FLATHEAD COUNTY MONTANA
PRE-DISASTER MITIGATION PLAN

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

FLATHEAD COUNTY MONTANA
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1.0 INTRODUCTION

Natural and man-made hazards are reoccurring factors that affect the safety and economic conditions of Flathead County residents. Historically, natural hazards including floods, high winds, severe summer storms, winter storms, wildfires, drought, and hazardous material spills have affected Flathead County. While most hazards cannot be eliminated, the effects from them can be anticipated and mitigated. Flathead County, working in conjunction with Montana DES, Hydrometrics, Inc. and Arrowhead Engineering, Inc. have prepared this Pre-Disaster Mitigation (PDM) Plan (the Plan) to help guide future hazard mitigation activities. The Flathead County Pre-Disaster Mitigation Plan profiles significant hazards to the community and identifies mitigation projects that can reduce their impacts. The purpose of the Plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from natural and man caused hazards. The Flathead County Pre-Disaster Mitigation Plan includes resources and information to assist county residents, organizations, local government, and others interested in participating in planning for natural and man caused hazards. The mitigation plan provides a list of mitigation objectives and projects that will assist Flathead County in reducing risk and preventing loss from future hazard events.

1.1 AUTHORITY

The Disaster Mitigation Act (DMA) of 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by adding a new section, 322 - Mitigation Planning. It requires all local governments to have an approved Pre-Disaster Mitigation Plan in place by November 1, 2003 to be eligible to receive Hazard Mitigation Grant Program project funding.

Flathead County and the incorporated Cities of Kalispell, Columbia Falls and Whitefish have adopted this Pre-Disaster Mitigation Plan. These governing bodies have the authority to promote sound public policy regarding natural and man-made hazards. Copies of the signed Resolutions from these jurisdictions are included as Appendix A to this plan. The Plan was adopted at the regularly scheduled meetings of the Kalispell, Columbia Falls and Whitefish city councils, and at a meeting of the Flathead County commissioners, all of which were open to the public and advertised through the typical process for publicizing public meetings.

The Flathead County Office of Emergency Services (OES) will be responsible for submitting the adopted Plan to the State Hazard Mitigation Office in Helena, Montana. The State Hazard Mitigation Officer will then submit the Plan to the Federal Emergency Management Agency (FEMA) for review. This review will address the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, Flathead County and the other plan signatories will gain eligibility for local mitigation project grants and post-disaster hazard mitigation grant projects (HMGP).

1.2 ACKNOWLEDGEMENTS

Many groups and individuals have contributed to development of the Flathead County Pre-Disaster Mitigation Plan. The local Office of Emergency Services (OES), Local Emergency Planning Committee (LEPC), and the Montana State Hazard Mitigation Officer provided significant guidance and support to development of the plan. Elected officials, city and county personnel, personnel from several of the rural volunteer fire departments, the Fire Mitigation Committee from the North Fork Improvement Association and local community members participated in the planning process and contributed significantly to the Plan's development. The Flathead County Fire and Emergency Services also provided important input through their independent development of a Wildfire Community Protection Plan (Flathead County, 2004).

1.3 PROJECT AREA LOCATION

Flathead County is located in northwest Montana, and has an area of 5,098 square miles. Flathead County is bounded by Glacier, Pondera and Teton Counties on the east, Lincoln

