,643
Persons living below poverty level (2008-2012)	14.8%	12.5%	17.3%	16.4%	12.3%
Total Number of Firms (2007)	114,398	13,592	--	3,397	2,083

Source: U.S. Census Bureau; Quick Facts and 2008-2012 American Community Survey; "--" = not available

### 3.7 LAND USE AND FUTURE DEVELOPMENT

Most vacant residential property within the cities has been developed in recent years, fueling an increase in annexations and development outside of the city boundaries to satisfy housing demand. Retail development has significantly increased along U.S. 93 and Highway 2 in the last decade. A number of large retailers and shopping centers have been established to serve the communities' needs. Agriculture is still the predominant land use in the Flathead Valley; however, large areas of agricultural lands have been converted to residential uses.

The commercial core of Columbia Falls has shifted from a traditional downtown center along Nucleus Avenue to a more linear development along US Highway 2 within the community. At the same time, the community has felt significant pressure generally unregulated linear strip development along US Highway 2 between Kalispell and Columbia Falls (Columbia Falls Growth Policy, 2013).

Unincorporated communities within Flathead County contain residential development either along a grid system of streets or within platted subdivisions. Outside of the towns, most residential development is associated with planned housing communities, ranch and farming operations and scattered homes in an open and rural environment. Recreational cabin and second home development exists throughout the area.

A major concern regarding future development in Flathead County is the conversion of private timber lands to residential land use. The three largest timber landowners, F.H. Stoltze Land and Lumber, Plum Creek, and Montana Forest Products own 42 percent of the private land in the county. In recent years, private timberland has been converted to residential land use. Public safety concerns over development in the wildland urban interface (WUI) have led to subdivision regulations (see below); however, some development still occurs outside the subdivision process. Please refer to *Section 4.2* for a discussion on wildfire in Flathead County.

### ***Land Use Implementation Tools***

Industrial, commercial and residential land use is managed with zoning ordinances and subdivision regulations in accordance with guidelines set forth in the city growth policies. Building codes also play an important role to ensure structures are constructed to safety standards.

### **Growth Policies**

Flathead County adopted a growth policy in 2007 and revised the document in 2012, to help address growth pressures. The Cities of Kalispell, Columbia Falls, and Whitefish adopted growth policies in 2003, 2013, and 2007, respectively. Neighborhood plans addressing growth have been completed for: Ashley Lake, Bigfork, Helena Flats, Labrant-Lindsey Lane, Lakeside, Little Bitterroot, North Fork, Riverdale, Rogers Lake, The Canyon, Two Rivers, and West Valley neighborhoods in the County and for the Talbot neighborhood in Columbia Falls.

The Flathead County Growth Policy recognizes that development in environmentally critical areas, particularly in places identified at high risk for wildfire, flooding, areas prone to high groundwater, and unstable slopes, has proven costly for residents. Local government has therefore, outlined a number of goals and policies to mitigate impacts from these hazards. According to the Flathead County Growth Policy (2012), there are lands in Flathead County on which development would pose such a substantial

threat to the health, safety and general welfare of the entire community that it is reasonable to guide all growth away from these areas.

It recognizes that public safety can be threatened as more people move into the WUI; the zone where structures and other human development meet and intermingle with undeveloped wildland or forests. This WUI zone is comprised of private and public lands and can pose risks to life, property, and infrastructure in associated communities if not mitigated. See *Section 4.2* for a discussion on the wildfire hazard in Flathead County.

One hundred (100) -year floodplains are areas where there is a 1 percent chance of flooding in any given year, based on the historical flood of record. The federal government requires minimum standards be observed in these areas, but local communities can regulate beyond the minimums to protect taxpayers and residents from future flood events. The County Growth Policy states that fill in the floodplain raises the ground level above the base flood elevation, but this simply displaces flood waters to other areas of the community and is both extremely unfair to other landowners on the flood fringe and hazardous due to unpredictable flood processes. See *Section 4.3* for a discussion on flooding in Flathead County.

Areas prone to high groundwater pose a special risk to both the public and the landowner. Homes constructed in areas of shallow groundwater are far more likely to experience flooding, mold and unstable foundations. During drought years, it is easy to forget the impacts of shallow groundwater to the health and safety of Flathead County residents. Some health issues created by mold-infested living areas are a burden to all county taxpayers and are sometimes avoidable in new subdivisions. The Flathead County Growth Policy recognized that areas subject to shallow groundwater should be identified, and regulating development in these areas is a responsible action that should be taken for the health and safety of current and future residents.

The Growth Policy also recognizes that steep slopes can be extremely unsafe. Dynamic processes occur in these areas that are not compatible with public health and safety. Rock slides, flash floods, tree falls, avalanches, and unstable soils are among the more serious hazards in steep terrain.

Flathead County is also an area of known seismic activity, making development in areas of steep slopes additionally hazardous. The vast majority of lands in Flathead County that exceed slopes of 30 percent are in National Forest and State lands. However, there is private property on which a steep slope designation would apply and those lands should be restricted from development directly upon the steep slopes.

### *Zoning Ordinances*

Zoning is a tool used by local government to control and direct land use in communities, in order to protect the public health, safety and welfare. Zoning ordinances regulate where future growth should or should not be allowed (e.g., which areas of the county are most suitable for development as well as least suitable due to issues such as floodplains, seasonal high groundwater, steep slopes and wildland urban-interface areas.) Flathead County, as well as the cities of Columbia Falls, Kalispell, and Whitefish, have adopted zoning ordinances. Specific land use regulations also exist for the Canyon Area.

### *Subdivision Regulations*

In contrast to zoning which regulates how existing lots may be used and developed, subdivision regulations govern the division of raw land into building lots. They typically identify areas with physical limitations that may not be suitable for development unless the hazards are eliminated or will be overcome by approved design and construction techniques.

Flathead County and the cities of Columbia Falls, Kalispell, and Whitefish control development through the use of subdivision regulations. The County's subdivision regulations state that all subdivisions must be designed so that potentially significant adverse impacts to public health and safety have been avoided or reasonably minimized. Among other things, adverse impacts to public health and safety are defined as: flooding, high water table, snow avalanches, high hazard fire areas, rock falls or landslides, subsidence, steep slopes in excess of 30 percent, and other natural hazards. The Cities also identify lands unsuitable for subdivision as those where there is evidence of hazards such as flooding, snow avalanches, rock falls, landslides, slope equal to or greater than 25 percent, subsidence, high water table, air or vehicular traffic hazards and/or seismic activity.

### *Building Codes*

Building codes are also a tool to control future development. The main purpose of building codes are to protect public health, safety and general welfare as they relate to the construction and occupancy of buildings and structures. They comprise a set of rules that specify the minimum acceptable level of safety for buildings and often contain requirements for snow and wind loads, roof construction, and seismic risk. Building codes are generally intended to be applied by architects and engineers, but are also used by building inspectors. Building codes are in effect in the cities of Columbia Falls, Kalispell, and Whitefish. The City of Columbia Falls contracts with the City of Whitefish for building code inspection and administration. Flathead County does not administer a building code program for the rural areas outside the city. Montana has adopted the International Building Code.

### *Floodplain Regulations*

Floodplain regulations are enforced through the floodplain administrator in Flathead County. The County, as well as the cities of Columbia Falls, Kalispell, and Whitefish, participate in the National Flood Insurance Program.

Flathead County is affected by flood incidents due to occasional high volume rain events as well as rapid snow melt in the drainage areas of the County's major streams. FEMA maps are available for areas based on flood insurance studies for drainage conditions along the major streams in the county. The FEMA Flood Insurance Rate Maps (FIRM) for Flathead County are based on Flood Insurance Studies.

The floodplain of the major streams, as well as its tributary streams, can present a serious obstacle to many types of development, and would necessarily be considered a constraint to the expansion of residential and commercial uses where flooding conditions exist. Future land use planning in the floodplain area should follow the requirements of the Floodplain Ordinance by controlling the location of structures in the floodplain. Design standards contained in the subdivision regulations also address procedures and requirements for floodplain development review.

### *Lake and Lakeshore Protection Regulations*

Both Flathead County and the City of Whitefish have Lakeshore Protection Regulations to prevent construction on steep slopes adjoining lakes. The regulations stipulate the maximum grade shall not exceed 15 percent and no natural slope in excess of 30 percent grade shall be disturbed by construction of a boat ramp.

## **4.0 RISK ASSESSMENT AND VULNERABILITY ANALYSIS**

Flathead County is exposed to many hazards both natural and man-made. A risk assessment and vulnerability analysis was completed to help identify where mitigation measures could reduce loss of life or damage to property in the County.

This section includes a description of the risk assessment methodology and a hazard profile for seven hazards organized from high to low by county priority: wildfire, flooding, hazardous material incidents, severe winter weather, communicable disease, transportation accidents, severe summer weather, earthquake, landslide, drought, terrorism, dam failure, and volcanic ash. The section is concluded with a risk assessment summary and discussion on the location of future development projects. Supporting documentation is presented in **Appendix C**.

### **4.1 RISK ASSESSMENT METHODOLOGY**

A risk assessment was conducted to address requirements of the DMA 2000 for evaluating the risk to Flathead County from natural and man-made hazards. DMA 2000 requires measuring potential losses to critical facilities and property resulting from natural hazards by assessing the vulnerability of these facilities to natural hazards. In addition to the requirements of DMA 2000, the risk assessment approach taken in this study evaluated risks to vulnerable populations and also examined the risk presented by several man-made hazards. The goal of the risk assessment process is to determine which hazards present the greatest risk and what areas are the most vulnerable to hazards.

The risk assessment approach used for this plan entailed using geographic information system (GIS) software and data to develop vulnerability models for people, structures, critical facilities, and evaluating those vulnerabilities in relation to hazard profiles that model where hazards exist. This type of approach to risk assessment is dependent on the detail and accuracy of the data used during the analysis. Additionally, some types of hazards are extremely difficult to model. Data limitations are described in *Section 4.1.7*.

#### **4.1.1 Critical Facilities and Building Stock**

Critical facilities were mapped using coordinates provided by Flathead County. Mapping of these facilities allowed for the comparison of their location to the hazard areas where such hazards are spatially recognized. Construction type of critical facilities (e.g. steel, wood, masonry, etc.) has not been compiled and was therefore, not considered in the analysis. This data should be collected for future updates of this plan.

Infrastructure, including bridges, water and wastewater facilities, and communication sites had digital mapping available and were therefore included in the analysis. Bridge data was obtained from the Montana Natural Resource Information System (NRIS) and the National Bridge Inventory while other data was obtained from the County. Replacement values of critical facilities were used in the risk assessment as this information was readily available from the County, Cities and Montana Cadastral Mapping Program. **Figures 3, 3A, 3B, and 3C** present the location of critical facilities in Flathead County, Columbia Falls, Kalispell, and Whitefish, respectively. Bridge replacement values were extrapolated using unit costs (developed by Lewis and Clark County) for span length and width. **Figure 4** presents the bridge locations in Flathead County. The *Critical Facility* section in **Appendix C** presents a key to the bridge inventory. Flathead County may wish to enhance the bridge data for the 2019 PDM Plan update by adding the major culverts in the county.

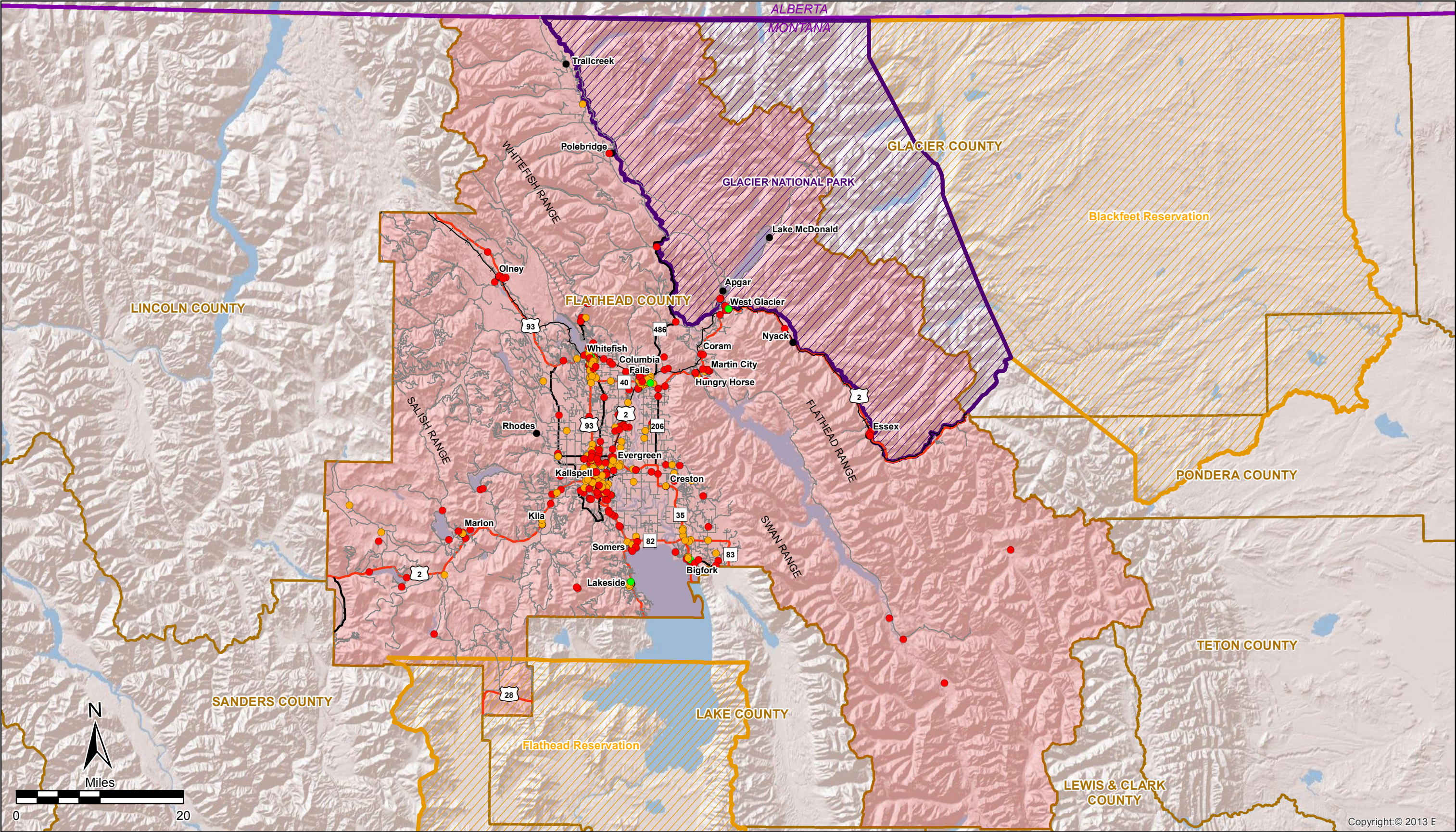
Building stock data was obtained from the Montana Department of Revenue's (MDOR) cadastral mapping program. This system spatially recognizes land parcels within the County with a distinction between residential and other properties. Appraised building values are available on the parcel level and were used to determine exposure. The "other" building type includes all properties not designated as residential and in this study and consists of commercial, agricultural and industrial properties. Data used for this analysis was from 2014.

Building exposure in the risk assessment is presented in accordance with distinct census reporting areas. The County also has 16 census designated places (Batavia, Bigfork, Coram, Evergreen, Forest Hill Village, Helena Flats, Hungry Horse, Kila, Lakeside, Little Bitterroot Lake, Marion, Martin City, Nirada, Olney, Somers, and West Glacier), in addition to the three incorporated communities (Columbia Falls, Kalispell, and Whitefish). A census-designated place is a concentration of population identified by the U.S. Census Bureau for statistical purposes. CDPs are populated areas that lack separate municipal government, but which otherwise physically resemble incorporated places. **Figure 5** presents the census reporting areas used for the PDM risk assessment.

#### **4.1.2 Vulnerable Population**

Data from the 2010 census was used in the analysis to determine vulnerable populations at risk in the hazard areas, as available. Census data was downloaded from the U. S. Census Bureau's website. Downloaded data included total population (by census block) and number of individuals under the age of 18 for the incorporated communities, the County, CDP, and census divisions. Data for populations over the age of 65 and for individuals living below the poverty level were not available for Census 2010; therefore, this information should be included in the 2019 PDM Plan update.

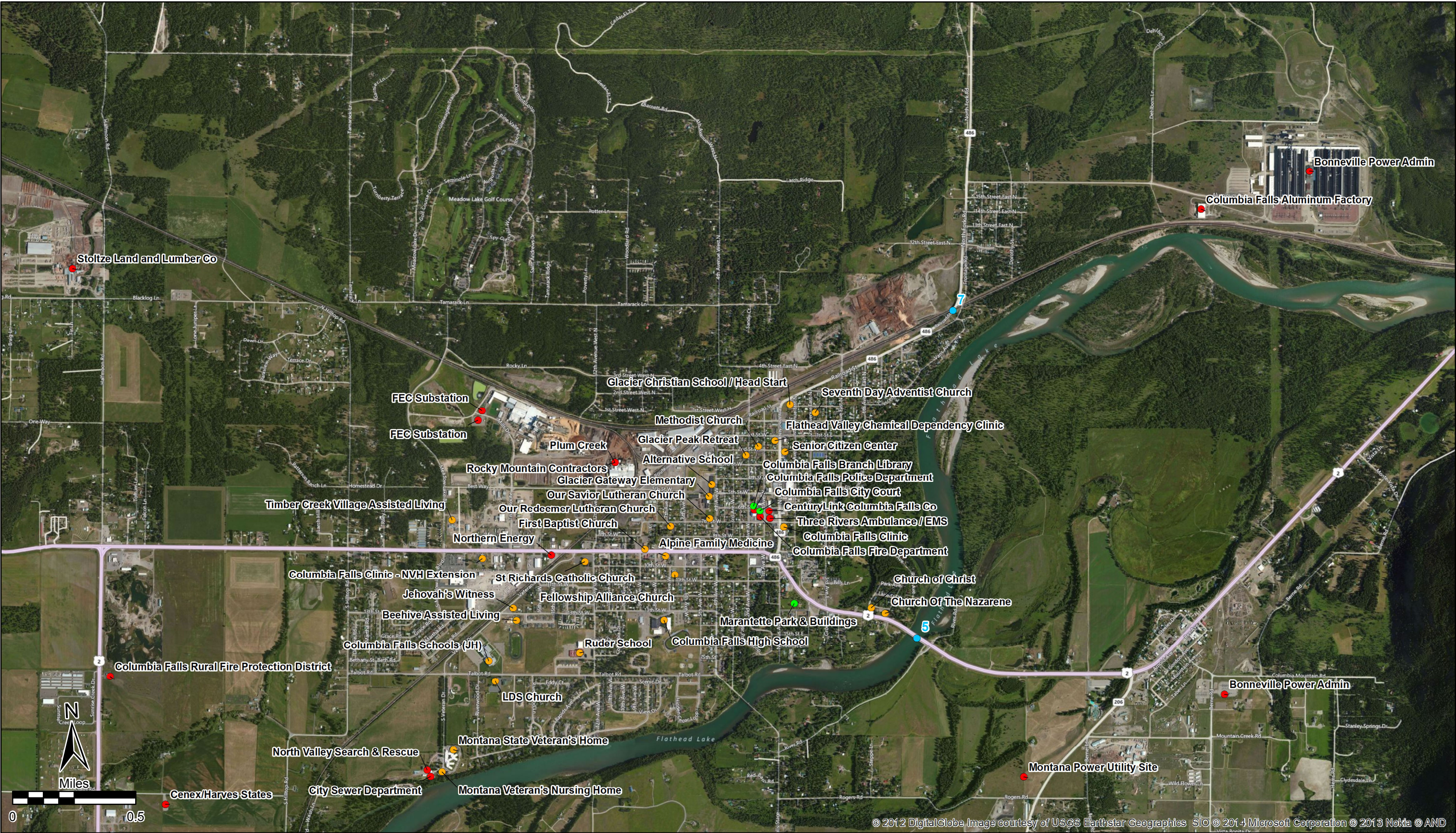




- |                         |               |                   |                                 |
|-------------------------|---------------|-------------------|---------------------------------|
| ● Critical Facility     | ⊙ County Seat | — Primary Route   | ▨ Indian Reservation            |
| ● Vulnerable Population | ● Place Names | — Secondary Route | ▨ National Park                 |
| ● Other                 |               | — Other Route     | ▨ County                        |
|                         |               | — Railroads       | ▨ United States - Canada Border |

May 2014  
**Figure 3**  
**Critical Facilities**  
**Flathead County**  
**Pre-Disaster Mitigation Plan**



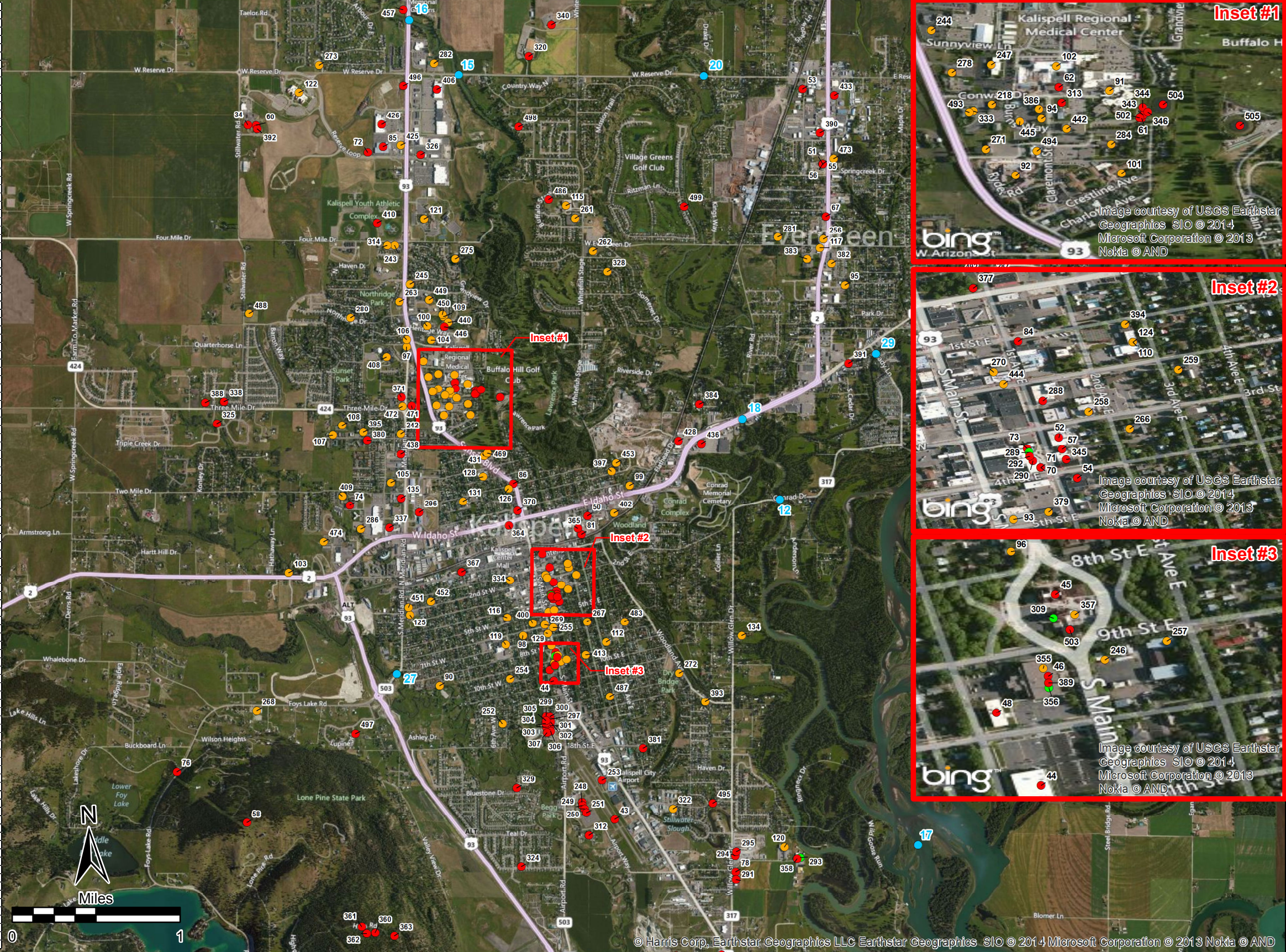


- |                         |           |
|-------------------------|-----------|
| ● Critical Facility     | ● Other   |
| ● Vulnerable Population | ● Bridges |

May 2014  
Figure 3A  
**Columbia Falls - Critical Facilities**  
**Flathead County**  
Pre-Disaster Mitigation Plan



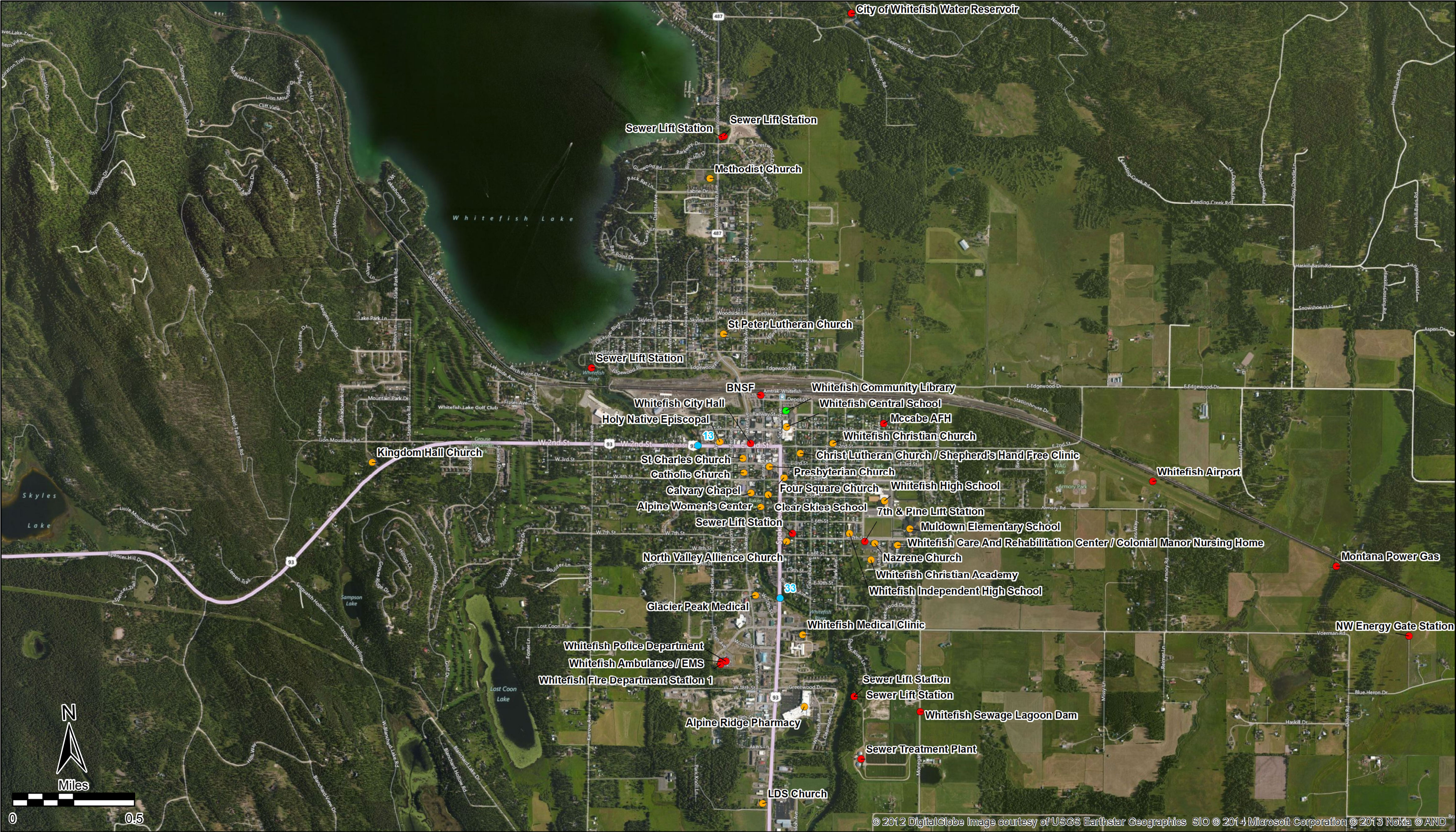
MAP ID	NAME	MAP ID	NAME
34	NWLO Fire Cache	292	Public Works
43	Kalispell City Airport	293	Weed Building
44	Flathead Community Health Center	294	Facility Maintenance Building
45	Courthouse / Juvenile Probation Complex	295	Road & Bridge Shop
46	Justice Center	296	Fairgrounds (Includes Concessions, Bathrooms, Exhibit Halls)
48	Treasurer / Sup't of School (Blue Building)	297	Kalispell City Shop
50	MDT Kalispell Office & Shop	299	Shop Complex - Sewer Dept. Storage 2
51	Bee Broadcasting Inc.	300	Shop Complex - Sewer Dept. Storage 1
52	KAJ	301	Shop Complex - Parks / Solid Waste Warehouse
53	KALS	302	Shop Complex - Open Machine Shed
54	KCFW	303	Shop Complex - Sand Storage
55	KDBR	304	Shop Complex - Sign & Signal Shop
56	KKMT	305	Shop Complex - Sign & Signal Storage
57	KOFI	306	Shop Complex - Standpipe Water Supply
58	KUFM Kalispell Tower	307	Shop Complex - Water Warehouse
60	MHP - Kalispell Dispatch Microwave Tower	309	Youth Court
61	MHP - Kalispell Water / Microwave Tower	312	Admin / Filter / Bioreactor Building - Sewage Treatment
62	Alert Air Ambulance	313	ALERT Helipad
67	Evergreen Fire Rescue Station 81	314	All About Kids
70	Kalispell Ambulance / Ems	320	Applied Materials
71	Kalispell Fire Department Station 61	322	Area On Aging
72	Kalispell Fire Department Station 62	324	Ashley Meadows #18
73	Kalispell Police Department	325	Lift Station
74	Montana Highway Patrol District VI Office	326	AT&T
76	Smith Valley Fire Department Substation	328	AWARE Group Home
77	Smith Valley Fire Dept.	329	Balmer Lift Station #15
78	South Kalispell Volunteer Fire Department	333	Big Sky Family Medicine
79	West Valley Volunteer Fire and Rescue Station 1	334	Big Sky Manor
81	AMERIGAS	337	Blackfoot Communications
82	Amerigas Propane LP	338	Cottonwood #28 - Sewage Treatment
84	CenturyLink Main Co	340	Bonneville Power Admin
85	Costco	343	Booster Station #1
86	Plum Creek	344	Booster Station #2 Pump House
90	Ashley Creek Court	345	Bresnan Communications
91	Brendan House	346	Buffalo Well & Pump House
92	Buffalo Hill Terrace	355	Detention Center
93	Chemical Dependency Service	356	District Court
94	Clear Choice Clinic / Steven M.Martini Clinic	357	Juvenile Detention
95	Edgewood Vista Kalispell	358	Records Preservation
96	Flathead County Home Health	360	Communications Site
97	Flathead Valley Chemical Dependency Clinic	361	Communications Site
98	Friendship House Inc Personal Care	362	Communications Site
99	Greenwood Village Assisted Living	363	Communications Site
100	Heritage Place	364	Cenex/Harves States
101	Immanuel Lutheran Home	365	Cenex/Harves States
102	Kalispell Regional Medical Center	367	Cenex/Harves States
103	Langston's Adult Foster Care	370	Century Link
104	Pathways Treatment Center	371	Century Link Office
105	Glenwood Prestige Assisted Living	376	Communications Tower
106	Quality Of Life	377	Depot Park Well - Water Treatment
107	Renaissance Assisted Living - Liberty	379	Domestic Violence Team Building
108	Wel - Life At Kalispell	380	El Dorito Lift Station #4
109	Western Montana Mental Health Center	381	Elk's Sewer Lift Station #2
110	Bridge Academy (Underman Education Center)	382	Evergreen Clinic
112	Cornelius Hedges Elementary School	383	Evergreen Jr High
115	Edgerton Elementary School	384	Evergreen Water District
116	Eliot School	386	Family Health Care
117	Evergreen Crossroads School	388	Flathead County Search & Rescue
119	Flathead High School	389	Flathead County Sheriff's Office
120	Flathead Valley Christian School	390	Flathead Electric
121	Flathead Valley Community College	391	Flathead Electric Utility Site
122	Glacier High School	392	Flathead Emergency Communication Center
124	Lasar Alternative High School (Underman Education Center)	393	Flathead Industries Group Home
125	Lillian Peterson Elementary School	394	Flathead Industries Group Home
126	Montana Academy	395	Flathead Valley Recovery House
128	Russell School (Elementary)	397	Flathead Youth Home
129	Saint Matthew's School	400	Glacier Manor
130	Smith Valley Elementary School	402	Head Start
131	Trinity School	406	Home Depot
133	West Valley Schools	408	Kalispell Middle School
134	Woodland Montessori Center	409	Kalispell Senior Apartments
135	FWP Region 1 Headquarters	410	Kidsport - Pumphouse
218	Obstetrics	413	Meadowlark Montessori
242	All Families Healthcare	425	MedNorth Urgent Care
243	Buchele Plastic Surgery	426	Lowe's
244	Flathead Orthopedics	428	Montana Power
245	Glacier Foot & Ankle	431	Natelson OBGYN
246	Kalispell Foot & Ankle	433	NORCO
247	Kalispell Medical Arts / Pharmacy	436	Northern Energy Propane
248	Airport Hangar 1	438	Northwest Energy
249	Airport Hangar 2	440	Northwest Healthcare
250	Airport Hangar 3	441	Northwest Montana Head Start / Valley Victory Church
251	Airport Hangar 4	442	Northwest Womens Health Care
252	1st United Pentecostal Church	444	NW Montana Physicians Group
253	Airport Terminal & Office	445	NW Montana Surgical
254	Bethel Baptist Church	446	NW Telephone Building
255	Bethlehem Lutheran Church	449	Professional View
256	Calvary Lutheran Church	450	Safehouse-Mental Health
257	Central Bible Church	451	Samaritan House 2nd ST W
258	Central Christian Church	452	Samaritan House
259	Christ Church Episcopal	453	Seventh Day Adventists Community Center
261	Church Of Latter Day Saints	457	Sewer Lift Station
262	Church Of Nazarene	463	Smith Valley Grange
263	Cornestone Community Church	469	Sunset Professional Building
266	Epworth United Methodist	471	UPS
267	Faith Covenant Church	472	VA Clinic
268	Family Life Christian Church	473	Valley Medical
269	First Presbyterian Church	474	West Gate Senior Apartments
270	Fresh Life Church	483	Woodland Clinic
271	Grace Church	486	Buffalo Stage Lift Station #12
272	Jehova's Witness	487	Church of God of the Prop
273	Jehova's Witness - Off W Reserve Dr	488	Church Of Christ
275	Glacier Church	493	Rocky Mountain Heart and Lung
278	Mt Conference Of 7th Day Adventist Church	494	VA Montana Health Care
280	Northridge Lutheran Church	495	Green Acres Lift Station #5
281	Risen Christ Parish	496	Kalispell Lift Station
282	Riverside Vineyard Church	497	Lone Pine Meadows #33
284	Salvation Army Church / Touch of Grace Free Clinic	498	Moe's Run #30
286	The River Church	499	Nicklaus Lift Station #11
288	City Admin Offices	502	Reservoir - Elevated Water Tank
289	Library	503	Courthouse - West Annex (Commissioner's Office)
290	City Hall	504	Water Reservoir #1
291	Eagle Transit Building	505	Water Reservoir #2



- Critical Facility
- Vulnerable Population
- Other
- Bridges (Refer by # to Bridge Inventory List)

May 2014  
Figure 3B  
**Kalispell - Critical Facilities**  
**Flathead County**  
Pre-Disaster Mitigation Plan

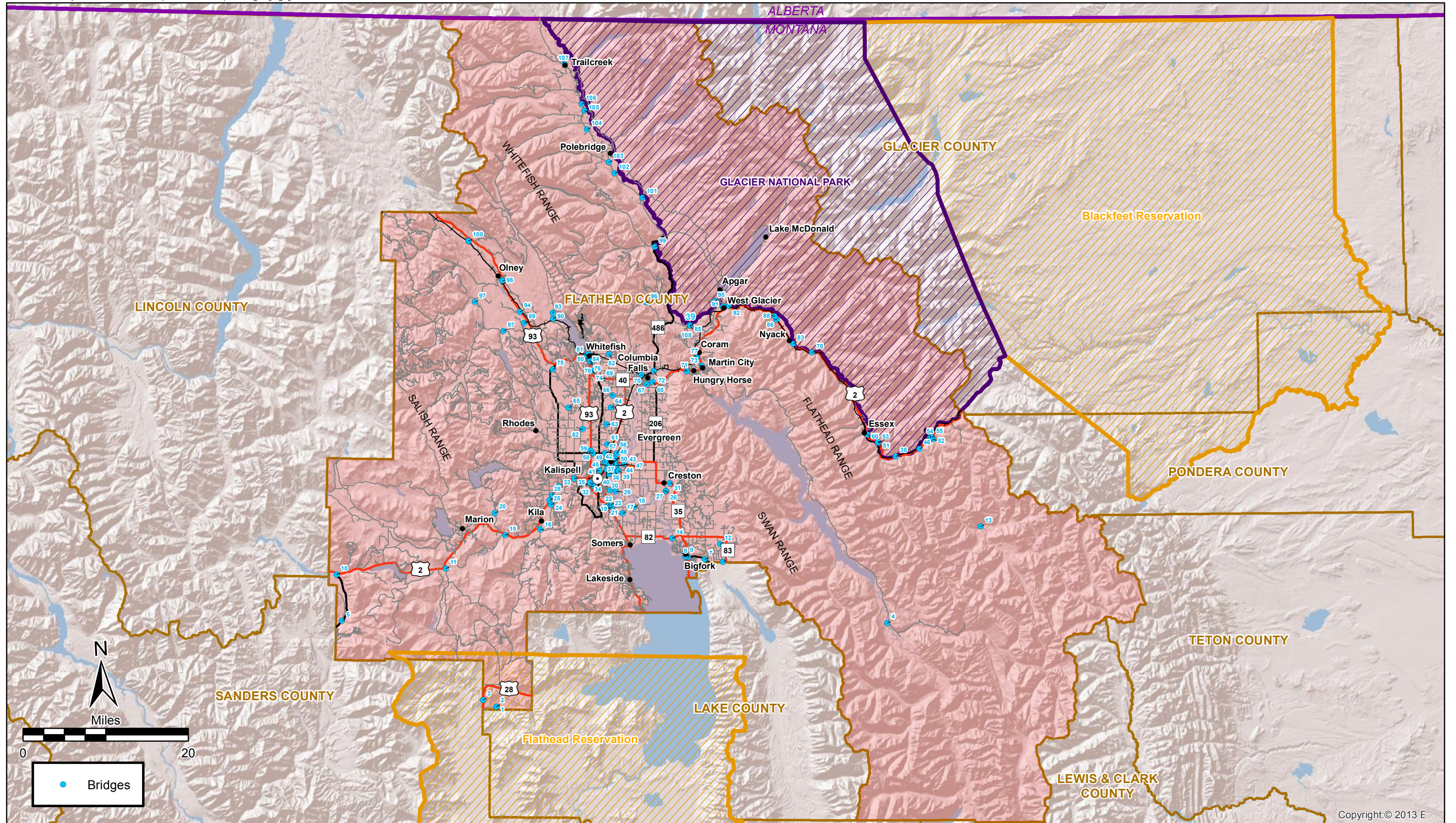




- |                         |           |
|-------------------------|-----------|
| ● Critical Facility     | ● Other   |
| ● Vulnerable Population | ● Bridges |

May 2014  
Figure 3C  
**Whitefish - Critical Facilities**  
**Flathead County**  
Pre-Disaster Mitigation Plan





- County Seat
- Place Names
- Primary Route
- Secondary Route
- Other Route
- Railroads
- Indian Reservation
- National Park
- County
- United States - Canada Border

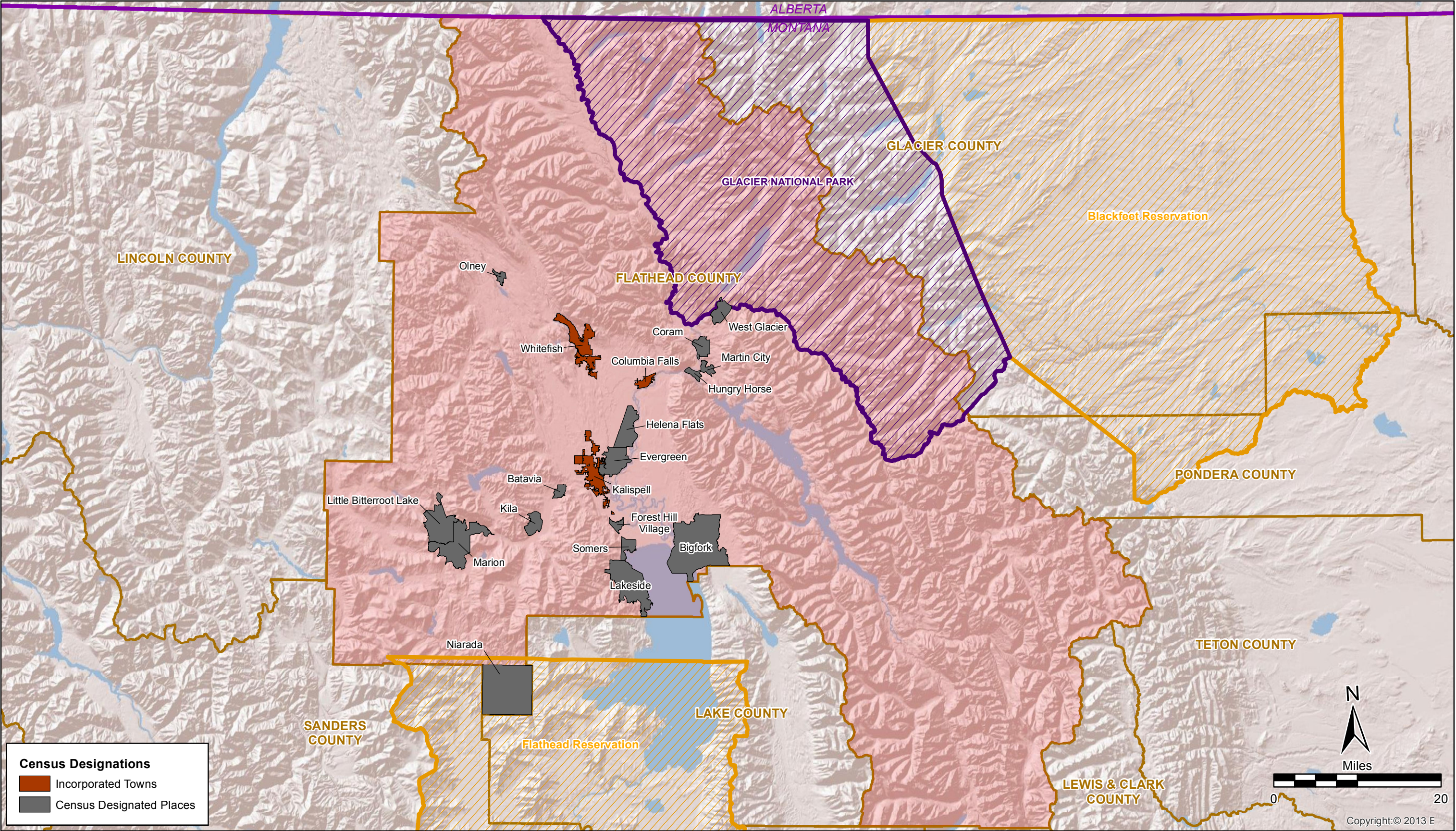
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May 2014

Figure 4

**Bridge Inventory  
Flathead County  
Pre-Disaster Mitigation Plan**





Indian Reservation National Park County United States - Canada Border

May 2014  
Figure 5  
**Census Designations  
Flathead County**  
Pre-Disaster Mitigation Plan



### **4.1.3 Hazard Identification**

The 2009 PDM Plan identified 10 hazards affecting Flathead County (wildfire, weather, flooding, earthquake, subsidence, human-caused hazard, dam failure, avalanche, landslide, and volcanic eruption). Hazards for the 2014 PDM update were identified by the Planning Team who reviewed a history of past events in the County that were compiled from: internet research, available GIS data, public meeting input, past disaster declarations, the 2009 PDM Plan and the State of Montana Multi-Hazard Mitigation Plan. Hazards included in the 2014 update generally included those profiled in the 2009 PDM Plan with the following changes: the weather hazard was split into severe summer and winter weather profiles; the human-caused hazard was split into a hazardous material incident, transportation accident/mass casualty, communicable disease, and terrorism/violence/civil unrest profile; the avalanche hazard was included in the severe winter weather profile; and, the landslide and subsidence hazards were consolidated into one profile. One new hazard was profiled in the 2014 PDM Plan; Drought. Hazards in the 2014 update were re-ranked using the Calculated Priority Ranking Index (CPRI) presented in **Table 4.1.1** (see *Plan Section 4.1.5*).

### **4.1.4 Hazard Profiles**

Hazard profiles were prepared for each of the identified hazards and are presented within this section according to their prioritized rank (see *Plan Section 4.1.6*). The level of detail for each hazard is generally limited by the amount of data available.

Each hazard profile contains a description of the hazard and the history of occurrence, the vulnerability and area of impact, the probability and magnitude of future events, and an evaluation of how future development is being managed to reduce risk. The methodology used to analyze each of these topics is further described below.

#### Description and History

A number of databases were used to describe and compile the history of hazard events profiled in this plan. This data was supplemented by input from the public, local officials, newspaper accounts, and internet research. The two primary databases used included the National Climatic Data Center (NCDC) Storm Events Database and Spatial Hazard Events and Losses Database for the United States (SHELDUS).

The NCDC Storm Events database receives Storm Data from the National Weather Service. The NWS receives their information from a variety of sources, including county, state and federal emergency management officials, local law enforcement officials, skywarn spotters, NWS damage surveys, newspaper clipping services, the insurance industry and the general public. Storm Data is an official publication of the National Oceanic and Atmospheric Administration (NOAA) which documents the

occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce.

SHELDUS is a county-level hazard data set for the United States for 18 different natural hazard event types. For each event, the database includes the date, location, property losses, crop losses, injuries, and fatalities that affected each county. The database includes every loss-causing and/or deadly event between 1960 through 1975 and from 1995 onward. Between 1976 and 1995, SHELDUS reflects only events that caused at least one fatality or more than \$50,000 in property or crop damages.

### *Vulnerability and Area of Impact*

Vulnerabilities are described in terms of critical facilities, structures, population, and socioeconomic values that can be affected by the hazard event. Hazard impact areas describe the geographic extent to which a hazard can impact a jurisdiction and are uniquely defined on a hazard-by-hazard basis. Mapping of the hazards, where spatial differences exist, allows for hazard analysis by geographic location. Some hazards can have varying levels of risk based on location. Other hazards cover larger geographic areas and affect the area uniformly.

### *Probability and Magnitude*

Probability of a hazard event occurring in the future was assessed based on hazard frequency over a 100 year period. Hazard frequency was based on the number of times the hazard event occurred divided by the period of record. If the hazard lacked a definitive historical record, the probability was assessed qualitatively based on regional history and other contributing factors. Probability was broken down as follows:

- Highly Likely – greater than 1 event per year (frequency greater than 1).
- Likely – less than 1 event per year but greater than 1 event every 10 years (frequency greater than 0.1 but less than 1).
- Possible – less than 1 event every 10 years but greater than 1 event every 100 years (frequency greater than 0.01 but less than 0.1).
- Unlikely – less than 1 event every 100 years (frequency less than 0.01)

The magnitude or severity of potential hazard events was evaluated for each hazard. Magnitude is a measure of the strength of a hazard event and is usually determined using technical measures specific to the hazard. Magnitude was calculated for each hazard where property damage data was available. Magnitude is:

- $(\text{Property Damage} / \text{Number of Incidents}) / \$ \text{ of Building Stock Exposure} = \text{Magnitude expressed as a percentage.}$

### Future Development

The impact to future development was assessed based on potential opportunities to limit or regulate development in hazardous areas such as zoning and subdivision regulations. The impacts were assessed through a narrative on how future development could be impacted by the hazard. Plans, ordinances and/or codes currently in place were identified that could be revised to better protect future development in the County from damage caused by natural and man-made hazards.

#### **4.1.5 Hazard Ranking and Priorities**

In ranking the hazards, the Planning Team completed a Calculated Priority Risk Index (CPRI) Work Sheet for each hazard. The CPRI examines four criteria for each hazard (probability, magnitude/severity, warning time, and duration); the risk index for each according to four levels, then applies a weighting factor (**Table 4.1-1**). The result is a score that has been used to rank the hazards. Each hazard profile presents its CPRI score with a cumulative score sheet included in **Appendix C**. **Table 4.1-2** presents the results of the CPRI scoring for all hazards.

**TABLE 4.1-1  
CALCULATED PRIORITY RISK INDEX**

CPRI Category	Degree of Risk			Assigned Weighting Factor
	Level ID	Description	Index Value	
<b>Probability</b>	Unlikely	<ul style="list-style-type: none"> <li>Rare with no documented history of occurrences or events.</li> <li>Annual probability of less than 0.01.</li> </ul>	1	45%
	Possibly	<ul style="list-style-type: none"> <li>Infrequent occurrences with at least one documented or anecdotal historic event.</li> <li>Annual probability that is between 0.1 and 0.01.</li> </ul>	2	
	Likely	<ul style="list-style-type: none"> <li>Frequent occurrences with at least two or more documented historic events.</li> <li>Annual probability that is between 1 and 0.1.</li> </ul>	3	
	Highly Likely	<ul style="list-style-type: none"> <li>Common events with a well documented history of occurrence.</li> <li>Annual probability that is greater than 1.</li> </ul>	4	
<b>Magnitude/Severity</b>	Negligible	<ul style="list-style-type: none"> <li>Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure).</li> <li>Injuries or illnesses are treatable with first aid and there are no deaths.</li> <li>Negligible quality of life lost.</li> <li>Shut down of critical facilities for less than 24 hours.</li> </ul>	1	30%
	Limited	<ul style="list-style-type: none"> <li>Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure).</li> <li>Injuries or illnesses do not result in permanent disability and there are no deaths.</li> <li>Moderate quality of life lost.</li> <li>Shut down of critical facilities for more than 1 day and less than 1 week.</li> </ul>	2	
	Critical	<ul style="list-style-type: none"> <li>Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure).</li> <li>Injuries or illnesses result in permanent disability and at least one death.</li> <li>Shut down of critical facilities for more than 1 week and less than 1 month.</li> </ul>	3	
	Catastrophic	<ul style="list-style-type: none"> <li>Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure).</li> <li>Injuries or illnesses result in permanent disability and multiple deaths.</li> <li>Shut down of critical facilities for more than 1 month.</li> </ul>	4	
<b>Warning Time</b>	Less than 6 hours	Self explanatory.	4	15%
	6 to 12 hours	Self explanatory.	3	
	12 to 24 hours	Self explanatory.	2	
	More than 24 hours	Self explanatory.	1	
<b>Duration</b>	Less than 6 hours	Self explanatory.	1	10%
	Less than 24 hours	Self explanatory.	2	
	Less than one week	Self explanatory.	3	
	More than one week	Self explanatory.	4	



TABLE 4.1-2 CALCULATED PRIORITY RANKING INDEX SUMMARY; FLATHEAD COUNTY					
Hazard	Probability	Magnitude and/or Severity	Warning Time	Duration	CPRI Score
Transportation Accidents	Highly likely	Limited	< 6 hours	< 24 hours	3.65
Hazardous Materials Incidents	Highly likely	Critical	< 6 hours	< 1 week	3.60
Communicable Disease	Highly likely	Critical	> 24 hours	> 1 week	3.25
Wildfire	Highly likely	Limited	6-12 hours	> 1 week	3.25
Severe Winter Weather	Highly likely	Limited	> 24 hours	< 1 week	2.85
Flooding	Likely	Critical	12-24 hours	< 1 week	2.85
Earthquake	Possible	Critical	< 6 hours	> 1 week	2.80
Severe Summer Weather	Highly likely	Limited	> 24 hours	< 6 hours	2.65
Avalanche	Likely	Limited	6-12 hours	< 24 hours	2.60
Terrorism, Violence, Civil Unrest	Possible	Critical	< 6 hours	< 24 hours	2.60
Dam Failure	Unlikely	Catastrophic	< 6 hours	< 1 week	2.55
Drought	Likely	Limited	> 24 hours	> 1 week	2.50
Landslide	Possible	Limited	< 6 hours	< 24 hours	2.30
Volcanic Ash	Possible	Critical	> 24 hours	< 1 week	2.25

The Calculated Priority Risk Index scoring method has a range from 0 to 4. "0" being the least hazardous and "4" being the most hazardous situation.

The Planning Team felt that with the CPRI ranking did not accurately represent the County's priorities; therefore, the list of hazards was re-prioritized as shown below. The remainder of this section contains the hazard profiles in this order.

- 1 – Wildfire (*Plan Section 4.2*)
- 2 – Flooding (*Plan Section 4.3*)
- 3 – Hazardous Material Incidents (*Plan Section 4.4*)
- 4 – Severe Winter Weather (*Plan Section 4.5*)
- 5 – Communicable Disease (*Plan Section 4.6*)
- 6 – Transportation Accidents (*Plan Section 4.7*)
- 7 – Severe Summer Weather (*Plan Section 4.8*)
- 8 – Earthquake (*Plan Section 4.9*)
- 9 – Landslide (*Plan Section 4.10*)
- 10 – Terrorism, Violence, Civil Unrest (*Plan Section 4.11*)
- 11 – Dam Failure (*Plan Section 4.12*)
- 12 – Volcanic Ash (*Plan Section 4.13*)

#### **4.1.6 Assessing Vulnerability – Estimating Potential Losses**

The methodology used in the vulnerability analysis presents a quantitative assessment of the building stock, population, and critical facility exposure to the individual hazards. Building stock data, available from the Montana Department of Revenue's cadastral mapping program was used in the analysis. This

data spatially recognizes land parcels along with the appraised value of building stock. Using GIS, hazard risk areas were intersected with the building stock data to identify the number of structures and exposure due to each hazard. Using GIS, hazard risk areas were also intersected with critical facility data to determine the number and exposure of critical facilities to each hazard. Various infrastructure (e.g. water systems, wastewater systems) were analyzed as part of the critical facility vulnerability analysis. A separate analysis was completed for the County's bridges.

Population exposure was computed using data from the 2010 census and the percentage of the census blocks located in each hazard area. Population exposure is reported according to total population living in the hazard area and a subset of this data, individuals under the age of 18 years. Using GIS, total population for the census blocks was intersected with the hazard maps to determine the population at risk. It should be noted that there are some inherent inaccuracies using this approach. Using a percentage of census block population to compute the number of individuals living in the hazard area may include more persons than actually reside in the hazard area where census blocks are large.

For hazards that are uniform across the jurisdiction (i.e. severe summer weather, structure fires, and severe winter weather) the methodology presented below was used to determine annualized property loss.

- Exposure x Frequency x Magnitude

Where:

- Exposure = building stock, vulnerable population, or critical facilities at risk
- Frequency = annual number of events determined by calculating the number of hazard events / period of record
- Magnitude = percent of damage expected calculated by: (property damage/# incidents)/ building stock or critical facility exposure

For hazards that are not uniform across the jurisdiction and instead occur in specific areas (e.g. flooding, wildfire, hazardous material incidents, dam failure, etc.) the hazard area factored into the loss estimation calculations.

For hazards without documented property damage, magnitude could not be calculated and therefore, only the exposure of the building stock or population was computed. Annualized loss estimates cannot be calculated without property damage using this risk assessment approach.

#### **4.1.7 Data Limitations**

Risk assessment results are only a general representation of potential vulnerabilities and there are many inherent inaccuracies with the risk assessment methodology used. Output is only as good as the data sources used and Flathead County may wish to consider alternate data for future PDM Plan updates.

The methodology used for the risk assessment has inherent limitations. Hazard layers were intersected with MDOR parcel data. The MDOR data does not locate structures within the parcel; therefore, any structures within a parcel “clipped” by the hazard layer were assumed to be vulnerable. Where parcels are large in size, it may be inaccurate to assume that all structures are actually within the hazard area. Therefore, exposure data for some hazards may over-report the number and value of structures at risk.

The remainder of this section presents hazard profiles organized by County priority followed by a risk assessment summary. Loss estimates, where applicable, are summarized at the end of this section.

## 4.2 WILDFIRE

<b>CPRI SCORE = 3.25</b>
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### Description and History

A wildfire is an unplanned fire, a term which includes grass fires, forest fires and scrub fires, both man-caused and natural in origin. Severe wildfire conditions have historically represented a threat of potential destruction within the region. Negative impacts of wildfire include loss of life, property and resource damage or destruction, severe emotional crisis, widespread economic impact, disrupted and fiscally impacted government services, and environmental degradation.

Wildfire risk is the potential for a wildfire to adversely affect things that residents value- lives, homes, or ecological functions and attributes. Wildfire risk in a particular area is a combination of the chance that a wildfire will start in or reach that area and the potential loss of human values if it does. Human activities, weather patterns, wildfire fuels, values potentially threatened by fire, and the availability (or lack) of resources to suppress a fire all contribute to wildfire risk. Summer in Flathead County typically brings the fire season, the result of low rainfall, high temperatures, low humidity, and thunderstorms. However, major wildfires can occur at any time of the year. Varied topography, semi-arid climate, and numerous human-related sources of ignition make this possible.

Flathead County has witnessed a number of wildfires that have destroyed property and affected wildlife habitat, scenic resources, and air quality. **Tables 4.2-1 and 4.2-2**, respectively, present wildfire listings from the Montana DNRC and U.S. Forest Service, 10 acres in size and over.

**TABLE 4.2-1**  
**DNRC WILDFIRE LISTINGS >10 ACRES IN FLATHEAD COUNTY**

Date	Name	Cause	Acres	Suppression Cost	Date	Name	Cause	Acres	Suppression Cost
3/12/1992	Boorman School	Debris Burning	10	\$478	3/21/2001	Batavia	Debris Burning	30	\$655
5/7/1992	South Swan Hill	Debris Burning	10	\$18,071	8/14/2001	Werner Peak	Lightning	860	\$3,108,459
10/1/1992	Danielson Rd	Debris Burning	45	\$478	4/5/2002	Smith Lake	Debris Burning	10	\$127
3/27/1994	Farm To Market	Debris Burning	10	\$2,868	4/24/2002	Patrick Creek	Debris Burning	15	\$2,512
3/29/1994	Rhodes Draw	Debris Burning	10	\$2,868	4/19/2002	Michels Slough	Debris Burning	30	\$127
6/24/1994	Bierney Creek #1	Debris Burning	10	\$9,516	4/20/2002	Blanchard Lk	Debris Burning	80	\$2,519
3/23/1994	Swan Highway	Debris Burning	11	\$2,868	7/25/2003	Ashley Road	Equipment	25	\$2,921
4/17/1994	Lower Tally	Debris Burning	12	\$5,500	10/18/2003	Hoffman Draw	Debris Burning	25	\$9,008
4/17/1994	Twin Bridges	Smoking	20	\$8,360	7/17/2003	Lynch	Lightning	35	\$83,407
4/10/1994	Granite Hill	Debris Burning	23		3/30/2004	Spring Creek	Debris Burning	10	\$2,772
9/25/1994	Peters Ridge	Lightning	140	\$486,886	6/4/2004	Lower Gunsight	Lightning	23	\$29,414
8/13/1994	Lost Trail	Lightning	1200	\$601,659	5/3/2005	Bootjack	Debris Burning	10	\$292
9/30/1996	Ashley	Debris Burning	30	\$19,032	5/12/2006	Eagle Crest	Debris Burning	11	\$13,742
9/29/1996	Upper Fish	Debris Burning	50	\$646	7/10/2006	Hoffman Draw	Lightning	18	\$84,357
9/29/1996	Red Air	Debris Burning	75	\$72,792	8/22/2006	Murr Creek	Lightning	343	\$882,677
9/29/1996	Meadow Lake	Debris Burning	92	\$27,225	7/17/2007	Browns Ranch	Lightning	17	\$142,452
8/27/1996	South Sullivan	Arson	205	\$238,753	11/1/2007	Coon #24	Debris Burning	20	\$8,790
3/31/1998	North Hill	Debris Burning	10	\$2,722	7/20/2007	Hog Heaven	Lightning	168	\$101,042



**TABLE 4.2-1  
DNRC WILDFIRE LISTINGS >10 ACRES IN FLATHEAD COUNTY**

Date	Name	Cause	Acres	Suppression Cost	Date	Name	Cause	Acres	Suppression Cost
3/28/1998	Eagle Bend	Miscellaneous	30	\$156	8/6/2008	Dower Draw	Miscellaneous	10	\$37,585
4/9/1998	Wapaiti	Debris Burning	30	\$2,722	7/6/2008	Upper Lost Prairie	Lightning	13	\$2,024
9/2/1998	Ashley	Equipment	40	\$50,926	9/5/2009	Rogers Lake	Campfire	33	\$67,715
4/21/1998	Lost Prairie	Debris Burning	120	\$7,290	11/16/2009	Michael Slough	Debris Burning	42	\$1,494
4/18/1999	Kienas Road	Debris Burning	20	\$0	8/14/2010	Sullivan Creek	Lightning	10	\$14,410
5/25/1999	South Foy's II	Debris Burning	40	\$23,617	3/20/2010	Airport Road	Debris Burning	13	\$1,140
7/29/1999	Bar-Z Ridge	Equipment	107	\$524,017	7/12/2010	No. Fork Murr	Debris Burning	17	\$116,487
4/18/1999	Browns Ranch	Debris Burning	550	\$17,278	8/7/2010	Gunsight Pass	Lightning	22	\$78,124
10/25/2000	Rand Creek II	Miscellaneous	15	\$3,116	3/15/2010	Lost Prairie	Debris Burning	29	\$1,140
8/4/2000	Dahl Lake	Lightning	197	\$371,470	4/5/2010	Northwestern Lake	Miscellaneous	32	\$5,824
8/12/2000	Bald Hill	Lightning	867	\$1,193,061	8/12/2011	Peters Ridge	Lightning	14	\$250,000
4/21/2001	Dower Draw	Debris Burning	10	\$622	8/22/2011	Fitzsimmons	Miscellaneous	23	\$156,432
8/6/2001	Bunyan	Lightning	18	\$32,794	<b>TOTAL</b>			5,995	\$8,935,439

Source: DNRC, 2013

**TABLE 4.2-2  
U.S. FOREST SERVICE WILDFIRE LISTINGS >10 ACRES IN FLATHEAD NATIONAL FOREST**

Date	Name	Cause	Acres	Suppression Cost	Date	Name	Cause	Acres	Suppression Cost
6/23/1986	-	Lightning	17	\$90,000	8/14/2001	Moose	Lightning	71,000	\$19,460,000
8/19/1986	-	Lightning	15	\$139,000	8/18/2001	Ear	Lightning	620	\$3,960,000
5/11/1987	-	Lightning	20	\$12,000	8/18/2001	Long	Lightning	800	\$4,000
7/15/1987	-	Lightning	300	\$8,700	8/19/2001	Tobbagan	Lightning	270	\$1,350
9/13/1987	-	Lightning	35	\$0	9/13/2001	Birk	Lightning	9,674	\$48,370
9/13/1987	-	Lightning	156	\$0	10/28/2002	Condor Peak	Lightning	10	\$300
9/16/1987	-	Lightning	241	\$28,800	7/16/2003	Little Salmon	Lightning	36,765	\$1,600,000
8/4/1988	-	Lightning	630	\$203,900	7/16/2003	Pagoda	Lightning	310	\$10,000
8/16/1988	-	Lightning	138	\$250,000	7/17/2003	Wedge Canyon	Lightning	50,981	\$34,000,000
8/17/1988	-	Lightning	11	\$15,000	7/23/2003	Robert	Other	57,273	\$3,075,000
8/17/1988	-	Lightning	18	\$14,800	7/30/2003	Moose Lake	Lightning	10	\$97,845
8/17/1988	-	Lightning	30	\$23,000	8/5/2003	Una	Lightning	1,172	\$17,500
8/17/1988	-	Lightning	180	\$200,100	8/5/2003	Mid	Lightning	11,213	\$225,000
8/28/1988	-	Lightning	35	\$35,000	8/5/2003	Some Creek	Lightning	11,772	\$175,000
9/6/1988	Red Bench	Lightning	37,500	\$2,035,800	8/5/2003	Charlotte	Lightning	10	\$1,000
10/8/1988	-	Lightning	120	\$9,000	8/6/2003	Crazy Horse	Lightning	11,300	\$13,000,000
9/5/1990	-	Lightning	105	\$50,000	8/8/2003	Independence	Lightning	152	\$10,000
9/18/1990	-	Lightning	35	\$50,000	8/8/2003	Leota Peak	Lightning	1,740	\$26,000
9/23/1990	-	Lightning	19	\$15,000	8/8/2003	Lime Creek	Lightning	3,148	\$154,000
8/11/1991	-	Lightning	756	\$0	8/8/2003	Gordon Creek	Lightning	14,845	\$50,000
8/27/1991	-	Warming Fire	76	\$0	8/8/2003	Casey Creek	Lightning	333	\$16,000
9/15/1991	-	Lightning	320	\$90,000	8/9/2003	Molly	Lightning	49	\$1,200
9/17/1991	-	Lightning	234	\$14,000	8/15/2003	Gyp Mtn	Lightning	4,992	\$75,000
9/28/1991	-	Fireworks	84	\$0	8/15/2003	Bartlett Mtn	Lightning	1,529	\$75,000
10/16/1991	-	Lightning	10	\$32,000	8/19/2003	High	Lightning	122	\$25,000
8/17/1992	-	Warming Fire	270	\$0	8/19/2003	Wounded Buck	Lightning	300	\$42,000
8/17/1992	-	Lightning	90	\$154,000	8/19/2003	Doe	Lightning	460	\$65,000
7/16/1994	-	Other	20	\$500,000	8/19/2003	Beta Lake	Lightning	2,615	\$1,000,000
8/3/1994	Slim Ridge	Lightning	1,564	\$3,000	8/19/2003	Doris	Lightning	2,615	\$1,000,000

**TABLE 4.2-2**  
**U.S. FOREST SERVICE WILDFIRE LISTINGS >10 ACRES IN FLATHEAD NATIONAL FOREST**

Date	Name	Cause	Acres	Suppression Cost	Date	Name	Cause	Acres	Suppression Cost
8/3/1994	Dean Ridge	Brakeshoe	3,507	\$1,000	8/19/2003	Ball Creek	Lightning	7,520	\$8,000,000
8/9/1994	Charlotte Peak II	Lightning	278	\$600	8/19/2003	Blackfoot Lk	Lightning	14,194	\$19,000,000
8/11/1994	Trilobite Lakes	Other	750	\$1,600	8/19/2003	Castle Lake	Lightning	29	\$60,000
8/14/1994	Little Wolf	Lightning	10,610	\$1,200,000	8/1/2005	Limestone Pk	Lightning	188	\$300,000
8/15/1994	-	Lightning	35	\$20,000	8/6/2005	Kelly Point	Cooking Fire	3,875	\$500,000
8/15/1994	-	Fireworks	80	\$35,000	8/8/2006	Jenny Creek	Lightning	1,020	\$3,000
8/15/1994	-	Lightning	45	\$200	8/11/2006	Tango Point	Lightning	1,467	\$2,000
8/15/1994	-	Warming Fire	46	\$100	8/13/2006	Spud Point	Lightning	55	\$3,000
8/15/1994	Pivot Mountain	Lightning	1,237	\$2,500	8/17/2006	Holland Peak	Lightning	1,840	\$1,340,000
8/15/1994	Helen Creek	Lightning	8,497	\$71,800	8/18/2006	Sun Dog	Lightning	1,560	\$3,500,000
9/10/1994	-	Lightning	46	\$100	9/6/2006	Werner Peak	Lightning	18	\$66,000
9/19/1994	-	Other	85	\$100	9/7/2006	Brushshack	Lightning	702	\$3,000
7/17/1996	Dean Creek	Lightning	41	\$8,000	9/7/2006	High Rock	Lightning	492	\$3,000
7/18/1996	Cabin Creek	Lightning	35	\$600	6/28/2007	Turtlehead	Lightning	1,408	\$13,000
7/24/1996	Van East	Resource Burn	50	\$325,000	6/29/2007	Amphitheatre	Lightning	377	\$2,000
8/15/1996	Pilot Peak	Lightning	30	\$600	7/16/2007	Railley	Lightning	21,585	\$160,000
9/23/1996	Fish Creek	Slash Burning	50	\$10,000	7/17/2007	Calbick	Lightning	1,011	\$130,000
7/31/1997	Damnation	Lightning	85	\$0	7/17/2007	Corporal	Lightning	16,105	\$1,500,000
8/7/1998	Damnation	Lightning	210	\$4,894	7/18/2007	Skyland	Lightning	44,176	\$163,200
8/7/1998	Bowl Mtn.	Lightning	3,070	\$450,000	7/18/2007	Felix	Lightning	875	\$49,000
8/20/1998	Picture Creek	Lightning	20	\$1,285	7/26/2007	Brush Creek	Lightning	29,921	\$19,500,000
8/20/1998	Waldbillig 2	Lightning	165	\$10,920	8/10/2007	Gust Mtn	Lightning	100	\$5,000
8/20/1998	Sunburst	Lightning	658	\$3,760	9/10/2007	Table Mtn	Lightning	100	\$2,000
8/20/1998	Challenge	Lightning	8,800	\$5,000,000	7/21/2008	Lindbergh Lk	Other	64	\$835,543
9/4/1998	Cold Lake	Lightning	59	\$250,000	8/9/2008	Wildrose Mtn	Lightning	19	\$10,000
9/12/1998	Jim Lakes III	Lightning	55	\$100,000	8/9/2008	Cardinal Peak	Lightning	228	\$20,000
7/17/1999	Swaney	Lightning	88	\$550,000	8/9/2008	Triangle	Lightning	335	\$500,000
7/29/1999	Essex	Powerline	34	\$103,000	7/26/2009	Gabe Creek	Lightning	1,932	\$120,000
8/27/1999	Meadow Crk Mtn	Lightning	26	\$0	9/17/2009	Ninko	Lightning	670	\$750,000
8/27/1999	Boundary	Lightning	80		9/26/2009	Baldy	Other	246	\$800,000
8/28/1999	Gordon Creek	Lightning	345	\$0	9/26/2009	Lost Creek	Resource Burn	650	\$15,000
9/17/1999	Doogan Dog	Slash Burning	38	\$100,000	6/20/2010	Cardinal Crk	Lightning	2,127	\$130,000
9/17/1999	Dean Ridge	Resource Burn	747	\$5,500	8/26/2010	Deerlick	Lightning	20	\$7,000
7/23/2000	Little Salmon	Lightning	10	\$3,000	7/19/2011	Hammer Crk	Lightning	6,314	\$480,000
7/23/2000	Helen Creek	Lightning	1,645	\$100,000	8/10/2011	Peters Ridge	Lightning	14	\$328,110
7/26/2000	Tillson	Lightning	30	\$1,000	8/16/2011	Big Salmon Lk	Warming Fire	5,183	\$130,000
8/4/2000	Ibex	Lightning	20	\$500	9/8/2011	Upper Ayres	Lightning	174	\$85,000
8/4/2000	Pilot Peak	Lightning	30	\$500	9/8/2011	Stadler Creek	Lightning	633	\$25,000
8/4/2000	Wall Creek	Lightning	60	\$500	9/8/2011	Puzzle	Lightning	2,153	\$136,500
8/4/2000	Minaret Peak	Lightning	619	\$1,500	9/8/2011	Clack Creek	Lightning	121	\$10,000
8/10/2000	Gergen East	Lightning	34	\$150,000	2011	So. Fork Lost Ck	Other	2,160	\$900,000
8/11/2000	Chipmunk	Lightning	3,130	\$3,000,000	7/20/2012	Bar Creek	Lightning	3,000	\$170,000
8/11/2000	Crimson Peak	Lightning	410	\$1,500	7/20/2012	Rapid Creek	Lightning	5,509	\$20,000
8/26/2000	Cyclone Ridge	Lightning	210	\$350,000	7/22/2012	Prisoner Lake	Lightning	4,186	\$185,000
9/16/2000	Haystack	Lightning	20		7/27/2012	Condon Mtn	Lightning	5,500	\$6,800,000
8/2/2001	Bunyan	Lightning	25	\$130,000	8/21/2012	Dart Creek	Lightning	10	\$420,000
8/2/2001	Bergsicker	Lightning	8,649	\$85,000	9/9/2012	Wall Creek	Lightning	5,011	\$75,000
8/3/2001	Cannon	Lightning	1,794	\$20,000	<b>TOTAL</b>			<b>590,574</b>	<b>\$161,544,077</b>

Source: U.S. Forest Service, 2013

Wildfires can be caused by any flame source but are most often triggered by lightning, human carelessness, arson or down power lines. The railroad is also an ignition source for wildfire in Flathead County. Welding and grinding crews as well as the trains themselves throw sparks which can easily set dry vegetation ablaze.

A Presidential wildfire disaster was declared in Flathead County in 1994 (Little Wolf Fire), 2000, and 2003 (Robert Fire, Wedge Canyon Fire, and Flathead Fire Zone). State-wide wildfire emergencies were declared in 1988, 1990, 1991, 1994, 1996, 1998, 2000, 2001, 2003, 2006, and 2007. Below is a newspaper account of the 2003 wildfires.

When Glacier Park Burned, Chris Peterson, Hungry Horse News, July 24, 2013)

*It was a summer of smoke and fire. A combination of drought, high winds, lightning strikes and human carelessness caused vast fires that scorched thousands of acres, shut down the west side of Glacier National Park for days on end, and cost taxpayers more than \$104 million as the fires burned for three months. All told, from the Canadian border south to Condon, wildfires burned 310,000 acres, including 133,000 acres in Glacier Park — more than 10 percent of the Park. Several houses in the North Fork burned to the ground despite the efforts of thousands of firefighters on the ground and dozens of aircraft in the air. But no lives were lost.*



A firefighter looks at the Wedge Canyon Fire in the North Fork in its early stages before it ran across the valley, jumped the river and entered Glacier National Park. (Source: Hungry Horse News)

*Thunderstorms rolled through the Flathead Valley on the night of July 17. The thunderheads brought little rain and plenty of lightning. The year had started out dry, with below normal snows and June precipitation 1.32 inches below normal. July was even drier, with just 0.09 inches of rain, about 1.36 inches below normal. Then the winds came. The Wedge Canyon Fire grew the next morning from two acres to thousands of acres as it roared out of the canyon east toward homes in the North Fork. The fire burned 2,000 acres in 20 minutes, feeding on dead white bark pine killed years before by blister rust. Meanwhile, the Trapper Creek Fire was burning inside the Park in the upper McDonald Creek valley north of The Loop on the Going-to-the-Sun Road.*

*Thirty mile per hour winds blew across the valley on July 23, and the Wedge Canyon and Trapper Creek fires exploded out of control. The Wedge Canyon Fire crossed the fuel break, hopped the North Fork of the Flathead River and entered the Park.*

*The Trapper Creek Fire raged south to The Loop. Hundreds of visitors in the Park watched as it burned right to the Sun Road before rangers evacuated the area. That same afternoon, what's believed to have been an old camp fire near Canyon Creek north of Columbia Falls sprang to life. The Robert Fire raced across the forest, leapt the North Fork River near Glacier Rim and climbed into the Apgar Hills. More lightning and more wind followed. On Aug. 10, the Robert Fire went on another run, leaping the Camas and Inside North Fork roads and running up the north shore of Lake McDonald in a brilliant evening display of fire and smoke. Meanwhile, scores of lower-profile but large fires burned around the Flathead that summer, including several in the Bob Marshall Wilderness, the Blackfoot Lake Complex along the west side of the Hungry Horse Reservoir, the Rampage Complex in the Middle Fork of the Flathead River, and the Crazy Horse Fire near Condon. As large fires burned through August, smoke dogged the valleys, tourists fled and thousands of firefighters filled camps. The Wedge Canyon and Robert fires were at one time ranked as the top priority fires in the country. Seven cabins and 29 outbuildings burned in the Wedge Canyon Fire. In the end, what Mother Nature largely started, she put out. On Sept. 8, 2003, about an inch of rain fell across the region and the fire season all but ended. A few fires sputtered into October, but the big runs were over.*

Flathead County has a high degree of potential for extended fire seasons ranging from March through October or November. County capabilities include rural fire districts, municipal fire departments and fire service areas that provide fire and emergency services throughout Flathead County. The County has the potential to interact with not only DNRC, but also Glacier National Park, the Flathead National Forest, the Salish Kootenai Indian Reservation and Canada thus providing a high degree of interagency complexity. As with numerous counties in Montana, there is an increasing development of WUI areas, with potential access problems and a general lack of understanding of the need for an asset protection zone to protect the improvements (Firelogistics, 2011).

Flathead County has a non-regulatory Community Wildfire Protection Plan (2011). **Appendix E** contains a copy of this document. Mitigation projects identified in this plan are incorporated herein by reference.

### Vulnerability and Area of Impact

Problems with wildfire also occur when combined with the human environment. People and structures near wildfires are threatened unless adequately protected through evacuation or mitigation. Should fires occur, structures within the wildland-urban interface (WUI) are very vulnerable. The WUI is the zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. A WUI exists anywhere that structures are located close to natural vegetation and where a fire can spread from vegetation to structures, or vice versa.



For Flathead County, the WUI is defined as that area in or immediately adjacent to wildland or forest fuels within 1.5 miles of residential structures, developments, or private properties suitable for development or for residential use (Firelogistics, 2011). This zone may be adjusted based on site specific analysis and mapping using logical boundary locations such as geographic features or fuel breaks. When subdivision development is proposed or occurs that is physically outside the established WUI area as adopted by Flathead County, then the WUI boundary will automatically include the subdivision development. Individual features that will also be included as WUI include: municipal or community watersheds, access roads needed for evacuations, and important infrastructure including utility corridors, transportation corridors, and electronic sites necessary for emergency operations.

A significant loss of life could occur to residents, firefighters, and others who are in the wildfire area and do not evacuate. Infrastructure such as electric transmission lines, fuel tanks, and radio transmission towers are not often equipped to withstand the heat from a wildfire. Timber resources, animal habitats, and waterways can all be damaged leading to negative economic and environmental impacts.

A wildfire risk assessment, known as the West-Wide Wildfire Risk Assessment, was recently completed for 17 western states including Montana (Sanborn, 2012). The purpose of the project was to quantify the magnitude of the current wildfire problem and level of risk to communities and resources in the West with results comparable across geographic areas. Flathead County's ranking in the four areas of wildfire risk is presented.

- Fire Risk Index (FRI) - Measure of overall wildfire risk. Flathead County is fourth among Montana counties in this category.
- Fire Effects Index (FEI) - Identifies areas with important values affected by wildland fire and/or that are costly to suppress. FEI is a weighted combination of the Values Impacted Rating and Suppression Difficulty Rating data. Flathead County ranks fourth in this category among Montana counties.
- Fire Threat Index (FTI) - Wildfire threat is an index related to the likelihood of an acre to burn. The FTI integrates the probability of an acre igniting and the expected final fire size, based on the rate of spread in four weather percentile categories, into a single measure of wildfire threat. Flathead County ranks fourth in this category among Montana counties.
- Wildland Development Areas - Describes where people are living in wildland areas. This dataset is derived from the LandScan population count data and represents the number of housing units per acre. Flathead County ranks first in this category among Montana counties.

It is possible that Flathead County residents could be exposed to wildfire smoke originating in the Libby area of adjoining Lincoln County that could pose a respiratory hazard. Due to the Libby Asbestos Superfund, amphibole dust has been detected on the bark of trees in the Kootenai National Forest near the closed W.R. Grace Vermiculite Mine property. A five-mile radius around the mine property has been impacted by releases of asbestos from the mine including the surrounding forest.

Since the awareness of Libby amphibole contamination in tree bark, firefighting in this area is currently performed from the air or with use of appropriate protective gear and equipment. Further testing is being completed to evaluate the potential exposure hazard to area residents from smoke if a wildfire was to escape initial suppression efforts. A task force of local, state, and federal agencies are considering options to address this hazard which may include keeping an air-based wildfire suppression unit stationed in Libby during the fire season (Lincoln County PDM Plan, [Tetra Tech, 2011]).

### Probability and Magnitude

Property damage is difficult to obtain for wildfires since it is typically the agricultural and forest resources that sustain the damage. DNRC has collected data on structure loss from wildfires since 2003. This source indicates that in the past 10 years, wildfire has not claimed any residential structures in Flathead County. As such, the magnitude of wildfire can be correlated with the acres burned and cost to suppress the fire by local, state, and federal agencies. **Table 4.2-3** presents the wildfire events in Flathead County with reported suppression costs. In the past 25 years, over \$172 million has been spent to suppress wildfires in Flathead County.

TABLE 4.2-3 FLATHEAD COUNTY WILDFIRE SUPPRESSION COST SUMMARY					
Date	Acres Burned	Suppression Cost	Date	Acres Burned	Suppression Cost
1986*	44	\$291,300	2000	7,330	\$5,411,648
1987*	776	\$57,500	2001	93,772	\$26,954,251
1988*	38,701	\$2,876,700	2002	157	\$333,085
1989*	5	\$6,400	2003	235,590	\$82,302,291
1990*	165	\$142,100	2004	50	\$60,354
1991*	1,504	\$167,800	2005	4,080	\$806,092
1992	432	\$175,726	2006	7,557	\$6,167,276
1993	0	\$0	2007	115,899	\$22,411,302
1994	28,264	\$3,093,525	2008	678	\$1,573,152
1995	3	\$4,500	2009	3580	\$2,000,669
1996	673	\$721,848	2010	2,276	\$362,124
1997	88	\$13,000	2011	16,800	\$2,514,042
1998	13,285	\$5,992,559	2012*	23,240	\$8,009,544
1999	2103	\$1,333,912	<b>TOTAL</b>	594,949	\$172,448,788

Source: DNRC, 2013; U.S. Forest Service, 2013

\* = USFS Data Only

Wildfire does not present a uniform risk across Flathead County. **Figure 6 and 6A through 6C** present a wildfire risk map showing the WUI in Flathead County, Columbia Falls, Kalispell, and Whitefish, respectively. The WUI layer used for this analysis is from the CWPP (Firelogistics, 2011). To complete the vulnerability analysis for this project, GIS was used to intersect the WUI layer with both the critical facility and MDOR cadastral parcel datasets. Estimates of vulnerable population were calculated by determining the percent exposure in each census block for the hazard area. Exposure values are presented in **Table 4.2-4**. Annualized loss estimates were calculated by applying frequency and magnitude to building stock exposure, and are presented on the Risk Assessment Summary tables in *Section 4.15 (Tables 4.15-1 through 4.15-4)*. Building exposure reflects only the monetary structure value and does not account for improvements or personal effects that may be lost to wildfire. The *Wildfire Section* in **Appendix C** presents supporting documentation from the risk assessment including a list of critical facilities in the WUI.

GIS analysis of the wildfire risk to Flathead County indicates that approximately 914,642 acres are within the WUI. According to the vulnerability analysis, 12,015 residences, 767 commercial, industrial and agricultural buildings, and 108 critical facilities and locations where vulnerable populations reside are located in the WUI. Digital data on construction type for the facilities is not available but will be considered in future PDM updates.

The history of wildfires in the region has prompted Flathead County to identify wildfire as a significant hazard. Smoke from fires both within and outside of the County can create poor air quality. Sensitive groups, such as the elderly and asthmatics, can be affected. Wildfires can also have a significant impact on the regional economy with the loss of timber, cultivated fields and pasture, natural resources, recreational opportunities, or tourism. Although the primary concern is to structures and the interface residents, most of the costs associated with fires come from firefighting efforts. As past events have also shown, infrastructure such as power transmission lines can also be threatened.

Wildfires generally occur more than once per year in Flathead County and therefore, the probability of future events are rated as “highly likely”.

#### Future Development

Wildfire disasters can be mitigated through comprehensive land use planning that includes housing development design, fuels management, and public education. Regulations and ordinances addressing these issues in future development can play a significant role to minimize the danger posed by fire to residents, homes, and firefighters.

The Flathead County Growth Policy (2012) acknowledges the wildfire risk in the County through the following policy statements on future development:

- Adopt techniques that mitigate the threat to public health and safety created by various developments near the WUI.
- Require new subdivisions to have adequate on-site water capacity and recharge for fire protection.
- Support mutual aid agreements between rural and municipal fire districts.
- Recommend subdivisions located outside existing rural fire districts be annexed into the nearest district if possible.
- Encourage two or more subdivision access points in areas of high and extreme fire hazard.
- Ensure convenient access to and within all subdivisions for the largest emergency service vehicles.

The Columbia Falls Growth Policy (2013) recognizes that steep slopes in combination with timberlands create wildfire hazards. A fire protection policy encourages loop roads over cul-de-sacs in order to provide secondary access, in areas at high risk from wildfire.

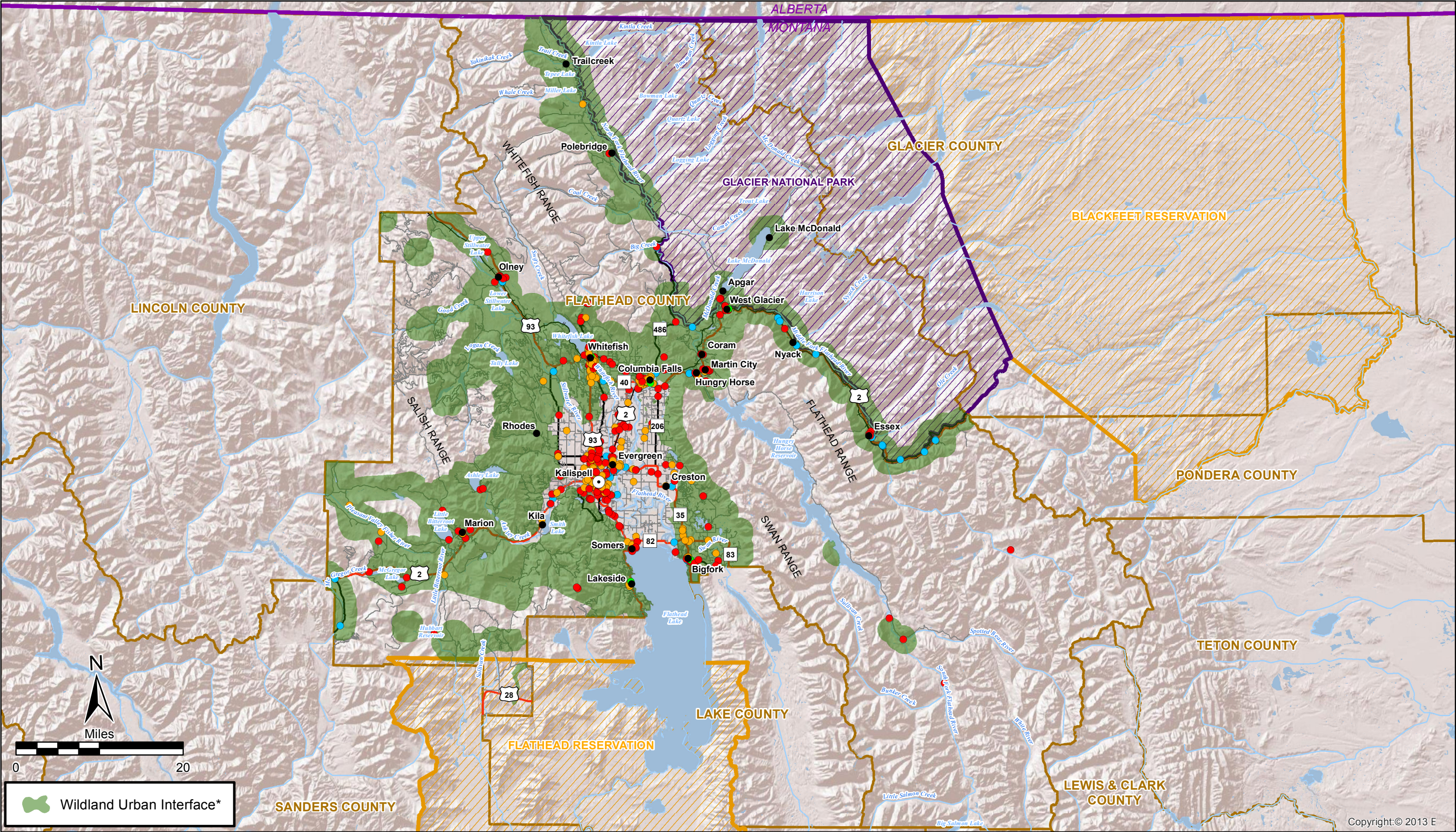
Subdivision Regulations for Flathead County and the Cities of Columbia Falls and Whitefish have special standards for high fire hazard areas as well as defensible space standards. High fire hazard areas include heads of draws, excessive slopes, dense forest growth, or other hazardous wildfire components. For subdivisions proposed in areas subject to moderate or high wildfire hazard, the following standards apply:

- Secondary access is required.
- Road right-of-way shall be cleared of slash.
- Building sites shall be prohibited on any slope that exceeds 30 percent when located in areas where the general slope characteristic exceeds 30 percent and at the apex of "fire chimneys".
- Open space, park land and recreation should be located to separate residences and other buildings from densely forested areas.
- A water supply of sufficient volume for effective fire controls.
- Only Class A and Class B fire-rated roofing materials are allowed.
- Defensible Space Standards shall be incorporated around all primary structures.

The Flathead County Zoning Regulations (2012) indicate in performance standards for residential clustering, that the cluster sites, if located within a forested area, not be within an area that is rated as "very high" or "extreme" fire risk by the Montana DNRC after subdivision improvements.

Neighborhood Plans for Labrant-Lindsey Lane, Lakeside, Little Bitterroot, North Fork, The Canyon, and West Valley identify goals and policies associated with the wildfire hazard.



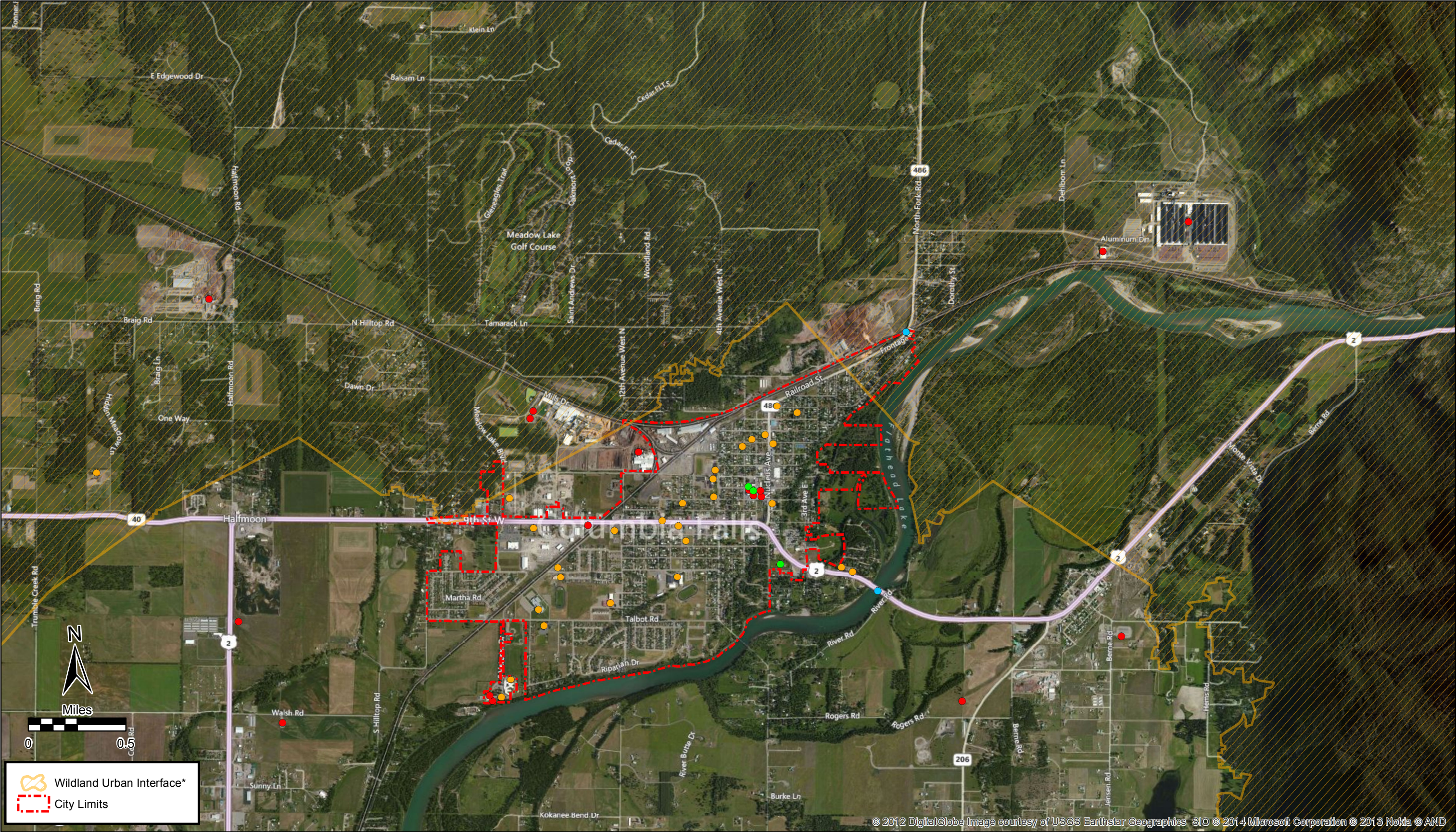


\*Wildland Urban Interface Risk Areas as determined by the Local Community Wildfire Protection Plan.



- |               |                         |                   |                  |                               |
|---------------|-------------------------|-------------------|------------------|-------------------------------|
| ○ County Seat | ● Critical Facility     | — Primary Route   | — River/Stream   | Indian Reservation            |
| ● Place Names | ● Vulnerable Population | — Secondary Route | — Lake/Reservoir | National Park                 |
|               | ● Other                 | — Other Route     |                  | County                        |
|               | ● Bridges               | — Railroads       |                  | United States - Canada Border |





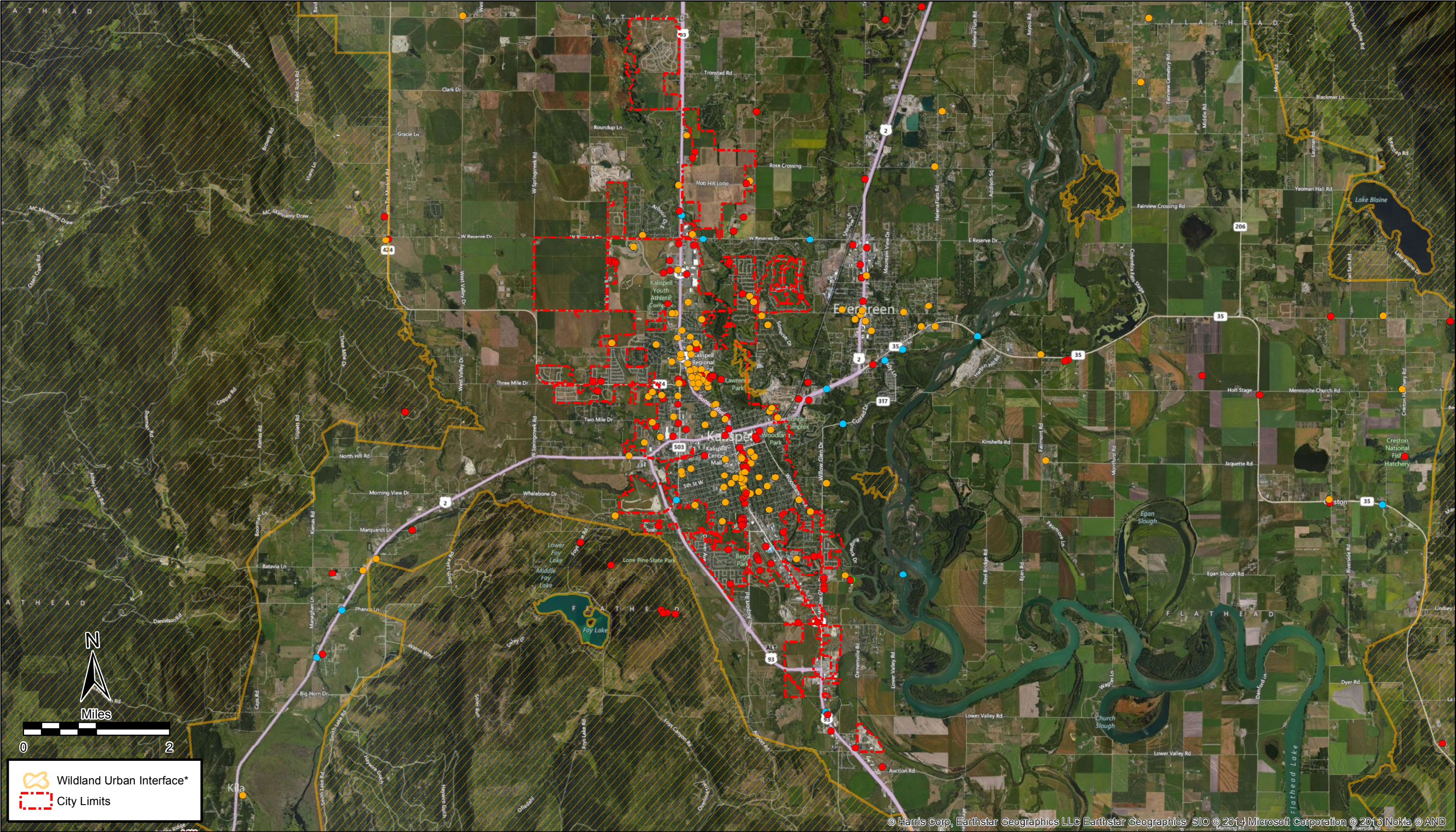
\*Wildland Urban Interface Risk Areas as determined by the Local Community Wildfire Protection Plan.



- |                         |           |
|-------------------------|-----------|
| ● Critical Facility     | ● Other   |
| ● Vulnerable Population | ● Bridges |

May 2014  
Figure 6A  
**Wildland Urban Interface - Columbia Falls**  
**Flathead County**  
Pre-Disaster Mitigation Plan





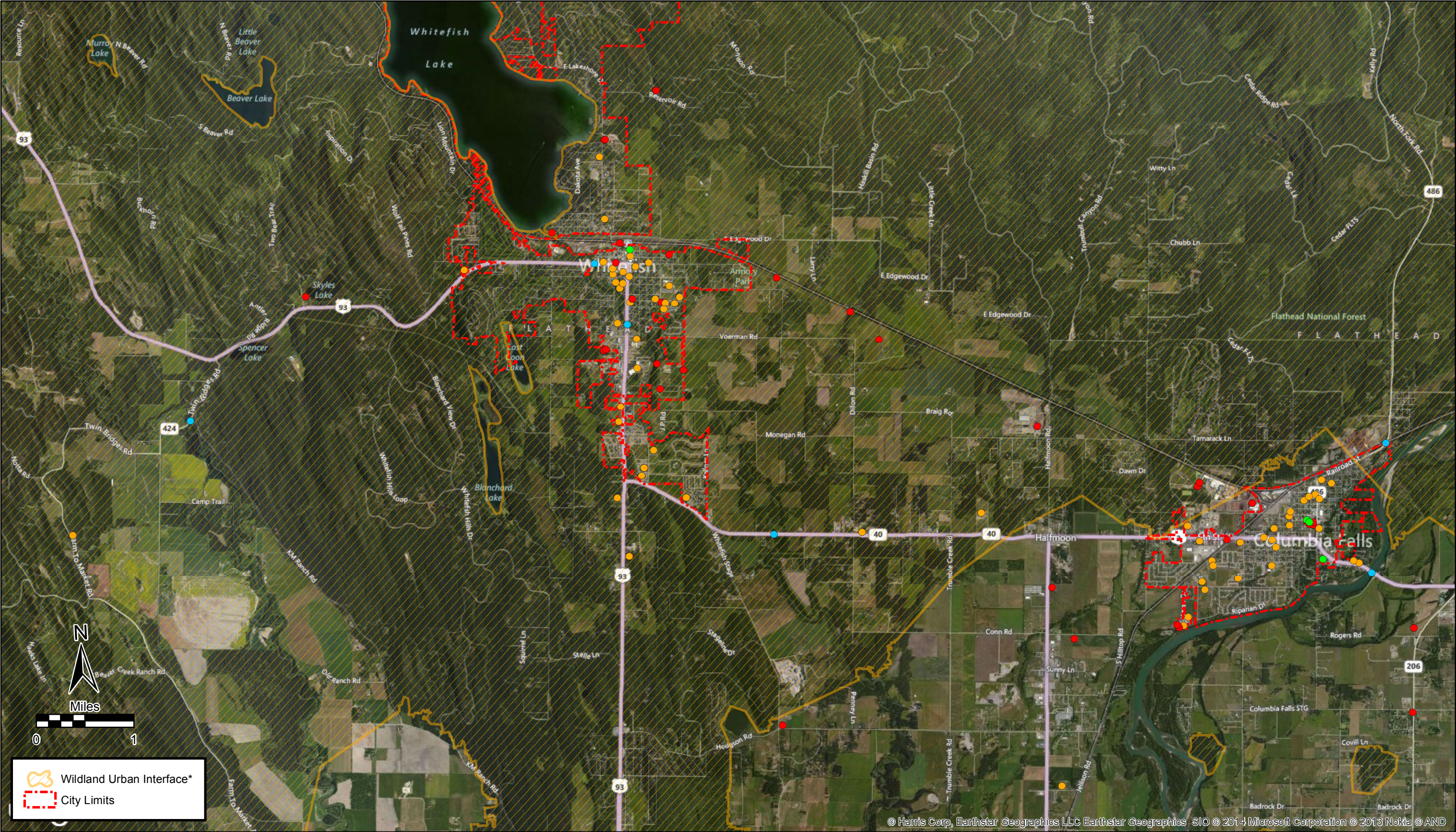
\*Wildland Urban Interface Risk Areas as determined by the Local Community Wildfire Protection Plan.



- |                         |           |
|-------------------------|-----------|
| ● Critical Facility     | ● Other   |
| ● Vulnerable Population | ● Bridges |

May 2014  
Figure 6B  
**Wildland Urban Interface - Kalispell  
Flathead County**  
Pre-Disaster Mitigation Plan





\*Wildland Urban Interface Risk Areas as determined by the Local Community Wildfire Protection Plan.



● Critical Facility	● Other
● Vulnerable Population	● Bridges

May 2014  
Figure 6C  
**Wildfire Hazard Area - Whitefish  
Flathead County**  
Pre-Disaster Mitigation Plan



**TABLE 4.2-4  
FLATHEAD COUNTY VULNERABILITY ANALYSIS – WILDFIRE**

JURISDICTION	RESIDENTIAL PROPERTY EXPOSURE \$	# RESIDENCES AT RISK	COMMERCIAL, INDUSTRIAL & AGRICULTURAL PROPERTY EXPOSURE \$	# COMMERCIAL, INDUSTRIAL & AGRICULTURAL PROPERTIES AT RISK	CRITICAL FACILITIES EXPOSURE RISK \$	# CRITICAL FACILITIES AT RISK	BRIDGE EXPOSURE \$	# BRIDGES AT RISK	PERSONS AT RISK	PERSONS UNDER 18 AT RISK
<b>Incorporated Communities &amp; County</b>										
Columbia Falls	\$8,257,028	62	\$5,232,384	6	\$0	0	\$614,170	1	495	115
Kalispell	\$0	0	\$298,500	2	\$0	0	\$0	0	462	90
Whitefish	\$650,672,548	2,603	\$207,959,032	425	\$41,251,158	44	\$690,060	4	6,376	1,238
Remainder of County	\$2,032,751,49	9,350	\$129,577,438	334	\$24,885,618	64	\$14,247,22	43	24,122	5,326
<b>Census Designated Places</b>										
Batavia	\$1,057,133	9	\$147,091	2	\$0	0	\$0	0	191	56
Bigfork	\$506,812,230	2,211	\$77,658,708	203	\$11,452,506	21	\$769,328	3	4,218	773
Coram	\$23,181,631	251	\$4,452,676	24	\$0	2	\$0	0	539	96
Evergreen	\$1,627,869	10	\$0	0	\$0	0	\$186,536	1	1,194	291
Forest Hill Village	\$8,720,594	77	\$1,928,685	12	\$1,387,810	1	\$0	0	194	27
Helena Flats	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Hungry Horse	\$28,023,684	347	\$7,163,105	55	\$0	5	\$0	0	862	192
Kila	\$9,818,987	70	\$2,559	1	\$0	0	\$0	0	324	56
Lakeside	\$279,544,662	1,241	\$22,324,728	79	\$663,800	5	\$0	0	2,669	551
Little Bitterroot Lake	\$53,248,916	245	\$635,600	1	\$0	2	\$0	0	194	22
Marion	\$39,518,471	274	\$2,787,274	14	\$189,650	7	\$0	0	886	252
Martin City	\$15,563,882	167	\$4,572,828	25	\$1,173,497	9	\$26,840	1	500	95
Niarada	\$0	0	\$0	0	\$0	0	\$0	0	7	2
Olney	\$3,817,244	60	\$332,500	2	\$416,999	5	\$73,152	1	167	28
Somers	\$50,177,633	236	\$5,238,185	10	\$156,948	1	\$0	0	496	104
West Glacier	\$25,898,923	178	\$13,807,381	31	\$738,678	8	\$1,719,035	2	227	28

### 4.3 FLOODING

<b>CPRI SCORE = 2.85</b>
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#### Description and History

A flood is a natural event for rivers and streams. Excess water from snowmelt and rainfall accumulates and overflows onto the banks and adjacent floodplains. Floodplains are lowlands, adjacent to rivers and lakes that are subject to recurring floods. A flash flood generally results from a torrential (short duration) rain or cloudburst on a relatively small drainage area. Ice jam flooding occurs when pieces of floating ice carried by the streams current accumulate at an obstruction to the stream. The water held back can cause flooding upstream, and if the obstruction suddenly breaks, flash flooding can then occur downstream as well. A log jam is an accumulation of large woody debris (usually logs more than four inches in diameter and over six feet long) that can span an entire stream or river channel. When the jam is large enough water can accumulate upstream of the jam which will cause flooding. Once a log jam releases, downstream flooding may occur. The Flathead, Stillwater and Whitefish Rivers all have had significant log jams in the past and it can be assumed they will occur again in the future.

It is estimated that flooding causes 90 percent of all property losses from natural disasters in the United States and kill an average of 150 people a year nationwide. Most injuries and deaths occur when people are swept away by flood currents and most property damage results from inundation by sediment-laden water. Faster moving floodwater can wash buildings off their foundations and sweep vehicles downstream. Pipelines, bridges, and other infrastructure can be damaged when high water combines with flood debris. Basement flooding can cause extensive damage to the structure and systems of a building.

The NWS provides short-term forecasts and warnings of hazardous weather to the public by producing regularly-scheduled severe weather outlooks and updates on various forms of hazardous weather including heavy rain and flooding. A “watch” is issued when conditions are favorable for severe weather in or near the watch area. A “warning” is issued when the severe weather event is imminent or occurring in the warned area. Warning and Advisory Criteria for flooding is presented below.

Flash Flood Warning: Flooding is imminent, water levels rise rapidly with inundation occurring in less than 6 hours.

Flood Warning: Flooding is expected to occur more than 6 hours after the causative event.

The most severe flooding in Flathead County usually occurs in the spring and early summer months as a result of snowmelt and/or rainfall runoff. On rare occasions, ice jams result in some overbank flooding. In addition to flooding along streams, shallow flooding periodically occurs in other isolated, developed areas of the county due to other factors. The mountains can receive several hundred inches of snow annually. Low flows in the basin occur naturally during the winter months, and floods normally occur in

the spring during periods of rapid snowmelt. Runoff from snowmelt, occasionally combined with rainfall, provides high stream flows in the spring.

According to the Flathead County Growth Policy (2012), the Flathead Valley has experienced six severe flood events. These occurred in 1894, 1926, 1948, 1964, 1975 and 1995. Presidential Disasters due to flooding were declared in Flathead County in 1975, 1996, 1997, and 2011. Statewide flood emergencies were declared in 1978, 1981, 1984, 1986, 1997, 1998, 2003 and 2013 (DMA, 2013).

A description of several flood events in Flathead County from the Flathead County Flood Insurance Study (FEMA, 2013) is presented below.

**1964 Flood** - Rain-swollen Bear Creek swept down from the Continental Divide to obliterate large sections of U.S. Highway 2. What once was a timbered valley along Bear Creek was now a wide gravel and rock trough (Hungry Horse News). Extremely high runoff in the Middle Fork Flathead River drainage basin caused extensive damage to highways and railroads in narrow valleys along the southern edge of Glacier National Park. A steel bridge on U.S. Highway 2 across the river at the unincorporated community of Essex was washed away. In the Nyack Flats area downstream of Essex, 30 residents were evacuated by air. It was reported that one of the homes and some barns at Nyack had only roofs above water. Farther downstream along Middle Fork Flathead River at West Glacier, the main highway bridge to the west entrance of Glacier National Park was damaged beyond repair. An old, low single arch concrete bridge was completely submerged, but the arch was not seriously damaged. Downstream from West Glacier, a rock canyon constricted flow, and for a time, part of the river flowed upstream along McDonald Creek into Lake McDonald in Glacier National Park. Flow of South Fork Flathead River was completely regulated at Hungry Horse Dam which saved the community of Columbia Falls. Even with one of the three forks regulated, there was extreme flooding in the Flathead River Basin upstream from Flathead Lake..." Almost beyond comprehension is the devastating flood damage to residents of the Flathead Valley along the banks of the Flathead River and the hundreds of people living in the Evergreen area. The flood parallels that of 1948 when the same area was flooded" (Kalispell News). Flathead County suffered \$28.4 million in damages, according to the Daily Interlake. Hundreds of homes flooded, especially in Evergreen and around Columbia Falls. From Essex to Flathead Lake, five bridges were ruined, six miles of railroad track and 20 miles of U.S. Highway 2 were destroyed.

**1975 Flood** - More than 200 trailer homes were either flooded or pulled from high-water areas, particularly at Spruce Park (Evergreen area) which ended up under more than four feet of water. About 50 residences in the Evergreen area were surrounded by rising waters (Kalispell Weekly News). In addition to the Flathead River Valley flooding, severe flows and damage were experienced along Bear Creek and Middle Fork Flathead River in 1975. Five homes were inundated and the county road was damaged near the West Glacier Golf Course. Rushing water also collapsed the old bridge near the Glacier National Park Headquarters.

**1997 Flood** - In 1997, snowmelt flooding caused numerous road closures and road washouts throughout the region. At least three road washouts were reported and one bridge was damaged. At least 50 homes were flooded, mainly along Ashley Creek and the Stillwater, Swan, and Whitefish Rivers. Fifty (50) people were isolated along Truman Creek, which washed out an access road.

**2005 Flood** – In 2005, a home was flooded from Hemlar Creek over topping its banks. Other creeks that flooded were Krause and Handkerchief where homes were also threatened by high water. Flooding of low lying areas was reported near Swan Lake. In Big Fork Bay, the combination of high creek flows and high water in Flathead Lake caused rising water and minor damage to docks in the bay. In Glacier National Park, the Going to the Sun Road was closed due to rockslides from heavy rainfall.

### Vulnerability and Area of Impact

According to the Flathead County Growth Policy (2012), the presence of floodplain in Flathead County is an impediment to growth and development. The relatively flat terrain of the valley floor manifests itself in the sinuous nature of the rivers that wind through the valley to Flathead Lake. Glacier outwash underlies most of the area in the Flathead River Valley and forms floodplains and terraces adjacent to the Flathead River and its tributaries. Most of the floodplain is located along the Flathead River corridor between Columbia Falls and Flathead Lake. Areas of 100-year floodplain are present along the Stillwater and Whitefish Rivers.

Residents living closer to the center of the valley commonly access a shallow alluvial aquifer, often referred to as the Evergreen Aquifer. The Evergreen Aquifer is located between the Flathead River to the east and Whitefish River to the west, and between Badrock Canyon to the north and the confluence of the Flathead and Whitefish rivers to the south. The depth to water table in this area is generally less than 50 feet and, for much of the area, less than five feet.

According to the Flathead County Growth Policy (2012), a significant amount of area with seasonally high ground water and/or frequent flooding can be found throughout the Flathead River corridor and the valley bottom, which is experiencing development pressure. Much of the development south of Kalispell in the Lower Valley area is occurring where the depth to groundwater is less than 15 feet. Homes being constructed in this area are on individual water and septic systems which have the potential to impact water quality.