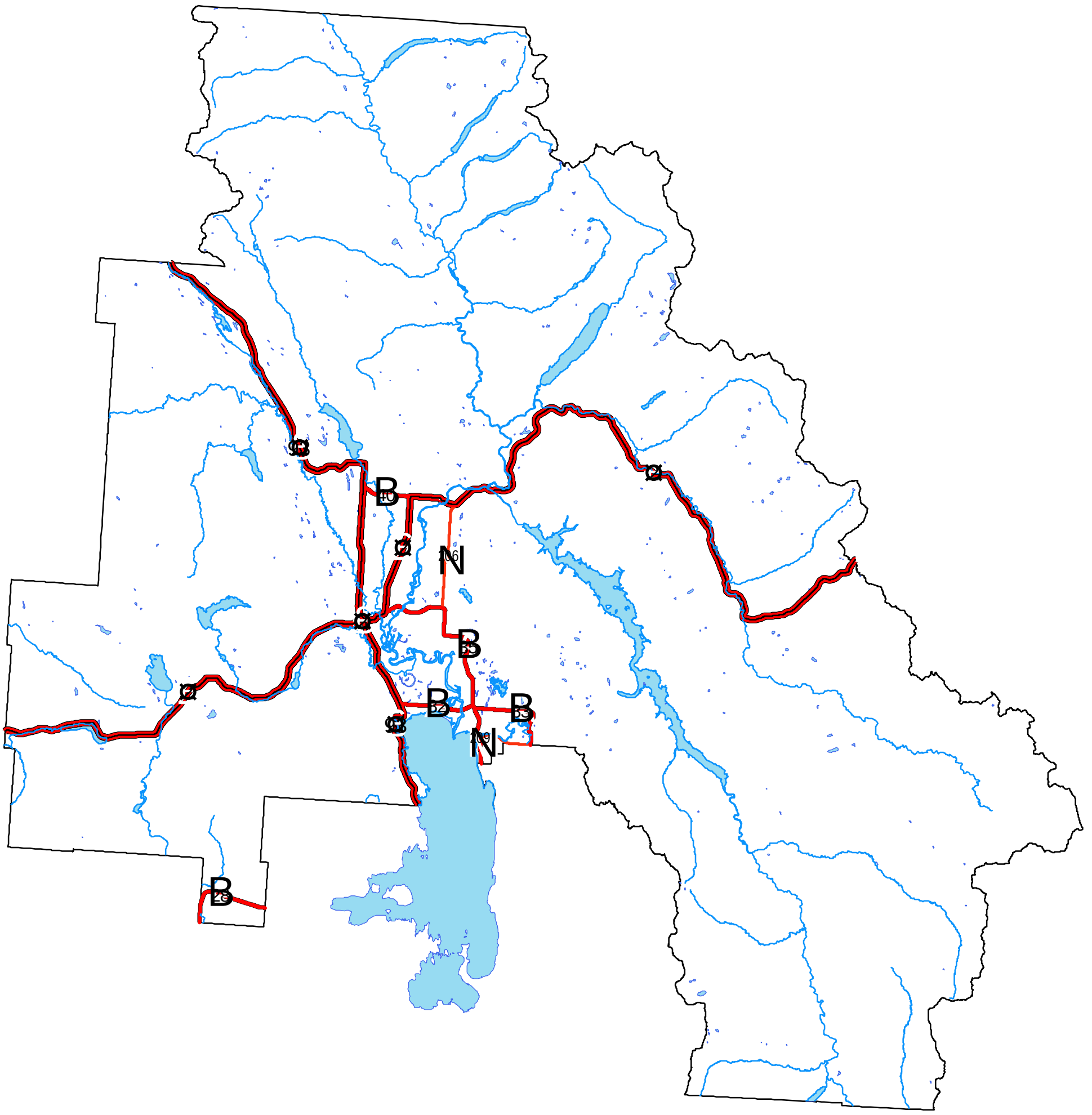
County on the west, Sanders, Lake, Missoula and Lewis and Clark Counties on the south, and the Canadian Province of British Columbia to the north. Kalispell is the county seat and the county has two other incorporated cities: Columbia Falls and Whitefish. The three cities, along with the County comprise the jurisdictions for the Plan. The Flathead River and tributaries drain the eastern portion of the county; the Flathead River discharges to Flathead Lake about nine miles southeast of Kalispell. Hungry Horse Reservoir created by the 564 foot high Hungry Horse Dam on the South Fork Flathead River has a length of 34 miles and impounds nearly three and a half million acre feet of water. Figure 1-1 presents a location map of the Flathead County Plan area.

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.

1.4 CLIMATE AND WEATHER

Flathead County, Montana 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.

FLATHEAD COUNTY OVERVIEW



PROJECT:	EXAMPLE
DATE PLOTTED:	EXAMPLE
SCALE:	1:626,368

FILE PATH:

FLATHEAD COUNTY GIS DEPARTMENT
e-mail: gis_online@co.flathead.mt.us
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FIGURE 1-1

Average high and low temperatures in Kalispell in January are 28.2° and 12.7° F respectively. The lowest temperature recorded at Kalispell was -38° 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° F and the July mean low temperature is 47.1° F. Both summer and winter temperatures vary considerably with elevation and local topography. Brief spells with temperatures above 100° F can occur but are often short lived. The highest temperature recorded in Kalispell was 105° F. Extended periods with temperatures above 90° F occur every few years. Freezing temperatures can occur during any month of the year, but are rare in low elevation 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. Appendix B contains a listing of historic severe weather events recorded by the NWS in Flathead County. Of the 234 events chronicled by the NWS from 1950 through 2006, 110 are winter storms or high winds, 110 are summer thunderstorm/hail/high wind events, 12 are floods and 2 are tornados.

1.5 REGIONAL ECONOMY

According to the 2000 census (US Bureau of Census, 2001), the population of Flathead County was 74,471. The Census Bureau estimates that the 2006 population was 85,314, which represents a 14.6% increase in population since the 2000 census, but is still only 16.7 persons per square miles. 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.

Historically, the Flathead County economy was dominated by the lumber industry. However, in recent years a number of mills have closed. Government, service sector (tourism, medical, financial and retail), manufacturing and timber industry are the primary employers in the county. The Montana Department of Labor and Industry reported that in July 2007 Flathead County had a total labor force of 48,163 and an unemployment rate of 2.1% (Montana Department of Labor and Industry - http://www.ourfactsyourfuture.org/cgi/dataanalysis/ ?PAGEID=94&SUBID=205).

In 2004, 12.1% of Flathead County residents lived below the poverty level as compared to 13.6% for the State as a whole (U.S. Bureau of the Census, 2007).

Columbia Falls - As of the 2000 census, Columbia Falls had a total population of 3,645. The biggest employers are Plum Creek Lumber Company, Columbia Falls Aluminum Company, Smith Food & Drug, Super 1 Foods and Pamida. The Burlington Northern Santa Fe (BNSF) railroad runs through the north end of the city with a spur line that goes to Kalispell.

Kalispell – Population of Kalispell as of the 2000 census was 14,223. Major transportation routes serving Kalispell include US Highway 93 north/south and US Highway 2 east/west. Largest employers in Kalispell area (2004) include the Kalispell Regional Medical Center, Plum Creek Timber, Semi Tool, Flathead Valley Community College and the Kalispell School District.

Whitefish – The 2000 census population of Whitefish was 5,032. US Highway 93 runs through Whitefish providing primary north/south access; the BNSF railroad east west service has a station and provides regular passenger service in Whitefish. Tourism and service industries, including the Big Mountain Resort, are major employers in the Whitefish area.

1.6 SCOPE AND PLAN ORGANIZATION

The scope of the Flathead County Pre-Disaster Mitigation Plan includes the following:

- Identify and prioritize disaster events that are most probable and destructive;
- Identify critical facilities;
- Identify areas within the community that are most vulnerable;
- Develop goals for reducing the effects of a disaster event;
- Develop specific objectives and projects to be implemented for each goal;
- Develop procedures for monitoring progress and updating the Plan; and
- Officially adopt the Plan.

The Plan is organized into sections that describe the planning process (Section 2), hazard evaluation and risk assessment (Section 3), mitigation strategies (Section 4), and Plan maintenance (Section 5). Appendices containing supporting information are included at the end of the Plan.

2.0 PLANNING PROCESS

The Flathead County Pre-Disaster Mitigation (PDM) Plan is the result of a collaborative effort between Flathead County citizens, public agencies, and regional, state, and federal organizations. Public participation, local emergency planning committee, and local emergency management services played a key role in identifying historic disasters and setting priorities for development of goals and mitigation projects. Interviews were conducted with the Flathead Office of Emergency Services, elected officials, and public meetings were held to include the input of Flathead County residents.

2.1 PUBLIC PARTICIPATION

The PDM planning process began in 2004. Interviews were conducted with individuals and specialists from organizations interested in hazard mitigation planning. The interviews identified common concerns related to natural and man-made hazards and identified key long- and short-term activities to reduce risk. Stakeholders interviewed for the plan included representatives from local government, utilities, and police and fire officials. Appendix C contains a list of people that attended the stakeholder meetings including a LEPC Quarterly meeting March 18, 2004 and a meeting of the North Fork Improvement Association Fire Mitigation Committee on April 18, 2004.

Additional public input was sought from the LEPC in 2007 after a revised draft of the PDM plan was completed. Appendix C includes a list of attendees at the 2007 LEPC meeting.