Development in floodplains results in a concurrent risk of property damage due to floods and impacts on city services for risk protection during flood season. **Figure 7 and 7A through 7C** present the flood-prone areas within Flathead County, Columbia Falls, Kalispell, and Whitefish, respectively. These maps were developed from digital flood insurance rate maps (DFIRMs).

### *Flood Protection Measures*

As of the 2013 Continuing Eligibility Inspection, Flathead County has six levees on the Flathead River that are included in the U.S. Army Corp of Engineers (USACE) PL84-99 Rehabilitation and Inspection Program and considered active under the requirements of that program. The six levees are Edmiston, El Rancho, El Rancho East, Lybeck, Pressentine and Steel Bridge. These levees are inspected every two years by the USACE and Flathead County performs maintenance and repair work to keep these levees in the PL84-99 Program. In 2013 a seventh levee that had previously been active under the PL84-99 program (Pederson Levee) was voluntarily withdrawn from the program by Flathead County because the work required by the USACE to maintain the levee as active in the program after the 2011 inspection was cost prohibitive. Other levees in Flathead County are not maintained by Flathead County at this time.

The Whitefish River has no manmade flood protection structure near Whitefish. However, the naturally occurring high banks through the town provide adequate flood protection. Whitefish Lake provides flood storage detention and some flow regulation along Whitefish River near Whitefish (FEMA, 2013).

Dams and reservoirs that affect the Flathead River Valley flooding are Hungry Horse Dam and Reservoir on South Fork Flathead River and Kerr Dam on Flathead Lake on Flathead River.

Stillwater River has several small lakes which are capable of providing some flood detention in the upper reaches of the watershed. Just north of Kalispell, there is a dike running along the left bank (looking downstream) of Stillwater River in the area of the golf course. This dike has changed physical dimensions several times due to recreational development in the area. This dike is not certified and is not reflected on the FIRM. Along Stillwater River, there are other minor flood protection features, which are intended to reduce overbank flooding and stabilize streambanks (FEMA, 2013).

### *Floodplain and Floodway Management*

The National Flood Insurance Program (NFIP) encourages local governments to adopt “sound” floodplain management programs to reduce private and public property losses due to floods. Flathead County and the incorporated communities participate in the NFIP. **Table 4.3-1** presents statistics on flood insurance policies and losses.



TABLE 4.3-1 NATIONAL FLOOD INSURANCE PROGRAM STATISTICS (THROUGH 12/31/2013)				
Jurisdictions	Policies in Force	Insurance in Force	Number of Losses	Total Payments
Flathead County	584	\$134,440,800	6	\$528,914
City of Columbia Falls	8	\$1,263,300	96	\$110,829
City of Kalispell	41	\$10,316,400	9	\$11,085
City of Whitefish	106	\$9,373,600	1	\$0

Source: FEMA, 2014. <http://bsa.nfipstat.fema.gov/reports/1011.htm#MTT>;  
<http://bsa.nfipstat.fema.gov/reports/1040.htm#30>

Many of the flood prone areas in Flathead County are covered by Flood Insurance Rate Maps (FIRMs), developed by FEMA. These maps show areas of 100-year Special Flood Hazard Areas, commonly referred to as 100-year floodplains in the County. FEMA has not identified all of the floodplains in Flathead County, but most of the Flathead, Whitefish and Stillwater River corridors and the valley bottoms have been mapped and shown on the FIRMs. Approximately 12 percent of the valley area of Flathead County is designated as 100-year floodplain. An additional 2 to 3 percent of the valley bottom is designated as 500-year floodplain. A Flood Insurance Study produced by FEMA of Flathead County was updated 2013.

Flathead County and the incorporated communities passed Floodplain and Floodway Management Ordinances to comply with the Montana Floodplain and Floodway Management Act and to ensure compliance with requirements for continued participation in the National Flood Insurance Program. The floodplain ordinances identify land use regulations to be applied to all identified 100-year floodplains within local jurisdictions.

According to DNRC, there are no repetitive loss properties in Flathead County or the communities of Columbia Falls, Kalispell, or Whitefish. A repetitive loss property is any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling ten-year period, since 1978. There are no severe repetitive loss properties in Flathead County or the incorporated communities. Severe repetitive loss properties have had at least four NFIP claim payments over \$5,000 each and the cumulative amount exceeding \$20,000; or, where at least two separate claim payments have been made with the cumulative amount exceeding the market value of the building.

The NFIP's Community Rating System (CRS) recognizes community efforts (beyond minimum standards) by reducing flood insurance premiums for the community's property owners. CRS discounts on flood insurance premiums range from 5 percent up to 45 percent. Those discounts provide an incentive for new flood protection activities that can help save lives and property in the event of a flood. To participate in the CRS, a community can choose to undertake some of the 18 public information and floodplain management activities. Based on the total number of points a community earns, the CRS assigns you to one of ten classes. Your discount on flood insurance premiums is based on your class.

Flathead County participates in the CRS and has a rating of “8” which provides a 10 percent discount on flood insurance premiums.

### Probability and Magnitude

Flood listings with associated property damage from the SHELDUS database and Montana DES database of State and Federal disaster declarations are presented in **Table 4.3-2**.

TABLE 4.3-2 FLATHEAD COUNTY FLOOD EVENTS WITH DAMAGES					
Date	Injuries	Fatalities	Property Damage	Crop Damage	Source
1948	-	-	\$9,706,059	-	Flood Insurance Study
1964	-	-	\$184,869,097	-	Flood Insurance Study (damage west of Continental Divide)
3/17/1969	0	0	\$5,525	-	SHELDUS
7/21/1970	0	0	-	\$148,765	SHELDUS
1975	-	-	\$8,695,762	-	Flood Insurance Study
2/24/1986	0.04	0.04	\$42,844	-	SHELDUS
7/12/1989	0	0	\$2,349	\$2,349	SHELDUS
11/11/1989	0	0	\$313,189	-	SHELDUS
7/5/1990	0	0	\$8,926	\$8,926	SHELDUS
11/24/1990	0	0	\$22,314	-	SHELDUS
6/6/1995	0	0	\$178,518	-	SHELDUS
2/7/1996	0	0	\$155,863	-	SHELDUS
5/1/1997	0	0	\$302,647	-	SHELDUS; NCDC
5/26/1998	0	0	\$20,708	-	SHELDUS
7/19/2004	0	0	\$24,623	-	SHELDUS; NCDC
6/2/2005	0	0	\$208,568	-	SHELDUS; NCDC
11/5/2006	0	0	\$8,122,083	-	SHELDUS; NCDC
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>\$212,679,075</b>	<b>\$160,040</b>	

Source: SHELDUS, 2013 (adjusted to 2014 dollars); NCDC, 2014; DES, 2013

The DFIRM-generated flood hazard layer is shown on **Figures 7 and 7A through 7C** for the County and incorporated communities. The flood hazard area was intersected with the critical facility and MDOR parcel datasets using GIS (**Table 4.3-3**). Vulnerable population was calculated based on the percentage of flood risk area in each census block. Annualized loss estimates are presented in the Risk Assessment Summary Tables in *Section 4.15* (**Tables 4.15-1 through 4.15-5**). The *Flooding Section* in **Appendix C** presents supporting documentation from the risk assessment.

The GIS analysis indicates that 68,332 acres in Flathead County are located in the flood hazard area including 2,103 residences, 95 commercial, industrial and agricultural buildings, and 4 critical facilities or locations where vulnerable populations reside. It should be noted, however, that the analysis methods used may indicate more structures and value at risk than in actuality because the data does not

distinguish where on the parcel the structures are located and structures on any parcel “clipped” by the hazard area are assumed to be at risk.

Based on the frequency of past events, the probability of flooding in Flathead County is rated as “likely”; an event that may occur more than once per decade but not every year.

### Future Development

Floodplain regulations exist in Flathead County and the cities of Columbia Falls, Kalispell, and Whitefish. These regulations basically preclude new structural development within areas classified as designated floodways under state law. Floodplain provisions in the Flathead County Subdivision Regulations, as well as subdivision regulations for Columbia Falls, Kalispell and Whitefish, stipulate that land located in the 100-year floodplain or deemed subject to flooding shall not be subdivided for building or residential purposes. Building in the 100-year floodplain requires state, federal, and local permits and buildings must be elevated two feet above the base flood elevation with no basements. There are no restrictions for building in the 500-year floodplain. The Subdivision Regulations also provide standards for flood hazard evaluation in subdivision review.

Subdivision regulations for the City of Columbia Falls have provisions for high groundwater. Surface areas where monitored groundwater elevations in four feet or less to the surface, generally from March 15 through June 30, cannot be subdivided for residential or development purposes unless public sewer service is available or a property engineered private community waste water treatment system is constructed.

The Flathead County Growth Policy (2012) includes two goals and several policies to address the flood hazard:

*Restrict development on lands that pose an unreasonable risk to the health, safety and general welfare of all Flathead County residents.*

- Discourage high density development within the 500-year floodplain.
- Discourage development within the 100-year floodplain that displaces floodwaters to neighboring properties.
- Encourage impact-mitigated development in areas of shallow groundwater. Use test holes or bore holes and best available data to determine areas of shallow groundwater.

*Preserve and protect floodplains to ensure the safety of residents from flood hazards and to prevent the degradation of water quality and critical wildlife habitat.*

Adopt FEMA maps and existing floodplain studies as they become available.

- Review and revise floodplain regulations as necessary. Consider appropriate setback requirements from floodplain.

- Discourage development in floodway or floodway fringe that may result in a net increase in the floodplain area.
- Consider density guidelines in the floodplain regulations.
- Discourage development that displaces floodwaters within the 100-year floodplain.

The Flathead River to the east along with the Whitefish River and Stillwater River create a significant amount of area that is restricted to development because it lies in the 100-year floodplain. Whenever any type of fill is proposed in the 100-year floodplain, a floodplain development permit is required to be obtained in accordance with the NFIP. The City of Kalispell's Floodplain Development Permit Implementation Strategy is:

- Continue to participate in the NFIP to keep flood insurance rates low for all the residents of the community.
- Discourage fill in the 100-year floodplain when other viable options are available for development.
- Do not allow the creation of new subdivision lots in the 100-year floodplain when fill would be required to establish a building site.

The City of Kalispell Growth Policy (2003) has one goal, and several policies and recommendations that address the flood hazard:

*Development near environmentally sensitive areas should be accomplished so that these features are left in a relatively undisturbed state.*

- Development in environmentally sensitive areas including 100-year floodplain, wetlands, riparian areas, shallow aquifers and on steep slopes may pose inherent development limitations and design should be managed to avoid and mitigate environmental impacts and natural hazards.
- Filling of wetlands and the 100-year floodplain should be avoided.
- Development should be designed to avoid the loss and minimize impacts to environmentally sensitive areas including the 100-year floodplain, wetlands, riparian areas and shallow aquifers.

Recommendations:

- The City should coordinate with the County in developing a community-wide drainage plan encompassing the city and surrounding suburbs, to reduce water pollution and flooding.
- Coordinate regulatory programs involving floodplain, habitat and water quality.
- Maintain the integrity of environmentally sensitive areas in order prevent flooding, maintain high water quality and prevent soil erosion.
- Identify areas of the 100-year floodplain and other areas with limited development potential that may be suitable for future park development.

The City of Columbia Falls Growth Policy (2013) recognizes that floodplains present development limitations in the eastern portion of their planning area where the Flathead River creates a large floodplain area. Growth policies and recommendations include:

- Development in 100-year floodplains should be managed to avoid and mitigate environmental impacts and natural hazards.
- Filling of the 100 year floodplain should be avoided.

Recommendations:

- Protect the 100-year floodplain through implementation of the National Flood Insurance Program for both the City and the County.

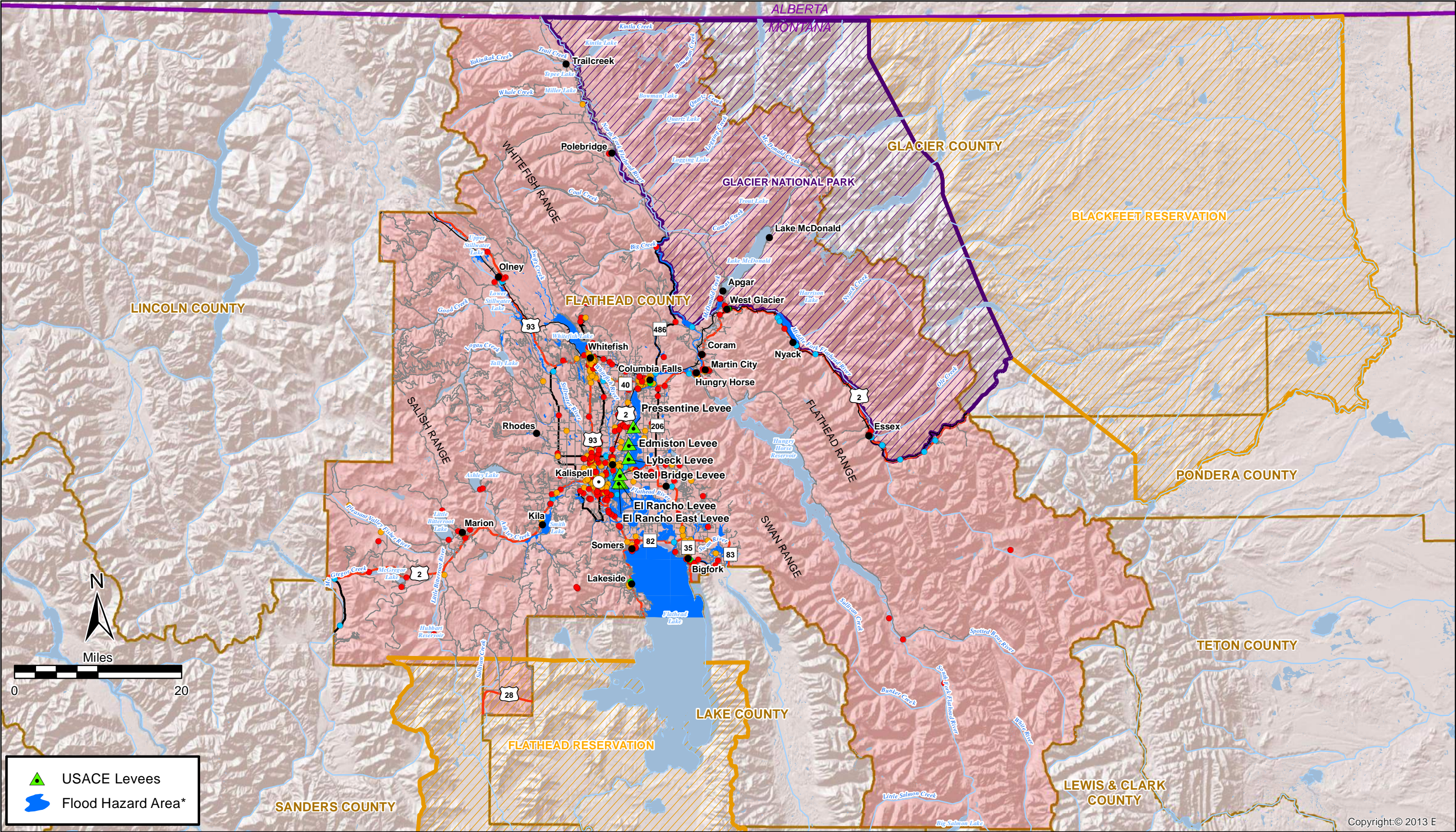
The City of Columbia Falls implemented a back flow prevention program which helps mitigate property damage from flooding.

Flathead County Zoning Regulations (2012) and the Canyon Area Land Use Regulatory System (2004) stipulate that structures shall not be located in a 100-year floodplain (floodway and flood fringe).

Neighborhood Plans for Ashley Lake, Bigfork, Helena Flats, Lakeside, North Fork, Riverdale and The Canyon identify goals and policies associated with the flood hazard.

The Flathead City-County Health Department, which issues permits for all on-site sewage disposal systems, does not allow a system in or within 100 feet of a designated 100-year floodplain because of Department of Environmental Quality (DEQ) requirements that septic systems be 100 feet from surface water.



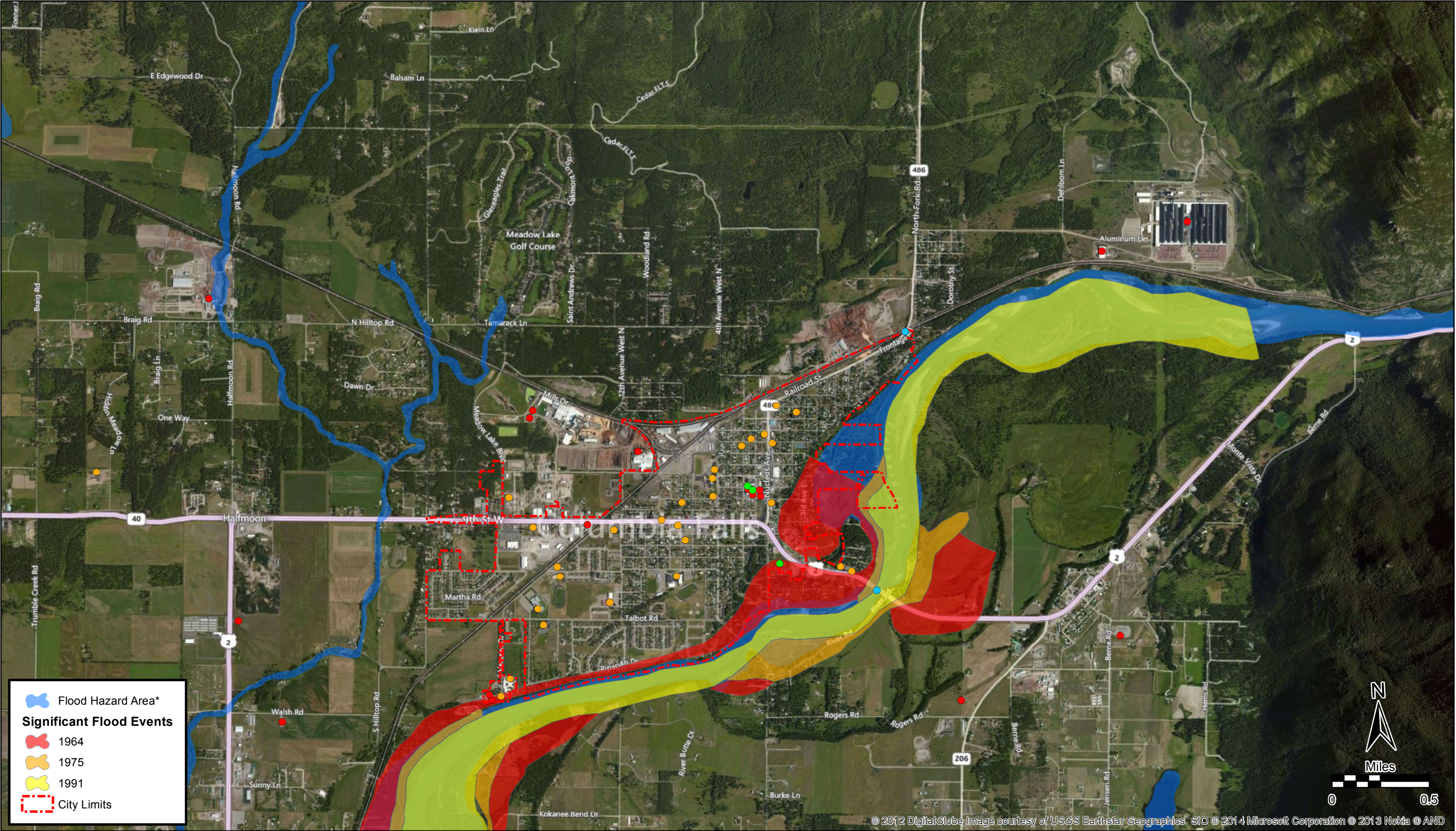


\*Flood Hazard Area as determined by county DFIRM (Digital Flood Insurance Rate Maps) for a 100-yr flood event.



- |               |                         |                   |                  |                                 |
|---------------|-------------------------|-------------------|------------------|---------------------------------|
| ○ County Seat | ● Critical Facility     | — Primary Route   | — River/Stream   | ▨ Indian Reservation            |
| ● Place Names | ● Vulnerable Population | — Secondary Route | — Lake/Reservoir | ▨ National Park                 |
|               | ● Other                 | — Other Route     |                  | ▨ County                        |
|               | ● Bridges               | — Railroads       |                  | ▨ United States - Canada Border |





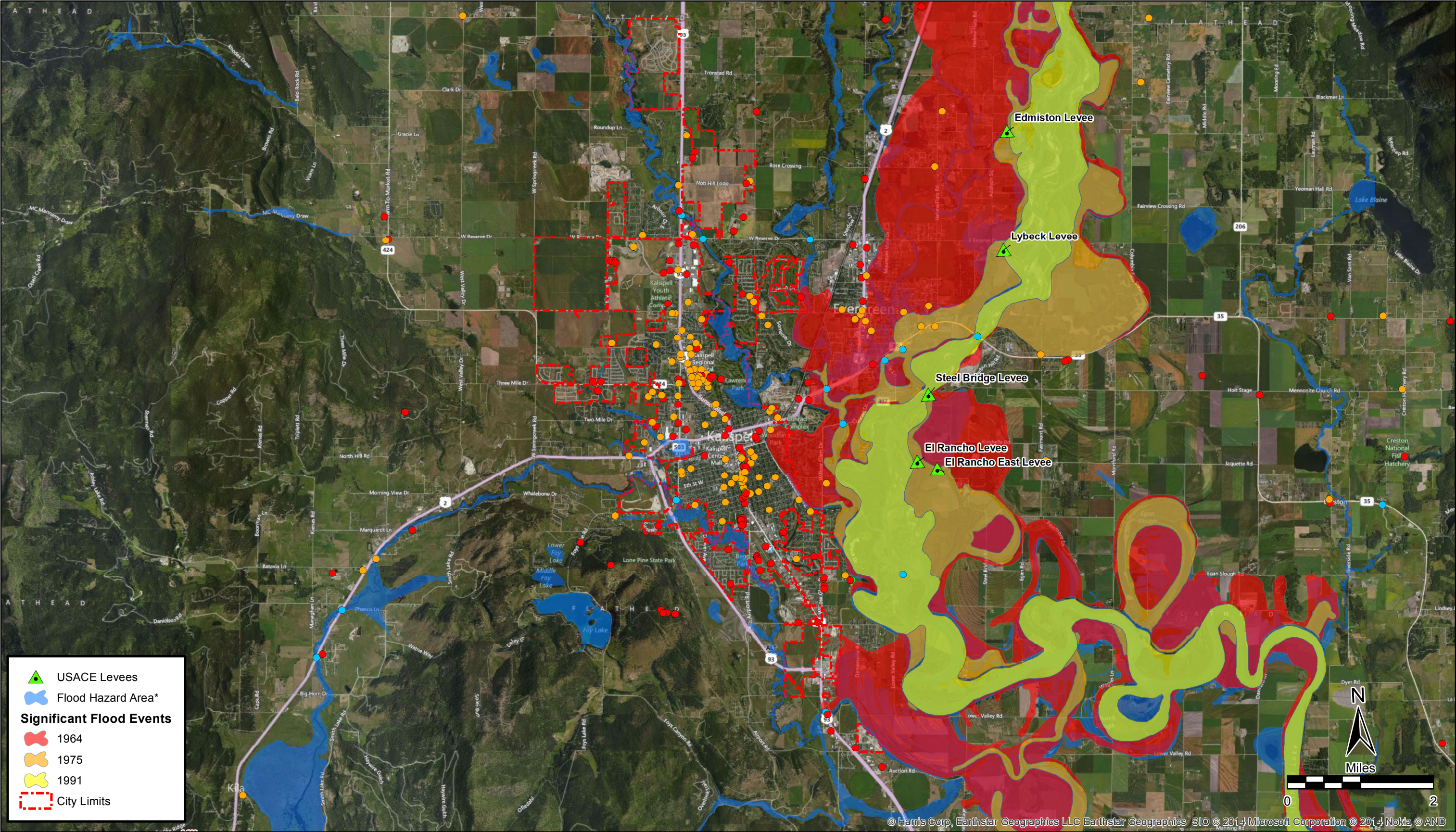
\*Flood Hazard Area as determined by county DFIRM (Digital Flood Insurance Rate Maps) for a 100-yr flood event.



● Critical Facility	● Other
● Vulnerable Population	● Bridges

May 2014  
Figure 7A  
**Flood Prone Terrain - Columbia Falls**  
**Flathead County**  
Pre-Disaster Mitigation Plan





\*Flood Hazard Area as determined by county DFIRM (Digital Flood Insurance Rate Maps) for a 100-yr flood event.



● Critical Facility	● Other
● Vulnerable Population	● Bridges

May 2014  
Figure 7B  
**Flood Prone Terrain - Kalispell  
Flathead County**  
Pre-Disaster Mitigation Plan



\*Flood Hazard Area as determined by county DFIRM (Digital Flood Insurance Rate Maps) for a 100-yr flood event.



- Critical Facility
- Vulnerable Population
- Other
- Bridges



**TABLE 4.3-3**  
**FLATHEAD COUNTY VULNERABILITY ANALYSIS – FLOODING**

JURISDICTION	RESIDENTIAL PROPERTY EXPOSURE \$	# RESIDENCES AT RISK	COMMERCIAL , INDUSTRIAL & AGRICULTURAL PROPERTY EXPOSURE \$	# COMMERCIAL , INDUSTRIAL & AGRICULTURAL PROPERTIES AT RISK	CRITICAL FACILITIES EXPOSURE RISK \$	# CRITICAL FACILITIES AT RISK	BRIDGE EXPOSURE \$	# BRIDGES AT RISK	PERSONS AT RISK	PERSONS UNDER 18 AT RISK
<b>Incorporated Communities &amp; County</b>										
Columbia Falls	\$4,627,771	24	\$0	0	\$0	0	\$0	0	500	100
Kalispell	\$12,025,723	56	\$1,220,620	8	\$241,180	1	\$0	0	2,120	486
Whitefish	\$54,556,085	201	\$17,773,297	37	\$0	2	\$616,908	3	1,533	327
Remainder of County	\$495,843,950	1,822	\$24,995,530	50	\$0	1	\$12,388,28	43	17,030	3,930
<b>Census Designated Places</b>										
Batavia	\$3,155,807	19	\$1,525,996	5	\$0	1	\$91,436	2	239	70
Bigfork	\$105,534,700	485	\$53,310,884	208	\$0	2	\$769,328	3	2,175	353
Coram	\$1,095,576	7	\$0	0	\$0	0	\$12,360,00	1	76	13
Evergreen	\$150,043,842	720	\$89,550,375	194	\$971,782	3	\$2,660,278	10	5,796	1,503
Forest Hill Village	\$1,051,268	5	\$1,462,396	1	\$0	0	\$0	0	59	16
Helena Flats	\$33,169,687	137	\$1,808,852	5	\$0	0	\$0	0	758	203
Hungry Horse	\$4,877,920	19	\$0	0	\$0	0	\$0	0	180	34
Kila	\$0	0	\$0	0	\$0	0	\$0	0	21	0
Lakeside	\$68,358,777	283	\$3,636,592	14	\$0	0	\$0	0	880	166
Little Bitterroot Lake	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Marion	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Martin City	\$625,895	4	\$0	0	\$0	0	\$0	0	43	9
Niarada	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Olney	\$1,563,684	5	\$0	0	\$0	0	\$0	0	10	0
Somers	\$13,834,395	47	\$12,093,704	11	\$0	0	\$0	0	469	125
West Glacier	\$16,848,930	87	\$1,892,499	8	\$0	0	\$0	0	68	5



#### 4.4 HAZARDOUS MATERIAL INCIDENTS

**CPRI SCORE = 3.60**

##### Description and History

A hazardous material release is the contamination of the environment (i.e. air, water, soil) by any material that because of its quantity, concentration, or physical or chemical characteristics threatens human health, the environment, or property. Hazardous materials, including petroleum products and agricultural chemicals, are commonly stored and used in Flathead County and are regularly transported via the regions roadways, railroads, and pipelines. A release of hazardous materials from both fixed and transportation incidents pose possible threats to the county. Hazards range from small spills on roadways to major transportation releases on railways. Illegal methamphetamine operations have also become a concern. Hazardous material incidents occur periodically in Flathead County, although most are minor. Further details on the transportation accident hazard, including train derailments, is presented in *Section 4.7*.

Records of hazardous material events, available from the National Response Center (NRC) database are summarized in **Table 4.4-1**.

TABLE 4.4-1 FLATHEAD COUNTY HAZARDOUS MATERIAL INCIDENTS							
Incident Date	Type Of Incident	Incident Cause	Location	Nearest City	Suspected Responsible Company	Medium Affected	Material Name
5/2/1990	Fixed	Equipment Failure	Hungry Horse Dam	Hungry Horse	DOI-BOR	Water	Transformer Oil
7/5/1990	Fixed	Natural	Hungry Horse Dam	Hungry Horse	DOI-BOR	Water	Mineral Oil
7/6/1990	Mobile	Operator Error	Hwy 35 And Hwy 83	Bigfork	JGL Distributing	Land	Gasoline
2/10/1991	Railroad	Unknown		Whitefish	BN Railroad	Air	Liquefied Pet. Gas
5/10/1991	Pipeline	Operator Error	Hwy 2	Kalispell	Montana Power Co.	Air	Natural Gas
8/9/1991	Unknown Sheen	Unknown	Hungry Horse Dam	Hungry Horse	DOI-BOR	Water	Unknown Oil
9/10/1991	Fixed	Equipment Failure	2000 Aluminum Dr.	Columbia Falls	CF Aluminum	Land	133 PPM / PCBs
11/7/1991	Railroad	Transport Accident	Rail Yard	Whitefish	BN Railroad	Land	Diesel Oil
4/15/1992	Fixed	Dumping	383 Kelly Road	Columbia Falls		Land	Unknown Oil
8/15/1992	Fixed	Equipment Failure	2000 Aluminum Dr.	Columbia Falls	CF Aluminum	Air	Hydrogen Fluoride
6/1/1993	Fixed	Other	163 Park Way	Bigfork	Pacific Power & Light	Water	Transformer Oil
10/20/1993	Pipeline	Unknown	1028 East Idaho	Kalispell	Montana Power	Air	Natural Gas
7/13/1994	Fixed	Equipment Failure	2000 Aluminum Drive	Columbia Falls	CF Aluminum	Land	PCBs
7/15/1994	Fixed	Equipment Failure	Hungry Horse Dam	Hungry Horse	DOI-BOR	Water	Mineral Oil
12/2/1994	Fixed	Equipment Failure	Hungry Horse Dam	Hungry Horse	DOI-BOR	Water	Hydraulic Oil
12/28/1994	Fixed	Equipment Failure	Hungry Horse Dam	Hungry Horse	Dix Corp	Water	Hydraulic Oil
4/27/1995	Mobile	Operator Error	Hungry Horse Dam	Kalispell	Hungry Horse Dam	Land	PCBs
6/13/1995	Fixed	Unknown	Black Otter Trail	Lakeside	FAA	Land	No. 2-D Fuel Oil
10/17/1995	Fixed	Other	Hungry Horse Dam	Hungry Horse	DOI-BOR	Water	Lubricating Oil
5/15/1996	Fixed	Dumping	530 Edgewood Place	Whitefish		Land	Freon
7/22/1996	Fixed	Other	2000 Aluminum Drive	Columbia Falls	CF Aluminum	Land	Coal Tar Pitch
10/8/1996	Fixed	Operator Error	Hungry Horse Dam	Hungry Horse	The Ryan Company	Water	Mineral Oil
10/9/1996	Fixed	Equipment Failure	Hungry Horse Dam	Hungry Horse	Ryan Co	Water	Mineral Oil
5/21/1997	Pipeline	Unknown	801 Whitefish Stage Rd	Kalispell	Montana Power Co	Water	Natural Gas
7/2/1997	Mobile	Transport Accident	2nd St / Baker Ave	Whitefish	LHC Inc.	Water	No. 2-D Fuel Oil
7/4/1997	Vessel	Other	200 Lesley Ave	Somers	Adv. Dock and Decks	Water	Diesel Oil
1/9/1998	Fixed	Equipment Failure	4170 Hwy 2 E	Kalispell	Horizon Airlines	Land	Propylene Glycol

**TABLE 4.4-1**  
**FLATHEAD COUNTY HAZARDOUS MATERIAL INCIDENTS**

Incident Date	Type Of Incident	Incident Cause	Location	Nearest City	Suspected Responsible Company	Medium Affected	Material Name
3/23/1998	Mobile	Operator Error	7725 Hwy 2 West	Kalispell	Snyder's Bakery	Water	Diesel Oil
3/24/1998	Fixed	Unknown	Hungry Horse Dam	Hungry Horse	DOI-BOR	Water	Lubricating Oil
4/29/1998	Railroad	Equipment Failure	2000 Aluminum Drive	Columbia Falls	CF Aluminum	Land	Coal Tar Pitch
6/24/1998	Fixed	Dumping	875 Helena Flats Road	Kalispell	Pro Tech	Land	Unknown Material
4/13/1999	Fixed	Other	1353 E N 15 St	Colombia Falls		Water	Unknown Material
1/12/2000	Continuous	Other	500 12th Ave W	Columbia Falls	Plum Creek.		Anhydrous Ammonia
2/14/2000	Fixed	Other	2000 Aluminum Drive	Columbia Falls	CF Aluminum	Air	PAHs
12/11/2000	Fixed	Unknown	1255 Frontage Rd	Columbia Falls	Montana Power Co.	Other	Natural Gas
4/28/2001	Vessel	Unknown	1034 Angle Point Road	Lakeside	Owner of Barge	Water	Diesel Oil
7/21/2001	Mobile	Unknown	South Lion Lake	Hungry Horse		Water	Gasoline
9/5/2001	Fixed	Equipment Failure	Hungry Horse Dam	Hungry Horse	DOI-BOR	Water	Mineral Oil
10/26/2001	Mobile	Unknown	Big Fork Bay Marina	Bigfork	PEC	Water	Hydraulic Oil
4/2/2002	Fixed	Equipment Failure	Half Moon Substation; Hwy 2 / Falcon Ln	Columbia Falls	Flathead Electric Co-Op	Land	Transformer Oil (non-PCB)
7/28/2002	Mobile	Other	Hockaday Bay, Flathead Lake	Lakeside	Flathead Co. Sheriff Dept.	Water	Gasoline; Battery Acid; Ethylene Glycol
8/8/2002	Continuous	Other	2000 Aluminum Drive	Columbia Falls	CF Aluminum	Air	Sulfur Dioxide
4/3/2003	Storage Tank	Operator Error	1278 Hwy 2 E	Kalispell	Holiday Gas Station	Water	Gasoline
4/30/2003	Storage Tank	Equipment Failure	2000 Aluminum Drive	Columbia Falls	CF Aluminum	Land	Benzo (A) Pyrene
8/30/2004	Pipeline	Unknown	330 1st Ave West	Kalispell	Montana Power Co.	Air	Natural Gas
11/25/2004	Railroad	Unknown	Mile Post 1208	ConKelly	BNSF Railroad	Land	No. 2-D Fuel Oil
4/1/2005	Mobile	Equipment Failure	Hungry Horse Reservoir	Hungry Horse	Horizon Helicopters	Water	Aviation Fuel
6/16/2005	Fixed	Dumping	Olney Dumpsite	Olney		Soil	Road Tar
7/15/2005	Unknown Sheen	Unknown	Somers Bay	Somers		Water	Unknown Oil
7/16/2005	Vessel	Unknown	Somers Bay	Somers Bay		Water	No. 1-D Fuel Oil
9/28/2005	Mobile	Other	3850 Hwy 2 E.	Kalispell		Water	Gasoline
9/28/2005	Storage Tank	Equipment Failure	Doris Creek / HH Res.	Hungry Horse	Horizon Helicopters	Land	Jet Fuel: JP-8
3/8/2006	Fixed	Equipment Failure	Hungry Horse Dam	Hungry Horse	DOI-BOR	Water	Lubricating Oil
5/30/2006	Storage Tank	Equipment Failure	2000 Aluminum Drive	Columbia Falls	CF Aluminum	Land	Molten Coal Tar Pitch
6/26/2006	Storage Tank	Unknown	Foys Lake	Kalispell		Water	Unknown Material
7/5/2006	Vessel	Vessel Sinking	Flathead Lake			Water	Gasoline
3/23/2007	Storage Tank	Equipment Failure	1177 Hwy 2 East	Kalispell	Kari Dodge	Land	Motor Oil
7/3/2007	Mobile	Dumping	420 Deer Creek Road	Lakeside		Water	Unknown Oil
7/25/2007	Storage Tank	Unknown	1011 Hwy 2 West	Kalispell	Jenesis Development	Water	Gasoline
7/27/2007	Unknown Sheen	Unknown	Riverside/Kalispell Ave	Whitefish		Water	Unknown Oil
9/30/2007	Fixed	Dumping	1117 Klondike Loop	Somers		Water	Gasoline
8/12/2008	Mobile	Other	Deer Creek Road	Lakeside		Land	Motor Oil
8/19/2008	Fixed	Other	Lee Road	Bigfork		Water	Raw Sewage
4/22/2009	Fixed	Dumping	340 Danielson Road	Kalispell		Land	Waste Oil
7/1/2009	Fixed	Dumping	Labrant Road	Bigfork		Soil	Unknown Oil
5/6/2010	Fixed	Explosion	218 12th Street West	Columbia Falls	Northwestern Energy	Air	Natural Gas
3/28/2011	Pipeline	Other	Along US Hwy 2		Northwestern Energy	Air	Natural Gas
4/27/2011	Storage Tank	Operator Error	Gravel Yd/Stillwater Rd	Kalispell	LHC Inc.	Land	Tarmac Oil
1/27/2012	Fixed	Equipment Failure		Kalispell		Air	Propane
1/30/2012	Mobile	Equipment Failure	Hungry Horse Dam	Hungry Horse	MDT	Water	Hydraulic Oil
3/9/2012	Fixed	Explosion	715 9th Ave West	Kalispell	Northwestern Energy	Air	Natural Gas
6/5/2012	Fixed	Other	500 Depot St.	Whitefish	BNSF Railroad	Water	Produced Water

Source: National Response Center, 2014

The U.S. Environmental Protection Agency (EPA) maintains the Toxic Release Inventory (TRI) of facilities that have released contaminants to the environment. TRI listings for Flathead County are presented in **Table 4.4-2**.

TABLE 4.4-2 TOXIC RELEASE INVENTORY – TOTAL AGGREGATE RELEASES TO ENVIRONMENT				
Facility Name & Address	Air Emissions (Pounds)	Surface Water Emissions (Pounds)	Releases to Land (Pounds)	Total Releases (Pounds)
Columbia Falls Aluminum Co. LLC, 2000 Aluminum Dr., Columbia Falls				
2012	0	NR	0	0
2011	0	NR	0	0
2010	0	NR	0	0
2009	1,297	NR	965	2,262
JTL Group, Kalispell DBA Knife River-Kalispell, 3131 Hwy 2E, Kalispell				
2012	0.2	NR	NR	0.2
2011	2.15	NR	NR	2.15
2010	616	NR	NR	616
2009	923	NR	NR	923
Plum Creek MDF, Inc., 500 12 <sup>th</sup> Ave. W., Columbia Falls				
2012	171,177	NR	NR	171,177
2011	136,277	NR	NR	136,277
2010	139,277	NR	206	139,483
2009	93,275	NR	355	93,630
Plum Creek Northwest Plywood Inc., 75 Sunset Dr., Kalispell				
2012	9	NR	NR	9
2011	9	NR	NR	9
2010	9	NR	NR	9
2009	7.5	NR	NR	7.5

Source: EPA, 2014; ([http://www.epa.gov/enviro/html/tris/tris\\_query.html](http://www.epa.gov/enviro/html/tris/tris_query.html))

Locations of chemical/petroleum storage in Flathead County with Tier II reporting requirements are listed in **Table 4.4-3**.

TABLE 4.4-3 FLATHEAD COUNTY TIER 2 HAZARDOUS MATERIAL REPORTERS					
Facility Name	Address	Facility Name	Address	Facility Name	Address
Amerigas	53 4th Ave EN , Kalispell,	CHS, Inc.	150 1st Ave W North - Kalispell	NORCO	2555 Hwy #2 E
Amerigas Propane LP	2290 Farm to Market Rd	CHS, Inc.	900 Walsh Rd - Columbia Falls	Northern Energy	6115 Hwy 35 , Bigfork,
Applied Materials	3850 Hwy 2 E - Kalispell	CHS, Inc.	250 Auction Rd - Kalispell	Northern Energy	1425 US Hwy 2 , Columbia Falls
Applied Materials	655 W Reserve - Kalispell	CHS, Inc.	505 W Center - Kalispell	Northern Energy	75 Auction Rd , Somers,
AT&T Mobility	851 Trumble Circle Rd - Kalispell	CHS, Inc.	200 Wagar Ln, Marion	Pacific Steel Recycling	105 Montclair - Kalispell
AT&T MT0077	Hwy 2 - Marion	Columbia Falls Aluminum Factory	2000 Aluminum Columbia Falls	Plum Creek	500 - 12th Ave W - Columbia Falls
AT&T MT0080	228 Highland Blvd - West Glacier	Century Link - Bigfork CO	275 Bridge St - Bigfork	Plum Creek	75 Sunset Dr - Kalispell
BNSF	101 Railway - Essex	Century Link - C Falls CO	28 6th S West - Columbia Falls	Rocky Mountain Contractors	2214 Hwy 2 E - Kalispell
BNSF	500 Depot St - Whitefish	Century Link - KAL Main CO	111 1st Ave E - Kalispell	Spotted Bear Ranger Station	MP 53.2 / FS Road #38, Hungry Horse
Bonneville Power Administration	Blacktail Peak - Lakeside	Coca Cola Refreshments	230 S Complex Dr - Kalispell	SkyWest Airlines dba Delta Connection	4170 Hwy 2 E, Kalispell
Bonneville Power Administration	Jensen/Columbia Mtn Rd, Columbia Falls	Costco	2330 US Highway 93 N - Kalispell	Stoltze Land and Lumber Co	600 Halfmoon Rd - Columbia Falls

TABLE 4.4-3 FLATHEAD COUNTY TIER 2 HAZARDOUS MATERIAL REPORTERS					
Facility Name	Address	Facility Name	Address	Facility Name	Address
Bonneville Power Administration	Aluminum Drive- Conkelly Substation	Glacier National Park	64 Grinnell Drive - West Glacier	UPS	1151 N Meridian Rd, Kalispell
Bonneville Power Administration	1850 Whitefish Stage - Kalispell	Home Depot	2455 Hwy 93 N - Kalispell	Verizon	860 South fork Rd E - Martin City
Bonneville Power Administration	2540 MT Hwy 35 - Kalispell	Horizon Air	4170 Hwy 2 E - Kalispell	Western States Equipment	3500 Hwy 95 S - Kalispell
Charter Communications	Mount Aeneas	Lowes	2360 Highway 93 N - Kalispell		

Source: Flathead County Office of Emergency Services, 2014

There have been no Presidential Disaster Declarations associated with Hazardous Material Incidents in Flathead County; however, a State emergency declaration was issued for the event described below.

### 1989 Whitefish Lake Fuel Spill –

On July 31, 1989, a Burlington Northern freight train derailed west of Whitefish and four tank cars slid down an embankment into the lake. Three of those cars leaked fuel into the water; 20,000 gallons of diesel fuel spilled into Mackinaw Bay.



Two of the four Burlington Northern tank cars that slid down the embankment along Whitefish Lake after derailling in the 1989 wreck.  
Source: Whitefish Pilot

The Montana Department of Justice maintains a list of clandestine methamphetamine drug laboratory sites. Lab sites in Flathead County are listed in **Table 4.4-4**. Methamphetamine labs typically require a hazardous material response.

TABLE 4.4-4 METHAMPHETAMINE LABORATORY SITES IN FLATHEAD COUNTY					
Date	City	Address	Date	City	Address
6/1/1999	Columbia Falls	254 Circle Drive	2/22/2002	Whitefish	315 Central Ave.
9/17/1999	Hungry Horse	416 1 <sup>st</sup> Ave. NW	3/14/2002	Kalispell	35 W. Cottonwood Drive
10/17/1999	Kalispell	134 Lawrence Lane	8/8/2002	Kalispell	498 Forest Hill Road
3/10/2000	Hungry Horse	567 Canyon Road	10/21/2002	Kalispell	2615 U.S. Highway 2 E
10/6/2000	Kila	4400 U.S. Highway 2 W	1/28/2003	Kalispell	1695 MT Hwy 35
9/16/2000	Marion	10667 U.S. Hwy 2 W	6/18/2003	Kalispell	3570 Farm to Market Rd.
12/6/2000	Kalispell	480 Tronstad	2/1/2004	Whitefish	1320 Old Talley Lake Rd.
12/13/2000	Kalispell	159 Bernard Rd.	5/19/2004	Kalispell	2462 U.S. Highway 2
1/11/2001	Kalispell	545 Anderson Lane	6/10/2004	Bigfork	4815 Foothill Rd.
1/25/2001	Kalispell	546 Lenwood Lane	8/17/2004	Kalispell	1340 Willow Glen Drive
2/9/2001	Kalispell	187 Glenwood Drive	4/15/2013	Kalispell	43 Tahoe Drive
7/5/2001	Kalispell	543 Von Der Heide Lane	5/22/2013	Columbia Falls	1060 Columbia Mtn Rd.
9/18/2001	Kalispell	655 E. Evergreen Drive	5/31/2013	Columbia Falls	189 River Road
1/10/2002	Kalispell	543 Von Der Heide Lane	6/19/2013	Kalispell	1701 U.S. Highway 93 S.
2/18/2002	Kalispell	1045 Conrad Drive	9/23/2013	Kalispell	330.5 Parliament Drive

Source: Montana Dept. Justice (<http://svc.mt.gov/deq/methquery/>), 2014

The Kalispell Regional Hazmat Team, a State of Montana resource, was established to assist local jurisdictions with hazardous materials incidents. The Kalispell Regional Hazmat Team's response area borders Canada to the north, Idaho to the west, Missoula's Regional Team to the South, and Great Falls' Regional Team to the East. The team is staffed by Kalispell Fire Department personnel trained to the Hazmat Technician level, and their equipment is housed and available from Kalispell Fire Department Station 61.

If a derailment occurs near Columbia Falls, Whitefish or Glacier Park, the State of Montana, Flathead County and BNSF would take the lead for response and cleanup efforts. BNSF has drafted a new Geographical Response Plan, which identifies stockpiles of hazardous material cleanup supplies, equipment and trained personnel.

### Vulnerability and Area of Impact

A major concern to Flathead County residents is the potential for a hazardous material incident in the County associated with derailment of railroad tanker cars carrying oil from the Bakken Oil Fields of North Dakota and eastern Montana. On average, one trainload of crude oil per day is shipped west via Burlington Northern Santa Fe (BNSF) Railway's Hi-Line route, along the southern boundary of Glacier Park, through Columbia Falls and Whitefish, and along the west shore of Whitefish Lake. While BNSF says "99.99 percent" of their hazardous shipments are delivered without incident, there is growing public concern about trains, sometimes more than 100 cars long, carrying highly flammable Bakken crude on tracks where derailments are all too common. (Hungry Horse News, *Preparing for Bakken Oil Trains*, Chris Peterson and Matt Baldwin, January 8, 2014)



A long line of oil tanker cars at the BNSF Railway yard in Whitefish. Source: Hungry Horse News

In the past year alone, there have been three fiery explosions involving trainloads of Bakken crude. On December 30, 2013, a train hauling 106 tank cars of Bakken crude exploded outside Casselton, North Dakota, when it collided with a derailed train carrying grain. On November 8, 2013, there was another fiery explosion involving Bakken crude on a train in rural Alabama. Most alarming was a derailment on July 6, 2013, in downtown Lac Megantic, Quebec, that left 47 residents dead. The Bakken crude from that derailment burned for four days in Canada's worst train disaster. The U.S. Department of Transportation issued a warning stating that Bakken's light, sweet crude oil may be different from traditional heavy crudes because it's prone to ignite at a lower temperature. (Hungry Horse News, *Preparing for Bakken Oil Trains*, Chris Peterson and Matt Baldwin, January 8, 2014)



The Canyon Neighborhood Plan outlines a goal to coordinate with the BNSF Railroad, State Highway Department, Local Emergency Service Providers, and Flathead County OES to develop spill contingency plans for train derailments and truck spills of toxic materials.

The volume and type of hazardous materials that flow into, are stored, and flow through communities will determine exposure to a potential release of hazardous materials. An accidental or intentional release of materials could produce a health hazard to those in the immediate area, downwind, and/or downstream.

The Emergency Planning and Community Right-to-Know Act (EPCRA) was enacted in 1986 to inform communities and citizens of chemical hazards in their areas. Sections 311 and 312 of EPCRA require businesses to report the locations and quantities of chemicals stored on-site to state and local governments in order to help communities prepare to respond to chemical spills and similar emergencies. EPCRA Section 313 requires the EPA and the states to annually collect data on releases and transfers of certain toxic chemicals from industrial facilities, and make the data available to the public in the Toxics Release Inventory. In 1990, Congress passed the Pollution Prevention Act which required that additional data on waste management and source reduction activities be reported under TRI. The goal of TRI is to empower citizens, through information, to hold companies and local governments accountable in terms of how toxic chemicals are managed. As shown in **Table 4.4-2**, four facilities in Flathead County are listed in the TRI Inventory.

The U.S. Department of Transportation issued an emergency restriction/prohibition order on May 7, 2014 which, in part, requires each railroad carrier to provide the State Emergency Response Commission (SERC) for each state in which it operates trains transporting 1,000,000 gallons or more of Bakken crude oil, notification regarding the expected movement of such trains through the counties in the state. The notification shall identify each county, through which the trains will operate. Failure to make notification within 30 days of the date of the order will result in the railroad being prohibited from operating any trains transporting 1,000,000 gallons or more of Bakken crude in the state until such notification is provided. The notification must provide information regarding the estimated volumes and frequencies of train traffic per week through each county within the state, identify and describe the petroleum crude oil expected to be transported in accordance with 49 CFR part 712, subpart C, provide all applicable emergency response information required by 49 CFR part 172, subpart G, identify the routes over which the material will be transported and provide at least one point of contact at the railroad. Updates must be provided prior to making any materials changes in the estimated volumes or frequencies of trains traveling through a county. MT DES forwards copies of the notifications to county emergency managers for their information and dissemination.

To model the spatial distribution of hazardous material incident risk in Flathead County a GIS data layer of transportation arteries was used, which included highways, major roadways, and railroads. Pipeline data is confidential and was therefore, unavailable for this analysis. Facilities where large quantities of hazardous materials or petroleum products are stored were added to this layer and it was then buffered by 0.25 miles. **Figures 8 and 8A through 8C** present the hazardous material buffer used in the analysis for the county and incorporated cities, respectively. Building exposure was calculated by intersecting the hazardous material buffer with the MDOR parcel and critical facility datasets. Vulnerable population exposure was determined using the percent of each census block affected by the hazardous material buffer. **Table 4.4-5** presents the results of the vulnerability analysis.

The GIS analysis indicates that there are over 86,000 acres of the county in the hazardous material buffer including 8,677 residences, 2,298 commercial, industrial and agricultural buildings, and 257 critical facilities and locations where vulnerable populations reside. The *Hazardous Material Incident Section* in **Appendix C** presents supporting documentation from the risk assessment including a list of critical facilities in the hazardous material buffer.

#### Probability and Hazard Magnitude

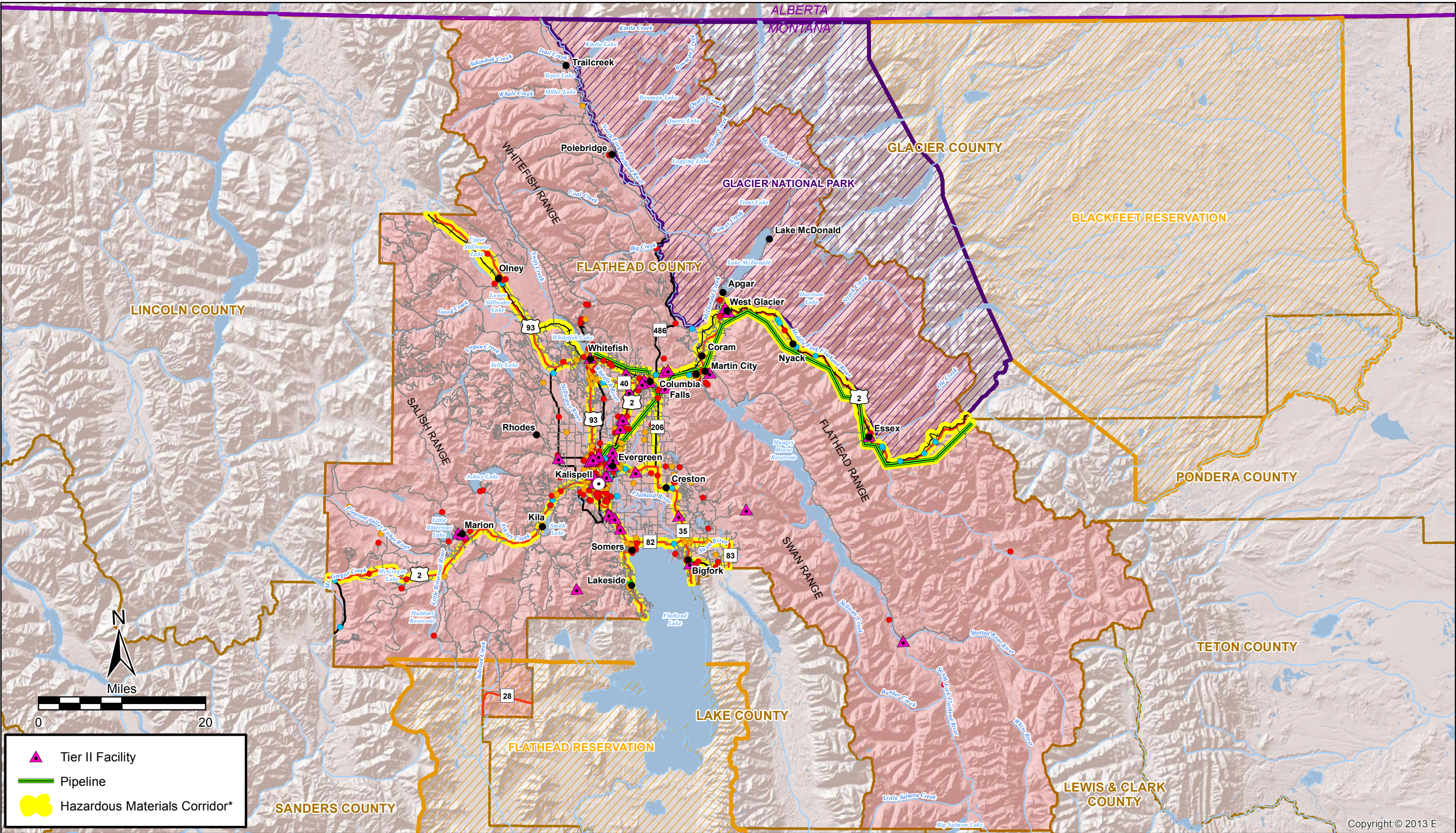
Hazardous materials incidents can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. The magnitude of the hazard is often expressed as a percentage of property damage caused by the incident. Damage associated with hazardous material incidents is typically handled by the insurance company of the responsible party; therefore, little data is available to document property loss from hazardous materials incidents in Flathead County.

The history of hazardous material events in Flathead County over the past 22 years indicates 72 incidents have occurred. Therefore, the probability of future events is rated as “highly likely”.

#### Future Development

There are no land use regulations that restrict building along transportation routes or in the vicinity of facilities which store large quantities of hazardous materials/petroleum products.



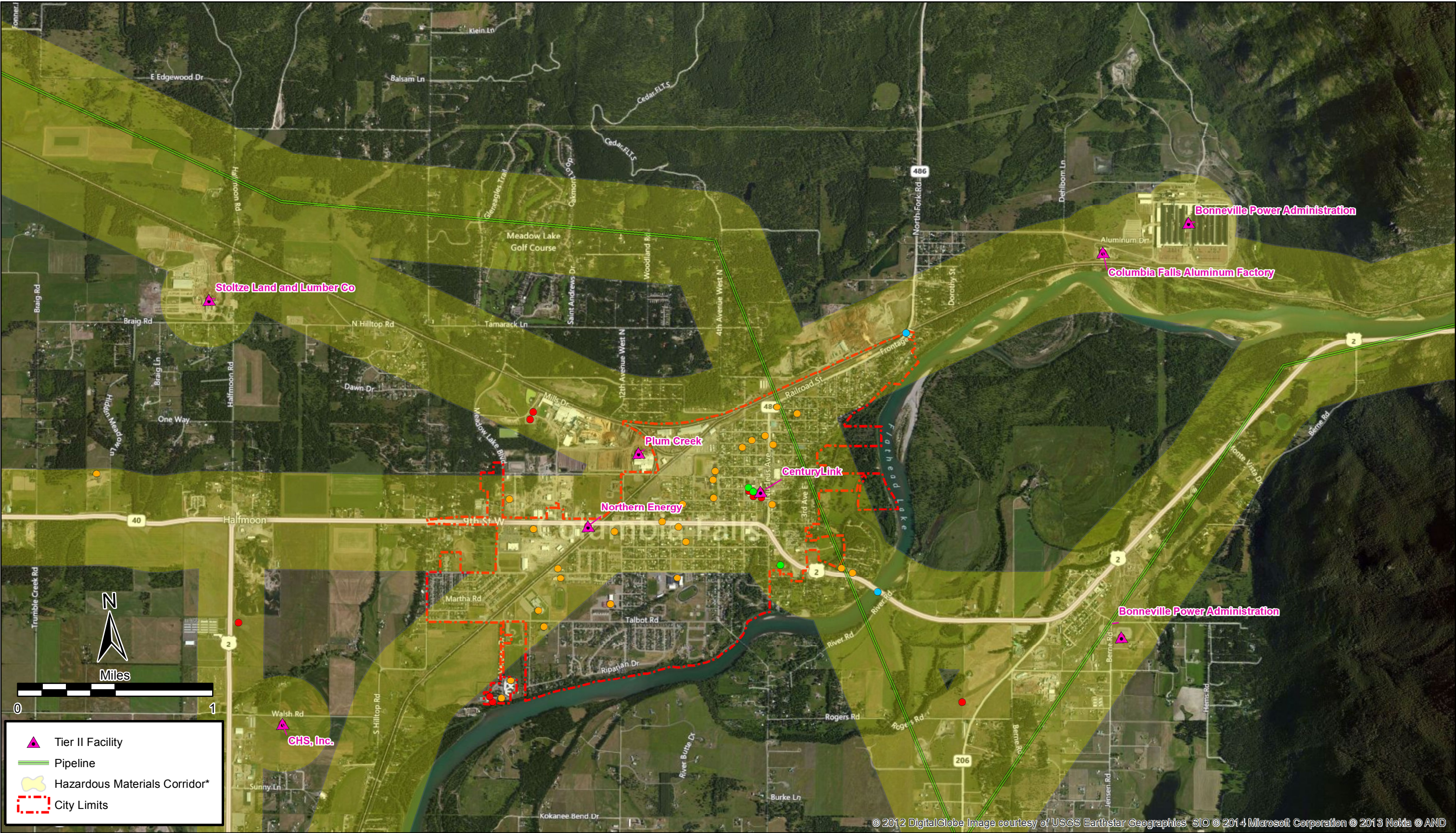


\*Hazardous Materials Corridor was developed by Buffering Highways, Railroads, Pipelines, and Toxic Release Facilities by 0.25 miles. Corridor shown here has been exaggerated for display purposes.



- |               |                         |                   |                  |                                 |
|---------------|-------------------------|-------------------|------------------|---------------------------------|
| ○ County Seat | ● Critical Facility     | — Primary Route   | — River/Stream   | ▨ Indian Reservation            |
| ● Place Names | ● Vulnerable Population | — Secondary Route | — Lake/Reservoir | ▨ National Park                 |
|               | ● Other                 | — Other Route     |                  | ▨ County                        |
|               | ● Bridges               | — Railroads       |                  | ▨ United States - Canada Border |





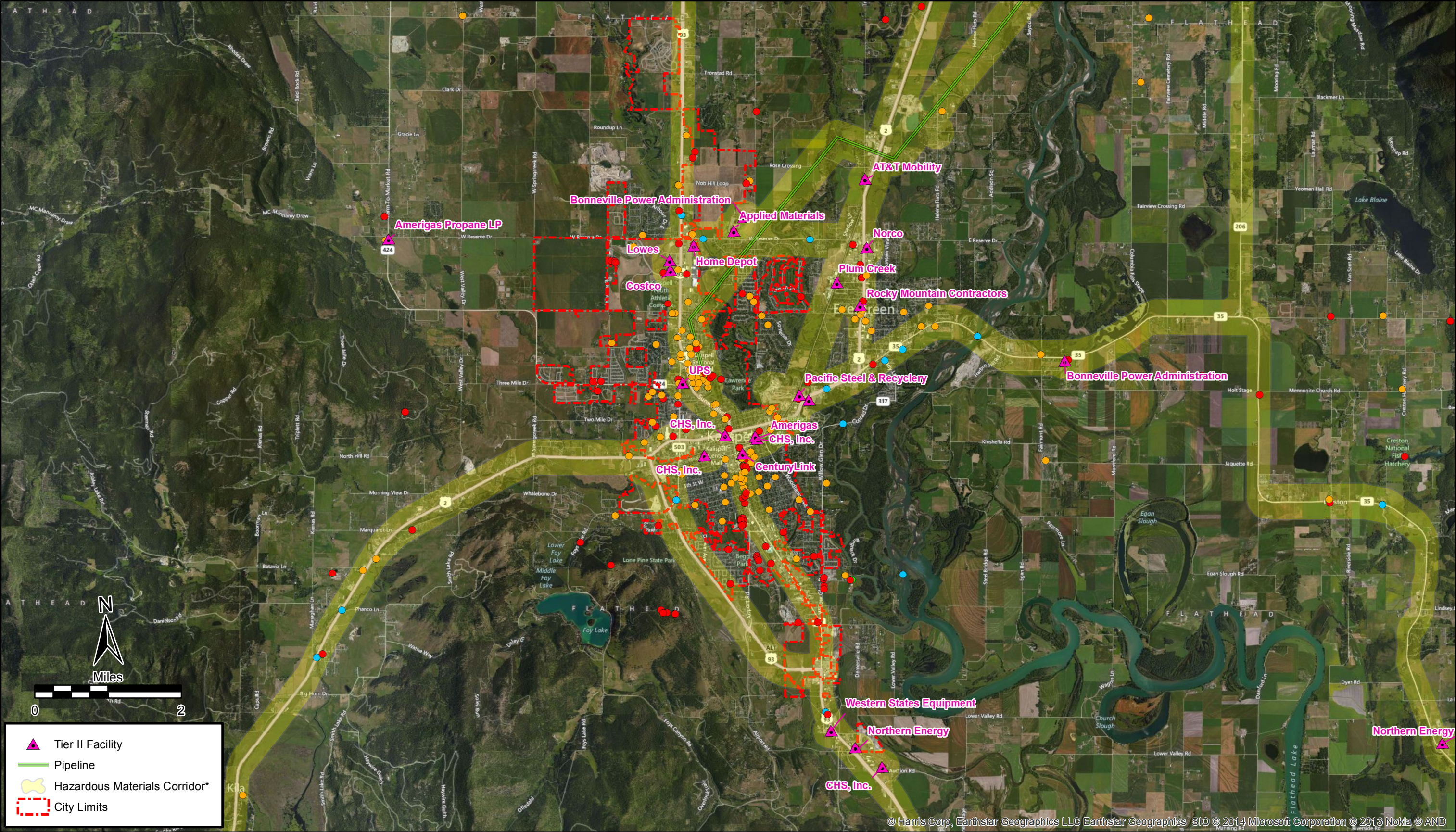
\*Hazardous Materials Corridor was developed by Buffering Highways, Railroads, Pipelines, and Toxic Release Facilities by 0.25 miles.



● Critical Facility	● Other
● Vulnerable Population	● Bridges

May 2014  
Figure 8A  
**Hazardous Material Transportation Buffer - Columbia Falls  
Flathead County**  
Pre-Disaster Mitigation Plan





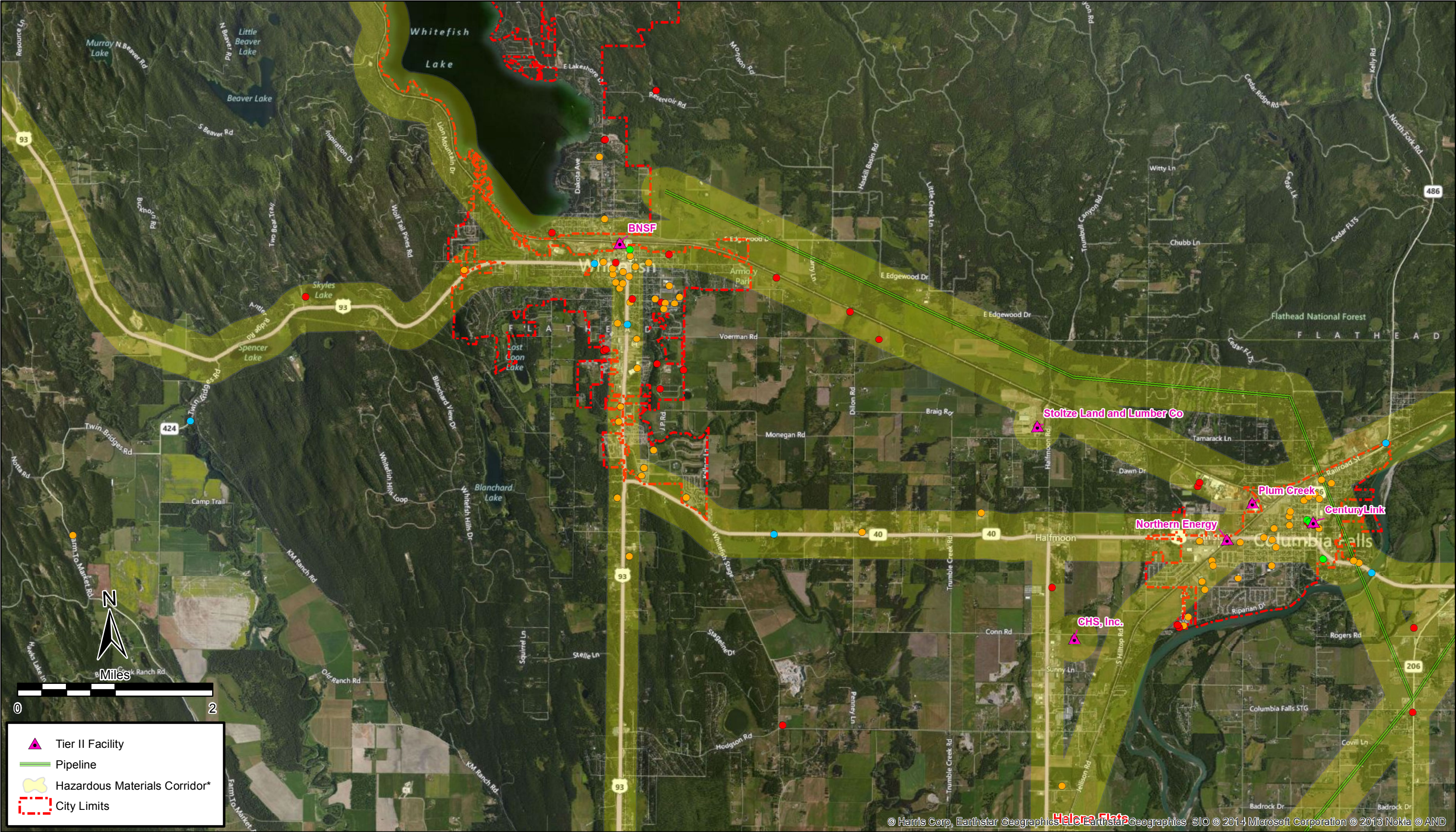
\*Hazardous Materials Corridor was developed by Buffering Highways, Railroads, Pipelines, and Toxic Release Facilities by 0.25 miles.



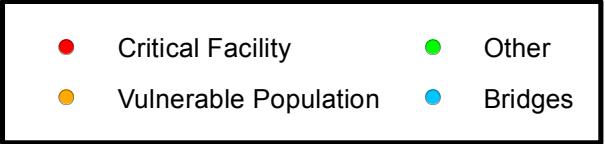
- Critical Facility
- Vulnerable Population
- Other
- Bridges

May 2014  
Figure 8B  
**Hazardous Material Transportation Buffer - Kalispell  
Flathead County**  
Pre-Disaster Mitigation Plan





\*Hazardous Materials Corridor was developed by Buffering Highways, Railroads, Pipelines, and Toxic Release Facilities by 0.25 miles.



May 2014  
Figure 8C  
**Hazardous Material Transportation Buffer - Whitefish Flathead County**  
Pre-Disaster Mitigation Plan



**TABLE 4.4-5**  
**FLATHEAD COUNTY VULNERABILITY ANALYSIS – HAZARDOUS MATERIAL INCIDENTS**

JURISDICTION	RESIDENTIAL PROPERTY EXPOSURE \$	# RESIDENCES AT RISK	COMMERCIAL, INDUSTRIAL & AGRICULTURAL PROPERTY EXPOSURE \$	# COMMERCIAL, INDUSTRIAL & AGRICULTURAL PROPERTIES AT RISK	CRITICAL FACILITIES EXPOSURE RISK \$	# CRITICAL FACILITIES AT RISK	BRIDGE EXPOSURE \$	# BRIDGES AT RISK	PERSONS AT RISK	PERSONS UNDER 18 AT RISK
<b>Incorporated Communities &amp; County</b>										
Columbia Falls	\$114,285,660	1,071	\$77,728,978	264	\$13,097,690	28	\$614,170	1	4,091	1,058
Kalispell	\$332,546,329	2,641	\$597,474,699	1,111	\$138,824,312	135	\$0	0	12,134	2,902
Whitefish	\$181,732,393	1,201	\$172,331,252	356	\$30,771,076	26	\$690,060	4	4,377	825
Remainder of County	\$651,207,367	3,764	\$274,131,246	567	\$49,385,873	68	\$8,049,565	31	21,424	4,932
<b>Census Designated Places</b>										
Batavia	\$10,284,942	80	\$3,131,307	18	\$118,400	3	\$91,436	2	385	109
Bigfork	\$116,136,486	622	\$64,811,804	159	\$11,331,300	17	\$769,328	3	3,079	542
Coram	\$19,932,057	218	\$4,452,676	24	\$0	1	\$12,360,00	1	526	91
Evergreen	\$87,409,250	849	\$124,016,677	287	\$3,504,875	21	\$2,538,362	8	5,201	1,370
Forest Hill Village	\$4,363,838	60	\$12,561,728	44	\$1,741,165	2	\$0	0	198	32
Helena Flats	\$26,147,014	191	\$5,316,368	20	\$0	3	\$0	0	926	246
Hungry Horse	\$25,948,341	316	\$6,974,188	56	\$0	3	\$0	0	682	158
Kila	\$10,956,609	85	\$897,811	2	\$722,310	1	\$0	0	285	51
Lakeside	\$90,497,979	443	\$18,155,085	63	\$663,800	3	\$0	0	1,786	360
Little Bitterroot Lake	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Marion	\$23,212,294	162	\$2,570,048	13	\$189,650	6	\$0	0	810	234
Martin City	\$8,241,543	81	\$3,425,413	17	\$651,691	4	\$26,840	1	352	71
Niarada	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Olney	\$2,815,459	54	\$332,500	2	\$141,049	4	\$73,152	1	167	28
Somers	\$40,725,309	227	\$7,790,337	23	\$351,048	2	\$0	0	884	217
West Glacier	\$9,090,838	70	\$10,741,670	23	\$738,678	7	\$1,719,035	2	173	26



#### 4.5 SEVERE WINTER WEATHER AND AVALANCHE

**CPRI SCORES:****SEVERE WINTER WEATHER = 3.00****AVALANCHE = 2.75**

The winter weather hazard profiled below includes several weather conditions that occur from late fall through early spring in Flathead County (November through April). Snow, blizzards, avalanches, extended cold and high winds frequently occur together but also occur independent of one another during these months.

##### Description and History

Winter storms and blizzards follow a seasonal pattern that begins in late fall and lasts until early spring. These storms have the potential to destroy property, and kill livestock and people. Winter storms may be categorized as sleet, ice storms or freezing rain, heavy snowfall or blizzards, and low temperatures. Blizzards are most commonly connected with blowing snow and low visibility. Winter also brings sustained straight line winds that can be well over 50 mph.

A severe winter storm is generally a prolonged event involving snow or ice and extreme cold. The characteristics of severe winter storms are determined by the amount and extent of snow or ice, air temperature, wind speed, and event duration. Severe winter storms create conditions that disrupt essential regional systems such as public utilities, telecommunications, and transportation routes.

A combination of temperatures to 30 below zero and high winds can close roads, threaten disruption of utilities, limit access to rural homes, impede emergency services delivery and close businesses. Such storms also create hazardous travel conditions, which can lead to increased vehicular accidents and threaten air traffic. Additionally, motorists stranded due to closed roads and highways may present a shelter problem.

Avalanches come in many shapes and sizes and even small ones can be dangerous. According to the Forest Service National Avalanche Center (<http://www.fsavalanche.org/>), there are three types of avalanches:

1) Slab avalanches: Most people that die in avalanches, die in slab avalanches. Slab avalanches occur when a more cohesive or harder layer of snow sits on top of a less cohesive or softer and weaker layer of snow. Sometimes the weak layer can barely support the layers above it and when additional weight like a skier or snow boarder is added to the upper layers, the weak layer collapses and the snowpack fractures and a slab avalanche occurs. Slab avalanches often involve large volumes of fast moving snow. Victims, like the skiers, typically trigger slabs at mid-slope below the fracture line which often makes escape very difficult.



2) Sluffs or loose snow avalanches: Sluffs are cold snow powdery surface slides that typically are the least dangerous type of slide; however, sluffs can and often do injure skiers and boarders by pushing them over cliffs and rock bands in steep terrain.

3) Wet avalanches: Wet slides occur when warm temperatures melt the surface snow layers and saturate them with water. The water weakens the bonds between layers and avalanches often occur. Wet avalanches move more slowly than dry avalanches but they can still be very dangerous.

The National Weather Service provides short-term forecasts of hazardous weather to the public by producing regularly-scheduled severe weather outlooks and updates on various forms of hazardous weather including blizzards and wind chill. Warning and Advisory Criteria for winter weather is presented in **Table 4.5-1**. The Flathead Avalanche Center provides pre-season avalanche information updates beginning in November, scheduled avalanche advisories three times a week from December through March. They also provide extra avalanche updates/bulletins/special advisories during this period, as needed.

TABLE 4.5-1 WARNING AND ADVISORY CRITERIA FOR WINTER WEATHER		
Winter Weather	Winter Weather Advisory	Winter Storm/Blizzard Warning
Snow	2-5 inches of snow in 12 hours	6 inches or more in 12 hours, or 8 inches in 24 hours
Blizzard	(see blowing snow)	Sustained winds or frequent gusts to 35 mph with visibility below a ¼ mile for three hours or more
Blowing Snow	Visibility at or less than a ½ mile.	Visibility at or less than a ½ mile in combination with snowfall at or greater than 6 inches and/or freezing precipitation
Ice/Sleet	(see freezing rain/drizzle)	Accumulations of ¼ inch or more of ice.
Freezing Rain/Drizzle	Light precipitation and ice forming on exposed surfaces.	None
Wind Chill	Wind chills of -20 to -39 degrees with a 10 mph wind in combination with precipitation	Wind chills -40 degrees or colder with a 10 mph wind in combination with precipitation.

Source: National Weather Service (NWS, 2013)

Note: January, 2014: The National Weather Service will start issuing avalanche warnings. They will re-transmit avalanche forecast made by U.S. National Forest Service Avalanche Centers to help protect life and property.

Snow storms and bitterly cold temperatures are common occurrences in Flathead County and generally do not cause any problems as residents are used to winter weather and are prepared for it. Sometimes, however, blizzards can occur and overwhelm the ability to keep roads passable. Heavy snow and ice events also have the potential to bring down power lines and trees. Extreme wind chill temperatures may harm residents if unprotected outdoors or if heating mechanisms are disrupted.

**Table 4.5-2** presents the severe winter weather events since 1996.



**TABLE 4.5-2  
FLATHEAD COUNTY SEVERE WINTER WEATHER REPORTS (~NOVEMBER - APRIL)**

Date	Event	Date	Event	Date	Event	Date	Event
1/3/1996	Heavy Snow	12/15/2001	Heavy Snow	2/24/2000	Heavy Snow	12/27/2008	Heavy Snow
1/18/1996	Heavy Snow	1/18/2002	Heavy Snow	3/14/2000	Heavy Snow	1/17/2005	Winter Storm
1/19/1996	Heavy Snow	1/24/2002	Heavy Snow	3/28/2000	Heavy Snow	3/17/2005	Winter Storm
1/20/1996	Heavy Snow	1/29/2002	Heavy Snow	4/13/2000	Winter Storm	4/13/2005	Heavy Snow
1/23/1996	Heavy Snow	2/7/2002	Heavy Snow	12/14/2000	Winter Storm	12/4/2005	Winter Storm
1/24/1996	Heavy Snow	3/1/2002	Heavy Snow	12/16/2000	Heavy Snow	1/9/2006	Winter Storm
1/27/1996	Heavy Snow	3/5/2002	Heavy Snow	12/26/2000	Heavy Snow	1/14/2006	Heavy Snow, Avalanche; 2 fatalities
2/1/1996	Cold/Wind Chill	3/11/2002	Heavy Snow	1/30/2001	Heavy Snow	1/16/2006	Heavy Snow
2/2/1996	Cold/Wind Chill	3/18/2002	Heavy Snow	2/4/2001	Heavy Snow	1/20/2006	Heavy Snow
3/4/1996	Heavy Snow	3/20/2002	Blizzard	2/15/2001	Blizzard	1/29/2006	Heavy Snow
3/29/1996	Heavy Snow	5/7/2002	Heavy Snow	2/24/2001	Heavy Snow	2/16/2006	Cold/Wind Chill
4/27/1996	High Wind; 45 kts	5/21/2002	Heavy Snow	3/31/2001	Heavy Snow	2/23/2006	Heavy Snow
11/18/1996	Winter Storm	6/8/2002	Heavy Snow	4/1/2001	Heavy Snow	5/27/2006	Heavy Snow
11/21/1996	Winter Storm	11/9/2002	Winter Storm	4/2/2001	Heavy Snow	9/15/2006	Heavy Snow
12/1/1996	Heavy Snow	12/26/2002	Winter Storm	4/7/2001	Heavy Snow	11/10/2006	Heavy Snow
12/2/1996	Heavy Snow	12/28/2002	Heavy Snow	6/12/2001	Heavy Snow	11/12/2006	Heavy Snow
12/13/1996	Heavy Snow	12/30/2002	Heavy Snow	10/11/2001	Heavy Snow	11/13/2006	High Wind; 150 kts
12/20/1996	Winter Storm	1/22/2003	Heavy Snow	10/23/2001	Heavy Snow	11/21/2006	Heavy Snow
1/6/1997	Heavy Snow	2/1/2003	Heavy Snow	11/22/2001	Heavy Snow	11/23/2006	Winter Storm
2/26/1997	Heavy Snow	2/20/2003	Winter Storm	11/28/2001	Heavy Snow	11/26/2006	Winter Storm
3/9/1997	Heavy Snow	3/2/2003	Heavy Snow	12/1/2001	Heavy Snow	12/15/2006	Winter Storm
3/12/1997	Winter Storm	3/5/2003	Winter Storm	12/6/2001	Heavy Snow	1/2/2007	Heavy Snow
11/20/1998	Heavy Snow	3/12/2003	Avalanche	12/12/2001	Heavy Snow	1/12/2011	Heavy Snow
12/2/1998	Heavy Snow	10/12/2003	Winter Storm	1/5/2007	Winter Storm	1/29/2011	Winter Storm
12/27/1998	Heavy Snow	11/10/2003	Winter Storm	1/7/2007	Winter Storm	1/30/2011	Extreme Cold/Wind Chill
12/29/1998	Heavy Snow	11/16/2003	Winter Storm	1/11/2007	Extreme Cold/Wind Chill	2/7/2011	Winter Storm
1/10/1999	Heavy Snow	11/18/2003	High Wind; 64 kts	2/19/2007	Winter Storm	2/21/2011	Heavy Snow
1/22/1999	Heavy Snow	11/20/2003	Heavy Snow	5/24/2007	Heavy Snow	2/24/2011	Extreme Cold/ Wind Chill
1/27/1999	Heavy Snow	11/23/2003	Winter Storm	11/26/2007	Heavy Snow	3/31/2011	High Wind; 82 kts.
2/1/1999	Winter Storm	11/25/2003	Heavy Snow	12/2/2007	Winter Storm	4/17/2011	Heavy Snow
2/6/1999	Winter Storm	11/28/2003	Winter Storm	12/19/2007	Heavy Snow	12/29/2011	Strong Wind; 43 kts.
2/18/1999	Heavy Snow	12/13/2003	Heavy Snow	12/29/2007	Winter Storm	1/10/2012	Heavy Snow
5/9/1999	Heavy Snow	1/1/2004	Winter Storm	1/3/2008	Heavy Snow	1/30/2012	Heavy Snow
9/25/1999	Heavy Snow	1/3/2004	Winter Storm	1/13/2008	Avalanche; 2 fatalities, 1 injury	2/24/2012	Heavy Snow
11/24/1999	Heavy Snow	1/5/2004	Cold/Wind Chill	1/14/2008	Winter Storm	3/13/2012	High Wind; 56 kts.
12/6/1999	Heavy Snow	1/7/2004	Winter Weather; 1 fatality, 6 injuries	1/20/2008	Cold/Wind Chill	3/18/2012	Heavy Snow
12/9/1999	Heavy Snow	1/24/2004	Winter Storm	1/26/2008	Heavy Snow	3/21/2012	Heavy Snow
12/11/1999	Heavy Snow	1/26/2004	Blizzard	1/27/2008	Winter Storm	5/26/2012	Heavy Snow
12/12/1999	Heavy Snow	1/27/2004	Heavy Snow	1/28/2008	Blizzard	10/23/2012	Heavy Snow
12/14/1999	Heavy Snow	1/28/2004	Avalanche	1/30/2008	Heavy Snow	11/8/2012	Heavy Snow
12/17/1999	Heavy Snow	3/5/2004	Winter Storm	2/7/2008	Winter Storm	12/2/2012	Winter Storm
1/1/2000	Heavy Snow	4/27/2004	Heavy Snow	2/8/2008	Winter Storm	12/7/2012	Heavy Snow
1/3/2000	Heavy Snow	5/10/2004	Heavy Snow	3/29/2008	Heavy Snow	12/17/2012	Winter Storm
1/13/2000	Heavy Snow	12/7/2004	Winter Storm	6/10/2008	Heavy Snow	5/23/2013	Heavy Snow
1/16/2000	Heavy Snow	12/30/2004	Cold/Wind Chill	12/12/2008	Blizzard; 1 fatality	9/25/2013	Heavy Snow
2/1/2000	Heavy Snow	1/7/2005	Winter Storm	12/13/2008	Cold/Wind Chill	9/29/2013	Winter Weather
2/14/2000	Heavy Snow	1/11/2005	Blizzard	12/17/2008	Heavy Snow	10/27/2013	Winter Weather

Source: NCDC, 2014; Notes: kts. = knots

TABLE 4.5-3 SUMMARY OF NOTABLE AVALANCHES IN FLATHEAD COUNTY: 1998-2014		
Date	Location	Summary
3/22/2000	Gildart Peak, Swan Range	1 snowmobiler caught, not buried and killed
12/17/2000	Marias Pass near Kalispell	2 snowmobilers killed
11/20/2001	Black Lake region in Jewel Basin	skier caught, fully buried, rescued alive and uninjured
2/10/2002	Mountains North of Whitefish Lake	1 snowmobiler, caught, buried, and killed wearing a transceiver
3/15/2002	Banana Chutes, backcountry terrain by Big Mtn.	1 skier caught, buried, and rescued alive
3/16/2002	South Canyon Creek area, North Fork of the Flathead	2 snowmobilers caught and buried, 1 killed wearing an avalanche transceiver
3/12/2003	West of Marias Pass; U.S. Hwy 2	Large avalanche cycle along highway and railroad corridor
1/28/2004	Essex	Two avalanches hit freight train, 15 cars derailed
1/14/2006	Red Meadow Lake west of Polebridge	3 snowmobilers caught and buried by a Natural avalanche. 1 rescued, 2 killed.
1/13/2008	Canyon Creek, near Whitefish Mountain	2 skiers caught, buried, and killed
3/31/2010	Peak 6966 near Marias Pass, Glacier National Park	1 snowboarder caught and killed
1/8/2011	Near Hungry Horse Reservoir, east of Kalispell	3 snowmobilers caught, 1 killed
2/1/2012	Twin Lakes, Swan Range	1 backcountry skier caught and killed
2/20/2012	Lost Johnny drainage, east of Kalispell	2 snowmobilers caught, 1 partly buried, 1 buried and killed
2/25/2012	Skyline Creek, near Marias Pass	2 snowbikers caught, 1 partially buried, 1 partly buried-critical and killed

Source: CAIC, 2014; avalanche.org

No Presidential Disasters have been declared for severe winter weather in Flathead County but a State Emergency Declaration was issued in 1978. State-wide winter storm emergencies were declared in 1978, 1989 and 1996 (DMA, 2013). A brief synopsis of a recent avalanche in neighboring Missoula County and a typical winter weather event are presented below.

**March 6, 2014** – Tons of snow, trees and debris came down a creek drainage near Essex plugging the Middle Fork of the Flathead River. The avalanche was one of three major slides in John F. Stevens Canyon along U.S. Highway 2 that closed both the road and BNSF Railway's main line through Northwest Montana. On Thursday afternoon, BNSF started conducting emergency avalanche control in the area. The railroad company had received a special-use permit from Glacier National Park to use an "avalauncher," or explosive charges, delivered by a helicopter, but only during daylight hours. The mitigation technique uses a cylinder suspended from a helicopter that sends a controlled pressure wave from the sudden combustion of hydrogen to trigger the slide. U.S. Highway 2 was closed between West Glacier and East Glacier from 2 to 4:30 p.m. while the railroad conducted the avalanche control.

Two other major slides came down in the canyon, known to locals as "Avalanche Alley." One of the slides covered a BNSF snow shed. Another slide came down at the Goat Lick Overlook, just east of Essex, and went under a highway bridge before blocking the Middle Fork of the Flathead River. The slide flooded the lowlands to the east of it. (*Massive Avalanche Plugs River, Closes Highway and Railroad Near Essex, Flathead Beacon, March 6, 2014*).



**June 2008** – An upper level trough and associated surface cold front moved across Western Montana beginning on the evening of June 11 and continuing through the day on June 12. This brought heavy snow accumulations throughout the area. Power outages occurred in northwest Montana as heavy snow caused tree damage from the northern Flathead Valley southward to Evaro Hill near Missoula. Snowfall amounts ranged from 4.5 inches in Hungry Horse to 10 inches at Essex and Swan Lake at the lower elevations. In the mountains, snowfall ranged from 12 inches at Moss Peak, 24 inches above the Loop to 40 inches at Badger Pass. The heavy snow brought down trees on the Sun Road and other routes in Glacier National Park (NCDC).

#### Vulnerability and Area of Impact

Flathead County is equally exposed to effects of extended cold and winter storms during the winter months. During this time, winter storm events may affect the higher regions with more snowfall. But because the population is concentrated mostly in the lower elevations, the hazard risk area for winter storms is considered uniform for the entire County. Annualized loss estimates are presented in the Risk Assessment Summary Tables in *Section 4.15 (Tables 4.15-1 through 4.15-4)*.

Since winter storms and cold spells typically do not cause major structural damage, the greatest threat to the population is the potential for utility failure during a cold spell. Although cold temperatures and snow are normal in the County, handling the extremes can go beyond the capabilities of the community. Should the temperatures drop below -15 for over 30 days or several feet of snow fall in a short period of time, the magnitude of frozen water pipes and sewer lines or impassable streets could result in disastrous conditions for many people. If power lines were to fail due to snow/ice load, winds, or any other complicating factor, the situation would be compounded. In the event power or other utilities were disrupted, many homes could be without heat. With temperatures frequently dropping below zero in a typical winter, an event where heating systems failed could send many residents to shelters for protection. Other residents may try to heat their homes through alternative measures and increase the chance for structure fires or carbon monoxide poisoning.

Avalanches threaten the safety of recreationists, primarily in back country locations. There have been over 100 fatalities in Montana due to avalanches from 1950 to 2013. In rare instances, avalanches can threaten structures. The railroad along U.S. Highway 2 has been blocked by avalanches on numerous occasions. AMTRAK runs two trains a day through John Stevens Canyon. Trains carry approximately 400 passengers. The train has had several near misses with avalanches in the Canyon over the years.

#### Probability and Magnitude

**Table 4.5-4** presents winter weather events with reported damages from the SHELDUS and NCDC databases. The dataset used to populate SHELDUS typically includes every loss causing and/or deadly event between 1960 through 1975 and from 1995 onward. Between 1976 and 1995, SHELDUS reflects

only events that caused at least one fatality or more than \$50,000 in property or crop damages. The NCDC data contains sporadic damage figures which were added to the dataset when they represented a unique damaging event.

TABLE 4.5-4 FLATHEAD COUNTY SEVERE WINTER WEATHER EVENTS WITH DAMAGES							
Date	Property Damage	Crop Damage	Remarks	Date	Property Damage	Crop Damage	Remarks
4/22/1960	\$183,929	\$0	High Wind	12/18/1990	\$21,458	\$0	Blizzard, Heavy Snow
5/4/1961	\$4,087	\$0	Heavy Snow	12/26/1990	\$2,146	\$0	Heavy Snow
2/22/1962	\$72	\$0	High Wind, Snow, Blowing Snow, Cold	12/27/1990	\$21,458	\$0	Blizzard
11/19/1962	\$6,454	\$0	High Winds	12/31/1990	\$215	\$0	Heavy Snow
12/15/1964	\$64,536	\$0	High Wind, Blowing Snow, Severe Cold	8/22/1992	\$350	\$34,986	Winter Storm
6/3/1966	\$171,667	\$0	Heavy Snow	8/25/1992	\$0	\$1,412	Frost/Freeze
1/15/1967	\$6,023	\$0	High Wind	1/3/1993	\$1,951	\$0	Heavy Snow
4/30/1968	\$35,764	\$0	High Wind	1/4/1993	\$1,951	\$0	Blizzard
9/19/1968	\$2,299	\$22,991	Heavy Snow, Wind	1/22/1993	\$46	\$0	Heavy Snow
1/1/1969	\$531	\$0	Cold And Snow	1/24/1993	\$195	\$0	Heavy Snow
1/26/1969	\$5	\$0	Lightning	10/7/1993	\$7,803	\$0	Winter Storm
5/10/1970	\$14,306	\$0	Heavy, Wet Snow and Strong Wind	11/3/1993	\$780	\$7,803	High Winds
3/3/1971	\$904	\$0	Wind, Snow	11/22/1993	\$26,010	\$0	Blizzard, Winter Storm
11/25/1971	\$1,004	\$0	Hoarfrost, Ice	2/23/1994	\$13,287	\$0	Winter Storm
1/9/1972	\$4,755	\$0	Strong Winds	2/26/1994	\$1,893	\$0	Winter Storm
1/16/1972	\$9,035	\$0	Strong Winds	4/25/1994	\$6,311	\$0	Heavy Snow, Winter Storm
2/16/1972	\$935	\$0	High Wind	11/16/1994	\$6,311	\$0	Heavy Snow
3/5/1972	\$904	\$0	High Winds	11/25/1994	\$10,819	\$0	Heavy Snow
12/1/1972	\$27,105	\$0	Strong Winds	3/24/1995	\$73,571	\$0	Winter Storm
1/29/1974	\$3,998	\$0	Wind	12/7/1995	\$14,714	\$0	High Winds
12/26/1974	\$772	\$0	High Winds	2/1/1996	\$6,676	\$0	Extreme Cold
10/21/1975	\$2,060,000	\$20,600	Snow	11/18/1996	\$0	\$0	Winter Storm
11/9/1985	\$52,551	\$0	Wind	5/8/1997	\$278,378	\$0	Heavy Snow
12/21/1987	\$99	\$0	Heavy Snow	2/15/2001	\$0	\$0	Winter Storm
1/14/1988	\$10	\$0	Heavy Snow	1/7/2004	\$0	\$0	Winter Storm
2/15/1988	\$170	\$0	High Winds	3/18/2004	\$2,368	\$0	Winter Storm
12/13/1988	\$23,843	\$0	Wind	12/15/2006	\$1,244	\$0	High Wind
1/31/1989	\$27,379	\$274	Blizzard	6/10/2008	\$80	\$0	Heavy Snow
2/1/1989	\$158,510	\$159	Severe Cold	12/12/2008	\$52,020	\$0	Blizzard
1/29/1990	\$8,583	\$0	Winter Snow	1/1/2009	\$1,314	\$0	Winter Storm
2/11/1990	\$2,146	\$0	High Winds	10/3/2009	\$17,517	\$0	High Wind
3/12/1990	\$187	\$0	Winter Storm	4/8/2010	\$3,433	\$0	Winter Storm
4/27/1990	\$2,682	\$0	Winter Storm	4/8/2010	\$1,373	\$0	Winter Storm
6/12/1990	\$86	\$0	Heavy Snow	1/29/2011	\$1,000	\$0	Winter Storm
11/22/1990	\$23,198	\$0	High Winds	2/12/2011	\$14,000	\$0	Winter Storm
11/23/1990	\$8,583	\$0	High Winds	<b>TOTAL</b>	<b>\$3,497,787</b>	<b>\$88,225</b>	

Source: SHELDUS, 2013; DES, 2013

Snow generally does not cause the communities to shut down or disrupt activities. Occasionally, though, extreme winter weather conditions can cause problems. The most common incident in these conditions are motor vehicle accidents due to poor road conditions. Such incidents normally involve



passenger vehicles; however, an incident involving a commercial vehicle transporting hazardous materials or a vulnerable population such as a school bus is also possible.

Sheltering of community members could present significant logistical problems when maintained over a period of more than a day. Transportation, communication, energy (electric, natural gas, and vehicle fuels), shelter supplies, medical care, food availability and preparation, and sanitation issues all become exceedingly difficult to manage in extreme weather conditions. Local government resources could be quickly overwhelmed. Mutual aid and state aid might be hard to receive due to the regional impact of this kind of event.

Severe winter storms and extended periods of extreme cold occur in Flathead County multiple times each year. Therefore, the probability of a severe winter storm event occurring in the future is rated as “highly likely”.

#### *Future Development*

The State of Montana has adopted the 2009 International Building Codes (IBC) and these codes are recognized by Flathead County and the incorporated communities as the standards for construction. The IBC includes a provision that buildings must be constructed to withstand a wind load of 75 mph constant velocity and three second gusts of 90 mph. Buildings must be designed to withstand a snow load of 30 pounds per square foot minimum. There is no building permit/inspection requirement in Flathead County; however, the Cities of Columbia Falls, Kalispell, and Whitefish enforce compliance with the IBC.

The Flathead County Subdivision Regulations (2005) describe lands on which there is evidence of hazards such as snow avalanches as unsuitable for subdivision as it may be detrimental to the health, safety or general welfare of existing or future residents unless the hazards are eliminated or will be overcome by approved design and construction plans.

#### 4.6 COMMUNICABLE DISEASE

CPRI SCORE = 3.25
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##### Description and History

Communicable diseases, sometimes called infectious diseases, are illnesses caused by organisms such as bacteria, viruses, fungi and parasites. Sometimes the illness is not due to the organism itself, but rather a toxin that the organism produces after it has been introduced into a human host. Communicable disease may be transmitted (spread) either by: one infected person to another, from an animal to a human, from an animal to an animal, or from some inanimate object (doorknobs, table tops, etc.) to an individual. A pandemic is a global disease outbreak. Human diseases, particularly epidemics, are possible throughout the nation and Flathead County is not immune to this hazard. In addition, livestock and animal disease could have a devastating effect on the economy and food supply in Flathead County and beyond. Highly contagious diseases are the most threatening to both populations.

Communicable disease or biological agents could be devastating to the population or economy of Flathead County. Human diseases when on an epidemic scale, can lead to high infection rates in the population causing isolation, quarantines and potential mass fatalities. Diseases that have been eliminated from the U.S. population, such as smallpox, could be used in bioterrorism.

The following list gives examples of biological agents or diseases that could occur naturally or be used by terrorists as identified by the Centers for Disease Control and Prevention (2011).

##### **Category A**

Definition - The U.S. public health system and primary healthcare providers must be prepared to address various biological agents, including pathogens that are rarely seen in the United States. High-priority agents include organisms that pose a risk to national security because they:

- Can be easily disseminated or transmitted from person to person;
- Result in high mortality rates and have the potential for major public health impact;
- Might cause public panic and social disruption; and
- Require special action for public health preparedness.

##### Agents/Diseases

Anthrax (*Bacillus anthracis*)

Botulism (*Clostridium botulinum* toxin)

Plague (*Yersinia pestis*)

Smallpox (variola major)

Tularemia (*Francisella tularensis*)

Viral hemorrhagic fevers (filoviruses [e.g., Ebola, Marburg] and arenaviruses [e.g., Lassa, Machupo])



**Category B**

Definition - Second highest priority agents include those that:

Are moderately easy to disseminate;

Result in moderate morbidity rates and low mortality rates; and

Require specific enhancements of CDC's diagnostic capacity and enhanced disease surveillance.

Agents/Diseases

Brucellosis (*Brucella* species)

Epsilon toxin of *Clostridium perfringens*

Food safety threats (e.g., *Salmonella* species, *Escherichia coli* O157:H7, *Shigella*)

Glanders (*Burkholderia mallei*)

Melioidosis (*Burkholderia pseudomallei*)

Psittacosis (*Chlamydia psittaci*)

Q fever (*Coxiella burnetii*)

Ricin toxin from *Ricinus communis* (castor beans)

Staphylococcal enterotoxin B

Typhus fever (*Rickettsia prowazekii*)

Viral encephalitis (alphaviruses [e.g., Venezuelan equine encephalitis, eastern equine encephalitis, western equine encephalitis])

Water safety threats (e.g., *Vibrio cholerae*, *Cryptosporidium parvum*)

**Category C**

Definition - Third highest priority agents include emerging pathogens that could be engineered for mass dissemination in the future because of:

Availability;

Ease of production and dissemination; and

Potential for high morbidity and mortality rates and major health impact.

Agents

Emerging infectious diseases such as Nipah virus and hantavirus

These diseases/bioterrorism agents can infect populations rapidly, particularly through groups of people in close proximity such as schools, assisted living facilities, and workplaces, and Hutterite Colonies.

Historically, the Spanish influenza outbreak after World War I in 1918-1919 caused 9.9 deaths per 1,000 people in the State of Montana (Brainerd and Siegler, 2002). Historical records from newspapers show that the influenza outbreak was so bad in 1918 that residents were quarantined from November 30 to December 17 after 18 people died and 53 new cases were discovered. In 1979 and again in late 2003, a flu epidemic hit the U.S. infecting hundreds of people. The swine flu (H1N1) pandemic of 2009 caused a number of fatalities in the country.

The Montana Department of Public Health and Human Services (DPHHS) manages a database of reportable communicable disease occurrences. The communicable disease summary for Flathead County between 2002 and 2012 is presented in **Table 4.6-1**.

TABLE 4.6-1 FLATHEAD COUNTY COMMUNICABLE DISEASE SUMMARY											
Disease	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<i>Vaccine Preventable Diseases</i>											
Hepatitis B	-	1	2	7	6	-	-	-	-	1	3
Pertussis	3	-	6	58	47	13	21	5	21	21	138
Tuberculosis	1	1	-	-	2	1	-	-	-	-	-
Varicella	-	-	-	-	27	105	48	28	90	19	25
<i>Enteric Diseases</i>											
Campylobacteriosis	12	9	8	14	26	15	24	11	10	25	22
Cryptosporidium	1	1	-	-	10	15	17	18	15	-	15
E Coli	-	-	-	-	1	2	2	2	2	-	-
Giardia	10	20	1	6	19	10	12	7	14	16	8
Salmonella	8	11	31	8	7	10	19	6	10	4	6
<i>Other Communicable Diseases</i>											
West Nile Virus	-	-	-	-	2	-	-	-	-	-	-
STD	123	120	143	150	205	201	205	162	235	291	243
<b>TOTAL</b>	<b>158</b>	<b>163</b>	<b>191</b>	<b>243</b>	<b>352</b>	<b>372</b>	<b>348</b>	<b>239</b>	<b>397</b>	<b>377</b>	<b>460</b>

Source: Montana DPHHS Communicable Disease Summaries, 2002 – 2012

Notes: STD = Sexually Transmitted Disease

According to the Montana Department of Livestock, known livestock and animal diseases such as Foot and Mouth, Bovine Spongiform Encephalopathy (Mad Cow Disease), Exotic Newcastle, Rabies, Scabies, and Brucellosis could have damaging effects on the livestock population. Losses from these diseases would be devastating and could have an economic effect county-wide.

### Vulnerability and Area of Impact

Diseases threaten the population, plants, and animals of Flathead County as opposed to structures. The entire population is at risk for contracting disease. The more urban nature of Kalispell, Whitefish, and Columbia Falls makes them more vulnerable to rapidly spreading and highly contagious diseases than other more rural parts of the County. In addition, the high number of tourist visits in the County could introduce a disease to the local population. The number of fatalities in the county would depend on the mortality (disease/agent attack) rate and the percentage of the population affected. The ability to



control the spread of disease will be dependent on the contagiousness of the disease and movement of the population. Given the uncertain nature of diseases, Flathead County is assumed to have the same communicable disease risk county-wide.

#### *Probability and Magnitude*

The probability of an epidemic in Flathead County is difficult to assess based on history and current data. Individual infectious diseases will likely be reported on an annual basis giving this hazard a probability rating of “highly likely”.

The magnitude of a communicable disease outbreak varies from common viral outbreaks to widespread bacterial infection. During the 1918 influenza pandemic, infection rates approached 28 percent in the United States (Billings, 1997). Other pandemics produced infection rates as high as 35 percent of the total population (World Health Organization, 2009). Such a pandemic affecting Flathead County represents a severe magnitude event. Almost any communicable disease that enters the regional population could overwhelm local health resources as would any rapidly spreading bioterrorism event for which there is no available vaccine or containment capability.

#### *Future Development*

There are no land use regulations for future development that could impact the communicable disease hazard. New residents and population add to the number of people threatened in the county but the location of such population increases would not increase their vulnerability to the hazard.

## 4.7 TRANSPORTATION ACCIDENTS

**CPRI SCORE =3.25**

The Transportation Accident Hazard Profile includes three hazards that affect Flathead County residents; highway accidents, railroad accidents, and aircraft accidents.

### Description and History

Accidents results from each of these transportation types, causing fatalities, injuries, and property damage. The following section describes highway, railroad, and aircraft accidents in Flathead County, with much information coming from the Flathead County Growth Policy (2012).

### **HIGHWAY ACCIDENTS**

Flathead County is connected to interstate routes by U.S. Highway 93 and U.S. Highway 2. The closest junction to Interstate 90 is 110 miles south of Kalispell. As such, the county is isolated and driving times are long to get to proximate urban areas. To the west, U.S. 2 connects to U.S. Highway 95 that connects to Interstate 90 into Spokane. U.S. 2 connects to Interstate-15, 150 miles east of Kalispell, traveling north to Calgary and south to Helena and Wyoming. U.S. Highway 93 and U.S. Highway 2 intersects in downtown Kalispell. U.S. Highway 93 runs south from Kalispell to Missoula where it connects to Interstate-90. To the north, U.S. 93 goes through Eureka to Canada. By road, Flathead County is not directly connected to major urban centers such as Spokane, Missoula, Great Falls, Billings and Calgary via interstate. There is, however, US and state highway connectivity.

The condition and maintenance of the county road system is a primary concern of most residents. County roads are very rural in character. Of the approximately 1,130 miles of county maintained roads, 430 miles are paved and the remaining 700 miles are graveled or unimproved. The Flathead County Road and Bridge Department is responsible for operating and maintaining public county roads in unincorporated areas of the county. There are approximately 100 bridges and 700 culverts, cattle passes and cattle guards maintained by the department.

Traffic on Montana State and US Highways is increasing at rates similar to county roads. According to MDT traffic count data, the average annual daily traffic (AADT) on highways has increased an average of 4 percent per year since 1990. The highway system AADT clearly shows that the highest concentration of traffic radiates outward from, or towards, the city of Kalispell. MT Highway 35, between Bigfork and Kalispell, has shown significant increase in travel as has US Highway 93 between Whitefish and Kalispell.

The source and location of transportation accidents vary but the response is typically the same. Response is focused on determining the presence of hazardous materials and then assisting the injured. Statistics on highway accidents in Flathead County over the past 10 years were provided by the Montana Department of Transportation (MDT), and are presented in **Table 4.7-1**.



TABLE 4.7-1 FLATHEAD COUNTY HIGHWAY ACCIDENTS; 2003 - 2013							
Year	Fatal Crashes	Injury Crashes	Total Crashes	Year	Fatal Crashes	Injury Crashes	Total Crashes
2013	19	497	1,785	2007	25	595	2,001
2012	11	482	1,704	2006	27	664	2,148
2011	13	444	1,612	2005	15	649	2,100
2010	8	401	1,475	2004	17	652	1,975
2009	13	475	1,785	2003	20	656	2,005
2008	22	431	1,954	<b>TOTAL</b>	<b>190</b>	<b>5,946</b>	<b>20,544</b>

Sources: MDT, 2014

### RAILROAD ACCIDENTS

The railroad is an important transportation corridor for the Flathead Valley. Amtrak supplies daily eastbound and westbound passenger service aboard the Empire Builder, which runs between Seattle/Portland and Chicago along the BNSF Railroad line. Connections to the Amtrak Passenger System are available in Whitefish and West Glacier. Two passenger trains per day: a west bound train that departs in the evening and an east bound train in the early morning. A limited amount of agricultural and commercial shipping in and out of the Flathead occurs along the same route with a spur into Kalispell. Amtrak's Empire Builder remains the most popular overnight route carrying more than half a million passengers. However, federal subsidies that keep the passenger service in operation are never guaranteed, and have to be constantly advocated by the state and by local communities that depend on the service.

BNSF has 32,000 route miles nationwide and employs approximately 40,000 people. The company operates approximately 60 trains per day through Whitefish, carrying mostly agricultural products and intermodal cargo. On average, one trainload of crude oil per day is shipped west via BNSF Railway's Hi-Line route, along the southern boundary of Glacier Park, through Columbia Falls and Whitefish, and along the west shore of Whitefish Lake. A significant amount of that crude originates from the booming Bakken oil fields of North Dakota and eastern Montana.

**Table 4.7-2** presents statistics on accidents at railroad crossings in Flathead County. **Table 4.7-3** presents statistics from the Federal Railroad Administration on railroad collisions and derailments.

TABLE 4.7-2 ACCIDENTS AT RAILROAD CROSSINGS IN FLATHEAD COUNTY: 1975 - 2013											
Date	Road Name	Nearest Town	F	I	Crossing Protection	Date	Road Name	Nearest Town	F	I	Crossing Protection
5/1/11	LaSalle Rd.	Kalispell	0	0	Gates	2/4/85	W. Evergreen Dr.	Kalispell	0	0	Cross Bucks
1/6/09	Jellison Rd.	CFalls	0	0	Cross Bucks	10/15/85	5 <sup>th</sup> St. West	CFalls	0	0	Cross Bucks
1/29/09	Private Rd.	Coram	0	0	Stop Signs	11/23/85	5 <sup>th</sup> St. West	CFalls	0	1	Cross Bucks
7/20/09	2nd Ave. West	CFalls	0	0	Gates	8/6/84	Vetville Rd/12 <sup>th</sup>	CFalls	2	0	Gates
1/18/08	Jellison Rd.	CFalls	0	0	Cross Bucks	9/8/84	4 <sup>th</sup> Ave. East	CFalls	0	0	Gates
2/12/07	Talbot Rd.	CFalls	0	0	Watchman	11/3/84	2 <sup>nd</sup> Ave. West	CFalls	0	0	Gates
10/3/07	MT Rock Works	Kalispell	0	0	Stop Signs	2/1/83	4 <sup>th</sup> Ave. East	CFalls	0	1	Cross Bucks

**TABLE 4.7-2  
ACCIDENTS AT RAILROAD CROSSINGS IN FLATHEAD COUNTY: 1975 - 2013**

Date	Road Name	Nearest Town	F	I	Crossing Protection	Date	Road Name	Nearest Town	F	I	Crossing Protection
8/5/05	Private Rd.	CFalls	0	0	Cross Bucks	6/10/83	Main St. (US 93)	Kalispell	0	0	Cross Bucks
10/16/03	Reserve Drive	Kalispell	0	0	Gates	9/12/83	C & C Plywood	Kalispell	0	0	Cross Bucks
12/10/03	Private	Coram	1	0	Stop Signs	1/24/82	4 <sup>th</sup> Ave. East	CFalls	0	0	Cross Bucks
1/13/02	4 <sup>th</sup> Ave.	CFalls	0	0	Gates	4/11/82	4 <sup>th</sup> Ave. East	CFalls	0	0	Cross Bucks
8/8/01	Lupfer Rd.	Whitefish	0	0	Cross Bucks	11/13/81	-	Somers	0	0	Cross Bucks
1/23/99	Melissa Welch R	Coram	0	0	Stop Signs	2/27/81	Lupfer Rd.	Whitefish	0	0	Cross Bucks
12/7/99	Hwy 93	Whitefish	0	0	Cross Bucks	12/16/81	Main St. (US 93)	Kalispell	0	0	Cross Bucks
2/9/98	Private Rd.	Essex	0	0	Cross Bucks	1/29/80	4 <sup>th</sup> Ave. East	CFalls	1	0	Cross Bucks
1/22/97	5 <sup>th</sup> St. West	CFalls	0	0	Stop Signs	1/6/79	N. Fork Rd.	CFalls	0	0	Cross Bucks
8/30/97	5 <sup>th</sup> St. West	CFalls	0	1	Gates	1/20/79	4 <sup>th</sup> Ave. East	CFalls	0	0	Cross Bucks
11/28/97	2 <sup>nd</sup> Avenue W	CFalls	0	0	Gates	2/2/79	12 <sup>th</sup> Ave. West	CFalls	0	0	Cross Bucks
3/29/96	Talbot Rd.	CFalls	0	1	Cross Bucks	3/18/79	Main St.	Olney	0	0	Cross Bucks
3/8/94	C & C Plywood	Kalispell	0	0	Stop Signs	4/12/79	2 <sup>nd</sup> Ave. West	CFalls	0	0	Cross Bucks
5/1/93	5 <sup>th</sup> St. West	CFalls	0	1	Watchman	11/30/79	W. Evergreen Dr.	Kalispell	0	1	Cross Bucks
12/23/93	W. Evergreen Dr.	Kalispell	0	1	Cross Bucks	12/17/79	Flathead Dr.	Kalispell	0	1	Cross Bucks
9/18/92	Private Crossing	Kalispell	0	0	Flashing Lts	1/3/78	5 <sup>th</sup> St. West	CFalls	0	0	Cross Bucks
1/29/91	Gladys Glen Rd.	Coram	0	0	Cross Bucks	1/4/78	3 Miles North	Coram	0	0	Cross Bucks
11/30/91	Blankenship Rd.	Coram	0	0	Gates	1/6/78	2 <sup>nd</sup> Ave. West	CFalls	0	0	Cross Bucks
2/5/90	Gladys Glen Rd.	Coram	0	0	Cross Bucks	6/6/78	Private Crossing	Kalispell	0	1	None
2/16/90	Private Crossing	Kalispell	0	0	Stop Signs	7/10/78	Main St. (US 93)	Kalispell	0	0	Cross Bucks
3/28/90	Private Crossing	Kalispell	0	0	Stop Signs	7/20/78	C & C Plywood	Kalispell	0	0	Cross Bucks
8/26/90	1 Mile East	Whitefish	0	1	Gates	7/21/78	W. Evergreen Dr.	Kalispell	0	0	Cross Bucks
3/18/88	Baker Rd.	Whitefish	0	0	Cross Bucks	12/15/78	5 <sup>th</sup> Ave. NW	Kalispell	0	0	Cross Bucks
6/9/88	Coram School Ln.	Coram	0	0	Gates	3/18/77	N. LaSalle Rd.	CFalls	0	0	None
9/29/88	Blankenship Rd.	Coram	0	0	Gates	9/9/77	C & C Plywood	Kalispell	0	0	Stop Signs
10/17/88	Flathead Power	Kalispell	1	0	None	12/12/77	Rose Crossing	Kalispell	0	0	Cross Bucks
10/19/88	Plum Crk Lumber	CFalls	0	0	None	12/21/77	Reserve St.	Kalispell	0	0	Cross Bucks
2/9/87	5 <sup>th</sup> St. West	CFalls	0	0	Cross Bucks	1/13/76	West Reserve Dr.	Kalispell	0	2	Cross Bucks
3/18/87	Main St. (US 93)	Kalispell	0	0	Flashing Lts	2/25/76	W. Evergreen Dr.	Kalispell	0	0	Cross Bucks
<b>TOTAL</b>									<b>5</b>	<b>12</b>	

Source: Federal Railroad Administration, 2014; F = Fatalities; I = Injuries;

<http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/gxrabbr.aspx>

**TABLE 4.7-3  
RAILROAD ACCIDENTS IN FLATHEAD COUNTY: 1984 - 2013**

Date	RR	Type	Cars Derailed	Cars w/ HazMat	Closest Town	F	I	Comments
25-Jan-2013	BNSF	Der	5	4	Coram	0	0	Broken rail. No hazardous materials released.
21-Nov-2013	BNSF	Der	4	3	Essex	0	0	No hazardous materials released.
16-Feb-2011	BNSF	Other	2	0	Essex	0	0	Snow plow on descending grade unable to stop.
9-Mar-2011	BNSF	Der	19	4	Essex	0	0	No hazardous materials released.
27-Mar-2011	MMT	Der	3	0	Kalispell	0	0	Speed over limit.
6-Jun-2011	BNSF	Der	6	0	Whitefish	0	0	Switch thrown by unknown party.
28-Aug-2009	BNSF/ATK	Der	4	0	Essex	0	1	NA
25-Nov-2009	BNSF	Other	0	0	Essex	0	0	Rockfall – Train hit rock between tracks
19-May-2008	BNSF	Other	0	0	Java	0	0	Locking mechanism failed
14-Aug-2008	BNSF	Other	1	0	Whitefish	0	0	Crew did not set hand brake when switching track
27-Dec-2008	BNSF	Other	19	0	Java	0	0	Equipment failure at switch
29-Dec-2008	BNSF	Other	0	0	Vista	0	0	Broken wheel in train.
16-Feb-2007	BNSF	Der	7	24	Whitefish	0	0	Broken rail. No hazardous materials released.
4-May-2006	BNSF	Der	1	8	Java	0	0	No hazardous materials released.
9-Dec-2006	BNSF	Der	3	2	Summit	0	0	No hazardous materials released.
17-Mar-2005	BNSF	Der	2	1	Whitefish	0	0	Operator error. No hazardous materials released.
10-May-2005	BNSF	Der	5	0	Pinnacle	0	0	Operator error at switch.
4-Aug-2005	BNSF	Col	1	0	Belton	0	0	Train not pulled entirely into controlled siding.
26-Aug-2005	BNSF	Der	26	0	Blacktail	0	0	Irregular track alignment.



**TABLE 4.7-3  
RAILROAD ACCIDENTS IN FLATHEAD COUNTY: 1984 - 2013**

Date	RR	Type	Cars Derailed	Cars w/ HazMat	Closest Town	F	I	Comments
28-Jan-2004	BNSF	Der	15	0	Essex	0	0	Tracks blocked by avalanche causing derailment.
20-Apr-2004	BNSF	Der	29	0	Java	0	0	Derailement blocks both main tracks.
25-Nov-2004	BNSF	Col	12	0	Conkelley	0	1	No hazardous materials released.
7-Mar-2003	BNSF	Der	7	0	Blacktail	0	0	Derailed on switch
8-Aug-2003	BNSF	Der	5	17	Whitefish	0	0	No hazardous materials released.
15-Feb-2001	BNSF	Der	20	2	Belton	0	0	No hazardous materials released.
28-Feb-2001	BNSF	Oth	0	0	Red Eagle	0	0	Switch operator error.
12-Apr-2001	BNSF	Der	1	0	Whitefish	0	0	Derailed due to burned journal.
6-Jan-2000	ATK/BNSF	Der	5	0	Essex	0	0	Derailed due to snow on track.
2-Jun-2000	BNSF	Der	3	0	Blacktail	0	0	Too much power used to move empty cars.
14-Sep-2000	BNSF	Oth	1	9	Coram	0	0	No hazardous materials released.
28-Nov-2000	BNSF	Der	1	46	Essex	0	0	No hazardous materials released.
24-Dec-2000	BNSF	Der	1	12	Java	0	0	No hazardous materials released.
22-Jul-1999	BNSF	Oth	1	1	Whitefish	0	0	No hazardous materials released.
24-Aug-1998	BNSF	Der	2	0	Belton	0	0	Improperly aligned switch.
29-Aug-1998	BNSF	Der	27	0	Blacktail	0	0	Stiff truck bolsteron.
10-Sep-1998	BNSF	Oth	0	0	Blacktail	0	0	Collision with signal truck.
18-Sep-1998	BNSF	Der	4	0	Essex	0	0	Broken rail.
1-Nov-1998	BNSF	Oth	0	0	Whitefish	0	0	Train struck power.
29-Jan-1997	BNSF	Der	1	0	Vista	0	0	Conductor failed to identify journal failure.
19-Apr-1997	BNSF	Col	0	0	Red Eagle	0	0	Train failed to stop for absolute signal.
20-Mar-1996	BNSF	Der	13	4	Whitefish	0	0	1 haz-mat car damaged.
6-Apr-1996	BNSF	Der	6	0	Red Eagle	0	0	Irregular cross level on track.
28-Apr-1996	BNSF	Der	3	8	Belton	0	0	Derailed during loading procedures.
28-Aug-1996	BNSF	Der	6	0	Rednor	0	0	Derailed due to improperly loaded cars.
28-Mar-1994	BNSF	Der	12	0	Belton	0	0	Due to interaction of lateral/vertical forces.
25-Jul-1994	BNSF	Oth	0	0	Red Eagle	0	0	Failure to comply with restricted speed.
20-Nov-1994	BNSF	Der	1	0	Essex	0	0	Damaged flange or tread build up.
18-Dec-1993	BN	Der	6	0	Belton	0	0	Burned off journal.
17-Apr-1992	BN	Oth	3	1	Whitefish	0	0	1 haz-mat car damaged.
9-Aug-1992	BN	Der	7	0	Lupfer	0	0	Mechanical failure.
10-Feb-1991	BN	Oth	2	0	Whitefish	0	0	Cars rolled after being switched and hit train.
10-Apr-1991	BN	Der	17	0	Summit	0	1	100 gallon diesel fuel spill resulted.
7-Nov-1991	BN	Oth	5	0	Whitefish	0	0	Cars came out of track and struck switch engine.
13-Dec-1991	BN	Der	5	0	Summit	0	0	Brake rigging fell under car.
20-Feb-1990	BN	Der	7	1	Belton	0	0	Air went into emergency and derailed in tunnel.
24-Aug-1990	BN	Der	1	0	Lupfer	0	0	Derailed and rolled down embankment.
4-Oct-1990	BN	Oth	3	0	Whitefish	0	0	Failure to properly secure hand brakes.
23-Jan-1989	BN	Der	32	0	Java	0	0	Broken rail.
31-Jan-1989	ATK/BN	Col	0	0	Glacier Park	0	6	Pass on absolute signal.
2-Feb-1989	BN	Der	52	0	Blacktail	0	0	Airbrakes failed to retard train.
31-Jul-1989	BN	Der	29	18	Vista	0	0	15 haz-mat cars damaged. 4 discharged fuel oil to lake.
17-Nov-1989	BN	Der	1	14	Conkelley	0	0	Excessive buffing or slack action.
11-Dec-1989	BN	Der	3	0	CFalls	0	0	Debris on tracks.
20-Jan-1988	BN	Der	7	0	Whitefish	0	0	Excessive lateral drawbar force.
17-Jul-1988	BN	Der	24	0	Essex	0	0	Improper use of automatic brake.
19-Jul-1988	BN	Der	6	0	Essex	0	0	Crew lost control of movement.
23-Jul-1988	ATK/BN	Der	5	0	Belton	0	2	Compound fracture of rail.
18-Dec-1988	BN	Der	22	0	Blacktail	0	0	Broken wheel which climbed rail.
20-Dec-1988	BN	Der	3	0	Coram	0	0	Worn flange on wheel.
16-Jun-1987	BN	Oth	6	0	Whitefish	0	1	Absence of man at leading end of movement.
12-Apr-1986	BN	Der	5	0	Java	0	0	Excessive buffer or slack action.
21-Jul-1985	BN	Der	22	0	Blacktail	0	0	Sunkink in track.
16-Nov-1985	BN	Der	6	0	Whitefish	0	0	Cars rolled over end stop of switching lead.
10-Dec-1985	BN	Der	1	0	Blacktail	0	0	Excessive speed.
28-Jan-1984	BN	Der	12	0	Blacktail	0	0	Irregular track alignment.
14-Jun-1984	BN	Der	11	0	Blacktail	0	0	Harmonic rockoff.
<b>TOTAL</b>						<b>0</b>	<b>28</b>	

Source: Federal Railroad Administration, 2014; <http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/incabbr.aspx>

Notes: RR = Railroad; BNSF = Burlington Northern-Santa Fe; ATK = Amtrak; F = Fatalities; I = Injuries; Der = Derailment; Col = Collision; Oth = Other

The railroad along U.S. Highway 2 has a checkered history for derailments, including several grain car spills in the 1980s that attracted grizzly bears out of Glacier Park. In 2013, four BNSF locomotives and a car with three cargo containers derailed as they pulled onto a siding just west of West Glacier. And in March 2011, a freight train derailed near Essex, leaving 19 cars off the tracks. No oil or other hazardous material was spilled in any of those incidents. But tank cars have toppled into Whitefish Lake, requiring extensive cleanup efforts (*Oil Train Shipments in Montana Raise Concern*, Missoulain, April 26, 2014). See Hazard Material Incident profile in *Section 4.4* for additional information on the Whitefish Lake fuel spill incident.

### **AIRCRAFT ACCIDENTS**

The demand for air service in Flathead County has increased dramatically over the last 20 years. General aviation airports are located in Kalispell, Whitefish and Ferndale. The Kalispell City Airport provides charter services and is managed by the City. Whitefish Municipal Airport and Ferndale Airport are managed by Glacier International Airport. Several major commercial airlines, as well as private charter services operate out of these facilities.

Glacier Park International Airport - Glacier Park International Airport began service in 1942 as the Flathead County Airport. The airport is centrally located on U.S. Highway 2 between Kalispell and Columbia Falls. Air service needs have increased roughly 75 percent over the past 20 years. In 1990, there were approximately 100,000 boardings. Total boardings increased to 178,000 by 2004, and then dropped slightly to 174,795 enplaned passengers in 2010.

Several lighted runways accommodate approximately 62,990 aircraft operations per year, including commercial, transient, local general and air taxi/jet aircraft operations. There are 162 aircraft based at the field, facility. Major commercial airlines providing service out of the airport include, American West, Big Sky, Northwest, Alaska/Horizon and Delta/Skywest Airlines.

Kalispell City Airport - The Kalispell City Airport is a public airport, owned by the City of Kalispell and is located about one mile south of the downtown area. This airport does not accommodate large air carrier aircraft, so it does not have an FAA class rating. The 3,600-foot long asphalt runway is lighted with two radio towers. There are 64 aircraft based on the field, some in hangars and operations average 105 aircraft per day. Several issues were identified at the facility including runway length and alignment, the KGEZ radio tower, security, funding for improvements, surrounding land use and land acquisition.

Whitefish Airport - The Whitefish Airport is a public airport, owned by Flathead County and is located about one mile east of Whitefish. The airport does not accommodate large air carrier aircraft. The airport has a 2,560-foot long turf runway that accommodates an average of 20 aircraft operations per



week. The runway is unlighted. Approximately 67 percent of operations are local general traffic and about 29 percent is transient general traffic. There are 3 single engine aircraft based on the field.

**Ferndale Airfield** - The Ferndale Airfield is also a public airport. The land is owned by Flathead County but is privately operated and is located approximately 3 miles northeast of Bigfork. This airport has a 3,500 foot long unlighted runway and does not handle large aircraft. In winter months, delayed snow removal may make the runway inaccessible. The Ferndale Airfield accommodates an average of 29 aircraft operations per day.

Aviation accidents can occur for a multitude of reasons from mechanical failure to poor weather conditions to pilot error. **Table 4.7-4** presents a summary of the aircraft accidents which have occurred in Flathead County from 1982 through 2013.

<b>TABLE 4.7-4 FLATHEAD COUNTY AIRCRAFT ACCIDENTS</b>							
Date	Airport	Aircraft Make	Fatalities	Date	Airport	Aircraft Make	Fatalities
12/9/2013	Kalispell	Beech 58P	Nonfatal	7/18/1998	Kalispell	Socata Rallye 235E	Nonfatal
11/26/2013	Kalispell	Quad City Ultralight	Nonfatal	7/18/1998	Kalispell	McCarty Avid	Nonfatal
7/2/2012	West Glacier	Cessna 210-5	Nonfatal	4/11/1998	Bigfork	Piper PA-46-350P	Fatal(2)
2/20/2012	Kalispell	Enstrom F28	Nonfatal	3/24/1998	Kalispell	Piper PA-22	Nonfatal
2/4/2012	Kalispell	Piper PA-28R-201T	Nonfatal	6/8/1996	Kalispell	Cessna 180	Nonfatal
7/8/2011	Bigfork	Schweizer Sgs 2-32	Fatal(1)	5/14/1992	Kalispell	Bellanca 8KCAB	Nonfatal
7/5/2011	Kalispell	Cubcrafters CC11-160	Nonfatal	2/12/1992	West Glacier	Grumman American	Fatal(2)
6/26/2011	West Glacier	Lemond Fly Fisher	Nonfatal	8/17/1991	Kalispell	Beech 58TC	Nonfatal
1/7/2010	Kalispell	Bell 206B	Nonfatal	12/31/1990	Kalispell	Swearingen SA-227	Nonfatal
4/4/2009	Kalispell	Cessna 182	Nonfatal	8/19/1990	Kalispell	Piper PA-30-160	Fatal(4)
9/16/2008	Kalispell	Stinson 108-1	Nonfatal	4/18/1990	Columbia Falls	Cessna 172	Nonfatal
7/8/2008	Kalispell	Cessna 150F	Nonfatal	2/23/1990	Kalispell	Heindenreich Fokker	Nonfatal
2/17/2008	Kalispell	Piper PA-32-300	Nonfatal	7/24/1989	Kalispell	Beech E35	Nonfatal
10/14/2007	Bigfork	Welch RV-9	Nonfatal	4/19/1989	Kalispell	Cessna 170a	Nonfatal
7/23/2007	Kalispell	De Havilland Beaver	Nonfatal	8/26/1988	Lakeside	Lake LA-4-200	Nonfatal
6/20/2007	Kalispell	Cessna 185C	Nonfatal	7/31/1987	Kalispell	Cessna A188B	Fatal(1)
11/2/2006	Kalispell	Bell 407	Nonfatal	7/11/1987	Kalispell	Cessna 175	Nonfatal
10/1/2006	Kalispell	Cessna 340A	Nonfatal	7/4/1987	Lakeside	Beech D18S	Fatal(10)
5/21/2006	West Glacier	Cessna 170B	Nonfatal	2/2/1986	Kalispell	Cessna 180	Fatal(1)
4/27/2006	Kalispell	Potts MA-5	Nonfatal	12/5/1985	Columbia Falls	Beech 35-B33	Fatal(1)
9/1/2005	Kalispell	Ballhagen/Shyrock Q-2	Nonfatal	10/12/1985	Kalispell	Cessna 182P	Nonfatal
5/3/2005	Kalispell	Cessna T210N	Fatal(2)	7/20/1985	Kalispell	Cessna 170B	Nonfatal
4/20/2005	Kalispell	Cessna T210N	Nonfatal	6/5/1985	Kalispell	Beech V35B	Nonfatal
4/17/2005	Whitefish	Hughes 269A	Nonfatal	2/14/1985	Kalispell	Cessna 152	Nonfatal
2/17/2005	Kalispell	Aviat Husky A-1	Nonfatal	8/30/1984	Kalispell	Boeing Stearman E75	Fatal(1)
8/29/2004	Kalispell	Beech C35	Fatal(2)	8/5/1984	West Glacier	Bell 47G	Nonfatal
5/17/2004	Bigfork	Piper J4/E	Nonfatal	6/16/1984	Kalispell	Cessna T-206	Nonfatal
10/9/2003	Olney	Seabase Magnum	Nonfatal	11/21/1983	Kalispell	Cessna 170B	Nonfatal
6/20/2000	Bigfork	Hoye Kolb Twinstar III	Fatal(2)	9/9/1983	Kalispell	Cessna 182N	Fatal(2)
1/27/2000	Columbia Falls	Cessna 310R	Nonfatal	4/23/1983	Kalispell	Piper J3C65	Nonfatal
6/19/1999	Kalispell	Cessna 180G	Nonfatal	11/20/1982	Near Kalispell	Bell 206B Helicopter	Nonfatal
5/22/1999	Kalispell	Cessna 182K	Nonfatal	8/22/1982	Near Kalispell	Cessna 150I	Fatal(1)

Source: Federal Aviation Administration, 2014; [http://www.faa.gov/data\\_research/accident\\_incident/](http://www.faa.gov/data_research/accident_incident/)

A summary of two aircraft accidents in Flathead County follows:

July, 4, 1987 - A twin-engine plane that crashed and burned near Lakeside and killed all 10 people on board including the members of a popular bluegrass band. Some witnesses said they saw an airplane "buzzing" the lake shortly before the crash. It hit the top of pine trees 20 yards away from U.S. 93, tearing off a portion of the tail section and then cut a burning swath through trees before plowing into an apple orchard. Musical instruments were scattered around the wreckage. (*Members of Montana Band Killed in Plane Crash*, AP News Archive, July 5, 1987).

April 26, 2013 - A private helicopter that was ferrying two passengers to a remote site in the Jewel Basin crashed on Mount Aeneas, though no one was seriously injured. The passengers were Flathead County employees flying to a radio repeater site near the mountain to perform equipment maintenance. The helicopter lost directional control, and the pilot was forced to perform an emergency landing in the snow below the ridgetop. The helicopter rolled onto its side after landing, and another helicopter flew the crew members from the site to safety. The radio technicians were taken to the hospital briefly and released. (*3 Survive Helicopter Crash on Mount Aeneas Snowfield*, Missoulain, April 26, 2013).

#### Vulnerability and Area of Impact

### **HIGHWAY ACCIDENTS**

Privately-owned vehicles provide transportation for individuals in Flathead County using the state and federal highway system as well as county and private roads. Trucks and trailers carry interstate and intrastate cargo. Highway accidents caused by severe weather and high speeds occur frequently. Mass casualty incidents involving school buses, regional transit lines or vacation tour buses have the potential to occur. For the sake of the PDM analysis, the Highway Accident hazard is considered to affect all of Flathead County uniformly.

### **RAILROAD ACCIDENTS**

There are numerous rail crossings in Flathead County. These gated and ungated crossings include private, public, grade separated and at-grade crossings. According to the National Transportation Safety Board, more than 80 percent of public railroad crossings do not have lights and gates, and 60 percent of all railroad accidents occur at these unprotected crossings. Railroad related hazards such as derailments, toxic spill contamination, blocked evacuation routes and vehicle collisions are a threat to communities. A mass casualty incident involving Amtrak is also a concern.

The BNSF railroad forms about 20 miles of Glacier Park's southern border, and it parallels Highway 2 roughly 50 miles between West Glacier and East Glacier. It passes through Columbia Falls and Whitefish,



and along the west shore of Whitefish Lake. Trainloads of crude oil, a significant amount originating from the Bakken oil fields of North Dakota, pass through Flathead County on a daily basis. In the past year alone, there have been three fiery explosions involving trainloads of Bakken crude. The U.S. Department of Transportation issued a warning on January 2, 2014 stating that Bakken's light, sweet crude oil may be different from traditional heavy crudes because it's prone to ignite at a lower temperature. Experts say lighter crudes, which contain more natural gas, have a much lower "flash point." The flash point is the lowest temperature at which a substance can vaporize to form an ignitable mixture in air. If a tanker catches fire, the first order of business would be getting people away. In nearly all cases, it's better to let a fire like that simply burn out. Extinguishing the flames would only allow more vapors to escape uncontrolled into the atmosphere, and uncontrolled vapors pose an even greater fire and health risk. A normal resident knows the railroad is there, and they'd know to head down Highway 93. But Flathead County has a lot of tourists and guests who don't know that. (*Preparing for Bakken Oil Trains*, Hungry Horse News, January 8, 2014).

The railroad along U.S. Highway 2 has a checkered history for derailments. Last winter, two trains derailed on either side of the Continental Divide, and two avalanches briefly blocked the tracks. If avalanche activity derailed oil trains, a disastrous situation could result.

The railroad accident hazard is unique to areas along the railroad rights-of-way. To model the spatial distribution of the railroad accident risk in Flathead County a GIS data layer of railroad corridors was used, and then buffered by 0.25 miles. Building exposure was calculated by intersecting the railroad buffer with the MDOR parcel and critical facility datasets. Vulnerable population exposure was determined using the percent of each census block affected by the railroad buffer. **Table 4.7-5** presents the results of the vulnerability analysis. **Figures 8 and 8A through 8C** in *Section 4.4 (Hazardous Material Incidents)* present the railroad accident buffer used in the PDM analysis.

GIS analysis of the railroad accident risk to Flathead County indicates that over 31,920 acres are within the railroad buffer, including 2,843 residences, 966 commercial, industrial and agricultural buildings, and 69 critical facilities and locations where vulnerable populations reside. The *Railroad Accident Section* in **Appendix C** presents supporting documentation from the risk assessment including a list of critical facilities in the railroad buffer.

### **AIRCRAFT ACCIDENTS**

A major airline crash would create a mass casualty incident with hundreds of injuries or deaths. Hazardous materials incidents are created with fuel spills and dangerous cargo, such as chemicals in a crop duster or an airplane carrying fire retardant. An airplane crash in a remote area of the County would create a search and rescue situation.

Aviation accidents in Flathead County typically involve private, small aircraft which do not involve mass casualties. These accidents typically occurred at remote locations and are often the result of severe weather. For the sake of the PDM analysis, the Aircraft Accident hazard is considered to affect all of Flathead County uniformly.

#### *Probability and Magnitude*

Flathead County is vulnerable to all types of transportation emergencies. The two major effects of railroad accidents are human injury and hazardous materials releases. A mass casualty incident involving Amtrak is also a possibility and a concern since remote locations have limited resources; making response time slow which could delay treatment of the injured.

Over the past 30 years, Flathead County has had 118 railroad accidents; 41 at railroad crossings resulting in 6 fatalities and 7 injuries, and 77 involving railroad collisions and derailments resulting in 28 injuries. In the past 10 years, there have been 190 fatal motor vehicle accidents. Aircraft accidents have resulted in 32 fatalities in the past 30 years. Since transportation accidents occur more than once per year, the probability of future events is rated as “highly likely”.

#### *Future Development*

Flathead County does not have any ordinances or regulations requiring special considerations to mitigate the effects of transportation accidents.



**TABLE 4.7-5**  
**FLATHEAD COUNTY VULNERABILITY ANALYSIS – RAILROAD ACCIDENTS**

JURISDICTION	RESIDENTIAL PROPERTY EXPOSURE \$	# RESIDENCES AT RISK	COMMERCIAL, INDUSTRIAL & AGRICULTURAL PROPERTY EXPOSURE \$	# COMMERCIAL, INDUSTRIAL & AGRICULTURAL PROPERTIES AT RISK	CRITICAL FACILITIES EXPOSURE RISK \$	# CRITICAL FACILITIES AT RISK	BRIDGE EXPOSURE \$	# BRIDGES AT RISK	PERSONS AT RISK	PERSONS UNDER 18 AT RISK
<b>Incorporated Communities &amp; County</b>										
Columbia Falls	\$74,708,145	680	\$45,374,345	117	\$8,816,365	17	\$614,170	1	2,837	743
Kalispell	\$50,195,568	524	\$195,412,842	524	\$8,267,768	23	\$0	0	3,316	675
Whitefish	\$111,589,887	749	\$50,472,972	181	\$1,117,310	9	\$263,344	1	2,877	560
Remainder of County	\$188,570,052	890	\$93,816,315	144	\$21,557,904	20	\$3,244,296	12	4,543	960
<b>Census Designated Places</b>										
Batavia	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Bigfork	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Coram	\$10,351,033	140	\$1,933,763	11	\$0	1	\$12,360,00	1	363	65
Evergreen	\$40,399,589	358	\$47,944,625	87	\$942,600	8	\$226,768	2	2,435	651
Forest Hill Village	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Helena Flats	\$3,840,728	36	\$5,020,561	16	\$0	2	\$0	0	441	110
Hungry Horse	\$2,010,969	12	\$0	0	\$0	0	\$0	0	176	34
Kila	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Lakeside	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Little Bitterroot Lake	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Marion	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Martin City	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Niarada	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Olney	\$1,595,895	33	\$332,500	2	\$141,049	1	\$73,152	1	115	13
Somers	\$0	0	\$0	0	\$0	0	\$0	0	0	0
West Glacier	\$5,992,703	51	\$8,642,840	17	\$738,678	5	\$1,719,035	2	141	21

#### 4.8 SEVERE SUMMER WEATHER

**CPRI SCORE = 2.80**

Severe summer weather includes thunderstorms, wind, hail, lightning, tornadoes, and microbursts that typically occur between May and October of each year in Flathead County.

##### Description and History

A severe thunderstorm is defined by the National Weather Service as a thunderstorm that produces wind gusts at or greater than 58 mph (50 knots), hail 1-inch or larger, and/or tornadoes. Although not considered “severe”, lightning and heavy rain can also accompany thunderstorms. Thunderstorms can produce intense downburst and microburst wind. In addition, strong winds, defined below, can occur outside of thunderstorms when the overall weather conditions are favorable.

Tornadoes are the most concentrated and violent storms produced by the earth’s atmosphere. They are created by a vortex of rotating wind and strong vertical motion, which possess remarkable strength and can cause widespread damage. The most violent tornadoes are capable of tremendous destruction with wind speeds of 300 mph or more. Maximum wind speeds in tornadoes are confined to small areas and vary over short distances. Tornadoes are most common in the Great Plains, and are more infrequent and generally small west of the Rockies. Thunderstorms can produce deadly and damaging tornadoes.

A microburst is a very localized column of sinking air, producing damaging divergent and straight-line winds at the surface that are similar to, but distinguishable from, tornadoes. The scale and suddenness of a microburst makes it a great danger to aircraft due to the low-level wind shear caused by its gust front, with several fatal crashes having been attributed to the phenomenon over the past several decades. Microbursts in forested regions have flattened acres of standing timber.

The NWS provides short-term forecasts and warnings of severe summer weather to the public by producing regularly-scheduled severe weather outlooks and updates on various forms of hazardous weather including tornado warnings, as listed below.

Severe Thunderstorm Warning: Any thunderstorm wind gust equal to or greater than 58 mph; any hail size 1-inch or larger.

High Wind: Sustained winds of 40 mph for an hour or any gust to 58 mph (non-convective winds).

Tornado Warning: A violently, rotating column of air extending from the base of a thunderstorm to the ground.

As of February 1, 2007, the NWS began using the Enhanced Fujita Scale for Tornado damage. The Enhanced F-scale is a set of wind estimates based on damage. It uses three-second gusts estimated at the point of damage based on a judgment of eight levels of damage to 28 indicators that vary with height and exposure.



Since the 2009 Flathead County PDM Plan was completed, several incidents of severe summer weather have affected the county. **Table 4.8-1** presents severe summer storm events from the NCDC database indicating the magnitude of these events.

TABLE 4.8-1 FLATHEAD COUNTY SEVERE SUMMER WEATHER REPORTS (~MAY-OCTOBER)							
Date	Location	Event	Magnitude	Date	Location	Event	Magnitude
7/2/1996	Polebridge	Hail	2.75 in.	4/9/2008	Kalispell	Tornado	EF0
7/2/1996	Glacier Park	Hail	1.75 in.	5/29/2008	Whitefish	Lightning	
7/2/1996	Col. Falls, Whitefish	Hail	1.00 in.	7/4/2008	Somers, Essex	Hail	0.75 in.
5/31/1997	Kalispell Intl Arpt	Tstm Wind	52 kts.	7/10/2008	West Glacier Region	High Wind	70 kts.
7/21/1997	Kalispell	Hail	1.00 in.	7/29/2008	West Glacier Region	High Wind	70 kts.
8/1/1997	Kalispell	Hail	1.50 in.	8/27/2008	West Glacier Region	High Wind	73 kts.
8/7/1997	Creston	Hail	1.75 in.	10/7/2008	West Glacier Region	Strong Wind	43 kts.
9/14/1997	Creston	Hail	1.00 in.	7/26/2009	Creston	Hail	1.75 in.
5/20/1998	Marion	Tstm Wind	52 kts.	7/26/2009	Jessup	Tstm Wind	52 kts.
5/25/1998	Columbia Falls	Tstm Wind	52 kts.	9/26/2009	West Glacier Region	High Wind	49 kts.
5/26/1998	Bigfork	Tstm Wind	52 kts.	10/3/2009	Flathead/Mission Valleys	High Wind	50 kts.
7/21/1999	Whitefish	Hail	1.50 in.	5/3/2010	West Glacier Region	High Wind	65 kts.
8/3/1999	Creston	Tstm Wind	52 kts.	7/22/2010	Batavia	Funnel Cloud	
8/30/1999	Creston	Hail	0.75 in.	7/22/2010	Kalispell, Col. Falls	Tstm Wind	56 kts.
4/4/2000	Whitefish	Tstm Wind	51 kts.	8/2/2010	Blacktail	Hail	1.00 in.
6/19/2000	Kalispell	Tstm Wind	52 kts.	8/6/2010	Whitefish	Hail	1.25 in.
7/22/2000	Bigfork	Tstm Wind	50 kts.	6/23/2011	Creston	Hail	1.25 in.
9/10/2000	Whitefish	Tornado	F0	7/7/2011	Apgar	Tstm Wind	52 kts.
5/19/2002	Pinnacle	Hail	1.00 in.	7/13/2011	Bigfork	Hail	0.88 in.
5/19/2002	Kalispell	Tstm Wind	52 kts.	7/16/2011	Olney	Hail	1.50 in.
6/27/2002	Bigfork	Hail	0.75 in.	7/16/2011	Lakeside	Tstm Wind	51 kts.
7/13/2002	Lakeside	Tstm Wind	57 kts.	7/19/2011	Whitefish	Hail, Heavy Rain	1.00 in.
8/16/2002	West Glacier Region	High Wind	47 kts.	7/22/2011	Creston	Funnel Cloud	
3/14/2003	Bigfork	Tstm Wind	53 kts.	7/25/2011	Lupfer, Marion	Hail	0.88 in.
5/25/2003	Olney	Tstm Wind	52 kts.	10/6/2011	Kalispell Arpt, Bigfork	Heavy Rain	
10/29/2003	West Glacier Region	High Wind	52 kts.	10/10/2011	Radnor, Coram	Heavy Rain	
6/25/2004	Coram, Polebridge	Hail	1.00 in.	6/26/2012	Lakeside, Creston	Hail	1.00 in.
6/30/2004	Lake McDonald	Heavy Rain		7/7/2012	Kalispell, Evergreen	Tstm Wind	46 kts.
7/19/2004	Kalispell	Hail	0.88 in.	7/27/2012	Kalispell, Whitefish	Hail	1.00 in.
9/1/2004	West Glacier	Hail	0.88 in.	9/10/2012	West Glacier Region	High Wind	74 kts.
10/17/2004	West Glacier Region	High Wind	60 kts.	10/16/2012	Evergreen	Heavy Rain	
6/5/2005	Whitefish	Tstm Wind	52 kts.	10/16/2012	Flathead/Mission Valleys	Strong Wind	43 kts.
8/10/2005	Kalispell	Hail	0.75 in.	4/29/2013	West Glacier Region	High Wind	50 kts.
6/13/2006	Hungry Horse, Bigfork	Hail	0.75 in.	5/9/2013	Somers	Lightning	
6/13/2006	West Glacier	Hail	1.00 in.	5/13/2013	Flathead/Mission Valleys	Strong Wind	49 kts.
7/6/2006	Marion	Tstm Wind	70 kts.	6/18/2013	West Glacier Region	Strong Wind	48 kts.
7/10/2006	Bigfork	Hail	1.00 in.	7/17/2013	Kalispell, Jessup, Kila	Hail	1.00 in.
7/24/2006	West Glacier	Tstm Wind	70 kts.	7/17/2013	Creston	Hail	1.75 in.
8/8/2006	Bigfork	Hail	1.00 in.	8/25/2013	Evergreen, Creston	Tstm Wind	40 kts.
8/31/2006	Lakeside, Bigfork	Hail	0.75 in.	8/25/2013	Kalispell Intl Arpt	Tstm Wind	48 kts.
5/12/2007	Columbia Falls	Hail	1.00 in.	8/26/2013	Kalispell	Tstm Wind	48 kts.
6/29/2007	Bigfork	Tstm Wind	52 kts.	8/29/2013	Kila, Kalispell	Hail	0.75 in.
7/18/2007	Kalispell	Hail	0.88 in.	8/29/2013	Columbia Falls	Hail	0.88 in.
7/18/2007	Lakeside	Tstm Wind	78 kts.	8/29/2013	Kalispell Arpt, Apgar	Tstm Wind	48 kts.
7/18/2007	Bigfork	Tornado	EF0	9/6/2013	Kalispell Intl Arpt	Hail, Heavy Rain	1.25 in.

Source: National Weather Service (NCDC, 2014)

Notes: Tstm = Thunderstorm; Kts. = Knots; In. = Inches

There have been no Presidential Disaster Declarations or State Disasters issued for the severe summer weather in Flathead County. Two severe summer weather events that caused property damage are summarized below.

**July 18, 2007** – Numerous trees and power poles were blown down along the northern shores of Flathead Lake. The roof to Carpenter's Arena near Kalispell was blown off. Damage to two other roofs was observed. One small grain silo was blown over near Somers. The damage observed from the NWS storm survey crew was indicative of straight line wind damage. Based upon the damage observed, winds were estimated to be between 80 and 100 mph. (NCDC)

**July 17, 2013** – A right-moving supercell developed just southeast of Kila and tracked north and east across the Creston area. A local business sustained considerable damage due to the estimated quarter size hail. (NCDC)

#### Vulnerability and Area of Impact

Based on review of historic weather data, the entire project area has been classified with a uniform risk for severe summer weather. Structures, utilities, and vehicles are most at risk from the wind component of these storms, with crops and livestock being additionally threatened by hail. Mostly likely, though, only isolated areas would be affected by these types of storms rather than encompassing the entire county. Annualized loss estimates are presented in the Risk Assessment Summary Tables in *Section 4.15 (Tables 4.15-1 through 4.15-4)*.

#### Probability and Hazard Magnitude

Windstorms and microbursts affect areas with significant tree stands, as well as areas with exposed property, major infrastructure, and aboveground utility lines. Severe hailstorms can also cause considerable damage to buildings and automobiles, but rarely result in loss of life. Nationally, hailstorms cause nearly \$1 billion in property and crop damage annually, as peak activity coincides with peak agricultural seasons. **Table 4.8-2** presents severe summer weather events in Flathead County with reported damages since 1960.

TABLE 4.8-2 FLATHEAD COUNTY SEVERE SUMMER WEATHER EVENTS WITH DAMAGES					
Date	Injuries	Fatalities	Property Damage	Crop	Remarks
8/3/1960	0	0	\$36,786	\$367,857	Hail
5/26/1961	0	0	\$18,393	\$184	Thunderstorm and Gusty
8/25/1963	0.07	0	\$2,452	\$245,238	Hail, Thunderstorms, Rain,
6/6/1964	0	1.2	\$0	\$0	Heavy Rain
6/30/1965	0	0	\$1,936	\$193,609	Funnel Cloud, Hail
7/24/1966	0	0	\$34,333	\$0	Thunderstorm and hail
7/19/1968	0	0	\$1,110	\$0	High wind, thunderstorms



TABLE 4.8-2 FLATHEAD COUNTY SEVERE SUMMER WEATHER EVENTS WITH DAMAGES					
Date	Injuries	Fatalities	Property Damage	Crop	Remarks
9/11/1968	0	0	\$3,219	\$0	Lightning, heavy rain
9/12/1970	0	0	\$143,056	\$0	Strong Winds
9/19/1971	0	0	\$1,594	\$0	Wind
7/29/1973	0	0	\$2,575	\$0	Damaging Winds
9/12/1973	0	0	\$16	\$0	Wind Storm
6/19/1974	0.33	0	\$74,638	\$0	Lightning
7/26/1974	0	0	\$746	\$0	High Winds
9/10/1974	0	0	\$22,391	\$0	Lightning
8/25/1976	0	0	\$0	\$198,077	Wind
6/1/1977	0.17	0	\$30,655	\$0	Wind
5/6/1979	0	0	\$156,061	\$0	Heavy Rain
7/5/1979	0	0	\$156,061	\$0	Wind, Lightning
5/21/1980	0	0	\$22,588	\$0	rain
6/9/1981	0	1	\$0	\$0	Severe lightning
8/18/1981	0	0	\$122,619	\$1,226,190	Wind, Hail
6/27/1982	0	0	\$117,045	\$0	Wind
6/20/1985	0.02	0	\$2,444	\$2,444	Hail/Wind
6/16/1987	2	0	\$990	\$99	Thunderstorm Wind
7/18/1987	0	0	\$0	\$49,519	Heavy Rain
3/28/1988	0	0	\$95	\$0	Hail
8/18/1988	1	0	\$954	\$0	Lightning
5/23/1989	0	0	\$904	\$0	Lightning
7/10/1989	0	0	\$0	\$90	Hail
7/26/1989	0	0	\$90,351	\$0	Thunderstorm Winds
7/26/1989	0	0	\$90	\$0	Thunderstorm Wind
7/31/1989	1	0	\$904	\$0	Thunderstorm Wind
9/1/1989	0	0	\$904	\$0	Thunderstorm Wind
7/5/1990	0	0	\$8,583	\$0	Lightning
8/20/1990	0	0	\$8,583	\$858	Hail
8/20/1990	0	0	\$8,583	\$858	Thunderstorm Wind, Hail
8/20/1990	0	0	\$85,833	\$858	Thunderstorm Winds
8/20/1990	0	0	\$8,583	\$858	Thunderstorm Wind
10/16/1991	0	0	\$169,519	\$0	Wind
5/15/1992	0	0	\$80	\$0	high winds
5/31/1993	0	0	\$78,030	\$0	Thunderstorm Winds
5/15/1994	0	0	\$151,471	\$0	Thunderstorm Winds
8/3/1994	0	0	\$75,735	\$0	High Winds
7/22/2000	1	1	\$0	\$0	Thunderstorm Wind
6/5/2005	0	0	\$13,733	\$0	Thunderstorm Wind
7/18/2007	0	0	\$325,263	\$0	Tornado
7/4/2008	0	0	\$2,081	\$0	Hail
7/11/2008	0	0	\$1,040	\$0	Strong wind
10/7/2008	0	0	\$2,991	\$0	Strong Wind
5/3/2010	0	0	\$10,300	\$0	
7/22/2010	0	0	\$20,600	\$0	
6/23/2011	0	0	\$4,500	\$0	
7/7/2011	0	0	\$0	\$19,000	
7/13/2011	0	0	\$1,000	\$3,600	
<b>TOTAL</b>	<b>5.59</b>	<b>3.2</b>	<b>\$2,022,421</b>	<b>\$2,309,342</b>	

Source: SHEL DUS, 2013; NCDC, 2014

Note: Often casualties and damage information are listed without sufficient spatial reference. In order to assign the damage amount to a specific county, the fatalities, injuries and dollar losses were divided by the number of counties affected from this event.

The history of thunderstorm, wind, hail events in Flathead County indicate that they occur more than once per year. Therefore, the probability of this hazard occurring in the future is rated as “highly likely”.

#### *Future Development*

The State of Montana has adopted the 2009 International Building Code which stipulates that buildings throughout the state must be constructed to withstand a constant velocity of 75 mph and three second gusts of 90 mph. There is no building permit/inspection requirement in Flathead County; however, the Cities of Columbia Falls, Kalispell, and Whitefish enforce compliance with the IBC.



## 4.9 EARTHQUAKE

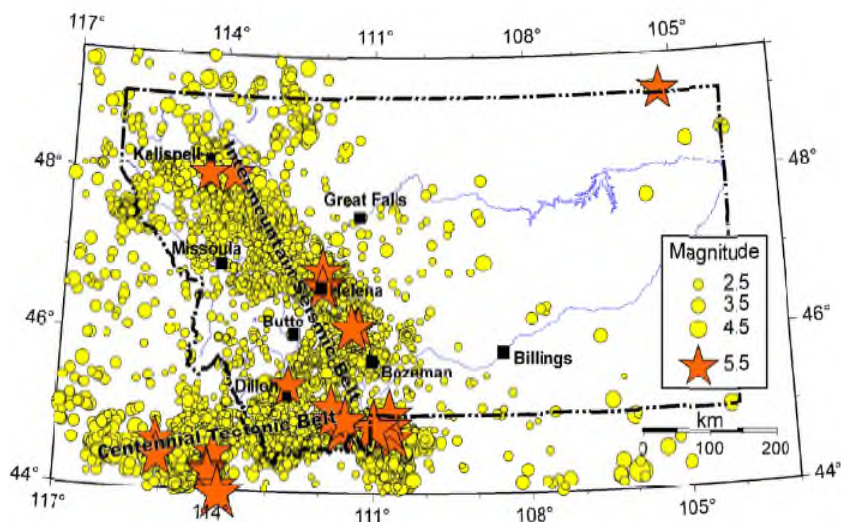
**CPRI SCORE = 2.80**

### Description and History

An earthquake is ground shaking and radiated seismic energy caused most commonly by a sudden slip on a fault, volcanic or magmatic activity, or other sudden stress changes in the earth. An earthquake of magnitude 8 or larger on the Richter Scale is termed a great earthquake. Fortunately, Montana has not experienced a great earthquake in recorded history. A great earthquake is not likely in Montana but a major earthquake (magnitude 7.0-7.9) occurred near Hebgen Lake in 1959 and dozens of active faults have generated magnitude 6.5-7.5 earthquakes during recent geologic time.

Earthquakes are measured by two variables, magnitude and intensity. The magnitude of an earthquake, as measured on the Richter scale, reflects the energy release of an earthquake. The intensity of an earthquake is gauged by the perceptions and reactions of observers as well as the types and amount of damage. The intensity of an earthquake is rated by the Modified Mercalli Scale. This scale ranks the intensity from I to XII. An earthquake rated as a I, would not be felt except by very few people under especially favorable circumstances. An intensity rating of XII on the other hand would result in total destruction.

A belt of seismicity known as the Intermountain Seismic Belt extends through western Montana, from the Flathead Lake region in the northwest corner of the State to the Yellowstone National Park region where the borders of Montana, Idaho, and Wyoming meet. The Intermountain Seismic Belt continues southward through Yellowstone Park, along the Idaho-Wyoming border, through Utah, and into southern Nevada. In western Montana, the Intermountain Seismic Belt is up to 100 km wide. Lincoln County is located at the fringe of this belt. The map below shows the occurrence and magnitude of earthquakes within the northern portion of the Intermountain Seismic Belt. (Source: MBMG, 2010)



**Table 4.9-1** shows the historic earthquakes which have occurred in Montana and the surrounding region since 1900 with a magnitude of 5.5 or greater. Although one significant earthquake occurred in eastern Montana in 1909, the majority have occurred along the Intermountain Seismic Belt and Centennial Tectonic Belt in western Montana.

TABLE 4.9-1 HISTORIC EARTHQUAKES OF MONTANA AND SURROUNDING REGIONS WITH MAGNITUDES OF 5.5 OR GREATER SINCE 1900					
Date	Magnitude	Approximate Location	Date	Magnitude	Approximate Location
05/16/1909	5.5	Northeast Montana	08/18/1959	6.0	Hebgen Lake
06/28/1925	6.6	Clarkston Valley, MT	08/18/1959	5.6	Hebgen Lake
02/16/1929	5.6	Clarkston Valley, MT	08/18/1959	6.3	Hebgen Lake
10/12/1935	5.9	Helena	08/19/1959	6.0	Hebgen Lake
10/19/1935	6.3	Helena	10/21/1964	5.6	Hebgen Lake
10/31/1935	6.0	Helena	06/30/1975	5.9	Yellowstone Park
07/12/1944	6.1	Central Idaho	12/08/1976	5.5	Yellowstone Park
02/14/1945	6.0	Central Idaho	10/28/1983	7.3	Challis, ID
09/23/1945	5.5	Flathead Valley	10/29/1983	5.5	Challis, ID
11/23/1947	6.1	Virginia City	10/29/1983	5.5	Challis, ID
04/01/1952	5.7	Swan Range	08/22/1984	5.6	Challis, ID
08/18/1959	7.5	Hebgen Lake	07/26/2005	5.6	Beaverhead County
08/18/1959	6.5	Hebgen Lake			

Source: Stickney and others, 2000

Major earthquakes are not common in Flathead County, although a number have been felt since the earliest historical occupation of the region. **Table 4.9-2** shows earthquakes near Flathead County which have occurred in the past 20 years.

TABLE 4.9-2 EARTHQUAKES IN FLATHEAD COUNTY GREATER THAN 4 MAGNITUDE IN PAST 25 YEARS							
Date	Magnitude	Depth	Miles from Kalispell	Date	Magnitude	Depth	Miles from Kalispell
4/1/1992	4.2	3.1 mi	34.8 mi	4/15/1998	4.1	2.7 mi	29.3 mi
5/2/1995	4.5	5.6 mi	8.4 mi	12/22/1998	4.7	7.6 mi	43.5 mi
6/29/1995	4.1	3.1 mi	8.3 mi	3/22/2006	4.3	5.1 mi	59.5 mi

Source: <http://www.city-data.com/city/Kalispell-Montana.html#ixzz1agOfqZje>

### Vulnerability and Area of Impact

Most earthquakes in Montana cannot be correlated to specific faults visible at the surface, except for those with magnitudes over 7.0. Small to moderate magnitude earthquakes occur at depths of three to 10 miles below the surface on small, discontinuous faults. **Figure 9** indicates the general location of faults in Flathead County.

The USGS's National Seismic Hazard Mapping Project has created peak ground acceleration maps. The maps show the strength of seismic shaking that has a 2 percent probability of being exceeded in a 50-



year period. The strength of the shaking is measured as a percent of the acceleration of gravity (%g). **Figure 9** shows peak ground acceleration zones and the location of Flathead County's critical facilities.

Peak ground acceleration increases across the County from the north to south indicating that portions of Flathead County from Kalispell to the south could experience shaking between 30 and 40%g; enough to damage older unreinforced masonry buildings. According to Qamar (2008), at 9.2%g the earthquake is felt by all with many frightened. Some heavy furniture is moved with a few instances of fallen plaster. Damage is considered slight. At 18%g, damage is 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. Some chimneys may be broken, and the shaking is noticed by people driving cars. At 34%g, damage is slight in specially designed structures, considerable in ordinary substantial buildings with partial collapse, and great in poorly built structures. Chimneys and walls may fall and heavy furniture is overturned.

Many structures, including critical facilities within Flathead County, have not been seismically assessed. Many of the existing homes, businesses, and critical facilities may not be structured to withstand seismic shaking.

#### Probability and Hazard Magnitude

The population would have little and mostly likely no warning prior to an earthquake, so the impact to that population could be considered high with little time to take protective actions.

To complete the vulnerability analysis for the earthquake hazard, GIS was used to intersect the USGS peak ground acceleration maps with both the critical facility and MDOR cadastral parcel datasets. Estimates of vulnerable population were calculated by determining the percent exposure in each census block for the hazard area. Exposure values are presented in **Table 4.9-3**. The *Earthquake Section* in **Appendix C** presents supporting documentation from the risk assessment including a list of critical facilities in the various seismic zones.

GIS analysis of the earthquake risk to Flathead County indicates that over 529,624 acres are within the 30-40%g zone of peak horizontal acceleration. According to the vulnerability analysis, 12,222 residences, 1,609 commercial, industrial and agricultural buildings, 210 critical facilities and locations where vulnerable populations reside are located in the 30-40%g zone. Digital data on construction type for the facilities is not available but will be considered in future PDM updates.

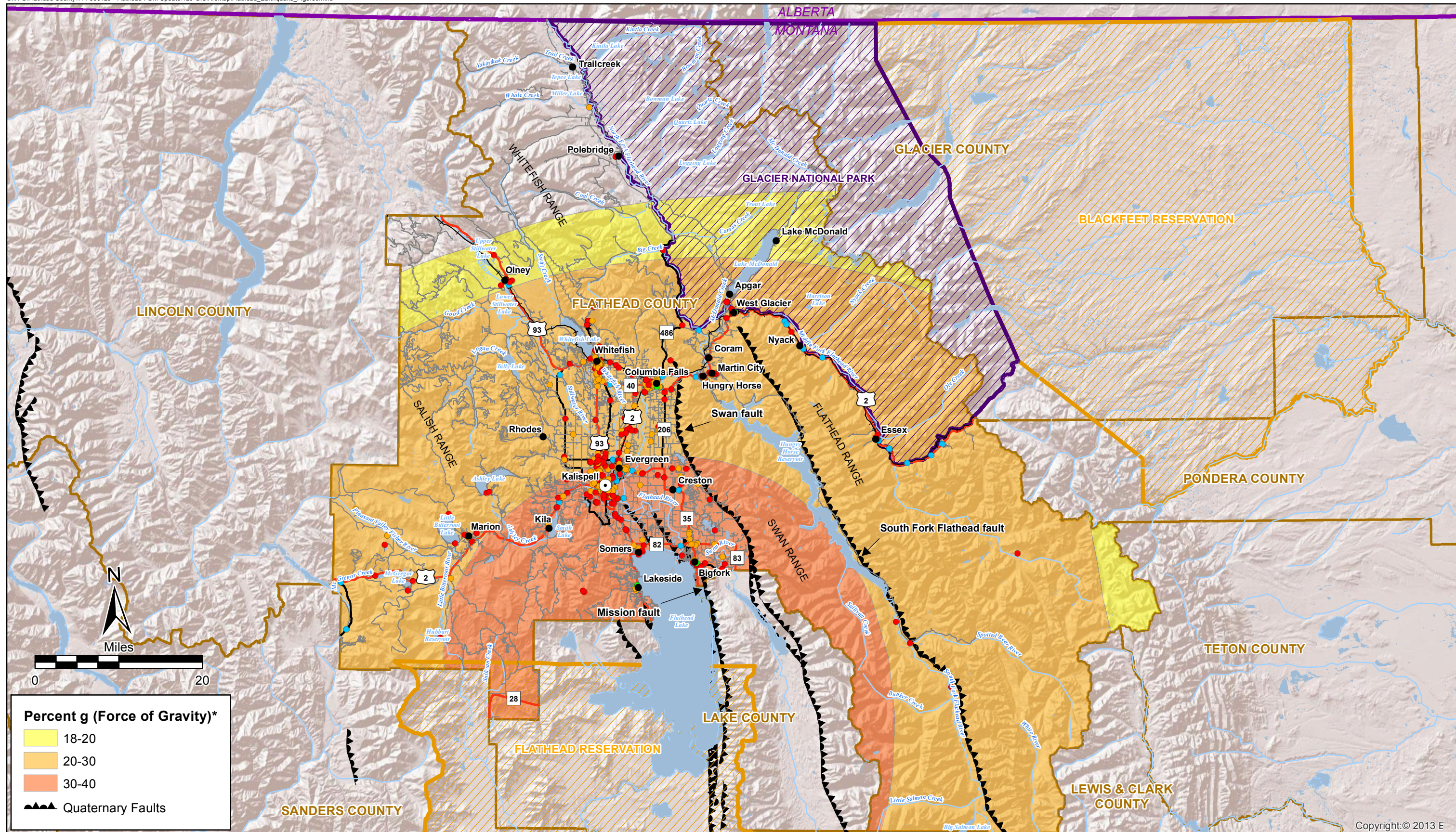
Hazard probability was assessed based on hazard frequency over a 10 year period. Since the earthquake hazard does not occur with an intensity to cause significant property damage or loss of life more than once every 10 years it was given a "possible" probability rating.

### *Future Development*

The Flathead County Growth Policy (2012) recognizes that Flathead County is an area of known seismic activity, making development in areas of steep slopes additionally hazardous. Subdivision regulations do not address seismic risk other than not allowing development on slopes over 30 percent.

















New construction must adhere to seismic provisions in the 2009 International Building Code (IBC) for commercial buildings and the 2006 International Residential Code (IRC) for residential dwellings, as adopted by the State of Montana. The Cities of Columbia Falls, Kalispell, and Whitefish have adopted both the IBC and IRC. Flathead County falls under the State's jurisdiction.





\*Peak Horizontal Acceleration (%g) with 2% Probability of Exceedance in 50 Years.  
Data taken from <http://gldims.cr.usgs.gov/website/nshmp2008/viewer.htm>



	County Seat		Critical Facility		Primary Route		River/Stream		Indian Reservation
	Place Names		Vulnerable Population		Secondary Route		Lake/Reservoir		National Park
			Other		Other Route				County
			Bridges		Railroads				United States - Canada Border

May 2014  
**Figure 9**  
**Earthquake Risk**  
**Flathead County**  
**Pre-Disaster Mitigation Plan**



**TABLE 4.9-3**  
**FLATHEAD COUNTY VULNERABILITY ANALYSIS – EARTHQUAKE (30-40 % g)**

JURISDICTION	RESIDENTIAL PROPERTY EXPOSURE \$	# RESIDENCES AT RISK	COMMERCIAL , INDUSTRIAL & AGRICULTURAL PROPERTY EXPOSURE \$	# COMMERCIAL , INDUSTRIAL & AGRICULTURAL PROPERTIES AT RISK	CRITICAL FACILITIES EXPOSURE RISK \$	# CRITICAL FACILITIES AT RISK	BRIDGE EXPOSURE \$	# BRIDGES AT RISK	PERSONS AT RISK	PERSONS UNDER 18 AT RISK
<b>Incorporated Communities &amp; County</b>										
Columbia Falls	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Kalispell	\$867,153,084	6,421	\$569,165,790	1,339	\$121,637,176	162	\$0	0	19,264	4,868
Whitefish	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Remainder of County	\$1,120,775,4	5,801	\$86,384,202	270	\$14,730,441	48	\$3,932,342	26	17,390	4,114
<b>Census Designated Places</b>										
Batavia	\$13,226,385	98	\$3,131,307	18	\$118,400	3	\$91,436	2	385	109
Bigfork	\$594,287,468	2,420	\$90,274,054	402	\$11,452,506	22	\$769,328	3	4,270	775
Coram	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Evergreen	\$169,653,991	1,527	\$283	283	\$3,920,825	24	\$2,837,058	12	7,035	1,851
Forest Hill Village	\$9,413,519	81	\$15,048,328	45	\$1,741,165	2	\$0	0	206	34
Helena Flats	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Hungry Horse	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Kila	\$20,611,303	156	\$1,039,250	4	\$722,310	2	\$0	0	392	71
Lakeside	\$279,640,972	1,241	\$22,324,728	79	\$663,800	5	\$0	0	2,669	551
Little Bitterroot Lake	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Marion	\$1,650,434	9	\$268,775	1	\$0	0	\$0	0	337	98
Martin City	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Niarada	\$719,215	4	\$0	0	\$0	0	\$0	0	7	2
Olney	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Somers	\$73,937,353	464	\$9,108,161	34	\$351,048	6	\$0	0	1,109	274
West Glacier	\$0	0	\$0	0	\$0	0	\$0	0	0	0

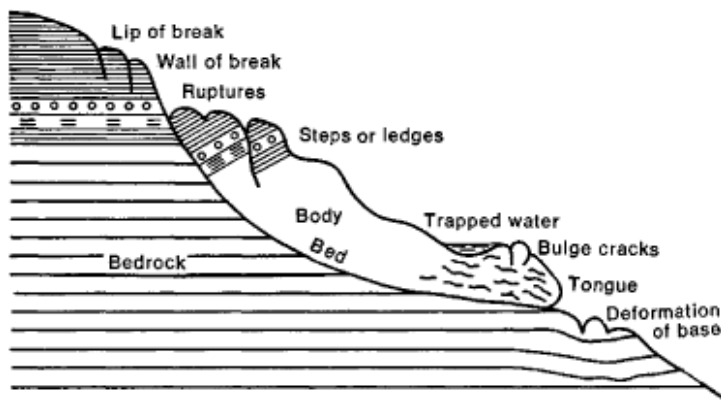


#### 4.10 LANDSLIDE AND SUBSIDENCE

CPRI SCORE = 2.30
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##### Description and History

A landslide is the movement of a soil and/or rock mass down a slope. Subsidence is the sinking down of land resulting from natural shifts or human activity, frequently causing structural damage to buildings. Any area composed of very weak or fractured materials resting on a steep slope can and likely will experience landslides. Landslides or debris flows, are often difficult to distinguish from flash floods and possess similar destructive potential and rapid onset. Debris flows generally occur during periods of



intense rain fall or rapid snowmelt. They usually start on steep hillsides as shallow slides that liquefy and accelerate. The consistency of debris flows range from watery mud to thick, rocky mud that can carry large items such as boulders, trees and cars. When the flow reaches flatter ground, debris can spread over a broad area, sometimes accumulating in thick deposits. Any given mass movement is

triggered by a single event. The two most common triggers are earthquakes and heavy rainfall.

Slope failure occurs when the gravitational force of slope materials exceed resisting forces due to strength, friction, and cohesion of the supporting materials. Slope properties, such as steepness, layering, fracturing of materials, or lack of vegetation, can make them inherently susceptible to failure. Factors such as moisture, overloading, and undercutting, can make matters worse. These factors can occur naturally or be induced by development activity. Slope failures are distinguished by five types: falls or free drops from steep cliffs; slides or movement of unconsolidated materials along slip surfaces of shear failure; slumps or movements of consolidated materials along the surface of shear failures; flows; and the slow or rapid fluid-like movement of soils and other unconsolidated materials. Very slow down-slope flow of soil is referred as creep. The average flow rate of materials can range from a fraction of an inch to 4 to 5 inches a week. Factors that influence creep include growing vegetation, freezing and thawing, and burrowing animals. Lateral spreads may occur on flat or gently sloping land due to liquefaction of underlying materials.

##### Vulnerability and Area of Impact

The Village Greens neighborhood along Whitefish Stage Road in Kalispell is vulnerable to the landslide hazard (**Figure 10A**). A 2010 landslide which took out about 20 feet of a backyard was determined by city officials to be “pretty expansive”. Slumping has been an ongoing problem in this area for years. The Village Greens Homeowners association spent \$30,000 to build earthen dams following a slide about six

or seven years ago, but the 2010 slide overran those dams. Ongoing erosion has added sediment to the stormwater retention pond below the bluff, though the City did some work several years ago to fix the storm drain and divert water from the pond. If unabated, the gradual erosion of the slope could cause catastrophic damage within a number of years. The Whitefish Stage slope problem is reportedly one of “scores of sites” in the county with similar problems. Another area annexed into the City of Kalispell that may be at risk of slope failure is the Granary Ridge townhouses which are close to the crest of the hill. (*Why Get This Far and Back Out?*, The Daily Inter Lake, April 12, 2014). A slope stabilization project, funded through a FEMA grant, is being considered by the county to build safer slopes and create adequate drainage.



Landslide events in Flathead County to date have not warranted a disaster declaration. According to the Flathead County Growth Policy (2012), steep slopes can be extremely unsafe. Dynamic processes occur in these areas that are not compatible with public health and safety. Rock slides, flash floods, tree falls, avalanches, and unstable soils are among the more serious hazards in steep terrain. Flathead County is also an area of known seismic activity, making development in areas of steep slopes additionally hazardous. The vast majority of lands in Flathead County that exceed slopes of 30 percent are in National Forest and State lands. However, there is private property on which a steep slope designation would apply and those lands should be restricted from development directly upon the steep slopes.

### Probability and Magnitude

Landslide risk was determined by using GIS data extracted from 10-meter Digital Elevation Models (DEMs) from the USGS National Map: <http://nationalmap.gov/>. Four DEMs were then mosaicked together in GIS and slope was calculated through the Spatial Analyst ‘Slope’ tool in ArcGIS Desktop 10.1 that determines slope measurement in degrees. Degrees of slope greater than or equal to 30 percent were then extracted for the PDM analysis (**Figure 10**). Only incorporated cities and CDPs were analyzed; the data was not extended throughout the county due to time and budgetary constraints. These landslide-prone areas were intersected with the critical facility and MDOR parcel datasets to determine exposure. Population exposure was calculated by the percent of the hazardous material buffer in each census block. **Table 4.10-1** presents the results of the landslide vulnerability analysis.

The GIS analysis indicates that 525 residences, 28 commercial, industrial, and/or agricultural buildings, and no critical facilities or bridges are located on or near slopes over 30 percent. The *Landslide Section* in **Appendix C** presents supporting documentation from the vulnerability analysis.



Based on the frequency of small landslide/slope failure events in Flathead County, the probability for a more significant event in the future is rated as “possible”.

### Future Development

It is the responsibility of those who wish to develop their property to assess the degree of hazard in their selection of development sites. Although the physical cause of many landslides cannot be removed, geologic investigations, good engineering practices, and effective enforcement of land-use management standards can reduce landslide hazards.

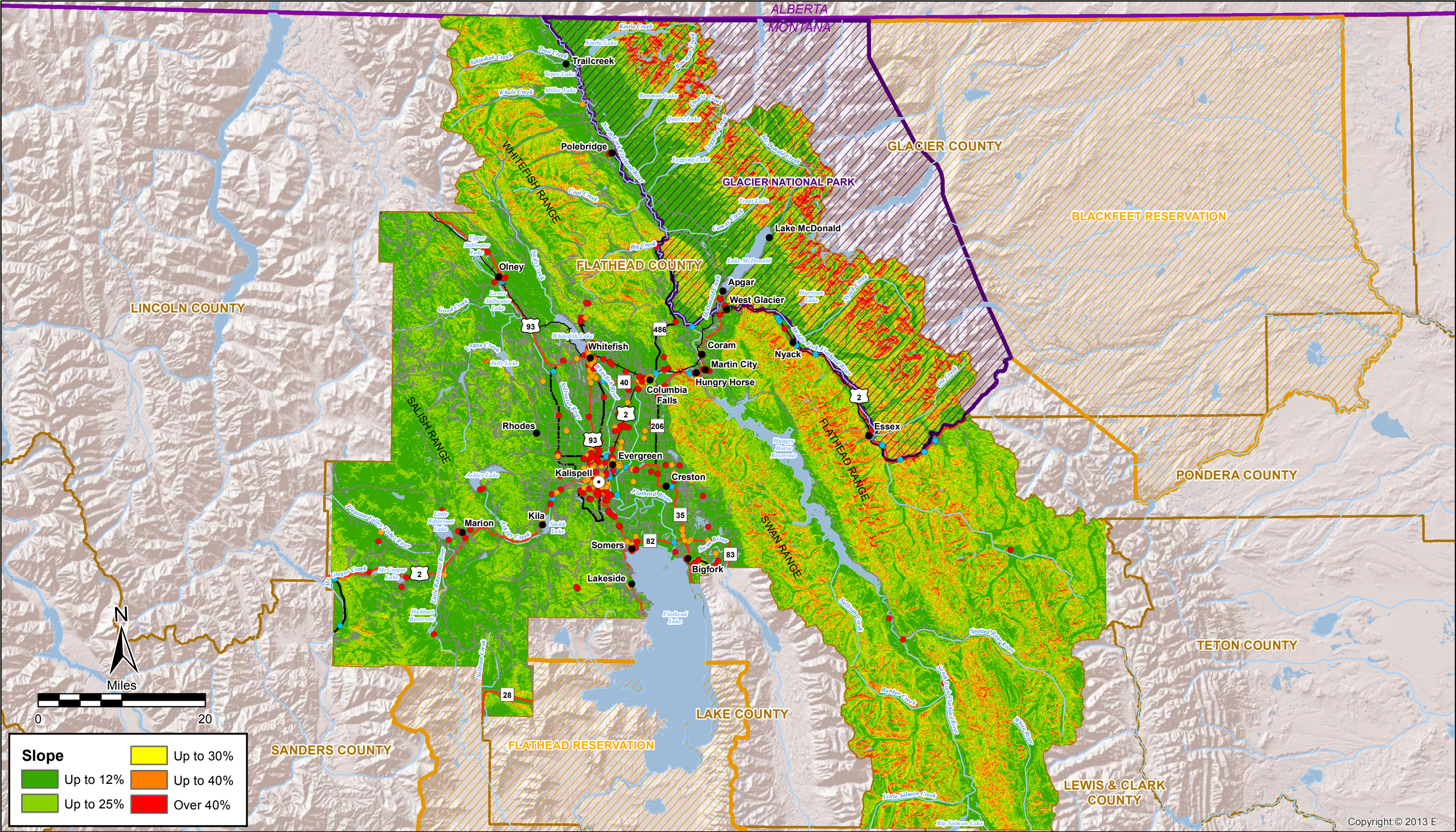
The Flathead County Growth Policy (2012) recommends a policy to restrict development on lands with steep slopes. The County Subdivision Regulations (2005) describe lands on which there is evidence of landslides, steep slopes in excess of 30 percent or subsidence as unsuitable for subdivision as they are detrimental to the health, safety or general welfare of existing or future residents unless the hazards are eliminated or will be overcome by approved design and construction plans. Development of commercial or industrial uses is not allowed on slopes exceeding 25 percent without a specific plan designed by a licensed engineer that demonstrates how the development can be accommodated with engineering solutions that provide for soil stability, structural integrity of the slope, proposed buildings, and roads.

Flathead County Zoning Regulations (2012) and the Canyon Area Land Use Regulatory System (1994) restrict development of commercial or industrial sites on slopes exceeding 25 percent without a specific plan designed by a licensed engineer that demonstrates how the development can be accommodated with engineering solutions that provide for soil stability, structural integrity of the slope, proposed buildings, and roads.

Flathead County stipulates in their Lake and Lakeshore Protection Regulations (2002) that the maximum grade shall not exceed 15 percent and no natural slope in excess of 30 percent grade shall be disturbed by construction of a boat ramp.

The City of Columbia Falls recognizes that steep slopes in the eastern portion of their planning area present certain development constraints and that un-regulated development of hillside areas may pose limitations due to soil disturbance and potential erosion. The Growth Policy (2013) outlines the following policy: *Lands which are in excess of 25 percent slope are generally considered as unsuitable for development because of the potential for sloughing, erosion, difficult access and building limitations and are subject to additional review and requirements.*





\*Landslide Prone Terrain as determined using a 10-meter DEM (Digital Elevation Model) and analyzing slope. Risk Assessment based on slopes > 30%.



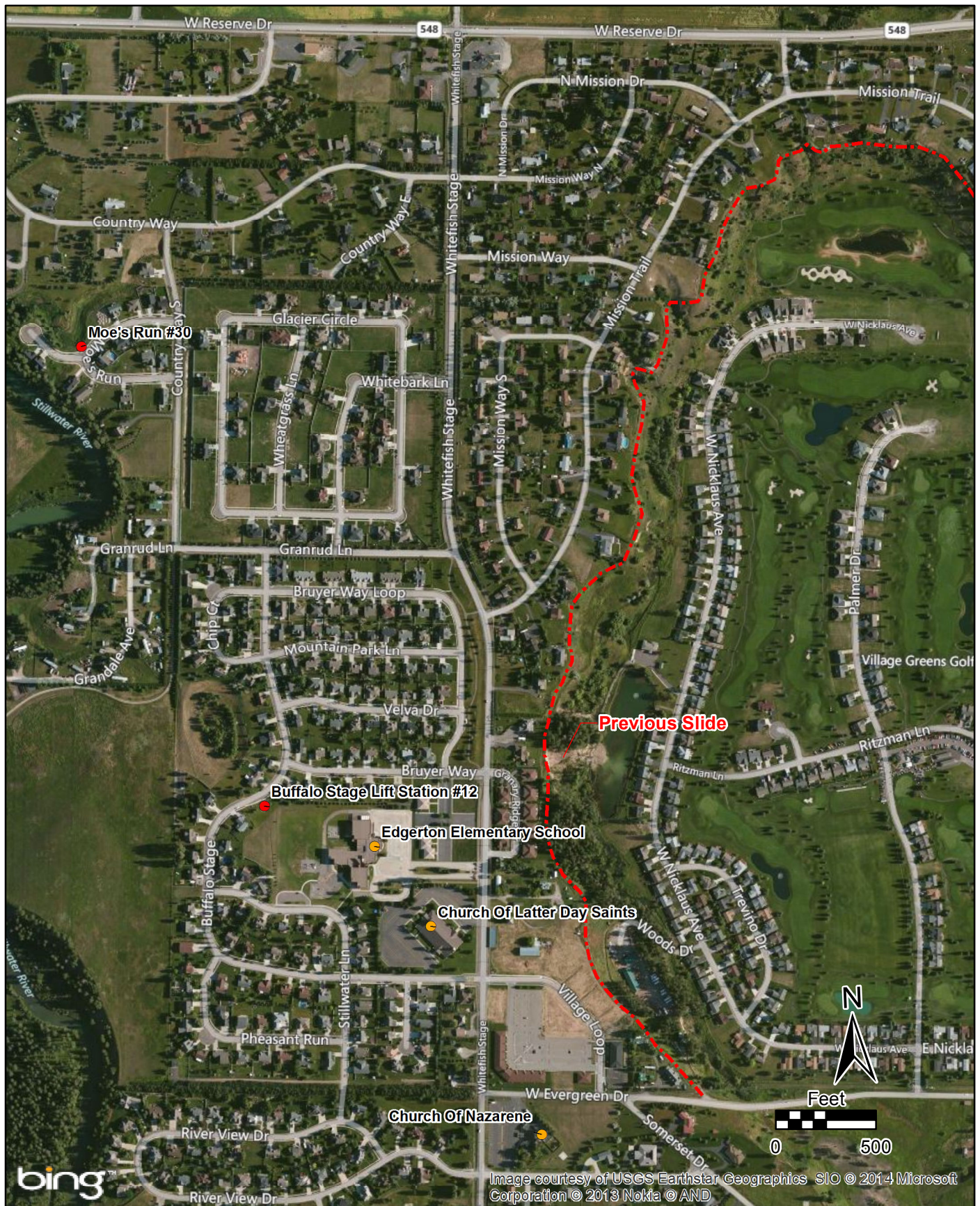
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May 2014

Figure 10

**Landslide Prone Terrain  
Flathead County  
Pre-Disaster Mitigation Plan**





\*Break in Slope digitized from aerial imagery by determining previous slides and boundary between property lawns and hillside. This should be used for reference purposes only.

May 2014

Figure 10A



- - - Break in Slope\*
- Critical Facility
- Vulnerable Population

**Landslide Prone Terrain - Kalispell  
Flathead County  
Pre-Disaster Mitigation Plan**



**TABLE 4.10-1**  
**FLATHEAD COUNTY VULNERABILITY ANALYSIS – LANDSLIDES/SUBSIDENCE**

JURISDICTION	RESIDENTIAL PROPERTY EXPOSURE \$	# RESIDENCES AT RISK	COMMERCIAL , INDUSTRIAL & AGRICULTURAL PROPERTY EXPOSURE \$	# COMMERCIAL , INDUSTRIAL & AGRICULTURAL PROPERTIES AT RISK	CRITICAL FACILITIES EXPOSURE RISK \$	# CRITICAL FACILITIES AT RISK	BRIDGE EXPOSURE \$	# BRIDGES AT RISK	PERSONS AT RISK	PERSONS UNDER 18 AT RISK
<b>Incorporated Communities &amp; County</b>										
Columbia Falls	\$4,874,419	23	\$0	0	\$0	0	\$0	0	348	56
Kalispell	\$1,728,589	11	\$298,500	2	\$0	0	\$0	0	211	50
Whitefish	\$3,247,627	6	\$0	0	\$0	0	\$0	0	101	22
Remainder of County	\$171,411,736	485	\$25,356,337	26	\$0	0	\$0	0	11,031	2,327
<b>Census Designated Places</b>										
Batavia	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Bigfork	\$16,460,570	51	\$525,600	1	\$0	0	\$0	0	1,045	183
Coram	\$1,843,553	4	\$0	0	\$0	0	\$0	0	110	21
Evergreen	\$4,260,170	11	\$137,400	1	\$0	0	\$0	0	335	83
Forest Hill Village	\$1,377,694	8	\$197,500	2	\$0	0	\$0	0	159	23
Helena Flats	\$777,989	2	\$1,000	1	\$0	0	\$0	0	356	98
Hungry Horse	\$4,892,240	20	\$26,550	1	\$0	0	\$0	0	185	35
Kila	\$1,200,122	5	\$2,559	1	\$0	0	\$0	0	108	18
Lakeside	\$17,076,958	49	\$170,620	1	\$0	0	\$0	0	1,233	255
Little Bitterroot Lake	\$172,454	1	\$0	0	\$0	0	\$0	0	97	16
Marion	\$450,531	3	\$0	0	\$0	0	\$0	0	166	48
Martin City	\$905,750	5	\$0	0	\$0	0	\$0	0	45	9
Niarada	\$0	0	\$0	0	\$0	0	\$0	0	7	2
Olney	\$0	0	\$0	0	\$0	0	\$0	0	51	15
Somers	\$10,868,742	33	\$171,100	1	\$0	0	\$0	0	502	99
West Glacier	\$1,238,044	5	\$1,063,800	2	\$0	0	\$0	0	117	16



#### 4.11 DROUGHT

<b>CPRI SCORE = 2.50</b>
--------------------------

Drought is an extended period of unusually dry weather and is a special type of disaster because its occurrence does not require evacuation of an area nor does it constitute an immediate threat to life or property. People are not suddenly rendered homeless or without food and clothing. The basic effect of a drought is economic hardship, but it does, in the end, resemble other types of disasters in that victims can be deprived of their livelihoods and communities can suffer economic decline.

The effects of drought become apparent when they are in longer duration because more and more moisture-related activities are affected. Non-irrigated croplands are most susceptible to moisture shortages. Rangeland and irrigated agricultural lands do not feel the effects as quickly as the non-irrigated, cultivated acreage, but their yields can also be greatly reduced due to drought.

Typically, droughts are not declared disasters in the same way as a Presidential Disaster Declaration; rather, they are declared but by the Secretary of the Department of Agriculture. Conservation Reserve Program (CRP) grazing may be opened to livestock owners for feed but other than this, the only real help for producers and growers is the fact that federal low interest loans are made available.

In periods of severe drought, range fires can destroy the economic potential of the agricultural industry, and wildlife habitat in, and adjacent to, the fire areas. Under extreme drought conditions, lakes, reservoirs, and rivers can be subject to severe water shortages. Insect infestation is an additional hazard resulting from drought.

The NWS issues the following warnings and advisories that relate to drought:

**Blowing Dust Advisory:** Issued for widespread or localized blowing dust reducing visibilities to less than a mile but greater than ¼ mile with sustained winds of 25 mph or greater.

**Dust Storm Warning:** Issued when widespread or localized blowing dust reduces visibilities to less than ¼ mile with sustained winds of 25 mph or greater.

**Heat Advisory:** Issued when conditions are favorable for heat index values reaching 105 degrees or greater for three days or more.

**Heat Warning:** Issued when high temperatures are expected to be over 105 degrees and low temperatures are expected to be over 80 degrees for three days or more.

The State of Montana established a Drought Advisory Committee and developed a Drought Plan to address the hazard. Information from the National Drought Mitigation Center also identifies Montana as a drought prone state. Temperatures can reach 100°F in the summer with extremely low humidities and high winds. Such dry, hot conditions contribute to drought conditions.

The history of drought in Montana, as presented in the State of Montana Natural Hazards Mitigation Plan (DES, 2001) is summarized below.

**1930's** - The 1930's Dust Bowl remains the most highly publicized of past droughts in Montana, but may not necessarily be the worst.

**1950's** - The mid-1950's saw Montana with a period of reduced rainfall in eastern and central portions of the state. In July of 1956, four counties applied for federal disaster aid due to greatly reduced precipitation amounts since June of the previous year. By November 1956, a total of 20 Montana counties had applied for federal drought assistance.

**1960's** - Montana saw another drought episode in 1961. By the end of June, 17 counties had requested federal disaster designations due to lack of moisture, higher than normal temperatures, and grasshopper infestation. Small grain crops died before maturing, and range grass and dryland hay crops were deteriorating rapidly. Livestock water supplies were at critical levels. In July of 1961, the State's Crop and Livestock Reporting Service called it the worst drought since the 1930s. In 1966, the entire state experienced another episode of drought.

**1980's** - Another well-established drought episode occurred in eastern Montana in 1980. Grasshopper infestations were seen in isolated areas, little wheat was planted, and large numbers of livestock were sold due to the hay and water shortages. Drought-related economic losses in Montana in 1980 were estimated to be \$380 million. The drought of 1980 continued into the following year. March snow packs were at 50-60 percent of normal, initiating forecasts of critical water shortages later in the season. August of 1984 saw Montana in flames with numerous fires burning out of control. Drought continued to plague the state in 1985 and all 56 counties received disaster declarations.

**1990's** – During the Drought of 1992, Governor Stan Stephens declared a drought disaster and suspended the issuance of beneficial water use permits by the DNRC from June to October.

**2000's** – The USDA issued Natural Disaster Determinations for drought for the entire state of Montana for the years 2000 through 2005. This designation entitled counties to low interest loans for producers, small business administration loans, and an Internal Revenue Service provision deferring capital gains.

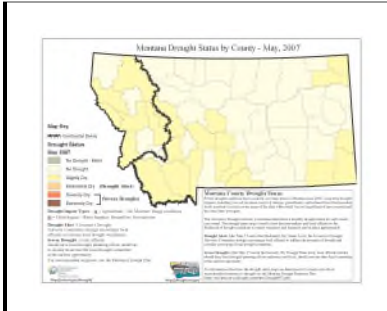
**Table 4.11-1** shows the Montana drought status for the period 2007-2013. **Table 4.11-2** summarizes drought conditions in Flathead County during this period. Since the Flathead County PDM Plan was completed in 2009, severe drought conditions have not impacted the county.



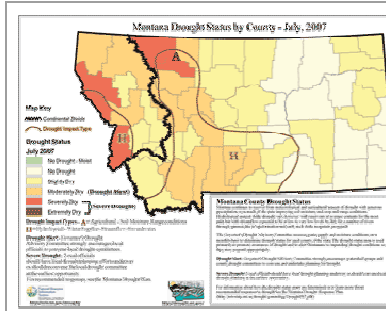
**TABLE 4.11-1**  
**MONTANA DROUGHT STATUS; 2007 – 2013**

**2007 Montana County Drought Status**

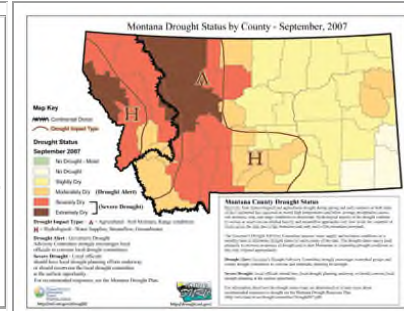
**May**



**July**



**September**



**2008 Montana County Drought Status**

**May**



**July**



**September**



**2009 Montana County Drought Status**

**May**



**July**

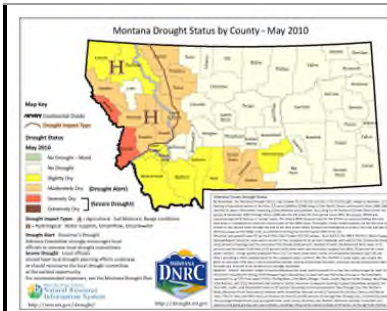


**September**

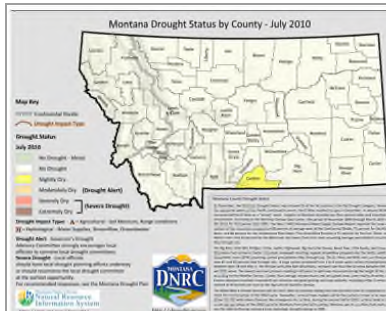


**2010 Montana County Drought Status**

**May**



**July**



**September**



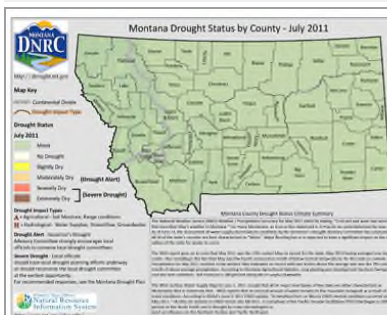
**TABLE 4.11-1**  
**MONTANA DROUGHT STATUS; 2007 – 2013**

**2011 Montana County Drought Status**

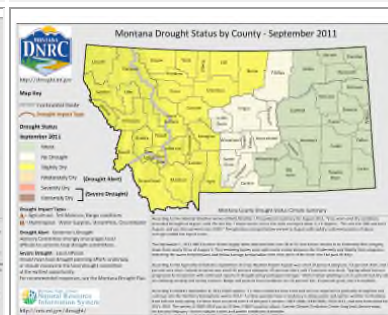
**May**



**July**



**September**

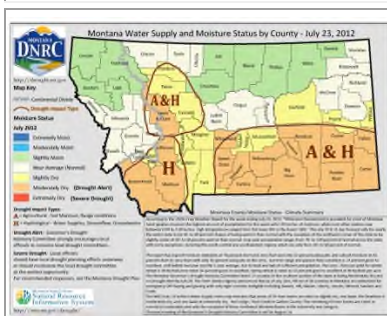


**2012 Montana County Drought Status**

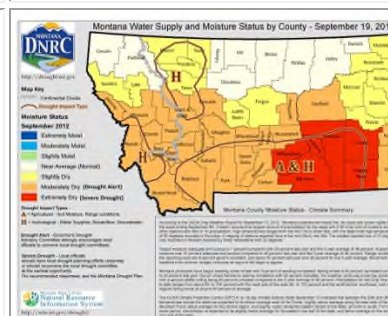
**May**



**July**

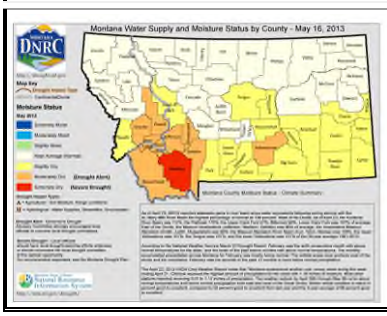


**September**

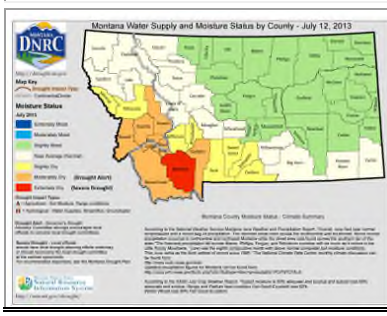


**2013 Montana County Drought Status**

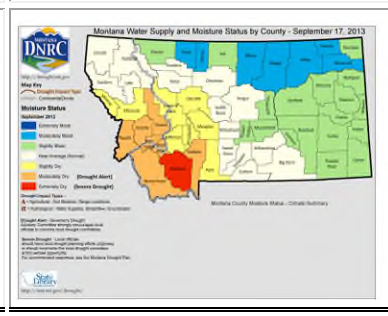
**May**



**July**



**September**



Source: <http://nris.mt.gov/drought/status/>

**TABLE 4.11-2**  
**FLATHEAD COUNTY DROUGHT SUMMARY**

		2007			2008			2009			2010			2011			2012			2013		
		May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept
Moist																						
No Drought																						
Slightly Dry	Drought																					
Moderately Dry	Alert																					
Severely Dry	Severe																					
Extremely Dry	Drought																					



Vulnerability and Area of Impact

Drought is a hazard that does not normally cause structural damage but can have significant population and economic effects. Flathead County communities rely on water for irrigation and public water supplies. A drought or blight could also have significant impacts on the agricultural community. Economic losses could result from loss of pasture and food supply for livestock. These losses would be in addition to those losses associated with lower crop yields due to drought conditions.

Another major impact of drought is to the natural resources of the area. As river and stream levels drop, fish populations and other natural resources are impacted. A hazard directly related to drought is wildfire. Drought conditions increase the chances that a major wildfire will threaten the community. Unlike many other events, drought evolves slowly, and therefore, the direct impact to the population (i.e. loss of life, injuries) would be low.

Probability and Hazard Magnitude

The National Drought Mitigation Center tracks indemnity payments for losses suffered due to drought on a county basis. **Table 4.11-3** presents drought damages for a 21 year period (1989 to 2009) for Flathead County and the State of Montana.

TABLE 4.11-3 DROUGHT INSURANCE CLAIMS; FLATHEAD COUNTY 1989 - 2009								
Year	State Total	Flathead Co.	Year	State Total	Flathead Co.	Year	State Total	Flathead Co.
1989	\$14,361,948	\$0	1996	\$10,637,521	\$0	2003	\$41,148,170	\$9,960
1990	\$29,146,575	\$5	1997	\$3,830,310	\$0	2004	\$29,427,194	\$5,754
1991	\$2,775,746	\$0	1998	\$18,201,060	\$0	2005	\$5,905,724	\$0
1992	\$37,767,835	\$0	1999	\$19,189,328	\$0	2006	\$41,483,327	\$0
1993	\$344,432	\$0	2000	\$44,989,149	\$0	2007	\$22,015,676	\$69,052
1994	\$5,539,598	\$0	2001	\$131,976,513	\$0	2008	\$74,979,811	\$89,216
1995	\$2,413,758	\$166	2002	\$108,139,519	\$0	2009	\$30,435,526	\$41,770

Source: National Drought Mitigation Center, 2013; <http://drought.unl.edu/Planning/Impacts/DroughtIndemnityData.aspx>

The NOAA's Paleoclimatology Program has studied drought by analyzing records from tree rings, lake and dune sediments, archaeological remains, historical documents, and other environmental indicators to obtain a broader picture of the frequency of droughts in the United States. According to their research, "...paleoclimatic data suggest that droughts as severe as the 1950's drought have occurred in central North America several times a century over the past 300-400 years, and thus we should expect (and plan for) similar droughts in the future. The paleoclimatic record also indicates that droughts of a much greater duration than any in the 20th century have occurred in parts of North America as recently as 500 years ago." Based on this research, the 1950's drought situation could be expected approximately once every 50 years or a 20 percent chance every 10 years. An extreme drought, worse

than the 1930's "Dust Bowl" has an approximate probability of occurring once every 500 years or a 2 percent chance of occurring each decade (NOAA, 2004).

Based on historic conditions, the probability of future drought events in Flathead County are ranked as "likely", occurring more than once every 10 years but not every year.

#### *Future Development*

Drought could have an effect on future development with regards to groundwater availability. New domestic water wells and sewer systems could use up more of the groundwater resource, particularly during periods of drought.



**4.12 TERRORISM, CIVIL UNREST AND VIOLENCE****CPRI SCORE: 2.60***Description and History*

Terrorism is defined in the Code of Federal Regulations as "the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives". Terrorists look for visible targets where they can avoid detection before or after an attack such as international airports, large cities, major international events, resorts, and high-profile landmarks. Bombings involving detonated and undetonated explosive devices, tear gas, and pipe and fire bombs have been the most frequently-used terrorist method in the United States. Other possible methods include attacks on transportation routes, utilities, or other public services, or incidents involving chemical or biological agents.

Cyber-terrorism involves computers, networks, and the information they contain. Like other terrorist acts, cyber-terror attacks are typically premeditated, politically motivated, perpetrated by small groups rather than governments, and designed to call attention to a cause, spread fear, or otherwise influence the public and decision-makers.

Biological and chemical weapons have been used primarily to terrorize an unprotected civilian population and not as a weapon of war. Biological agents are infectious microbes or toxins used to produce illness or death in people, animals, or plants that can be dispersed as aerosols or airborne particles. Biological agents could be used to contaminate food or water because they are extremely difficult to detect. Chemical agents kill or incapacitate people, destroy livestock, or ravage crops. Some chemical agents are odorless, tasteless, and are difficult to detect. They can have an immediate effect (a few seconds to a few minutes) or a delayed effect (several hours to several days).

Radiological dispersion devices (RDDs) are a combination of conventional explosives and radioactive material designed to scatter dangerous and sub-lethal amounts of radioactive material over a general area. Terrorist use of RDDs is considered far more likely than use of a nuclear device because they require very little technical knowledge to build and deploy compared to that of a nuclear device. RDDs also appeal to terrorists because certain radiological materials are used widely in medicine, agriculture, industry and research, and are much more readily available compared to weapons grade uranium or plutonium.

Eco-terrorism is the use or threatened use of violence of a criminal nature against innocent victims or property by an environmentally-oriented, subnational group for environmental-political reasons, or aimed at an audience beyond the target, often of a symbolic nature.

Civil unrest and violence typically occur on a smaller scale when large groups, organizations, or distraught individuals take action with potentially disastrous or disruptive results. Civil unrest can be the product of another event that creates panic in the community. Violence can be small scale, such as domestic violence, or larger and require significant government response.

Montana has traditionally attracted activist/extremist individuals and groups because of its low population and large geographic area. Groups active in Montana vary from white supremacists to single issue groups, such as environmental extremists.

### Vulnerability and Area of Impact

The origins and targets for terrorism and civil unrest are difficult to predict. Individuals or groups that feel oppressed on any issue can resort to violent acts to inflict harm and damage in an attempt to gain publicity or affect policy. The locations of these attacks can occur anywhere but often the symbols that represent a threat to their cause are often times the target. From a historic perspective, these targets have often been government buildings, government officials, and university facilities. Other common targets include medical clinics, businesses, population concentrations, computer mainframes, or critical infrastructure with the ability to cause significant disruption and damage. Civil unrest and riots are typically associated with large public gatherings, initially peaceful protests, controversial political decisions, large strikes, and law enforcement standoffs.

According to the Southern Poverty Law Center, an organization devoted to tracking hate groups in the United States, several White Nationalist hate groups have been active in Flathead County (**Table 4.12-1**). White nationalist groups espouse white supremacist or white separatist ideologies, often focusing on the alleged inferiority of non-whites. Groups listed in a variety of other categories - Ku Klux Klan, neo-Confederate, neo-Nazi, racist skinhead, and Christian Identity - could also be fairly described as "white nationalist." These groups range from those that use racial slurs and issue calls for violence to others that present themselves as serious, non-violent organizations and employ the language of academia. Although these organizations have not caused violence in Flathead County to date, a future incident cannot be ruled out. Flathead County also has a long international border with Canada and is sensitive to the challenges and vulnerabilities associated with it.

TABLE 4.12-1 HATE GROUPS ACTIVE IN FLATHEAD COUNTY		
Name	Type	City
Alternative Right	White Nationalist	Whitefish
National Policy Institute	White Nationalist	Whitefish
Pioneer Little Europe Kalispell Montana	White Nationalist	Kalispell
Washington Summit Publishers	White Nationalist	Whitefish

Source: Southern Poverty Law Center, 2014; <http://www.splcenter.org/get-informed/hate-map#s=MT>



Planning Team members expressed concern that violence or civil unrest could increase in Flathead County as a result of the expected increase in frequency of the Bakken oil trains through the County. There is also concern that Flathead County is becoming, with more regularity, a location for events that draw thousands of participants and, as such, could become a target for terrorists.

### *Probability and Magnitude*

The effects of terrorism can vary significantly from loss of life and injuries to property damage and disruptions in services such as electricity, water supply, public transportation, and communications.

Cyber-terrorism could involve destroying the actual machinery of the information infrastructure, remotely disrupting the information technology underlying the Internet, government computer networks, or critical civilian systems such as financial networks or mass media, or using computer networks to take over machines that control traffic lights, power plants, or dams. If cyber-terrorists managed to disrupt financial markets or media broadcasts, an attack could undermine confidence and cause panic. Attacks could also involve remotely hijacking control systems, with potentially dire consequences, such as breaching dams, colliding airplanes, or shutting down the power grid.

Planning Team members rated the probability of a significant terrorism incident in Flathead County as “possible”.

### *Future Development*

Future development should have little to no impact on the terrorism or violence threat. Given the goals of eco-terrorists; however, future development could serve as the basis for an event over controversial development.

**4.13 DAM FAILURE****CPRI SCORE = 2.55***Description and History*

Dams have been placed around Montana for many reasons including recreation, flood control, irrigation, water supply, hydroelectricity, and mining. Dams are built and owned by a variety of entities such as private individuals, utilities, and the government. Dams come in all shapes and sizes from small earthen dams to large concrete structures. The structural integrity of a dam depends on its design, maintenance, and weather/drainage situation. Problems arise when a dam fails and people and/or property lie in its inundation area. Dams can fail for a variety of reasons including seismic activity, poor maintenance, overwhelming weather and flow conditions, or by an intentional act. Dam failure can be compared to riverine or flash flooding in the area downstream from the dam, and sometimes for long distances from the dam, depending on the amount of water retained and the drainage area. Others may be located in areas that result in little if any damages during a failure.

The U.S. Army Corps of Engineers, National Inventory of Dams (NID) website keeps a record of dams across the country. Montana DES also keeps an extensive library of Emergency Action Plans (EAPs) for the state's high hazard dams. Hazard ratings are given to those dams for emergency management planning purposes. These ratings, high, significant, and low, are based on the potential for loss of life and property damage from the failure of the dam, not the condition or probability of the dam failing, as described below.

*Low Hazard Potential:* Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

*Significant Hazard Potential:* Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

*High Hazard Potential:* Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

Flathead County has six high hazard dams, one significant hazard dam, and several low hazard dams. There are no dams in adjoining counties, in Idaho, or in Canada with the potential to impact human life in Flathead County if a failure were to occur. **Figures 11, 11A and 11B** shows the high and significant hazard dam locations and their inundation areas. These dams are described in **Table 4.13-1**, below.



TABLE 4.13-1 HIGH AND SIGNIFICANT HAZARD DAMS IN FLATHEAD COUNTY						
Dam Name	River	Height (feet)	Maximum Storage (acre-ft)	Year Completed	Drainage Area (sq. mi.)	Hazard
Bigfork	Swan River	12	109	1902	655	High
Cedar Creek	Cedar Creek	86	2,720	1971	13	High
Hubbart	Little Bitterroot	-10	-10	1923	117	High
Hungry Horse	South Fork	564	2,982,026	1952	1,640	High
Jessup Mill Pond	Mill Creek	28	358	1941	125	High
Little Bitterroot	Little Bitterroot	-10	-10	1918	32	Significant
Smith Lake	-	15	131	NA	3	High

Notes: NA = not available

There is no record of failure of a high or significant hazard dam in Flathead County. During the flood of 1964, dams failed in Glacier and Pondera counties, east of Glacier National Park, as described below.

**June 8, 1964** - Heavy and continuous high-country storms created a healthy snow pack in the mountains, along with a south-moving accumulation of cold arctic air caused rain to fall at the rate of one inch per hour. Glacier County experienced 16 inches of rain in 36 hours. The floods and rampaging water that resulted were, in the opinion of the National Weather Service in Great Falls, the worst Montana had experienced since record-keeping began. President Lyndon Johnson declared Montana a National Disaster Area. Thirty (30) lives were lost due primarily to the sudden failure of Swift Dam on Birch Creek and Two Medicine Dam on Two Medicine Creek. There was no time to warn residents in the creek valley below. Raging rivers and streams in Glacier County destroyed 265 homes, 20,000 acres of hay land, two large dams and irrigation equipment for 37,000 acres. (Glacier County EOP, 2011)

#### Vulnerability and Area of Impact

Dams that could have the greatest impact to life and property demonstrated by their NID hazard rating are the high hazard dams. Those areas directly downstream from these high hazard dams would be the areas most at risk for loss of life and structural damage. Flathead County OES has Emergency Action Plans for the high hazard dams in the County.

To model the exposure from a breach of the high hazard dams in Flathead County, a GIS data layer was created for this project and figures created showing the dam failure hazard (**Figures 11, 11A and 11B**). Inundation areas were digitized from the EAPs and intersected with critical facility and MDOR parcel datasets to determine building exposures. Vulnerable populations were calculated based on the percent census block in the inundation areas. Exposure values are presented in **Table 4.13-2**.

GIS analysis of the dam failure risk to Flathead County indicates that over 99,376 acres are within the inundation areas of the high hazard dams, including 5,268 residences, 749 commercial, industrial and agricultural buildings, 79 critical facilities and locations where vulnerable populations reside. The *Dam*

*Failure Section* in **Appendix C** presents supporting documentation from the risk assessment including a list of critical facilities in the inundation areas.

#### *Probability and Magnitude*

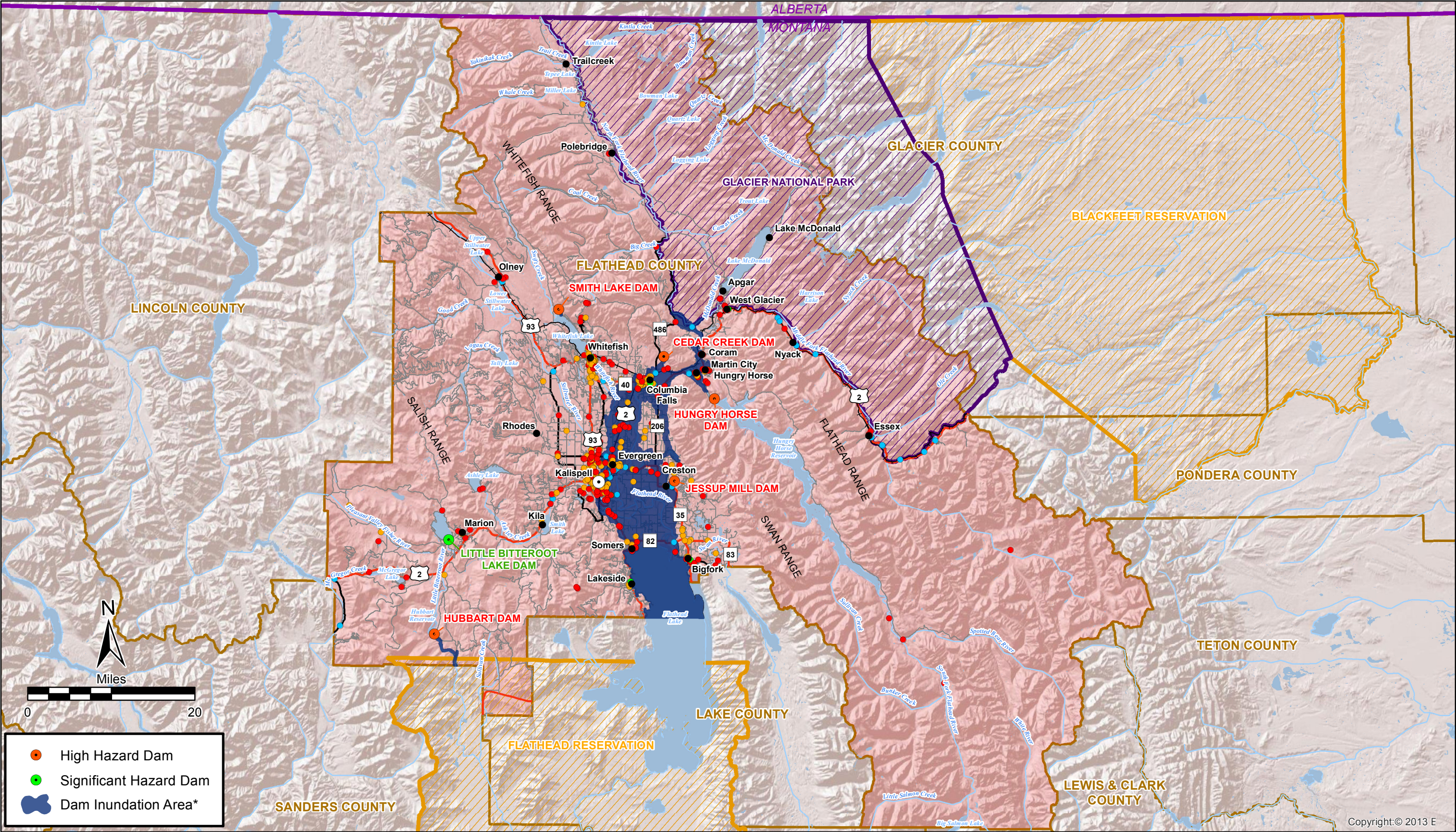
A dam failure event may allow for some advanced warning to the public, and therefore, the potential impact to the population is considered moderate. The probability of a significant dam breach in Flathead County was ranked as “unlikely” by the Planning Team.

A high magnitude dam failure can represent more than one threat of damage. The most obvious threat is the floodwater generated by sudden breaching of the dam which can result in direct damage due to submergence, hydraulic damage, and loss of life or property damage. A less obvious threat is sedimentation which can threaten the integrity of a downstream structure.

#### *Future Development*

The Flathead County subdivision regulations do not address new construction in dam inundation areas.





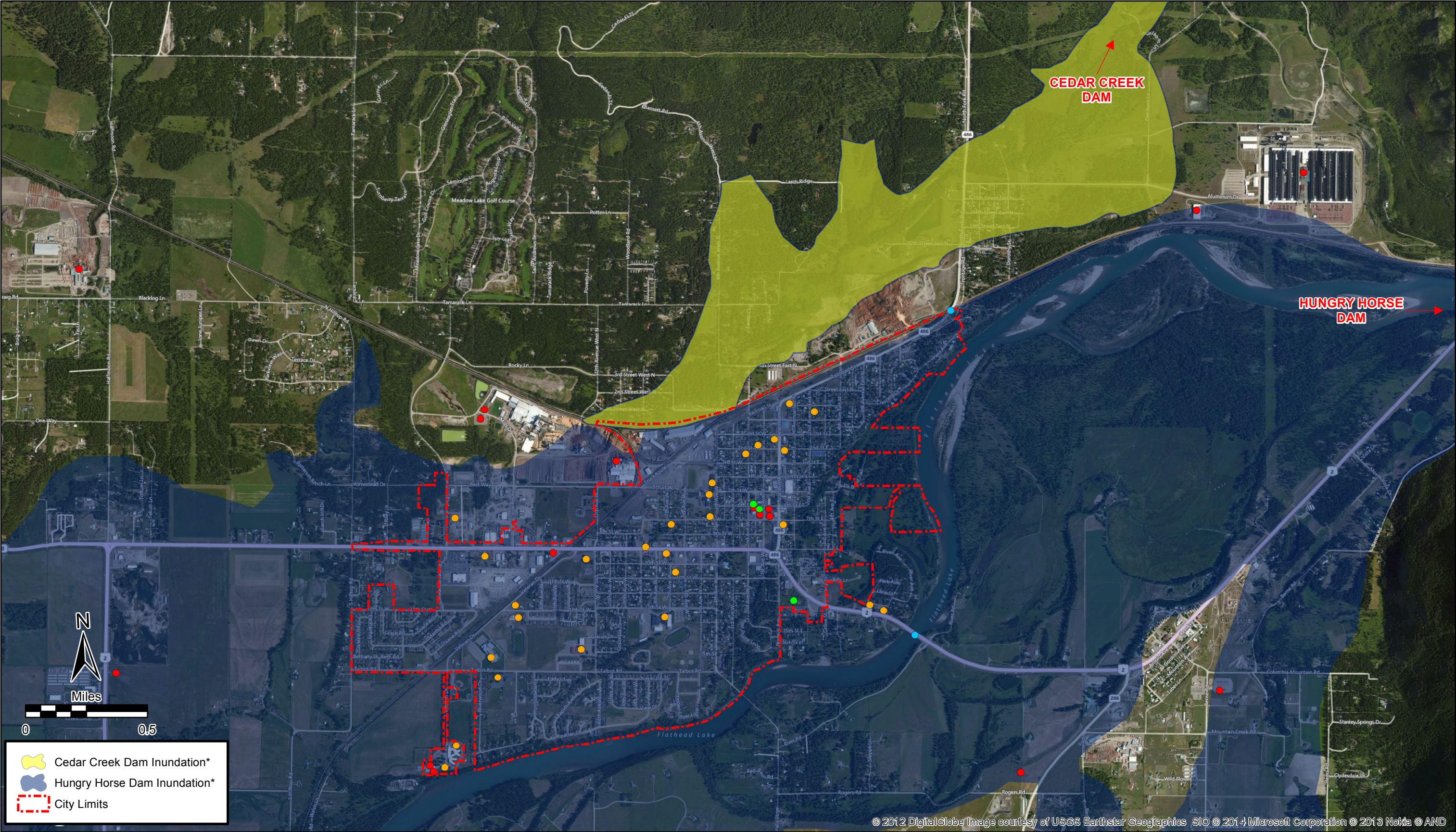
\*Dam Hazard Areas as determined by Inundation Maps in Emergency Action Plans.



- |               |                         |                   |                  |                                 |
|---------------|-------------------------|-------------------|------------------|---------------------------------|
| ○ County Seat | ● Critical Facility     | — Primary Route   | — River/Stream   | ▨ Indian Reservation            |
| ● Place Names | ● Vulnerable Population | — Secondary Route | — Lake/Reservoir | ▨ National Park                 |
|               | ● Other                 | — Other Route     |                  | ▨ County                        |
|               | ● Bridges               | — Railroads       |                  | ▨ United States - Canada Border |

May 2014  
**Figure 11**  
**Dam Failure Hazard Area**  
**Flathead County**  
**Pre-Disaster Mitigation Plan**





\*Dam Hazard Areas as determined by Inundation Maps in Emergency Action Plans.



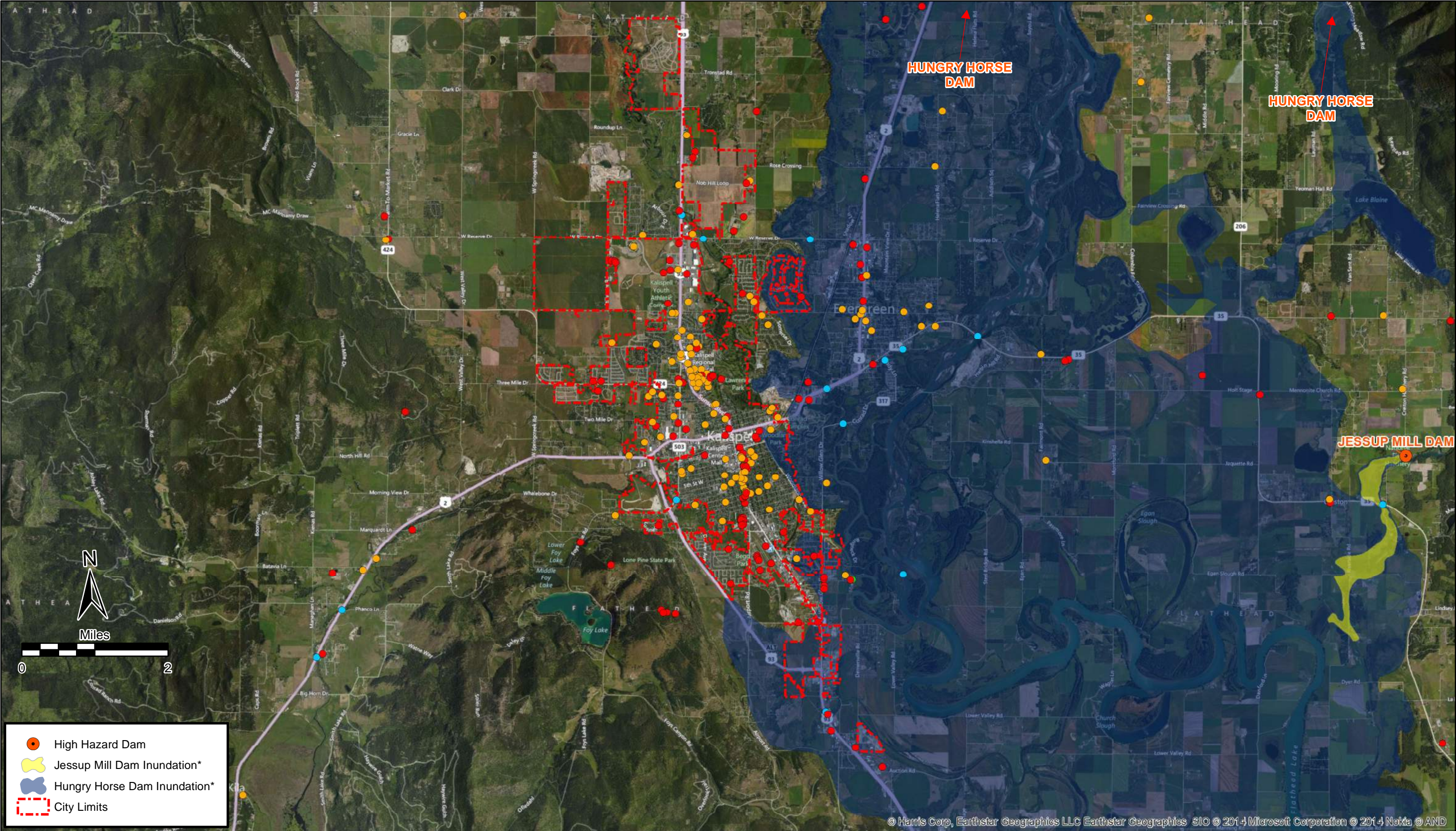
Critical Facility

Vulnerable Population

Other

Bridges





\*Dam Hazard Areas as determined by Inundation Maps in Emergency Action Plans.



● Critical Facility	● Other
● Vulnerable Population	● Bridges

May 2014  
Figure 11B  
**Dam Failure Hazard Area - Kalispell  
Flathead County**  
Pre-Disaster Mitigation Plan



**TABLE 4.13-2**  
**FLATHEAD COUNTY VULNERABILITY ANALYSIS – DAM FAILURE**

JURISDICTION	RESIDENTIAL PROPERTY EXPOSURE \$	# RESIDENCES AT RISK	COMMERCIAL , INDUSTRIAL & AGRICULTURAL PROPERTY EXPOSURE \$	# COMMERCIAL , INDUSTRIAL & AGRICULTURAL PROPERTIES AT RISK	CRITICAL FACILITIES EXPOSURE RISK \$	# CRITICAL FACILITIES AT RISK	BRIDGE EXPOSURE \$	# BRIDGES AT RISK	PERSONS AT RISK	PERSONS UNDER 18 AT RISK
<b>Incorporated Communities &amp; County</b>										
Columbia Falls	\$149,291,591	1,194	\$74,172,265	245	\$11,476,148	30	\$0	0	4,263	1,117
Kalispell	\$103,738,390	683	\$77,217,046	121	\$341,530	5	\$0	0	3,160	801
Whitefish	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Remainder of County	\$553,997,969	3,391	\$171,024,704	383	\$26,018,183	44	\$9,399,879	24	15,721	3,641
<b>Census Designated Places</b>										
Batavia	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Bigfork	\$129,636,147	385	\$24,673,604	224	\$0	2	\$414,528	2	737	81
Coram	\$4,366,227	47	\$835,470	4	\$0	0	\$12,360,00	1	268	43
Evergreen	\$193,701,544	1,718	\$128,891,424	311	\$3,920,825	23	\$2,837,058	12	7,342	1,938
Forest Hill Village	\$4,113,332	56	\$15,048,328	45	\$1,741,165	2	\$0	0	204	34
Helena Flats	\$50,345,443	330	\$7,602,422	31	\$0	5	\$0	0	1,009	270
Hungry Horse	\$27,844,080	345	\$7,136,558	57	\$0	5	\$0	0	826	192
Kila	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Lakeside	\$117,366,631	402	\$12,622,604	54	\$663,800	2	\$0	0	1,508	302
Little Bitterroot Lake	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Marion	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Martin City	\$3,405,628	31	\$2,022,245	9	\$0	0	\$26,840	1	189	33
Niarada	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Olney	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Somers	\$36,267,593	259	\$7,891,169	23	\$194,100	4	\$0	0	1,010	260
West Glacier	\$0	0	\$0	0	\$0	0	\$0	0	0	0



#### 4.14 VOLCANIC ASH

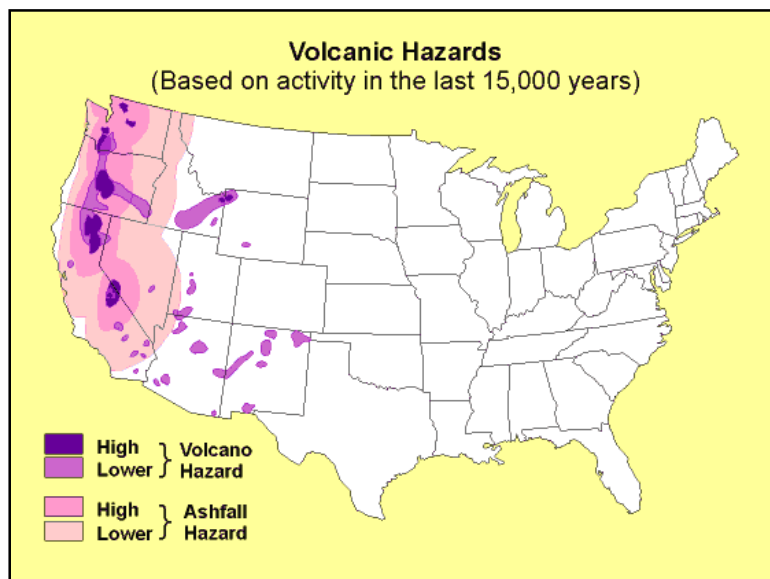
**CPRI SCORE = 2.25**

##### Description and History

Volcanic eruptions are generally not a major concern in Flathead County due to the relatively low probability (compared with other hazards) of events in any given year. However, Flathead County is within a region with a significant component of volcanic activity and has experienced the effects of volcanic activity as recently as 1980 (the eruption of Mount St. Helens in the state of Washington).

There are 20 active or potentially-active volcanoes in the United States. The two volcanic centers affecting Montana in recent geologic time are: 1) the Cascade Range of Washington, Oregon and California; and 2) the Yellowstone Caldera in Wyoming and eastern Idaho. Volcanic eruptions in the Cascade Mountains are more likely to impact Flathead County than Yellowstone eruptions, based on the historic trends of past eruptions. The primary effect of the Cascade volcanic eruptions on Flathead County would be ash fall.

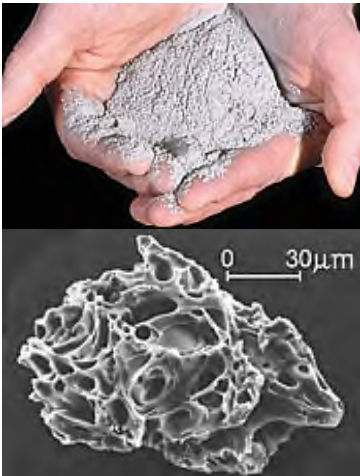
The distribution of ash from a violent eruption is a function of the weather, particularly wind direction and speed and atmospheric stability, and the duration of the eruption. As the prevailing wind in the mid-latitudes of the northern hemisphere is generally from the west, ash is usually spread eastward from the volcano. Exceptions to this rule do, however, occur. Ash fall, because of its potential widespread distribution, offers some significant volcanic hazards.



In the *Volcanic Hazards* map to the left, areas in purple show regions at greater or lesser risk of volcanic activity, including lava flows, ashfall, lahar (volcanic mudflows) and debris avalanches, based on the record of the last 15,000 years, as compiled by Mullineaux (1976). Areas in pink show regions at risk of receiving 5 cm or more of ashfall from large or very large explosive eruptions originating at the volcanic centers shown in purple. These projected ashfall extents are based on observed ashfall

distribution from a large eruption of Mt. St. Helens that took place 3,400 years ago, and the eruption of Mount Mazama that formed Crater Lake, Oregon, 6,800 years ago.

Volcanic ash can cause failure of electronic components, interrupt telephone and radio communications, and cause internal combustion engines to stall. Airborne particles of volcanic ash can pose a health risk to people with respiratory conditions. **Table 4.14-1** describes the effects of volcanic ash.

TABLE 4.14-1 EFFECTS OF VOLCANIC ASH	
 <p>Volcanic ash, like this 1980 ash from Mount St. Helens, is made up of tiny jagged particles of rock and glass (photo on bottom; magnified 200 times).</p>	<p>Short-circuits and failure of electronic components, especially high-voltage circuits and transformers (wet ash conducts electricity). Eruption clouds and ashfall commonly interrupt or prevent telephone and radio communications. Volcanic ash can cause internal-combustion engines to stall by clogging air filters and also damage the moving parts. Engines of jet aircraft have suddenly failed after flying through clouds of even thinly dispersed ash. Roads, highways, and airport runways can be made treacherous or impassable because ash is slippery and may reduce visibility to near zero. Cars driving faster than 5 miles per hour on ash-covered roads stir up thick clouds of ash, reducing visibility and causing accidents. Ash also clogs filters used in air-ventilation systems to the point that airflow often stops completely, causing equipment to overheat. Crop damage can range from negligible to severe, depending on the thickness of ash, type and maturity of plants, and timing of subsequent rainfall. Like airborne particles from dust storms, forest fires, and air pollution, volcanic ash poses a health risk, especially to children, the elderly, and people with cardiac or respiratory conditions, such as asthma, chronic bronchitis, and emphysema. Source: USGS, 2003b</p>

**Table 4.14-2** shows the thicknesses of recorded ash deposits in Montana.

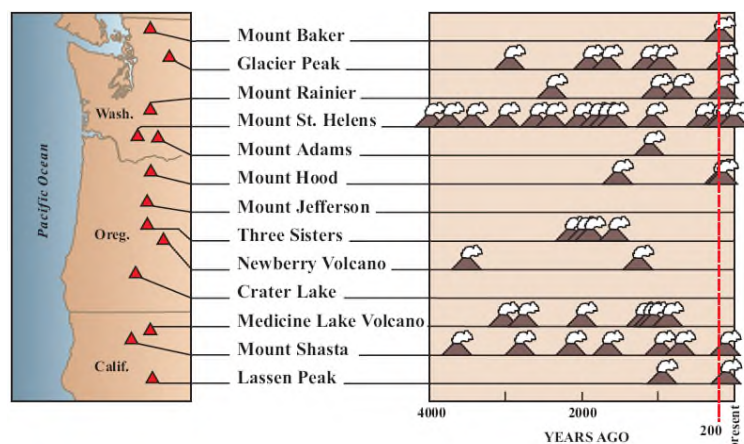
TABLE 4.14-2 RECENT VOLCANIC ASH EVENTS AFFECTING MONTANA			
Volcano	Most Recent Eruption (Yrs before Present)	Location Affected	Thickness of Ash in Montana
Yellowstone Caldera	665,000	Eastern Montana	
Glacier Peak	14,500	Western Montana	1.2 inches (compacted)
Crater Lake (Mt. Mazama)	7,600	Western Montana	Up to 6 inches (compacted)
Mount St. Helens	34	Entire State	Up to 0.2 inches (uncompacted)

Source: DES, 1996; Sarna-Wojcicki and others, 1981; USGS, 2003a; Nimlos, 1981.

### ***Cascade Eruptions***

The Cascade Range includes 27 volcanoes, many of which have been active in the last 4,000 years. The major threat these volcanoes pose to Montana is ashfall. The likely extent of such ashfall can be estimated on the basis of past eruptions. The figure below shows Cascade Eruptions during the past 4,000 years (Source: USGS, 2008).





After the eruption of Mount St. Helens in May 1980, a coating of up to 5.0 mm (0.2 inches) of ash fell on Western Montana (Sarna-Wojcicki and others, 1981). Ash deposits were thickest in the western portions of the state, tapering to near zero on the eastern part of the state (**Figure 4.15-2**). It is estimated that the ashfall cost Missoula County nearly \$6 million in cleanup and lost work time. Statewide

cost from this event has been estimated at between \$15 and \$20 million (DMA, 2013).

Travel was restricted in Western Montana for over a week because of concerns for public health; the ash was determined to be a physical respiratory irritant but not a toxic substance. The main hazards in Western Montana included reduced visibility (and resulting closed roads and airports), clogging of air filters, and a health risk to children, the elderly, and people with cardiac or respiratory conditions, such as asthma, chronic bronchitis, and emphysema.

The 1980 Mount St. Helens eruption was not a large eruption by world historical standards or even among prior Cascade eruptions. The amount of volcanic material ejected into the air from Mount St. Helens in 1980 (less than one-tenth cubic mile) was only about 1/80<sup>th</sup> of the volume ejected during the 1815 eruption of the Tambora volcano in Indonesia and less than 1/100<sup>th</sup> of the estimated ejecta from Mount Mazama during the eruption that formed Crater Lake. Therefore, future eruptions of large Cascade volcanoes, including Mount St. Helens, might be much larger than the May 18, 1980 eruption (Foxworthy and Hill, 1982).

### **Yellowstone Eruptions**

Another area of volcanic activity that has affected Montana in the past and could pose a serious threat in the future is the Yellowstone Caldera in northwestern Wyoming, just south of the Montana border. A caldera is a term for a large volcanic crater. The Yellowstone Caldera is 45 miles across at its greatest diameter. The spectacular geysers, boiling hot springs, and mud pots that have made Yellowstone famous are surface manifestations of a magma chamber at depth.

Cataclysmic eruptions 2.0, 1.3, and 0.6 million years ago ejected huge volumes of rhyolite magma; each eruption formed a caldera and extensive layers of thick pyroclastic-flow deposits. The caldera is buried by several extensive rhyolite lava flows that erupted between 75,000 and 150,000 years ago.

Fortunately for mankind, an eruption comparable in magnitude with those of Yellowstone has not occurred during recorded history. Initial lava flows were confined to the immediate area of the vent, but later flows inundated the headwaters of the Yellowstone River, near Gardiner. Pyroclastic flows (the Huckleberry Ridge Tuff) extended up to 55 miles from the vents.

#### *Vulnerability and Area of Impact*

The primary hazard to which Flathead County may be vulnerable at some future time, is ash fall from a Cascade volcano. Eruptions in the Cascades have occurred at an average rate of 1-2 per century during the last 4,000 years, and future eruptions are certain. Seven volcanoes in the Cascades have erupted in the last 200 years. The next eruption in the Cascades could affect hundreds of thousands of people. The effect in Montana would depend on the interaction of such variables as source location, frequency, magnitude and duration of eruptions, the nature of the ejected material and the weather conditions. Therefore, the entire state may be considered vulnerable to ashfall to some degree in the event of a volcanic eruption.

There is evidence that ash fall from a Yellowstone eruption could impact a far greater area; however, the most significant impacts would be on the southern half of Montana.

#### *Magnitude and Probability*

The most likely event affecting Flathead County would be a Cascade volcano eruption causing ash fall in the western portion of the state. An ash fall event could cause equipment failure to the motorized equipment. Clearing ash fall from the highways would cause extra resources devoted to the cleanup. The overall impact to critical facilities would be minor and primarily a response and recovery operation. After the eruption of Mount St. Helens in May 1980, a coating of up to 0.2 inches cost the state between \$15 and \$20 million in cleanup and lost work time (DMA, 2013). The trajectory of ash fall events is heavily dependent upon the size of the eruption and the prevailing weather and ambient winds.

The probability of the volcanic eruption hazard is ranked as “unlikely”; with less than one event per 100 years.

#### *Future Development*

As population increases in the Flathead County and recreational use/tourism expands, more people and property are at risk from ashfall associated with volcanic activity.



#### **4.15 RISK ASSESSMENT SUMMARY**

This section summarizes the results of the individual risk assessments presented under the hazard profiles. There have been no repetitive loss properties due to flooding in Flathead County. Neither the County nor the communities of Columbia Falls, Kalispell, or Whitefish have repetitive loss properties associated with other hazards. Annual loss estimates are presented for each hazard where damage data is available. Future development projects in Flathead County are discussed as they relate to the hazard areas.

##### *Vulnerability Analysis - Loss Estimation Summary*

Estimating potential losses and calculating risk requires evaluating where hazard areas and vulnerabilities to them coincide, how frequently the hazards occur, and then estimating the magnitude of damage resulting from a hazard event. Annualized loss was computed for the hazards where damage data was available. *Section 4.1* presents the methodology for loss estimation calculations. **Tables 4.15-1 through 4.15-4** present annual loss for the various hazards for residential, commercial (including industrial and agricultural buildings), and critical facilities in the County and incorporated communities. **Appendix C** contains supporting information.

##### *Composite Hazard Map and Future Development*

**Figures 12 and 12A through 12C** present the composite of hazard prone areas in the County and incorporated communities. The Columbia Falls, Kalispell, and Whitefish Growth Policies outline areas for future development within the next 10-15 years and these areas are shown on the composite hazard maps where GIS data was available. These maps can be used to help locate future projects outside hazard-prone areas. At this time, no new critical facilities and infrastructure improvements are planned for the County or Cities.

**TABLE 4.15-1  
HAZARD VULNERABILITY SUMMARY; FLATHEAD COUNTY**

Hazard	Residential Building Stock \$ Exposure in Hazard Area	# Residential Structures in Hazard Area	Residential Building Stock \$ Annual Loss	Commercial, Industrial & Agricultural Building Stock \$ Exposure in Hazard Area	# Commercial, Industrial & Agricultural Structures in Hazard Area	Commercial, Industrial & Agricultural Building Stock \$ Annual Loss	Critical Facility \$ Exposure in Hazard Area	# Critical Facilities Exposure in Hazard Area	Critical Facilities \$ Annualized Loss	Persons in Hazard Area	Under 18 in Hazard Area
Wildfire	\$2,032,751,499	9,350	\$10,462	\$129,577,438	334	\$667	\$24,885,618	64	\$128	24,122	5,326
Flooding	\$495,843,950	1,822	\$50,223	\$24,995,530	50	\$2,532	\$0	1	\$0	17,030	3,930
Hazardous Material Incidents	\$651,207,367	3,764	NA	\$274,131,246	567	NA	\$49,385,873	68	NA	21,424	4,932
Severe Winter Weather	\$3,171,673,112	15,490	\$82,124	\$355,357,815	841	\$9,201	\$73,655,907	143	\$1,907	39,524	9,107
Railroad Accidents	\$188,570,052	890	NA	\$93,816,315	144	NA	\$21,557,904	20	NA	4,543	960
Severe Summer Weather	\$3,171,673,112	15,490	\$99,199	\$355,357,815	841	\$11,114	\$73,655,907	143	\$1,907	39,524	9,107
Earthquake (30%g)	\$1,120,775,432	5,801	NA	\$86,384,202	270	NA	\$14,730,441	48	NA	17,390	4,114
Landslide *	\$171,411,736	485	NA	\$25,356,337	26	NA	\$0	0	NA	11,031	2,327
Dam Failure	\$553,997,969	3,391	NA	\$171,024,704	383	NA	\$26,018,183	44	NA	15,721	3,641

NA = Not Available. Annual loss cannot be computed due to the absence of historic property damage figures that are required to calculate magnitude. See Section 4.1 on page 4-1 which describes risk assessment methodology for additional information.

It should be noted that there are some inherent inaccuracies using a percentage of census block population to compute the number of individuals living in the hazard area. More persons than actually reside in the hazard area may be calculated where census blocks are large.

\* Only CDPs calculated in analysis for County landslide/subsidence risk; >30 percent slope



**TABLE 4.15-2  
HAZARD VULNERABILITY SUMMARY; CITY OF COLUMBIA FALLS**

Hazard	Residential Building Stock \$ Exposure in Hazard Area	# Residential Structures in Hazard Area	Residential Building Stock \$ Annual Loss	Commercial, Industrial & Agricultural Building Stock \$ Exposure in Hazard Area	# Commercial, Industrial & Agricultural Structures in Hazard Area	Commercial, Industrial & Agricultural Building Stock \$ Annual Loss	Critical Facility \$ Exposure in Hazard Area	# Critical Facilities Exposure in Hazard Area	Critical Facilities \$ Annualized Loss	Persons in Hazard Area	Under 18 in Hazard Area
Wildfire	\$8,257,028	62	\$42	\$5,232,384	6	\$27	\$0	0	\$0	495	115
Flooding	\$4,627,771	24	\$469	\$0	0	\$0	\$0	0	\$0	500	100
Hazardous Material Incidents	\$114,285,660	1,071	NA	\$77,728,978	264	NA	\$13,097,690	28	NA	4,091	1,058
Severe Winter Weather	\$173,120,101	1,447	\$4,483	\$79,159,691	267	\$2,050	\$13,097,690	34	\$339	4,690	1,217
Railroad Accidents	\$74,708,145	680	NA	\$45,374,345	117	NA	\$8,816,365	17	NA	2,837	743
Severe Summer Weather	\$173,120,101	1,447	\$5,415	\$79,159,691	267	\$2,476	\$13,097,690	34	\$339	4,690	1,217
Earthquake (30%g)	\$0	0	\$0	\$0	0	\$0	\$0	0	\$0	0	0
Landslide	\$4,874,419	23	NA	\$0	0	NA	\$0	0	NA	211	50
Dam Failure	\$149,291,591	1,194	NA	\$74,172,265	245	NA	\$11,476,148	30	NA	4,263	1,117

NA = Not Available. Annual loss cannot be computed due to the absence of historic property damage figures that are required to calculate magnitude. See Section 4.1 on page 4-1 which describes risk assessment methodology for additional information.

It should be noted that there are some inherent inaccuracies using a percentage of census block population to compute the number of individuals living in the hazard area. More persons than actually reside in the hazard area may be calculated where census blocks are large.

**TABLE 4.15-2  
HAZARD VULNERABILITY SUMMARY; CITY OF KALISPELL**

Hazard	Residential Building Stock \$ Exposure in Hazard Area	# Residential Structures in Hazard Area	Residential Building Stock \$ Annual Loss	Commercial, Industrial & Agricultural Building Stock \$ Exposure in Hazard Area	# Commercial, Industrial & Agricultural Structures in Hazard Area	Commercial, Industrial & Agricultural Building Stock \$ Annual Loss	Critical Facility \$ Exposure in Hazard Area	# Critical Facilities Exposure in Hazard Area	Critical Facilities \$ Annualized Loss	Persons in Hazard Area	Under 18 in Hazard Area
Wildfire	\$0	0	\$0	\$298,500	2	\$2	\$0	0	\$0	462	90
Flooding	\$12,025,723	56	\$1,218	\$1,220,620	8	\$124	\$241,180	1	\$24	2,120	486
Hazardous Material Incidents	\$332,546,329	2,641	NA	\$597,474,699	1,111	NA	\$138,824,312	135	NA	12,134	2,902
Severe Winter Weather	\$890,858,296	6,512	\$23,067	\$706,945,897	1,391	\$18,305	\$187,225,230	175	\$4,848	19,357	4,902
Railroad Accidents	\$50,195,568	524	NA	\$195,412,842	524	NA	\$8,267,768	23	NA	3,316	675
Severe Summer Weather	\$890,858,296	6,512	\$27,863	\$706,945,897	1,391	\$22,111	\$187,225,230	175	\$4,848	19,357	4,902
Earthquake (30%g)	\$867,153,084	6,421	NA	\$569,165,790	1,339	NA	\$121,637,176	162	NA	19,264	4,868
Landslide	\$1,728,589	11	NA	\$298,500	2	NA	\$0	0	NA	211	50
Dam Failure	\$103,738,390	683	NA	\$77,217,046	121	NA	\$341,530	5	NA	3,160	801

NA = Not Available. Annual loss cannot be computed due to the absence of historic property damage figures that are required to calculate magnitude. See Section 4.1 on page 4-1 which describes risk assessment methodology for additional information.

It should be noted that there are some inherent inaccuracies using a percentage of census block population to compute the number of individuals living in the hazard area. More persons than actually reside in the hazard area may be calculated where census blocks are large.



**TABLE 4.15-2  
HAZARD VULNERABILITY SUMMARY; CITY OF WHITEFISH**

Hazard	Residential Building Stock \$ Exposure in Hazard Area	# Residential Structures in Hazard Area	Residential Building Stock \$ Annual Loss	Commercial, Industrial & Agricultural Building Stock \$ Exposure in Hazard Area	# Commercial, Industrial & Agricultural Structures in Hazard Area	Commercial, Industrial & Agricultural Building Stock \$ Annual Loss	Critical Facility \$ Exposure in Hazard Area	# Critical Facilities Exposure in Hazard Area	Critical Facilities \$ Annualized Loss	Persons in Hazard Area	Under 18 in Hazard Area
Wildfire	\$650,672,548	2,603	\$3,349	\$207,959,032	425	\$1,070	\$41,251,158	44	\$212	6,376	1,238
Flooding	\$54,556,085	201	\$5,526	\$17,773,297	37	\$1,800	\$0	2	\$0	1,533	327
Hazardous Material Incidents	\$181,732,393	1,201	NA	\$172,331,252	356	NA	\$30,771,076	26	NA	4,377	825
Severe Winter Weather	\$650,672,548	2,603	\$16,848	\$209,616,677	427	\$5,428	\$41,251,158	44	\$1,068	6,376	1,238
Railroad Accidents	\$111,589,887	749	NA	\$50,472,972	181	NA	\$1,117,310	9	NA	2,877	560
Severe Summer Weather	\$650,672,548	2,603	\$20,351	\$209,616,677	427	\$6,556	\$41,251,158	44	\$1,068	6,376	1,238
Earthquake (30%g)	\$0	0	NA	\$0	0	NA	\$0	0	NA	0	0
Landslide	\$3,247,627	6	NA	\$0	0	NA	\$0	0	NA	101	22
Dam Failure	\$0	0	NA	\$0	0	NA	\$0	0	NA	0	0

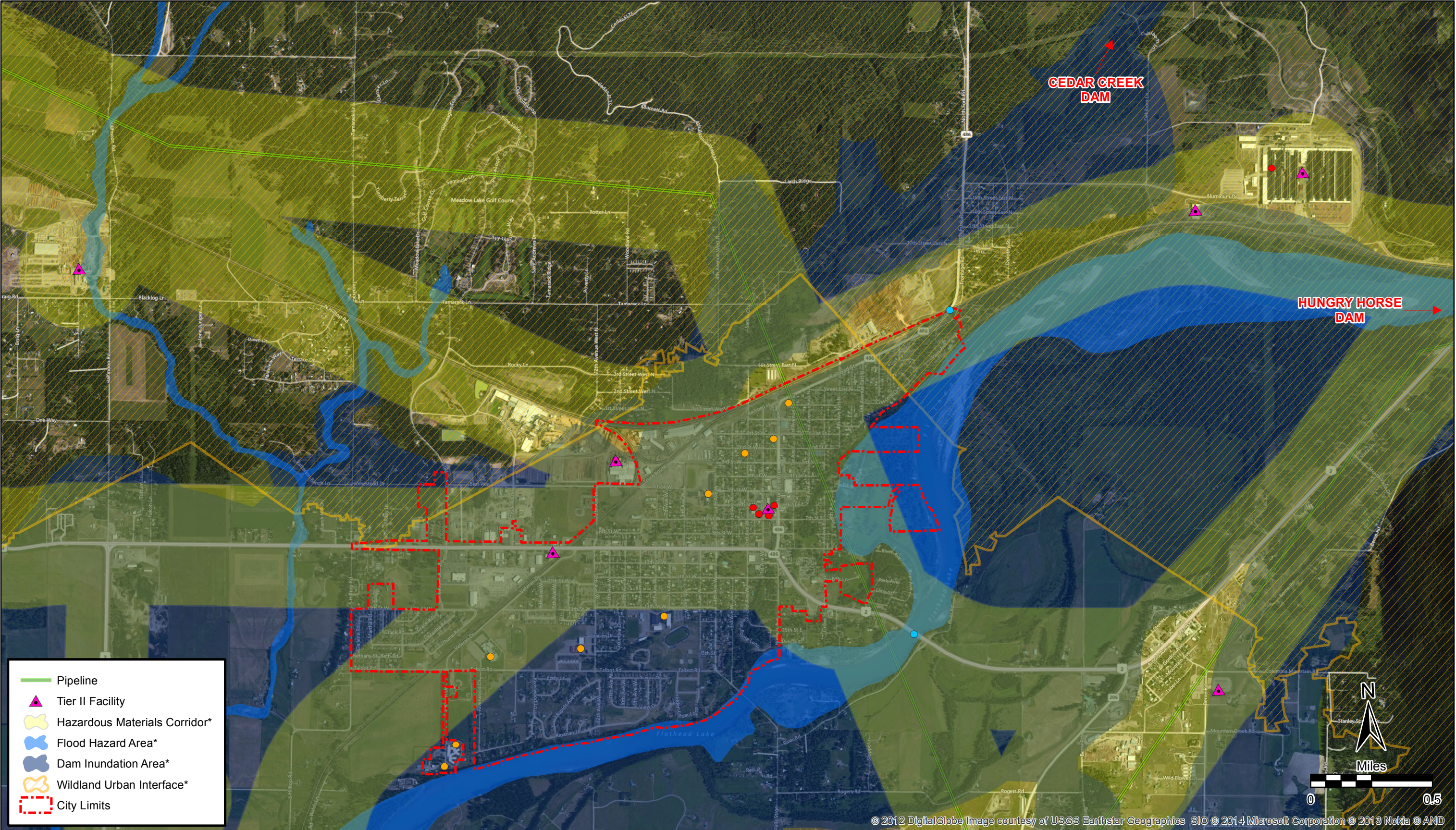
NA = Not Available. Annual loss cannot be computed due to the absence of historic property damage figures that are required to calculate magnitude. See Section 4.1 on page 4-1 which describes risk assessment methodology for additional information.

It should be noted that there are some inherent inaccuracies using a percentage of census block population to compute the number of individuals living in the hazard area. More persons than actually reside in the hazard area may be calculated where census blocks are large.









\*Color variations that DO NOT match the legend are due to overlapping hazard layers.

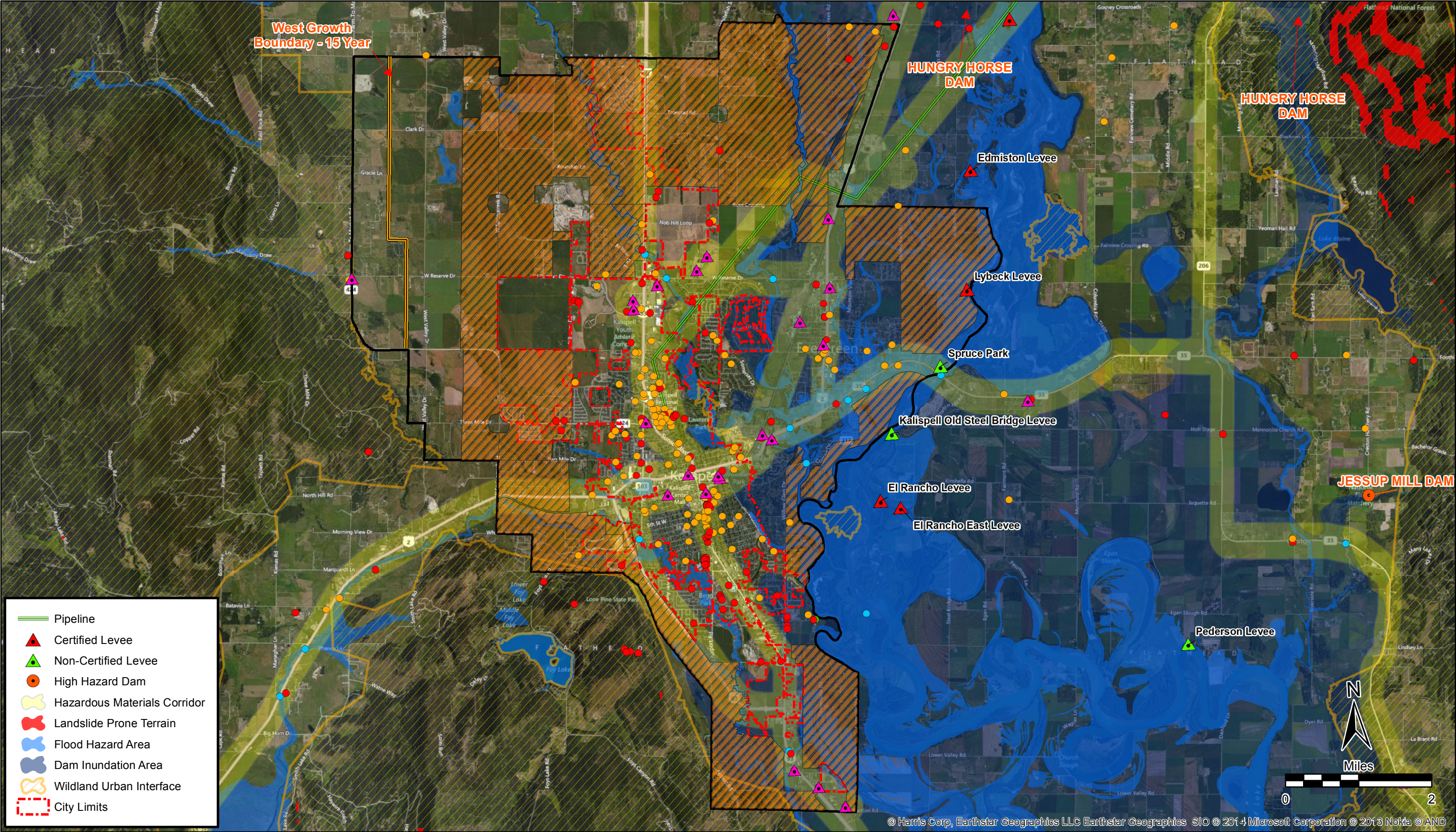


Critical Facility

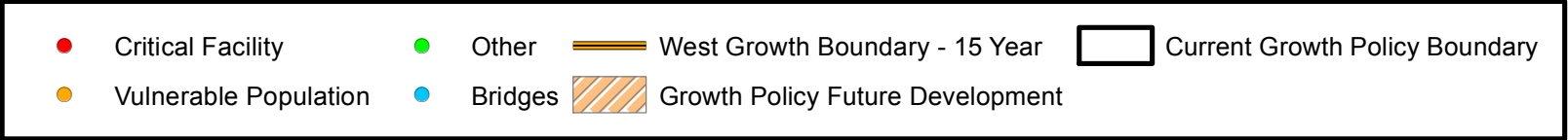
Vulnerable Population

Bridges





\*Color variations that DO NOT match the legend are due to overlapping hazard layers.



May 2014  
Figure 12B  
**Hazard Composite and Future Development - Kalispell  
Flathead County**  
Pre-Disaster Mitigation Plan





May 2014  
**Figure 12C**  
**Hazard Composite and Future Development - Whitefish**  
**Flathead County**  
**Pre-Disaster Mitigation Plan**



## **5.0 MITIGATION STRATEGY**

Hazard mitigation, as defined by the Disaster Mitigation Act of 2000, is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. The development of a mitigation strategy allows the community to create a vision for preventing future disasters, establish a common set of mitigation goals, prioritize actions, and evaluate the success of such actions.

Specific mitigation goals and projects were developed for Flathead County by the Planning Team and reviewed and enhanced at the public meetings. A matrix developed for project ranking emphasizing cost-benefit and input from local officials was used to determine project prioritization. Project implementation is discussed at the conclusion of this section. Projects included in the 2014 Flathead County mitigation strategy are presented in **Table 5.4-1. Appendix D** contains supporting documentation for the mitigation strategy including: example mitigation projects and a mitigation action plan with individual project worksheets.

### **5.1 HAZARD MITIGATION GOALS**

The PDM Plan goals describe the overall direction that Flathead County can take to work toward mitigating risk from natural and man-made hazards and avoid long-term vulnerabilities to these hazards. Mitigation goals for this plan are listed below. The 2009 Flathead County PDM Plan had only six goals; one for wildfire, severe weather events, flooding, earthquakes, hazardous material incidents, and dam failure. These goals were retained with others added to include the additional hazards profiled in this plan update. Goals were reordered to coincide with the hazard ranking with an “All Hazard” goal included at the end. Goals for the 2014 mitigation strategy are presented below:

- Goal 1: Minimize Risk of Wildfire at Urban Interface
- Goal 2: Reduce Impacts from Flooding
- Goal 3: Reduce Impacts from Hazardous Material Incidents
- Goal 4: Reduce Impacts from Severe Winter Weather
- Goal 5: Reduce Impacts from Communicable Disease
- Goal 6: Reduce Impacts from Transportation Accidents
- Goal 7: Reduce Impacts from Severe Summer Weather
- Goal 8: Reduce Impacts from Earthquakes
- Goal 9: Reduce Impacts from Landslides/Subsidence
- Goal 10: Reduce Impacts from Drought
- Goal 11: Reduce Impacts from Terrorism, Violence, and Civil Unrest
- Goal 12: Reduce Impacts from Dam Failure
- Goal 13: Reduce Impacts from Volcanic Ash
- Goal 14: Reduce Impacts from All Hazards



## **5.2 HAZARD MITIGATION OBJECTIVES AND PROJECTS**

The PDM Planning Team reviewed the list of projects from the 2009 plan and determined which were complete, should be deleted, or reworded for the 2014 mitigation strategy. A wide-range of mitigation actions were also reviewed (**Appendix D**) and additional projects were selected for the updated PDM Plan. **Table 5.4-2** presents a reconciliation of mitigation projects and their status.

Particular attention was given to new and existing buildings and infrastructure, and developing appropriate mitigation strategies for these facilities. Prior to being analyzed and prioritized, projects were placed under one of the following general objectives:

- Prevention
- Property Protection
- Public Education and Awareness
- Natural Resource Protection
- Structural Projects
- Emergency Services

Projects included in the 2014 Flathead County mitigation strategy are presented in **Table 5.4-1**.

## **5.3 PROJECT RANKING AND PRIORITIZATION**

Each of the proposed projects has value; however, time and financial constraints do not permit all projects to be implemented immediately. By prioritizing the actions, the most critical, cost effective projects can be achieved in the short term.

A cost-benefit matrix was developed to rank the mitigation projects using the following criteria. Each project was assigned a “high”, “medium”, or “low” rank for *Population Impacted*, *Property Impacted*, *Project Feasibility* and *Cost*, as described below:

For the *Population Protected* category, a “high” rank represents greater than 50 percent of County residents would be protected by implementation of the mitigation strategy; a “medium” rank represents 20 to 50 percent of County residents would be protected; and, a “low” rank represents less than 20 percent of County residents would be protected.

For the *Property Protected* category, a “high” represents that greater than \$500,000 worth of property would be protected through implementation of the mitigation strategy; “medium” represents that \$100,000 to \$500,000 worth of property would be protected; and, “low” would be less than \$100,000 would be protected.

For the *Project Feasibility* category a “high” rank represents that technology is available and implementation is likely; a “medium” rank indicates technology may be available but implementation could be difficult; and, a “low” rank represents that no technology is available or implementation would be unlikely.

For the *Project Cost* category, a “high” represents that the mitigation project would cost more than \$500,000; a “medium” rank represents the project cost would be between \$100,000 and \$500,000; and, “low” represents the project would cost less than \$100,000.

The overall cost-benefit was then calculated by summing the total score for each project. **Table 5.3-1** presents the cost-benefit scoring matrix. The mitigation action plans in **Appendix D** present the scoring of each project.

TABLE 5.3-1 COST-BENEFIT SCORING MATRIX				
	Population Protected	Property Protected	Project Feasibility	Cost
High	5	5	5	1
Medium	3	3	3	3
Low	1	1	1	5

After considering all mitigation projects, the Planning Team prioritized the projects as high, medium, or low based on which projects were most needed to protect life and property. Prioritization of the projects serves as a guide for choosing and funding projects. **Table 5.4-1** and the mitigation action plans in **Appendix D** present the County priority for each project.

## 5.4 PROJECT IMPLEMENTATION

The Planning Team reviewed the projects and assigned a corresponding county/city/town department responsible for its implementation. Cooperating organizations for implementation may also include local, federal or regional agencies that are capable of implementing activities and programs. The Planning Team identified a schedule for implementation and potential funding sources. The schedule for implementation included several categories including: “ongoing” for projects that are part of the County’s emergency management program; “short-term” for projects to be completed within 1-2 years; “mid-term” for projects to be completed within 3-4 years; “long-term” for projects to be completed in 5 or more years; and “Year 1-5” for projects which will span the entire planning period. Implementation details are shown in **Table 5.4-1**, **Table 5.4-2** and in the mitigation action plans in **Appendix D**. Potential funding sources are discussed in *Section 6.3*. The Flathead County Emergency Manager will be responsible for mitigation project administration.



**TABLE 5.4.1  
FLATHEAD COUNTY 2014 MITIGATION STRATEGY**

Goal	Objective	Project	Jurisdiction	Ranking (Score) / County Priority	Responsible Agency / Department	Schedule	Potential Funding Source
Goal 1 - Minimize Risk of Wildfire at Urban Interface	Objective 1.1 - Reduce fuels in the wildland urban interface	1.1.2 - Provide landowner, farmer, rancher and homeowner education on wildfire and fuel reduction of the WUI and adjoining lands.	County	High (18) / High	Fire Depts., Fire Service Area/OES, DNRC, USFS, NRCS	Ongoing	RC&D Grants
		1.1.3 - Support controlled burns to mitigate wildfire risk.	County	Medium (12) / Medium	Fire Depts., Fire Service Area/OES, DNRC, USFS, NRCS	Ongoing	Internal
		1.1.6 - Encourage ingress and egress fuel reduction.	County	Medium (14) / Medium	Fire Depts., Fire Service Area/OES, DNRC, USFS, NRCS	Ongoing	Internal
		1.1.7 - Encourage fuel reduction in utility right-of-ways and around critical infrastructure.	County	Medium (16) / Medium	Fire Depts., Fire Service Area/OES, utilities, CI Owners	Ongoing	Internal
		1.1.12 - Perform weed control or mowing along county roads and encourage weed control or mowing along railroads and USFS roads.	County	Medium (12) / Medium	Railroads, USFS, County Weed Depts.	Ongoing	County, USFS, Railroads
		1.1.13 - Support alternative methods to burning when reducing fuel hazards, such as chipping and harvest.	County	Low (8) / Low	Fire Dept., Fire Service Area/OES	Ongoing	Internal
	Objective 1.2 - Accurately assess and address the current WUI problems at the subdivision level	1.2.3 - Annex subdivisions outside of existing rural fire districts into nearest district, if possible.	County	Medium (12) / Medium	County Planning Dept., Fire Service Area/OES	Ongoing	Internal
		1.2.4 - Ensure convenient access to and within all subdivisions for the largest emergency service vehicles.	County, CFalls, Kalispell, Whitefish	Medium (10) / High	County Planning, Fire Districts, City Fire Depts., Fire Service Area	Ongoing	Internal
		1.2.5 - Encourage two or more subdivision access points in areas of high and extreme fire hazard.	County, CFalls, Kalispell, Whitefish	Medium (12) / High	County Planning, Fire Districts, City Fire Depts., Fire Service Area	Ongoing	Internal
		1.2.6 - Encourage defensible space and fuel treatments on new subdivisions.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	County Planning, Fire Districts, City Fire Depts., Fire Service Area	Ongoing	Internal
		1.2.7 - Implement Community Wildfire Protection Plan.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	Fire Depts., Fire Service Area/OES	Ongoing	Internal
		1.2.9 - Encourage water supply systems in new and existing subdivisions.	County, CFalls, Kalispell, Whitefish	Medium (14) / High	County Planning, Fire Districts, City Fire Depts., Fire Service Area	Ongoing	Internal

**TABLE 5.4.1  
FLATHEAD COUNTY 2014 MITIGATION STRATEGY**

Goal	Objective	Project	Jurisdiction	Ranking (Score) / County Priority	Responsible Agency / Department	Schedule	Potential Funding Source
Goal 1 - Minimize Risk of Wildfire at Urban Interface	Objective 1.3 - Encourage structure protection in the WUI	1.3.3 - Encourage a structure sprinkler systems program.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	County Planning, Fire Districts, City Fire Depts., Fire Service Area	Ongoing	Internal
		1.3.4 - Support homeowner fuel reduction programs to get landowners to do fuel reduction on private properties.	County, CFalls, Kalispell, Whitefish	High (18) / High	FEPC, Fire Depts., Fire Service Area/OES, DNRC, USFS, NRCS, Homeowners	Ongoing	RC&D Grants
	Objective 1.4 - Improve fire fighting capabilities	1.4.2 - Improve fire agency infrastructure (training facility, additional fire equipment storage, enhanced communications systems).	County, CFalls, Kalispell, Whitefish	Medium (14) / High	Fire Depts., Fire Service Area/OES	Ongoing	Internal, AFG Grants, Safer Grants, VFA Grants
		1.4.5 - Identify areas with high number of fire starts and inadequate suppression equipment.	County	Medium (14) / Medium	Fire Depts., GIS, Fire Service Area/OES, DNRC, USFS	Short-range	Internal
		1.4.6 - Install more year-round water draft sites (dry hydrants) in the rural fire districts.	County	Medium (16) / High	Fire Depts., Fire Service Area/OES	Short-range	Internal
	Objective 1.5 - Enhance wildfire detection capabilities	1.5.1 - Subscribe to lightning detection and prediction program through Wildfire Management Information at BLM.	County	Medium (12) / Medium	Fire Service Area/OES	Short-range	Internal
Goal 2 - Reduce Impacts from Flooding	Objective 2.1 - Prevent flooding of structures and infrastructure from inadequate storm drainage and poorly designed irrigation waterways	2.1.3 - Evaluate bridges and culverts at risk from flooding and develop schedule and funding to replace or upgrade as necessary.	County, CFalls, Kalispell, Whitefish	Medium (16) / Medium	County Public Works, MDT, City Public Works	Ongoing	Internal
		2.1.4 - Implement stream bank restoration projects to improve floodplain.	County	Low (6) / Medium	County Planning	Long-range	Grants
		2.1.5 - Encourage installation of backflow valves.	County, Kalispell, CFalls	High (18) / Medium	County and City Planning, MT Dept. Labor	Year 1-5	Individual building owners
		2.1.6 - Install storm drains in municipalities, as needed.	County, CFalls, Whitefish	Medium (14) / Medium	County Public Works, City Public Works	Year 1-5	Grants
		2.1.7 - Elevate roadways, as needed to reduce flood damage.	County, CFalls, Kalispell	Medium (10) / Medium	County Public Works, City Public Works	Long-range	Grants
		2.1.8 - Install water retention basins to improve safety from flooding.	County, CFalls, Kalispell	Medium (12) / Medium	County Public Works, City Public Works	Long-range	Grants
		2.1.9 - Identify areas that could be turned into parks to mitigate reoccurring flood damage.	County, Kalispell, CFalls	Low (8) / Medium	Planning Depts.	Year 1-5	Internal
	Objective 2.2 - Provide adequate warning of flooding events	2.2.2 - Obtain real time automated river gauges.	County, Kalispell, CFalls	High (18) / Medium	USGS, Landowners	Year 1-5	USGS, HMGP



**TABLE 5.4.1  
FLATHEAD COUNTY 2014 MITIGATION STRATEGY**

Goal	Objective	Project	Jurisdiction	Ranking (Score) / County Priority	Responsible Agency / Department	Schedule	Potential Funding Source
Goal 2 - Reduce Impacts from Flooding	Objective 2.3 - Improve the effectiveness of flood insurance programs	2.3.1 - Promote flood insurance education, especially insurance agents and home/business owners living in floodplain.	County, CFalls, Kalispell, Whitefish	High (18) / High	County Planning, OES	Ongoing	Internal
		2.3.2 - Adopt new FEMA maps and updates of existing floodplain studies as they become available.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	County Planning, OES	Ongoing	Internal
		2.3.3 - Review and revise floodplain regulations as changes occur in the NFIP, Montana law, and/or local policy.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	County Planning	Ongoing	Internal
Goal 3 - Reduce Impacts from Hazardous Material Incidents	Objective 3.1 - Enhance emergency service capabilities	3.1.2 - Ensure emergency service personnel have current training and equipment for response.	County, CFalls, Kalispell, Whitefish	Medium (14) / High	Fire Depts., Fire Service Area/OES	Ongoing	Internal, AFG Grants, Safer Grants, VFA Grants
		3.1.3 - Educate emergency service personnel on capabilities of privately owned response equipment and local government resources.	County, CFalls, Kalispell, Whitefish	High (20) / High	Fire Depts., Fire Service Area/OES	Ongoing	Internal
	Objective 3.2 - Provide outreach to private and public entities to enhance preparedness	3.2.1 - Work with vulnerable populations along hazardous material routes to ensure they have a response plan.	County, CFalls, Kalispell, Whitefish	Medium (12) / Medium	OES	Ongoing	Internal
		3.2.2 - Create a brochure targeting people along haz-mat routes on commodities transported and response.	County, CFalls, Kalispell, Whitefish	Medium (14) / High	OES, LEPC	Short-range	Internal
	Objective 3.3 - Encourage activities to minimize haz-mat incidents	3.3.1 - Promote businesses doing their Tier II reporting.	County, CFalls, Kalispell, Whitefish	Medium (12) / High	OES, LEPC	Ongoing	Internal
		3.3.2 - Continue to support the Highway 93 Alternate.	County, CFalls, Kalispell, Whitefish	High (20) / High	OES, LEPC	Ongoing	Internal
Goal 4 - Reduce Impacts from Severe Winter Weather	Objective 4.1 - Encourage public to protect themselves and their property	4.1.2 - Encourage public to report trees at risk of impacting power lines.	County, CFalls, Kalispell, Whitefish	High (18) / High	Flathead Electric, County & City Public Works	Ongoing	Internal
		4.1.3 - Provide outreach on recognizing when danger zone has approached; i.e. snow load on roofs, etc.	County, CFalls, Kalispell, Whitefish	High (20) / High	OES	Mid-range	Internal
Goal 5 - Reduce Impacts from Communicable Disease	Objective 5.1 - Promote activities to minimize disease outbreaks and impacts	5.1.1 - Develop a response plan on how to handle individuals determined to be diagnosed with a communicable disease while on-route through air travel.	County	Medium (12) / High	City-County Health, Airport Authority	Short-range	Internal

**TABLE 5.4.1  
FLATHEAD COUNTY 2014 MITIGATION STRATEGY**

Goal	Objective	Project	Jurisdiction	Ranking (Score) / County Priority	Responsible Agency / Department	Schedule	Potential Funding Source
Goal 5 - Reduce Impacts from Communicable Disease	Objective 5.1 - Promote activities to minimize disease outbreaks and impacts	5.1.2 - Continue to provide public health surveillance, disease investigations, and mitigation strategies.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	Healthcare providers, City-County Health, Hospitals	Ongoing	Internal
		5.1.3 - Continue Public Health education on sanitation and prevention.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	City-County Health, DEQ, DPHHS	Ongoing	Internal
		5.1.4 - Educate on the importance of employee cross training, record keeping and COOP plans to minimize the impact of epidemics.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	City-County Health	Ongoing	Internal
		5.1.5 - Continue Education and increase awareness with schools and daycares regarding the importance of and need for vaccination.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	City-County Health	Ongoing	Internal
		5.1.6 - Continue collaboration with community partners in regards to mass casualty planning.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	City-County Health	Ongoing	Internal
Goal 6 - Reduce Impacts from Transportation Accidents	Objective 6.1 - Promote measures to protect public safety	6.1.1 - Identify problem intersections and recommend traffic control methods.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	MDT, County & City Public Works	Ongoing	Internal
		6.1.2 - Examine unprotected railroad crossings and recommend if gates/signage are needed.	County, CFalls, Kalispell, Whitefish	Medium (12) / High	Railroad, OES	Ongoing	Railroad
Goal 7 - Reduce Impacts from Severe Summer Weather	Objective 7.1 - Promote activities to protect property	7.1.1 - Develop and implement programs to keep trees from threatening lives, property, and public infrastructure during wind events	County, CFalls, Kalispell, Whitefish	High (18) / High	County & City Public Works	Ongoing	Internal
	Objective 7.2 - Promote public awareness	7.2.1 - Promote NWS Severe Weather Awareness Week.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	OES	Ongoing	Internal
		7.2.2 - Provide outreach on the risks of lightning and other severe summer weather hazards.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	OES	Ongoing	Internal
Goal 8 - Reduce Impacts from Earthquakes	Objective 8.1 - Make existing residential, commercial, and government structures more resilient.	8.1.1 - Conduct site evaluations of critical facilities.	County, CFalls, Kalispell, Whitefish	Medium (14) / Medium-High	County Planning, OES	Year 1-5	Grants
		8.1.2 - Install window film for shatter prevention in schools.	County, CFalls, Kalispell, Whitefish	High (18) / Medium-High	School Districts	Year 1-5	Grants, Internal
		8.1.3 - Implement non-structural mitigation program for public schools, i.e., equipment/furniture straps.	County, CFalls, Kalispell, Whitefish	High (18) / Medium-High	School Districts	Year 1-5	Grants, Internal



**TABLE 5.4.1  
FLATHEAD COUNTY 2014 MITIGATION STRATEGY**

Goal	Objective	Project	Jurisdiction	Ranking (Score) / County Priority	Responsible Agency / Department	Schedule	Potential Funding Source
Goal 8 - Reduce Impacts from Earthquakes	Objective 8.1 - Make existing residential, commercial, and government structures more resilient.	8.1.4 - Implement non-structural and structural retrofits of government buildings, particularly critical infrastructure.	County, CFalls, Kalispell, Whitefish	High (18) / Medium-High	County Planning, OES	Year 1-5	Grants, Internal
		8.1.5 - Encourage residential and business retrofit programs.	County, CFalls, Kalispell, Whitefish	Medium (16) / Medium-High	OES	Year 1-5	Grants, Private
	Objective 8.2 - Provide for earthquake resistance in new construction	8.2.1 - Encourage enforcement of current building codes.	CFalls, Kalispell, Whitefish	Medium (16) / High	City Planning Depts.	Ongoing	Internal
	Objective 8.3 - Educate the public in earthquake mitigation and readiness.	8.3.1 - Require earthquake drills in schools in Flathead County.	County, CFalls, Kalispell, Whitefish	Medium (14) / High	School Districts, OES	Ongoing	Internal
		8.3.2 - Provide public education regarding earthquake awareness.	County, CFalls, Kalispell, Whitefish	High (20) / High	OES	Long-range	Internal
		8.3.3 - Encourage workplace earthquake drills.	County, CFalls, Kalispell, Whitefish	Medium (14) / High	OES	Ongoing	Internal
		8.3.5 - Continue "Earthquake Preparedness Month" outreach activities during October.	County, CFalls, Kalispell, Whitefish	High (20) / High	OES	Ongoing	Internal
	Objective 8.4 - Upgrade community infrastructure for seismic hazards.	8.4.1 - Retrofit bridges and overpasses for seismic stability.	County, CFalls, Kalispell, Whitefish	Medium (14) / High	MDT, City & County Public Works	Ongoing	Grants
		8.4.2 - Encourage retrofit public utility systems for seismic resistance.	County, CFalls, Kalispell, Whitefish	High (18) / Medium	OES, Critical Infrastructure Owners	Year 1-5	Internal
		8.4.3 - Encourage installation of public utility shut off and isolation valves.	County, CFalls, Kalispell, Whitefish	High (18) / Medium-High	OES, Critical Infrastructure Owners	Year 1-5	Internal
		8.4.4 - Encourage seismic evaluations of dams.	County	Medium (16) / High	Dam owners	Year 1-5	Internal, Grants

**TABLE 5.4.1  
FLATHEAD COUNTY 2014 MITIGATION STRATEGY**

Goal	Objective	Project	Jurisdiction	Ranking (Score) / County Priority	Responsible Agency / Department	Schedule	Potential Funding Source
Goal 9 - Reduce Impacts from Landslides/ Subsidence	Objective 9.1 - Protect property from landslide damage	9.1.1 - Implement slope preservation/ stabilization in slide-prone areas in the public domain.	County, CFalls, Kalispell, Whitefish	Medium (10) / Medium	City & County Public Works	Ongoing	Internal
		9.1.2 - Encourage slope preservation/ stabilization in slide-prone areas on private land.	County, CFalls, Kalispell, Whitefish	Medium (14) / Medium	OES	Ongoing	Grants
Goal 10 - Reduce Impacts from Drought	Objective 10.1 - Promote drought awareness	10.1.1 - Monitor drought conditions	County, CFalls, Kalispell, Whitefish	Medium (12) / Medium-High	OES	Ongoing	Internal
		10.1.2 - Encourage water conservation by domestic, municipal and industrial users.	County, CFalls, Kalispell, Whitefish	Medium (16) / Medium-High	OES	Year 1-5	Internal
		10.1.3 - Support drought programs implemented through the Conservation District, FSA and MSU extension.	County, CFalls, Kalispell, Whitefish	Medium (12) / Medium-High	OES	Year 1-5	Internal
		10.1.4 - Support the development of Water Shortage Contingency Plans for communities and water systems.	County	Medium (12) / Medium-High	OES, DEQ	Year 1-5	Internal, Grants
Goal 11 - Reduce Impacts from Terrorism, Violence, and Civil Unrest	Objective 11.1 - Ensure readiness in the event of a terrorist incident	11.1.1 - Maintain situational awareness through coordination with DES, DOJ and DHS.	County, CFalls, Kalispell, Whitefish	Medium (16) / Medium	OES	Ongoing	Internal
		11.1.2 - Continue to participate in exercises with Border Patrol and/or Civil Support Team.	County, CFalls, Kalispell, Whitefish	Medium (16) / Medium	OES	Ongoing	Internal
		11.1.3 - Educate the public and critical infrastructure on "See Something, Say Something" program.	County, CFalls, Kalispell, Whitefish	Medium (16) / Medium	OES	Short-range	Internal
Goal 12 - Reduce Impacts from Dam Failure	Objective 12.1 - Encourage dam safety	12.1.2 - Repair dams and levees, as needed.	County, CFalls	Medium (12) / High	County Public Works, City of CFalls, DNRC, COE, Pacific Corp	Ongoing	Internal, Grants, and Private
		12.1.3 - Implement dam failure alert systems.	County, CFalls, Kalispell, Whitefish	Medium (14) / Medium	OES, City of CFalls, DNRC, COE, Pacific Corp	Long-range	Grants, Private
		12.1.4- Develop/maintain list of house occupants in inundation areas (evacuation list) to include in EAPs.	County, CFalls, Kalispell, Whitefish	Medium (12) / High	OES, Dam owners	Short-range	Internal



**TABLE 5.4.1  
FLATHEAD COUNTY 2014 MITIGATION STRATEGY**

Goal	Objective	Project	Jurisdiction	Ranking (Score) / County Priority	Responsible Agency / Department	Schedule	Potential Funding Source
Goal 12 - Reduce Impacts from Dam Failure	Objective 12.2 - Promote awareness of dam failure hazard in future development	12.2.1 - Consider using dam inundation as item of consideration in subdivision and critical infrastructure location reviews.	County, CFalls, Kalispell, Whitefish	Medium (14) / Medium	City and County Planning Dept.	Year 1 - 5	Internal
		12.2.2 - Determine when dams need reclassification.	County	Medium (14) / Medium	OES, DNRC, Dam owner	Year 1-5	Internal, Private
Goal 13 - Reduce Impacts from Volcanic Ash	Objective 13.1 - Promote awareness on ash fall hazard	13.1.1 - Develop brochure related to volcanic ash fall.	County, CFalls, Kalispell, Whitefish	Medium (16) / Medium	OES	Short-range	Internal
		13.1.2 - Support the development of a volcanic ash contingency plan for surface water treatment and waste water systems.	County, CFalls, Kalispell, Whitefish	Medium (16) / Low	OES, DEQ	Long-range	DEQ
Goal 14 - Reduce Impacts from All Hazards	Objective 14.1 - Encourage awareness of all hazards	14.1.2 - Promote public education for emergency preparedness.	County, CFalls, Kalispell, Whitefish	High (20) / High	OES	Ongoing	Internal
		14.1.3 - Utilize social media as outreach for hazard mitigation.	County, CFalls, Kalispell, Whitefish	High (20) / High	OES	Ongoing	Internal
		14.1.4 - Promote NOAA Weather Radios and Storm Ready Program.	County, CFalls, Kalispell, Whitefish	High (20) / High	OES	Ongoing	Internal
	Objective 14.2 - Promote preparedness planning	14.2.1 - Promote development of disaster supply kits.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	OES	Ongoing	Internal
		14.2.2 - Confirm capabilities of shelters with Red Cross.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	OES, Public Health	Short-range	Internal
		14.2.3 - Maintain and update GIS mapping of critical infrastructure.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	OES, GIS	Ongoing	Internal
		14.2.4 - Understand the impact of interruption of commodity transport (propane, natural gas).	County, CFalls, Kalispell, Whitefish	Medium (16) / High	OES, LEPC	Year 1 - 5	Internal
		14.2.5 - Promote continuity of operations planning.	County, CFalls, Kalispell, Whitefish	Medium (16) / High	OES, Chamber of Commerce	Year 1 - 5	Internal, Private
		14.2.6 - Support critical infrastructure in conducting vulnerability assessments and developing emergency response plans.	County, CFalls, Kalispell, Whitefish	Medium (16) / Medium-High	OES	Ongoing	Internal

**TABLE 5.4.1  
FLATHEAD COUNTY 2014 MITIGATION STRATEGY**

Goal	Objective	Project	Jurisdiction	Ranking (Score) / County Priority	Responsible Agency / Department	Schedule	Potential Funding Source
Goal 14 - Reduce Impacts from All Hazards	Objective 14.3 - Upgrade equipment to manage all hazards	14.3.1 - Obtain generators for critical facilities and schools.	County, CFalls, Kalispell, Whitefish	Medium (14) / High	OES, Schools, Owners of CFs	Year 1-5	Grants, Private
		14.3.2 - Implement reverse 911 technology that includes cell phones.	County, CFalls, Kalispell, Whitefish	High (20) / High	OES	Short-range	Grants, Internal

Notes: AFG = Assistance to Fire Fighter; BOR = U.S. Bureau of Reclamation; BPA = Bonneville Power Administration; CF = Critical Facilities; CFalls = Columbia Falls; CI = Critical Infrastructure; DNRC = Montana Department of Natural Resources and Conservation; DPHHS = Department of Public Health and Human Services; FEPC = Flathead Economic Policy Center; GIS = Geographic Information System; LEPC = Local Emergency Preparedness Committee; NRCS = Natural Resource Conservation Service; NWE = NorthWestern Energy; NWS = National Weather Service; OES = Flathead County Office of Emergency Services; USFS = United States Forest Service; VFA = Volunteer Fire Fighter Assistance



**TABLE 5.4-2  
FLATHEAD COUNTY MITIGATION STRATEGY – PROJECT STATUS AND RECONCILIATION**

Hazard	Old Number	Project Type	Mitigation Action/Project	Status	Progress Made	Planned Activities
Wildfire	1.1.2	Public education and awareness	1.1.2 - Provide landowner, farmer, rancher and homeowner education on wildfire and fuel reduction of the WUI and adjoining lands.	Ongoing	Flathead OES and DNRC prevention do this annually via TV and radio ads.	Continue outreach on regular basis.
	1.1.3	Property protection	1.1.3 - Support controlled burns to mitigate wildfire risk.	Ongoing	Several controlled burned have been completed by U.S. Forest Service and Montana DNRC.	Agencies will conduct additional controlled burns, as appropriate.
	1.1.4	Property protection	Support fuel reductions on forested lands to reduce fuels in the areas of high risk to neighboring landowners in the WUI.	Delete	Included in projects 1.3.4 and 1.1.3	
	1.1.5	Other	Streamlined permitting process for fuel reduction.	Delete	No permit needed at local level.	
	1.1.6	Property protection	1.1.6 - Encourage ingress and egress fuel reduction.	Ongoing	County roads are completed. Subdivision regulations address this for new roads.	Provide outreach to private owners.
	1.1.7	Property protection	1.1.7 - Encourage fuel reduction in utility right-of-ways and around critical infrastructure.	Ongoing	Utilities do this on an as needed basis.	Utilities will continue as needed.
	1.1.8	Other	Encourage insurance incentives for properties where fuel mitigation has been completed.	Delete	Not feasible on the county level.	
	1.1.9	Public education and awareness	Provide farmer, rancher, and homeowner education specific to wildland fire problems.	Delete	Same as project 1.1.2	
	1.1.10	Prevention	Implement ordinances restricting WUI acreage near communities.	Delete	Not feasible since there is no county building permit process	
	1.1.11	Prevention	Implement regulations requiring abandoned buildings to be removed.	Delete	Not feasible. County doesn't have the authority or enforcement capacity.	
	1.1.12	Property protection	1.1.12 - Perform weed control or mowing along county roads and encourage weed control or mowing along railroads and USFS roads.	Ongoing/Reworded	County weed department does this annually.	Encourage agencies to continue this practice.
	1.1.13	Public education and awareness	1.1.13 - Support alternative methods to burning when reducing fuel hazards, such as chipping and harvest.	Ongoing	Flathead Economic Development Council provides outreach on this topic.	Continue outreach on regular basis.

**TABLE 5.4-2  
FLATHEAD COUNTY MITIGATION STRATEGY – PROJECT STATUS AND RECONCILIATION**

Hazard	Old Number	Project Type	Mitigation Action/Project	Status	Progress Made	Planned Activities
Wildfire	1.2.1	Prevention	1.2.1 - Require new subdivisions to have adequate on-site water capacity and recharge for fire protection.	Completed	Districts require on new major (over 6 lots) subdivision.	
	1.2.2	Emergency services	1.2.2 - Support mutual aid agreements between rural and municipal fire districts.	Completed	Countywide mutual aid agreements are in place including county fire districts, USFS and DNRC.	
	1.2.3	Emergency services	1.2.3 - Annex subdivisions outside of existing rural fire districts into nearest district if possible.	Ongoing	Ashley Lake area currently in progress to annex into Marion Fire Dept.	Continue as appropriate.
	1.2.4	Emergency services	1.2.4 - Ensure convenient access to and within all subdivisions for the largest emergency service vehicles.	Ongoing	Included in subdivision planning review process.	Continue as part of subdivision review.
	1.2.5	Emergency services	1.2.5 - Encourage two or more subdivision access points in areas of high and extreme fire hazard.	Ongoing	Recommendation only in subdivision planning process.	Continue as part of subdivision review.
	1.2.6	Property protection	1.2.6 - Encourage defensible space and fuel treatments on new subdivisions.	Ongoing	Recommendation only in subdivision planning process.	Continue as part of subdivision review.
	1.2.7	Other	1.2.7 - Implement Community Wildfire Protection Plan.	Ongoing	CWPP updated in 2013.	Update as needed in the future. Implement recommended projects.
	1.2.8	Other	Coordinate fuel mitigation with federal and state land management agencies.	Delete	Included in several other projects (1.1.3, 1.1.12)	
	1.2.9	Property protection	1.2.9 - Encourage water supply systems in new and existing subdivisions.	Ongoing	Required in major subdivisions.	Encourage implementation in existing subdivisions.
	1.2.10	Other	Implement Statewide consistent fire risk assessment system.	Delete	Not feasible at the county level.	
	1.3.1	Public education and awareness	Promote fire-resistant building materials.	Delete	No building codes/department for enforcement. Public outreach on wildfire mitigation covers this.	
	1.3.2	Emergency services	Enforce emergency access regulations.	Delete	Not feasible except for new subdivisions. Requirements vary from fire district to fire district.	
	1.3.3	Property protection	1.3.3 - Encourage a structure sprinkler systems program.	Ongoing	Whitefish, CFalls, and Kalispell require in commercial buildings of a certain size.	Continue to encourage implementation of sprinklers in residential and commercial buildings.
	1.1.1	Property protection	1.3.4 - Support homeowner fuel reduction programs to get landowners to do fuel reduction on private properties.	Ongoing	Flathead Economic Development Council: Haskell Basin/Foys Lake	Continue outreach on regular basis.
	1.3.4	Public education and awareness	Promote real estate disclosures.	Delete	Covered by other public education/outreach projects.	



**TABLE 5.4-2  
FLATHEAD COUNTY MITIGATION STRATEGY – PROJECT STATUS AND RECONCILIATION**

Hazard	Old Number	Project Type	Mitigation Action/Project	Status	Progress Made	Planned Activities
Wildfire	1.3.5	Prevention	Restrict commercial development in unsafe, inaccessible, remote rural areas.	Delete	Not feasible. No building codes or building department. Under zoning regulations.	
	1.4.1	Emergency services	1.4.1 - Develop water storage capacity and identify water supply sites to enhance fire-fighting capability.	Complete	Water supply sites identified and in CAD	
	1.4.2	Emergency services	1.4.2 - Improve fire agency infrastructure (training facility, additional fire equipment storage, enhanced communications systems).	Ongoing	Enhanced communications, training, new halls, new fire apparatus	Continue to enhance communications. Continue to provide wildfire training opportunities. Encourage fire districts to pursue grants and other funding for new fire halls and fire apparatus.
	1.4.3	Other	Provide for shared database between fire suppression agencies on: road closures, water sources, fuel ratings, district boundaries, ignition hazards and railroads.	Delete	Not feasible. No database.	
	1.4.4	Emergency services	1.4.4 - Use enhanced 911 inventories to identify residences and critical infrastructure.	Completed	This has been completed.	
	1.4.5	Other	1.4.5 - Identify areas with high number of fire starts and inadequate suppression equipment.	Ongoing	Tracked by departments.	Continue to track fire starts. Continue to encourage volunteerism to ensure adequate personnel.
	1.4.6	Emergency services	1.4.6 - Install more year-round water draft sites (dry hydrants) in the rural fire districts.	New project for 2014	New project for 2014 mitigation strategy.	Identify funding opportunities for dry hydrants. Encourage fire district to pursue funding opportunities.
	N/A	Emergency services	1.5.1 - Subscribe to lightning detection and prediction program through Wildfire Management Information at BLM.	New project for 2014	New project for 2014 mitigation strategy.	Register with BLM for access to web based program Review NRCG morning weather brief which also provides the past 24 hour lightening detection.
Flooding	3.1.1	Property protection	Implement flood resistant landscape guidelines (berms, ponds, irrigation, etc.).	Delete	Not feasible. No statutory mechanism to adopt these types of guidelines, if they were to be regulatory. Could be handled in an education pamphlet for distribution.	
	3.1.2	Property protection	2.1.2 - New driveway/private road bridge and culvert guidelines.	Complete	Permit system in place in county.	
	3.1.3	Structural	2.1.3 - Evaluate bridges and culverts at risk from flooding and develop schedule and funding to replace or upgrade as necessary.	Ongoing	Almost all bridges have been updated to concrete. Evaluated for hydraulic conductivity so they're sized appropriately. Culvert cleaned twice a year if needed.	Upgrade culverts that have demonstrated they can't handle rapid snowmelt flows or have ice jam problems.
	3.1.4	Natural resource protection	2.1.4 - Implement stream bank restoration projects to improve floodplain.	Retain	Road Dept. does stream bank restoration as part of protecting road and bridge system.	Identify project. Obtain funding. Secure permits from FCD, USACE, and Planning.

**TABLE 5.4-2**  
**FLATHEAD COUNTY MITIGATION STRATEGY – PROJECT STATUS AND RECONCILIATION**

Hazard	Old Number	Project Type	Mitigation Action/Project	Status	Progress Made	Planned Activities
Flooding	3.1.5	Property protection	2.1.5 - Encourage installation of backflow valves.	Retain	Mechanism in place requiring backflow valves. Integrity of some systems installed has been questionable.	Consider inspection process to ensure code is being followed.
	3.1.6	Property protection	2.1.6 - Install storm drains in municipalities, as needed.	Retain	No progress to report.	Columbia Falls and Whitefish may wish to pursue this project in the future.
	3.1.7	Property protection	2.1.7 - Elevate roadways, as needed to reduce flood damage.	Ongoing	County does this when roads are upgraded/when they need it.	Consider project at Echo Lake causeway.
	3.1.8	Property protection	2.1.8 - Install water retention basins to improve safety from flooding.	Retain	No progress to report.	Identify projects (i.e. Lowes/Costco stormwater pond expansion). Obtain funding. Secure permits.
	3.1.9	Prevention	2.1.9 - Identify areas that could be turned into parks to mitigate reoccurring flood damage.	Retain/Reworded	No progress to report.	Work with landowners of property that have been repeatedly flooded and determine whether acquisition funds available.
	3.1.10	Prevention	Discourage (regulate/restrict) high density development within the 500-year floodplain.	Delete	Not feasible. Unlikely since current restrictions in the 100-year floodplain are unpopular.	
	3.1.11	Prevention	Discourage (regulate/restrict) high density development within the 100-year floodplain.	Complete	This is currently done. In unzoned areas, subdivision regulations still require all lots created to have a buildable area outside the 100-year floodplain, restricting the placement of new structures in the 100-year floodplain in unzoned areas. Floodplain regulations do not allow new residential structures in the 100-year floodplain at or below the base flood elevation. All new structures, and substantial improvements of existing structures, must have the lowest ground floor elevated two feet above the base flood elevation.	
	3.2.1	Other	Implement river warning systems.	Delete	Rely on stream gauges	
	3.2.2	Other	2.2.2 - Obtain real time automated river gauges.	Ongoing	Automated gauges are in place on the Stillwater, Whitefish, and Flathead rivers. They are tied into the NOAA prediction center. New gauge at Foy's Bend.	Perform ongoing maintenance on gauges and identify new locations, as needed.
	3.2.3	Other	Encourage additional Snotel sites.	Delete	Snotel sites are installed by federal agencies, as needed. Only one in Flathead. Crews are sent out to measure snow pack where there are no Snotel sites.	
	3.2.4	Other	2.2.4 - Mapping of burn areas to be provided to NWS.	Complete	Forest Service, Park Service is doing this for major fires.	
	3.3.1	Public education and awareness	2.3.1 - Promote flood insurance education, especially insurance agents and home/business owners living in floodplain.	Ongoing	This is accomplished by FC Planning and EMS. FEMA materials available to the public at Planning Dept.	Continue to promote NFIP.
	3.3.2	Prevention	2.3.2 - Adopt new FEMA maps and updates of existing floodplain studies as they become available.	Ongoing	Just adopted new flood insurance rate maps for Evergreen area. RiskMap project underway by DNRC.	Continue to adopt maps as they're completed.



**TABLE 5.4-2  
FLATHEAD COUNTY MITIGATION STRATEGY – PROJECT STATUS AND RECONCILIATION**

Hazard	Old Number	Project Type	Mitigation Action/Project	Status	Progress Made	Planned Activities
Flooding	3.3.3	Prevention	2.3.3 - Review and revise floodplain regulations as changes occur in the NFIP, Montana law, and/or local policy.	Ongoing/Reworded	Text amendments have been made to reflect changes to Montana law over the years.	Update regulations as needed.
	3.3.4	Prevention	Ensure that development in floodway or floodway fringe does not create a net increase in the floodplain area.	Delete	Not a project. Covered in regulations.	
	3.3.5	Prevention	Consider density guidelines in the floodplain regulations.	Delete	Floodplain regulations are not an appropriate place to regulate density.	
	3.3.6	Prevention	Discourage (regulate/restrict) development that displaces floodwaters within the 100-year floodplain	Delete	Delete. Same as project 2.1.11.	
Hazardous Material Incidents	5.1.2	Emergency services	3.1.2 - Ensure emergency service personnel have current training and equipment for response.	Ongoing	Kalispell Regional HazMat Team provides training to district.	Continue to provide training. Continue available local government resources for response.
	-	Emergency services	3.1.3 - Educate emergency service personnel on capabilities of privately owned response equipment and local government resources.	New project for 2014	New project for 2014 mitigation strategy.	Provide scenario training from various non-government agencies. Ensure county resource list is up to date. Publish contractor database on OES webpage.
	-	Public education and awareness	3.2.1 - Work with vulnerable populations along hazardous material routes to ensure they have a response plan.	New project for 2014	New project for 2014 mitigation strategy.	Survey vulnerable populations along hazmat routes to determine if they have response plan. If no response plan exists, encourage and assist in development of plans.
	-	Public education and awareness	3.2.2 - Create a brochure targeting people along haz-mat routes on commodities transported and response.	New project for 2014	New project for 2014 mitigation strategy.	Develop and make available brochures at fairs, presentations, on-line etc.
	-	Emergency services	3.3.1 - Promote businesses doing their Tier II reporting.	New project for 2014	New project for 2014 mitigation strategy.	Provide information to potential tier reporters on the requirements for tier reporting.
	-	Other	3.3.2 - Continue to support the Highway 93 Alternate	New project for 2014	New project for 2014 mitigation strategy.	Attend meetings, submit letters of support as requested to support HW93 Alternate.
Severe Winter Weather	2.1.2	Public education and awareness	4.1.2 - Encourage public to report trees at risk of impacting power lines.	Ongoing/Reword	Utility companies, city/county public works are currently doing this.	Promote reporting utilizing social media, webpage, fairs, and presentations.
	-	Public education and awareness	4.1.3 - Provide outreach on recognizing when danger zone has approached; i.e. snow load on roofs.	New project for 2014	New project for 2014 mitigation strategy.	Provide public information using the webpage, social media, news media at appropriate time of the year.

**TABLE 5.4-2  
FLATHEAD COUNTY MITIGATION STRATEGY – PROJECT STATUS AND RECONCILIATION**

Hazard	Old Number	Project Type	Mitigation Action/Project	Status	Progress Made	Planned Activities
Severe Winter Weather	2.1.3	Emergency services	More snowplows.	Delete. Comfortable with equipment and staffing levels.	Always updating plows on replacement schedule. Budgetary issue. Dept. is comfortable with where they're at.	
	2.1.5	Emergency services	Assist facilities with vulnerable populations and critical facilities heat and power sources.	Delete	These are private facilities. Nursing homes have backup power.	
Communicable Disease	-	Emergency services	5.1.1 - Develop a response plan on how to handle individuals determined to be diagnosed with a communicable disease while on-route through air travel.	New project for 2014	New project for 2014 mitigation strategy.	Discuss topic with planning partners and determine action items for plan development.
	-	Prevention	5.1.2 - Continue to provide public health surveillance, disease investigations, and mitigation strategies.	New project for 2014	New project for 2014 mitigation strategy.	Continue to perform these activities as part of day-to-day activities. Identify applicable mitigation strategies for next PDM Plan update.
	-	Public education and awareness	5.1.3 - Continue Public Health education on sanitation and prevention.	New project for 2014	New project for 2014 mitigation strategy.	Create and/or update outreach materials and make available on website.
	-	Public education and awareness	5.1.4 - Educate on the importance of employee cross training, record keeping and COOP plans to minimize the impact or epidemics.	New project for 2014	New project for 2014 mitigation strategy.	Discuss topic within department. Identify individuals for cross-training and training opportunities.
	-	Public education and awareness	5.1.5 - Continue Education and increase awareness with schools and daycares regarding the importance of and need for vaccination.	New project for 2014	New project for 2014 mitigation strategy.	Create outreach materials and make available to schools and daycares.
	-	Public education and awareness	5.1.6 - Continue collaboration with community partners in regards to mass casualty planning.	New project for 2014	New project for 2014 mitigation strategy.	Discuss topic with LEPC and/or other planning partners. Consider exercise to test response capabilities.
Transportation Accidents	-	Emergency services	6.1.1 - Identify problem intersections and recommend traffic control methods.	New project for 2014	New project for 2014 mitigation strategy.	Work with city public works departments, road & bridge and MDT to identify intersections.
	-	Prevention	6.1.2 - Examine unprotected railroad crossings and recommend if gates/signage are needed.	New project for 2014	New project for 2014 mitigation strategy.	Work with BNSF to identify unprotected crossings and recommend gates/signage as appropriate.
Severe Summer Weather	-	Property protection	7.1.1 - Develop and implement programs to keep trees from threatening lives, property, and public infrastructure during wind events	New project for 2014	New project for 2014 mitigation strategy.	Develop brochures and promote public education to the public on landscaping.



**TABLE 5.4-2  
FLATHEAD COUNTY MITIGATION STRATEGY – PROJECT STATUS AND RECONCILIATION**

Hazard	Old Number	Project Type	Mitigation Action/Project	Status	Progress Made	Planned Activities
Severe Summer Weather	-	Public education and awareness	7.2.1 - Promote NWS Severe Weather Awareness Week.	New project for 2014	New project for 2014 mitigation strategy.	Provide information to the public utilizing the website, social media and news media.
	-	Public education and awareness	7.2.2 - Provide outreach on the risks of lightning and other severe summer weather hazards.	New project for 2014	New project for 2014 mitigation strategy.	Develop and make available brochures; provide information to the public utilizing the website, social media, news media and preparedness fairs/presentations.
Earthquake	4.1.1	Property protection	8.1.1 - Conduct site evaluations of critical facilities.	Retain	No progress to report.	Encourage critical facilities to conduct evaluations. Provide information of earthquake risk.
	4.1.2	Property protection	8.1.2 - Install window film for shatter prevention in schools.	Retain	No progress to report.	Work with school districts to encourage to install film. Provide information of earthquake risk.
	4.1.3	Property protection	8.1.3 - Implement non-structural mitigation program for public schools, i.e., equipment/furniture straps.	Retain	No progress to report.	Encourage school districts to implement non-structural mitigations programs. Provide information on non-structural mitigation activities. Provide information of earthquake risk.
	4.1.4	Property protection	8.1.4 - Implement non-structural and structural retrofits of government buildings, particularly critical infrastructure.	Retain	No progress to report.	Encourage local governments to implement non-structural mitigations programs. Provide information on non-structural mitigation activities. Provide information of earthquake risk.
	4.1.5	Property protection	8.1.5 - Encourage residential and business retrofit programs.	Retain	No progress to report.	Make information available to the public utilizing the website, social media, news media, preparedness fairs/presentations
	4.1.6	Public education and awareness	Provide education and awareness on earthquake preparedness.	Delete	Same as 4.3.2	
	4.2.1	Prevention	8.2.1 - Encourage enforcement of current building codes.	Ongoing	No progress to report.	City building departments to continue compliance inspections.
	4.2.2	Other	Adopt model seismic building codes.	Delete	Not feasible for County since there is no building dept. Cities not interested in pursuing.	
	4.2.3	Other	8.2.3 - Perform mapping of earthquake risk zones and faults at a local government scale.	Complete		
	4.2.4	Prevention	Consider higher building standards for critical facilities and structures housing vulnerable populations.	Delete	Not feasible for County since there is no building dept. Cities not interested in pursuing this project.	
	4.3.1	Public education and awareness	8.3.1 - Require earthquake drills in schools in Flathead County.	Retain	Participation in Rocky Mountain Shakeout	Promote Rocky Mountain Shakeout. Provide information on earthquake risk.

**TABLE 5.4-2  
FLATHEAD COUNTY MITIGATION STRATEGY – PROJECT STATUS AND RECONCILIATION**

Hazard	Old Number	Project Type	Mitigation Action/Project	Status	Progress Made	Planned Activities
Earthquake	4.3.2	Public education and awareness	8.3.2 - Provide public education regarding earthquake awareness.	Reworded	Routinely provide information at preparedness fairs/presentations	Promote Rocky Mountain Shakeout. Provide information on earthquake risk.
	4.3.3	Public education and awareness	8.3.3 - Encourage workplace earthquake drills.	Ongoing	Participation in Rocky Mountain Shakeout	Promote Rocky Mountain Shakeout. Provide information on earthquake risk.
	4.3.4	Other	Expand earthquake-monitoring network.	Delete	This is being done by the Montana Bureau of Mines and Geology.	
	4.3.5	Public education and awareness	8.3.5 - Continue "Earthquake Preparedness Month" outreach activities during October.	Ongoing	Participation in Rocky Mountain Shakeout	Continue to promote participation in Rocky Mountain Shakeout. Utilize news media, social media, web page to promote Earthquake Preparedness Month.
	4.3.6	Public education and awareness	Presentations and distribution of earthquake awareness materials.	Delete	Same as 8.3.2	
	4.4.1	Property protection	8.4.1 - Retrofit bridges and overpasses for seismic stability.	Retain	MDT and County Road & Bridges are already doing	MDT and Road & Bridge will continue to conduct evaluations.
	4.4.2	Property protection	8.4.2 - Encourage retrofit public utility systems for seismic resistance.	Retain	No progress to report.	Provide information on earthquake risk and potential impacts.
	4.4.3	Property protection	8.4.3 - Encourage installation of public utility shut off and isolation valves.	Retain	No progress to report.	Provide information on earthquake risk and potential impacts.
	4.4.4	Other	8.4.4 - Encourage seismic evaluations of dams.	Retain	No progress to report.	Provide information on earthquake risk and potential impacts.
	4.4.5	Public education and awareness	Educate transportation and utility employees on seismic hazards.	Delete	Same as 8.3.2	
Landslide	-	Property protection	9.1.1 - Implement slope preservation/stabilization in slide-prone areas in the public domain.	New project for 2014	New project for 2014 mitigation strategy.	Identify slide prone areas. Determine preservation activities. Apply for grants to conduct activities.
	-	Property protection	9.1.2 - Encourage slope preservation/stabilization in slide-prone areas on private land.	New project for 2014	New project for 2014 mitigation strategy.	Encourage residents living in slide prone areas to conduct preservation/stabilization activities.
Drought	-	Other	10.1.1 - Monitor drought conditions	New project for 2014	New project for 2014 mitigation strategy.	Participate in Governor's Drought Committee meetings.
	-	Other	10.1.2 - Encourage water conservation by domestic, municipal and industrial users.	New project for 2014	New project for 2014 mitigation strategy.	Utilizing existing information provide information on water conservation using the website, social media, news media and preparedness fairs/presentations.
	-	Other	10.1.3 - Support drought programs implemented through the Conservation District, FSA and MSU extension.	New project for 2014	New project for 2014 mitigation strategy.	Coordinate with agencies sponsoring drought programs. Provide information to the public using the website, social media, news media and preparedness fairs/presentations.



**TABLE 5.4-2  
FLATHEAD COUNTY MITIGATION STRATEGY – PROJECT STATUS AND RECONCILIATION**

Hazard	Old Number	Project Type	Mitigation Action/Project	Status	Progress Made	Planned Activities
Drought	-	Other	10.1.4 - Support the development of Water Shortage Contingency Plans for communities and water systems.	New project for 2014	New project for 2014 mitigation strategy.	Encourage communities and water districts to develop contingency plans.
Terrorism, Violence, Civil Unrest	-	Emergency services	11.1.1 - Maintain situational awareness through coordination with DES, DOJ and DHS.	New project for 2014	New project for 2014 mitigation strategy.	Review MIPA and Emergency Services Briefs developed by the MATIC.
	-	Emergency services	11.1.2 - Continue to participate in exercises with Border Patrol and/or Civil Support Team.	New project for 2014	New project for 2014 mitigation strategy.	Ensure Border Patrol has an opportunity to participate in exercises. Include Border Patrol on planning team.
	-	Emergency services	11.1.3 - Educate the public and critical infrastructure on “See Something, Say Something” program.	New project for 2014	New project for 2014 mitigation strategy.	Utilize available campaign literature to provide information to the public utilizing the website, social media, news media and preparedness fairs/ presentations.
Dam Failure	6.1.1	Emergency services	Coordinate with Bureau of Reclamation as to emergency procedures.	Delete	Have EAP. Do exercises on regular basis.	
	3.4.1	Natural resource protection	Removal of high hazard, inadequate flood control structures.	Delete	Not appropriate as all high hazard dams are inspected and maintained regularly.	
	3.4.2	Structural	12.1.2 - Repair dams and levees, as needed.	Ongoing	Maintain 6 levees as needed.	Review Corps of Engineers reports on levees. Annually inspect levees for needed repairs and removal of vegetative debris. Coordinate with dam owners to ensure they are inspecting dams on a regular basis.
	3.4.3	Emergency services	12.1.3 - Implement dam failure alert systems.	Retain	EAPs in place, inspected regularly. No alert system. Daily monitor during peak flow.	Continue to update and review EAPs. Ensure EAPs have names and contact information for downstream residents/businesses.
	-	Emergency services	12.1.4 - Develop/maintain list of house occupants in inundation areas (evacuation list) to include in EAPs.	New project for 2014	New project for 2014 mitigation strategy.	Ensure EAPs have names and contact information for downstream residents/businesses.
	-	Prevention	12.2.1 - Consider using dam inundation as item of consideration in subdivision and critical infrastructure location reviews.	New project for 2014	New project for 2014 mitigation strategy.	Conduct meeting with OES, Planning Dept. and Commissioners to discuss. Upload dam inundation GIS layer to Planning Dept. website.
	-	Other	12.2.2 - Determine when dams need reclassification.	New project for 2014	New project for 2014 mitigation strategy.	Coordination with dam owners regarding reclassification needs.

**TABLE 5.4-2  
FLATHEAD COUNTY MITIGATION STRATEGY – PROJECT STATUS AND RECONCILIATION**

Hazard	Old Number	Project Type	Mitigation Action/Project	Status	Progress Made	Planned Activities
Volcanic Ash	-	Public education and awareness	13.1.1 - Develop brochure related to volcanic ash fall.	New project for 2014	New project for 2014 mitigation strategy.	Research impacts of volcanic ash fall. Develop brochure. Provide information to the public utilizing the website, social media, news media and preparedness fairs/presentations.
	-	Public education and awareness	13.1.2 - Support the development of a volcanic ash contingency plan for surface water treatment and waste water systems.	New project for 2014	New project for 2014 mitigation strategy.	Support DEQ Public Water Supply personnel in support of contingency plan development.
All Hazard	2.1.1	Emergency services	14.1.1 - Utilize 911 mapping.	Delete	Not sure intent of this project.	
	2.1.4	Public education and awareness	14.1.2 - Public education addressing emergency preparedness.	Ongoing	Radio, health fair, birds, Facebook, twitter.	Continue providing information utilizing social media, fairs, agency presentations.
	-	Public education and awareness	14.1.3 - Utilize social media as outreach for hazard mitigation.	New project for 2014	New project for 2014 mitigation strategy.	Develop and post hazard mitigation outreach messages.
	3.2.5	Public education and awareness	14.1.4 - Continue and promote additional use of NOAA Weather Radios/Storm Ready Program.	Retain/Ongoing	Part of public education done by OES.	Continue to promote Storm Ready and NOAA Weather Radios.
	2.1.6	Public education and awareness	14.2.1 - Promote development of disaster supply kits.	Retain	Brochures available from FEMA and Red Cross distributed at fairs.	Continue to provide brochures at fairs, presentations, etc.
	-	Emergency services	14.2.2 - Confirm capabilities of shelters with Red Cross	New project for 2014	New project for 2014 mitigation strategy.	Coordinate with Red Cross and Health Department on capabilities of shelters.
	5.1.1	Other	14.2.3 - Maintain and update GIS mapping of critical infrastructure.	Retain	No progress to report.	Continue to identify and update GIS mapping of critical infrastructure.
	6.1.2	Other	Maintain and update GIS mapping of critical infrastructure.	Delete	Same as 5.1.1	
	6.1.3	Emergency services	Develop and maintain early warning systems.	Complete	Systems in place. Reverse 911, EAS	
	-	Emergency services	14.2.4 - Understand the impact of interruption of commodity transport (propane, natural gas).	New project for 2014	New project for 2014 mitigation strategy.	Add topic to LEPC agenda. Open discussion on broader scale.
	-	Emergency services	14.2.5 - Promote continuity of operations planning.	New project for 2014	New project for 2014 mitigation strategy.	Encourage businesses/local government/NPO's to develop and exercise COOP plans. Provide information/templates to businesses/local government/NPOs.
	-	Emergency services	14.2.6 - Support critical infrastructure in conducting vulnerability assessments and developing emergency response plans.	New project for 2014	New project for 2014 mitigation strategy.	Encourage critical infrastructure owners to conduct vulnerability assessments and develop plans.
	-	Emergency services	14.3.1 - Obtain generators for critical facilities and schools.	New project for 2014	New project for 2014 mitigation strategy.	Provide grant information to critical facilities and schools.



**TABLE 5.4-2**  
**FLATHEAD COUNTY MITIGATION STRATEGY – PROJECT STATUS AND RECONCILIATION**

Hazard	Old Number	Project Type	Mitigation Action/Project	Status	Progress Made	Planned Activities
All Hazard	-	Emergency services	14.3.2 - Implement reverse 911 technology that includes cell phones.	New project for 2014	New project for 2014 mitigation strategy.	Research Emergency Notification Systems. Identify an appropriate system Secure ongoing funding.

## 5.5 FUNDING OPPORTUNITIES

Although a number of the mitigation projects listed in *Section 5.1* may not be eligible for FEMA funding, Flathead County may secure alternate funding sources to implement these projects in the future including federal and state grant programs, and funds made available through the County. Alternate funding sources may include the following:

***U.S. Department of Housing and Urban Development, Community Development Block Grants (CDBG).***

The CDBG program is a flexible program that provides communities with resources to address a wide range of unique community development needs. CDBG money can be used to match FEMA grant money. More Information:

<http://www.hud.gov/offices/cpd/communitydevelopment/programs/>

***U.S. Fish & Wildlife Service, Rural Fire Assistance Grants.*** Each year, the U.S. Fish & Wildlife Service (FWS) provides Rural Fire Assistance (RFA) grants to neighboring community fire departments to enhance local wildfire protection, purchase equipment, and train volunteer firefighters. Service fire staff also assist directly with community projects. These efforts reduce the risk to human life and better permit FWS firefighters to interact and work with community fire organizations when fighting wildfires. The Department of the Interior (DOI) receives an appropriated budget each year for an RFA grant program. The maximum award per grant is \$20,000. The [DOI assistance program](#) targets rural and volunteer fire departments that routinely help fight fire on or near DOI lands.

[http://www.fws.gov/fire/living\\_with\\_fire/rural\\_fire\\_assistance.shtml](http://www.fws.gov/fire/living_with_fire/rural_fire_assistance.shtml)

***U.S. Department of Homeland Security.*** Enhances the ability of states, local and tribal jurisdictions, and other regional authorities in the preparation, prevention, and response to terrorist attacks and other disasters, by distributing grant funds. Localities can use grants for planning, equipment, training and exercise needs. These grants include, but are not limited to areas of Critical Infrastructure Protection Equipment and Training for First Responders, and Homeland Security Grants. More information:

<http://www.dhs.gov/>

***FEMA, Hazard Mitigation Grant Program (HMGP).*** The HMGP provides grants to States, Indian Tribes, local governments, and private non-profit organizations to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

More information: <http://www.fema.gov/government/grant/hmgrp/>



**FEMA, Pre-Disaster Mitigation Competitive (PDMC) Grant Program.** The PDM program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDMC grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.

More information: <http://www.fema.gov/government/grant/pdm/index.shtm>

**U.S. Bureau of Land Management (BLM), Community Assistance Program.** BLM provides funds to communities through assistance agreements to complete mitigation projects, education and planning within the WUI. For information:

[http://www.blm.gov/nifc/st/en/prog/fire/community\\_assistance.html](http://www.blm.gov/nifc/st/en/prog/fire/community_assistance.html)

**Fire Management Assistance Program** is authorized under Section 420 of the Stafford Act. It allows for the mitigation, management, and control of fires burning on publicly or privately owned forest or grasslands that threaten destruction that would constitute a major disaster.

More information: <http://www.fema.gov/government/grant/fmagp/index.shtm>

**U.S. Department of Agriculture, Community Facilities Loans and Grants.** 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 information: [http://www.rurdev.usda.gov/HCF\\_CF.html](http://www.rurdev.usda.gov/HCF_CF.html); or local Rural Development office.

**General Services Administration, Sale of Federal Surplus Personal Property.** 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 are no restrictions on the property purchased. More information: <http://www.gsa.gov/portal/category/21045>

**FEMA, Readiness, Response and Recovery Directorate, Fire Management Assistance Grant Program.** Program provides grants to states, tribal governments and local governments for the mitigation, management and control of any fire burning on publicly (non-federal) 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 information: <http://www.fema.gov/government/grant/fmagp/index.shtm>

**Hazardous Materials Emergency Preparedness Grants.** Grant funds will be passed through to local emergency management offices and HazMat teams having functional and active LEPC groups. More information: <http://www.phmsa.dot.gov/hazmat/grants>

**Renewable Resource Grant Program.** Administered by the Montana Department of Natural Resources and Conservation, the Resource Grant and Loan Program provides both grant and loan funding for public facility and other renewable resource projects. Projects that conserve, manage, develop or protect Montana's renewable resources are eligible for funding. Numerous public facility projects including drinking water, wastewater and solid waste development and improvement projects have received funding through this program. Other renewable resource projects that have been funded include irrigation rehabilitation, dam repair, soil and water conservation and forest enhancement. More information: <http://dnrc.mt.gov/cardd/LoansGrants/default.asp>

**Flathead Economic Policy Center's (FEPC) Northwest Montana Hazardous Fuels Program** has received cost-share grants to help Flathead County residents reduce the wildfire hazards on their property. For further information:

Flathead Economic Policy Center  
919 Elk Park Road  
Columbia Falls, MT 59912  
Phone: 406-892-8155 FAX: 406-892-8161  
[flathead001@centurytel.net](mailto:flathead001@centurytel.net)



## **6.0 CAPABILITY ASSESSMENT**

Flathead County's capabilities to implement mitigation projects include community planners, engineers, floodplain managers, GIS personnel, emergency managers, and financial, legal and regulatory requirements (zoning, building codes, subdivision regulations, and floodplain management ordinances). These resources have the responsibility to provide overview of past, current, and ongoing pre- and post-disaster mitigation planning projects including capital improvement programs, wildfire mitigation programs, stormwater management programs, and NFIP compliance projects. The goals and objectives used to mitigate natural and technological hazards builds on the community's existing capabilities.

### **6.1 FLATHEAD COUNTY OFFICE OF EMERGENCY SERVICES**

The mission statement of the Flathead County Office of Emergency Services is to save lives, prevent injury, and protect property and the environment by taking reasonable and affordable measures to mitigate, prepare for, respond to and recover from disasters.

The Emergency Management Division of Flathead County OES is responsible for the planning, coordination, and implementation of all emergency management and Homeland Security related activities for Flathead County. Other responsibilities include coordination of activities for the County's Emergency Operations Center (EOC). The EOC, when activated, is a central location where representatives of local government and private sector agencies convene during disaster situations to make decisions, set priorities and coordinate resources for response and recovery. In addition, this Division coordinates the Northwest Montana Type III Incident Management Team which is available locally and within the region to assist local governments with management of all hazard type III incidents. These efforts are designed to enhance the capacity of the local government to plan for, respond to, and mitigate the consequences of threats and disasters using an all-hazard framework.

The Emergency Management Division of Flathead County OES staff includes one full time person who devotes 100 percent of their time to emergency management. The position is federally funded through the Emergency Management Performance Grant program.

### **6.2 LOCAL EMERGENCY PLANNING COMMITTEE**

The mission of the Flathead County Local Emergency Planning Committee (LEPC) is to provide resources and guidance to the community through education, coordination and assistance in hazmat planning; and to assure public health and safety. They do not function in actual emergency situations, but attempt to identify and catalogue potential hazards, identify available resources, and mitigate hazards when feasible. The LEPC consists of representatives from businesses, local government, emergency responders and citizen groups located in Flathead County. Monthly meetings are held at the Flathead County Emergency Services facility in Kalispell.

### **6.3 FLATHEAD COUNTY FIRE SERVICE AREA**

The mission statement of the Flathead County Fire Service Area is to save lives, prevent injury, and protect property and the environment by taking reasonable and affordable measures to mitigate, prepare for, respond to and recover from disasters.

The Flathead County Fire Service Area is responsible for providing structure fire protection in rural areas of Flathead County that do not fall into a designated fire district. This service is provided by contracting with the closest existing fire districts. The Fire Service Area Board was established on May 1, 2007 and is composed of members, appointed by the Board of County Commissioners, as follows:

- One resident from the North Fork Fire Service area,
- One resident from the Middle Fork Fire Service area,
- One resident from the Fire Service Area west of Kalispell,
- One resident of Flathead County at large, and
- One resident of Flathead County active in a current firefighting role

Flathead County also has 20 fire departments and two EMS agencies; 16 of the 19 departments offer EMS services.

### **6.4 FLATHEAD COUNTY 911**

The Flathead 911 Emergency Communications Center in Kalispell, Montana receives emergency 9-1-1 calls and non-emergency calls in Flathead County from the cities of Columbia Falls, Kalispell and Whitefish as well as the townships of Bigfork, Columbia Heights, Coram, Creston, Essex, Evergreen, Ferndale, Hungry Horse, Kila, Lakeside, Marion, Martin City, Olney, Polebridge, Polson, Somers, West Glacier and unincorporated areas in Flathead County in Northwest Montana.

Flathead 911 dispatchers obtain state certification in law enforcement telecommunications and emergency medical dispatching. Flathead 911 dispatches for dozens of public safety agencies including city and rural fire departments, ambulance crews, law enforcement, forest service law enforcement, animal control and the local OES.

### **6.5 KALISPELL REGIONAL HAZARDOUS MATERIALS TEAM**

The Kalispell Regional Hazardous Materials Team provides support to jurisdictions in Northwest Montana 24 hours per day, seven days a week. Assistance can range from a phone consultation, over the phone research, a component of the team being dispatched, or an entire team being dispatched.



The team consists of hazardous materials emergency response personnel with specialized equipment specific to hazardous materials response. The team is intended to respond to the most acute and critical hazardous emergencies. The primary objective is to protect human life, the environment, and property during the early stages of an emergency.

When activated, the team will operate under the direction of the team leader and within ICS. Once Incident Command has been established, the team will work under the direct supervision of a Division, Group or Branch Director. Use of the team does not release the local response agencies from their duty to provide normal response functions.

## **6.6 NORTHWEST MONTANA TYPE 3 INCIDENT MANAGEMENT TEAM**

Through the resolution process, the Flathead County Commissioners tasked the Office of Emergency Services to develop an interagency incident management team, in partnership with the Montana State University Fire Training School, Department of Homeland Security and emergency response organizations from throughout Flathead County, which will meet the recommendations and guidelines established by the Department of Homeland Security and the National Incident Management System. The team consists of county and city officials – fire, law, emergency medical services (EMS), public health, public works, state and federal responders.

The Northwest Montana Type 3 Incident Management Team is an all-risk management team, formed as a county asset, to respond to major incidents and natural disasters – wildland fires, flooding, severe storms, and hazardous materials as well as large planned events. Team members are chosen from the most qualified and experienced personnel county-wide. The team’s strength comes from the diversity and commitment of its members.

An incident management team is a highly trained, experienced and credentialed group of people that come together to provide logistical, planning, financial and operational support. The team will support the incident commander, not assume or divide command authority unless requested to do so by a written delegation of authority from the chief elected official of the affected jurisdiction. All or part of the team may be activated when an incident or planned event exceeds normal response.

## **6.7 FLATHEAD ECONOMIC POLICY CENTER**

The Flathead Economic Policy Center’s (FEPC) Northwest Montana Hazardous Fuels Program has received cost-share grants to help Flathead County residents reduce the wildfire hazards on their property. FEPC began its hazardous fuels reduction efforts in 2005, receiving a grant from the DNRC to address the private lands eastward from Hungry Horse to the Glacier County line. That project was completed in 2006. FEPC took over administration of a four-county (Flathead, Lake, Lincoln, and

Sanders) fuels reduction program after the Northwest Regional Resource Conservation and Development organization ceased operations in 2011. Since then, FEPC has applied for and received an additional three grants for cost-share funds to landowners in Flathead County.



## **7.0 PLAN MAINTENANCE PROCEDURES**

The plan maintenance section of this document details the formal process that will ensure that the Flathead County PDM Plan remains an active and relevant document. The maintenance process includes a schedule for monitoring and evaluating the plan and producing a plan revision every five years. The plan can be revised more frequently than five years if the conditions under which it was developed change significantly (e.g. a major disaster occurs and projects are accomplished and/or new projects need to be identified, or funding availability changes). This section also describes how the County will monitor the progress of mitigation activities and be incorporated into existing planning mechanisms. The final section describes how the County will integrate public participation throughout the plan maintenance process.

### **7.1 MONITORING, EVALUATING AND UPDATING THE PLAN**

#### **7.1.1 2009 PDM Plan**

The 2009 PDM Plan was reviewed, as needed, since adoption. Mitigation projects were completed during this period as shown in **Table 5.4-2** and in *Section 7.2.1* below.

#### **7.1.2 2014 PDM Plan**

The PDM Plan should be reviewed annually at meetings of the LEPC. These reviews may be more or less frequent, as deemed necessary by the Deputy Director of the Flathead County Office of Emergency Services, but there will be a minimum of one review per year. The review should determine whether a plan update is needed prior to the required five-year update. The plan review should consider any new hazards and vulnerabilities as well as document completed mitigation projects, identify new mitigation projects and evaluate mitigation priorities.

The Deputy Director will be responsible for ensuring the PDM Plan review is on the agenda at the LEPC meetings so that applicability of the plan can be evaluated. The Deputy Director should prepare a status report summarizing the outcome of the plan review and the minutes should be made available to interested stakeholders and kept in a permanent file designated for the next (2019) PDM Plan update.

Three years after adoption of the PDM Plan, the Deputy Director may decide to apply for a planning grant through FEMA to start the 2019 PDM Plan update. An alternative would be to request funding through the County's appropriation process. Upon receipt of funding, the County will solicit bids in accordance with applicable contracting procedures and hire a contractor to assist with the project. The proposed schedule for completion of the plan update is one year from award of a contract, to coincide with the five-year adoption date of the 2014 PDM Plan Update.

The Deputy Director will be responsible for the plan update. Before the end of the five-year period, the updated plan will be submitted to FEMA for approval. When concurrence is received that the updated plan complies with FEMA requirements, it will be submitted to the Board of County Commissioners and City Councils for adoption. The Deputy Director will send an e-mail to individuals and organizations on the stakeholder list to inform them that the updated plan is available on the County website.

## **7.2 MONITORING PROGRESS OF MITIGATION ACTIVITIES**

### **7.2.1 2009 PDM Plan**

Since development of the 2009 PDM Plan, several mitigation projects were completed in Flathead County while a number of other projects are on-going and will continue through the next planning period. Completed projects include the following:

- WILDFIRE: Require new subdivisions to have adequate on-site water capacity and recharge for fire protection.
- WILDFIRE: Support mutual aid agreements between rural and municipal fire districts.
- WILDFIRE: Develop water storage capacity and identify water supply sites to enhance fire-fighting capability.
- FLOODING: New driveway/private road bridge and culvert guidelines.
- FLOODING: Discourage (regulate/restrict) high density development within the 100-year floodplain.
- FLOODING: Mapping of burn areas to be provided to NWS.
- EARTHQUAKE: Perform mapping of earthquake risk zones and faults at a local government scale.
- ALL HAZARDS: Develop and maintain early warning systems.
- ALL HAZARDS: Use enhanced 911 inventories to identify residences and critical infrastructure.

The Deputy Director has monitored completion of most of these activities; however, the 2009 PDM Plan did not outline a specific process to track the initiation, status, and completion of mitigation activities. In addition to completed projects from the 2009 PDM Plan, the Flathead County Emergency Operations Plan was updated in 2011 and hazard-specific annexes were reviewed and revised.

The Flathead Economic Policy Center is currently administering several landowner cost-share wildfire mitigation projects, as summarized below.

#### Agreement WSF-11(FEPC)-003 (WIN-WIN)

Funding source: National Fire Plan State Fire Assistance (USDA Forest Service and Montana DNRC)

Planned completion date: 12/31/14

Area: WUI area northwest, west, and southwest of Whitefish.



Amount available for cost-share payments: \$173,525  
Total number of acres treated to date: 252.4  
Additional acres under contract, but not yet completed: 57.9  
Cost per acre: \$1,236.71  
Cost-share – 50/50 (Average landowner reimbursement per acre: \$618.36)

Agreement SPF-11(FEPC)-003 (Haskill Basin)

Funding source: Western Competitive Resource Allocation (USDA Forest Service and Montana DNRC)  
Planned completion date: 12/31/14  
Area: Haskill Basin Watershed and north of Whitefish along Highway 93 to Lincoln County  
Amount available for cost-share payments: \$157,044  
Total number of acres treated to date: 289.8  
Average cost per acre: \$960.96  
Cost-share – 50/50 (Average landowner reimbursement per acre: \$480.48)

Agreement HZF-12-001 (North Fork 1)

Funding source: National Fire Plan, consistent with Cooperative Forestry Assistance Act (Montana DNRC)  
Planned completion date: 09/30/15  
Area: Non-federal lands adjacent to federal lands scheduled for hazardous fuel reduction activities which include the use of fire in the populated corridor on the west side of the North Fork Flathead River from Coal Creek to the Canadian border.  
Amount available for cost-share payments: \$72,000  
Total number of acres treated to date: 88.5  
Average cost per acre: \$1,170.41  
Cost-share – 75/25 (Landowner reimbursement per acre: \$877.81)

Agreement WSF-13-005 (Flathead West)

Funding source: National Fire Plan State Fire Assistance (USDA Forest Service and Montana DNRC)  
Planned completion date: 12/31/14  
Area: Western Flathead County  
Amount available for cost-share payments: \$202,500  
Total number of acres treated to date: 348.35  
Average cost per acre: \$636.06  
Cost-share – 50/50 (Landowner reimbursement per acre: \$318.03)

Agreement WSF-14(FEPC)-002 (BMP)

Funding source: National Fire Plan Western WUI Grant Program (USDA Forest Service and Montana DNRC)

Planned completion date: 12/31/15

Area: Non-federal lands from Big Mountain (Whitefish) to Marias Pass

Amount available for cost-share payments: \$202,500

Total number of acres treated to date: 106.8

Average cost per acre: \$322.71

Cost-share – 50/50 (Landowner reimbursement per acre: \$161.35)

Agreement HZF-14-001 (North Fork 2)

Funding source: Hazardous Fuels Reduction Grant Program (USDA Forest Service and Montana DNRC)

Planned completion date: 12/31/15

Area: Non-federal lands adjacent to federal fuels mitigation projects which include use of fire in the populated corridor on the west side of the North Fork Flathead River from the Hungry Horse area to the Canadian border.

Amount available for cost-share payments: \$70,298

Target number of acres: 75

Average cost per acre: unknown at this time

Cost-share – 75% grant funds; 25 % landowner share

### **7.2.2 2014 PDM Plan**

The process for monitoring and evaluating mitigation projects will be the responsibility of the PDM Planning Team. The Planning Team is comprised of individuals from county and city departments, emergency response entities and local business. This group will be responsible for implementing mitigation projects on behalf of their jurisdictions and annual meetings will provide a venue for reporting and accountability. Minutes should be prepared from these meetings and should be distributed to interested stakeholders as well as kept in a permanent file for the next PDM Plan update (2019). Agencies and organizations “assigned” responsibility for various aspects of the mitigation strategy will have the opportunity to coordinate with the Planning Team members on challenges, success and opportunities.

Individual projects will be monitored by the department implementing the project or the grant. Generally, HMGP and PDMC projects will be monitored by the Deputy Director and any National Fire Plan projects or Community Assessment Agreements will be monitored by the U.S. Forest Service and/or DNRC. Each organization will track projects through a central database and issue quarterly reports to federal agencies.

## **7.3 IMPLEMENTATION THROUGH EXISTING PROGRAMS**

Flathead County will have the opportunity to implement hazard mitigation projects through existing programs and procedures through plan revisions or amendments. The PDM Plan will be incorporated



into the plans, regulations and ordinances as they are updated in the future or when new plans are developed. **Table 7.3-1** presents a summary of existing plans and ordinances and how integration of mitigation projects will occur.

TABLE 7.3-1 IMPLEMENTATION OF MITIGATION INTO EXISTING PLANS AND CODES		
Type	Name	Integration Technique
<b>Plans</b>		
Emergency Operations	Flathead County Emergency Operations Plan, 2011	Integrated by reference in PDM Plan.
	Emergency Action Plan, Bigfork Dam	Dam failure mitigation projects should be integrated in EAPs when these documents are revised.
	Emergency Action Plan, Cedar Creek Dam	
	Emergency Action Plan, Hubbard Dam	
	Emergency Action Plan, Hungry Horse Dam	
	Emergency Action Plan, Jessup Mill Pond Dam	
	Emergency Action Plan, Smith Lake Dam	
	Emergency Action Plan, Bigfork Dam	
Growth Policies	Flathead County Growth Policy, 2013	Integration of mitigation strategies will occur when growth policies are revised.
	City of Columbia Falls Growth Policy, 2013	
	City of Kalispell Growth Policy, 2003	
	City of Whitefish Growth Policy, 2007	
Neighborhood Plans	Ashley Lake Neighborhood Plan, 2011	Integration of mitigation strategies will occur when neighborhood plans are revised.
	Bigfork Neighborhood Plan, 2009	
	Helena Flats Neighborhood Plan, 2008	
	Labrant-Lindsey Neighborhood Plan, 1998	
	Lakeside Neighborhood Plan, 2010	
	Little Bitterroot Neighborhood Plan, 1996	
	North Fork Neighborhood Plan, 2008	
	Riverdale Neighborhood Plan, 2008	
Neighborhood Plans	Rogers Lake Plan, 2008	Integration of mitigation strategies will occur when neighborhood plans are revised.
	The Canyon Plan, 1994	
	Two Rivers Plan, 2012	
	West Valley Neighborhood Plan, 1997	
	The Canyon Land Use Regulations, 1994	
Wildfire Mitigation	Flathead County Community Wildfire Protection Plan, 2011	Wildfire mitigation projects will be incorporated when plans are revised.
<b>Codes, Regulations &amp; Ordinances</b>		
Zoning	Flathead County Zoning Ordinance	Mitigation projects will be incorporated into revisions of zoning ordinances.
	City of Columbia Falls Zoning Ordinance	
	City of Kalispell Zoning Ordinance	
	City of Whitefish Zoning Ordinance	
	The Canyon Land Use Regulations, 1994	
Lakeshore	Flathead County Lake and Lakeshore Regulations, 2002	Mitigation projects will be incorporated into revisions of lakeshore regulations.
	City of Whitefish Lake and Lakeshore Regulations	
Building Codes	City of Columbia Falls Building Codes	Mitigation projects will be incorporated into building code revisions.
	City of Kalispell Zoning Building Codes	
	City of Whitefish Zoning Building Codes	

TABLE 7.3-1 IMPLEMENTATION OF MITIGATION INTO EXISTING PLANS AND CODES		
Type	Name	Integration Technique
Subdivisions	Flathead County Subdivision Regulations	Mitigation projects will be incorporated into revisions of subdivision regulations.
	City of Columbia Falls Subdivision Regulations	
	City of Kalispell Zoning Subdivision Regulations	
	City of Whitefish Zoning Subdivision Regulations	
Floodplain	Flathead County Floodplain and Floodway Management Regulations	Flood mitigation projects will be incorporated into revisions of floodplain regulations.
	City of Columbia Falls Floodplain Regulations	
	City of Kalispell Zoning Floodplain Regulations	
	City of Whitefish Zoning Floodplain Regulations	

A summary of how the PDM Plan can be integrated into the legal framework is presented below.

- Partner with other organizations and agencies with similar goals to promote building codes that are more disaster resistant on the State level.
- Develop incentives for local governments, citizens, and businesses to pursue hazard mitigation projects.
- Allocate County resources and assistance for mitigation projects.
- Partner with other organizations and agencies in northwestern Montana to support hazard mitigation activities.

Flathead County and the cities of Columbia Falls, Kalispell, and Whitefish use Growth Policies to guide development. Typically, a Growth Policy will address hazards; specifically, that life and property be protected from natural disasters and man-caused hazards. Mitigation goals in the PDM Plan will be recommended for incorporation into future revisions of these growth policies to ensure that high-hazard areas are being considered for low risk uses.

To ensure that the requirements of the PDM Plan are incorporated into other planning mechanisms and remain an on-going concern in Flathead County, job descriptions of various staff will be enhanced to include a mitigation component. The job descriptions of County and City Planners will be augmented to include involvement in the LEPC. Participation in these groups will provide an awareness of new and on-going mitigation initiatives for the purpose that they be integrated into plans, codes and regulations during revision. The job description of the County GIS Coordinator will include responsibilities for management and update of the spatial data compiled for the hazard analysis including coordinates of critical facilities and digital floodplain, inundation, and wildfire layers so this data can be integrated into other planning efforts. The job description of the Deputy Director will include responsibilities for implementing outreach activities for risk reduction in the County, coordinating with the Board of County Commissioners to secure funding for mitigation projects, ensure mitigation projects are implemented, and updating the PDM Plan. The Deputy Director will also be responsible for maintaining a permanent



master file for the PDM planning process, which will include damage figures from hazard events, records of mitigation projects, and notes/minutes from relevant meetings.

Meetings of the Board of County Commissioners will provide an opportunity for the Deputy Director to report back on the progress made on the integration of mitigation planning elements into County planning documents and procedures.

#### **7.4 CONTINUED PUBLIC INVOLVEMENT**

Flathead County is dedicated to involving the public directly in review and updates of the PDM Plan. The public will have many opportunities to provide feedback about the plan. Hard copies of the plan will be kept at appropriate county offices. An electronic copy of the plan will be available on the County website. The existence and location of plan hard copies will be publicized on the county website and Facebook page. *Section 2.0* includes the address and the phone number of the Deputy Director who will be responsible for keeping track of public comments on the plan.

The public will be invited to meetings of the LEPC when the PDM Plan is discussed. The meetings will provide the public a forum for which they can express concerns, opinions, or ideas about the plan. The Deputy Director will be responsible for using County resources to publicize the public meetings and maintain public involvement through the newspapers, radio and Internet.

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