A comprehensive list of individuals whose input was considered important to help develop the Plan was developed in consultation with the Local Emergency Planning Committee (LEPC) and included elected officials (County Commissioners and city mayors), OES, as well as the sheriff, fire managers and public works directors. Federal and State agencies on the contact list included the U.S. Forest Service, Army Corps of Engineers, U.S. Border Patrol, and Montana Department of Natural Resources and Conservation. Appendix C also presents the Flathead County contact list. Persons and entities on the contact list received a

variety of information during the planning process, including project maps and documents for review, meeting notifications, and mitigation strategy documents.

2.2 STAKEHOLDER INPUT

Input was sought for the PDM Plan from individuals and specialists from organizations interested in hazard management. Input was obtained during meetings which identified common concerns related to natural and man caused hazards and identified community concerns and ideas on activities that could reduce risk. Stakeholders that provided input to the Plan included representatives from local government, fire departments, public health providers, law enforcement and utility providers. A list of meetings and contacts with Flathead County stakeholders is presented in Appendix D.

2.3 PUBLIC MEETINGS

Public participation is playing a key role in development of goals and mitigation projects. Interviews have been and are being conducted with the Flathead County OES, Mayors and elected officials of the three Cities.

Several public meetings have been held to include the input of Flathead County residents. Meetings with four of the Rural County Fire Departments, Evergreen, Creston, West Valley, Trail Creek and the North Fork Improvement Association have been held.

Two meetings with the LEPC, in March 2004 and July 2007 were held.

There was no newspaper advertising done for this project. There was advertising when the fire mitigation portion of the PDM was done and little or no public participation was shown.

2.4 SOURCES OF DATA AND INFORMATION

The Plan incorporates data and information from various public and private resources. Sources for these data and reports are referenced when used. Public information resources included the U.S. Forest Service, U.S. Census Bureau, FEMA (for floodplain delineations),

and the Montana Bureau of Mines and Geology, among others. Conversations with the Montana Department of Transportation and a local avalanche expert provided data, reports, and maps.

2.5 PLAN REVIEW

Review copies of the draft Plan were provided to OES for distribution in hard copy and a copy was placed on the County web site. Plan reviewers included county commissioners, mayors of the incorporated town/cities, representatives of the LEPC, and other federal, state, and local officials. OES provided review copies of the Plan to all jurisdictions involved in the planning process including Kalispell, Whitefish, Columbia Falls, and Flathead County. Public comments were submitted to the OES after a 30-day review period. OES reviewed the comments and they were incorporated into the final Plan. Following public review of the Plan, the Plan was adopted by the local jurisdictions.

Following local adoption, the Plan was submitted to the Montana DES Hazard Mitigation Officer and the Montana FEMA representative.

Future comments or questions regarding this Plan should be addressed to:

Flathead County Office of Emergency Services
920 South Main St.
Kalispell, Montana 59901

3.0 HAZARD EVALUATION AND ASSESSMENT

Hazard identification and prioritization involved determining what hazards have, in the past, or are likely to, in the future, cause injury, death or damage to property. Searching historical records, interviewing people with knowledge of past disasters, and input from the Flathead County LEPC and members of the public, identified hazards. An assessment of risks posed by the identified hazards was conducted to address requirements of the Disaster and Mitigation Act of 2000 (P.L. 106-390, FEMA, 2000) for evaluating the risk to the community of the highest priority hazards. DMA 2000 requires measuring potential losses to critical facilities and property resulting from natural hazards by assessing the vulnerability of buildings and critical infrastructure to natural hazards. The risk assessment approach taken in this study evaluates risks to vulnerable populations and also examines the risk presented by man-made hazards. The goal of the risk assessment process is to determine which hazards present the greatest risk and what areas, populations or infrastructure are the most vulnerable to identified hazards.

The hazard risk assessment requires information about what hazards have historically impacted the community and what hazards may present risks in the future. The process of identifying potential hazards included review of historical records of past hazard events and obtaining public input from Flathead County residents on historic disasters. The first phase entailed interviewing local government officials and staff, local emergency planning and response staff, and the general public. Section 2.3 describes the public participation and public input process in detail. The second phase entailed researching government records and news publications for records of previous hazard events. The results of the initial hazard evaluation were used to focus further risk assessment on hazards that historically had caused the most problems and those judged to be of most future concern.

The risk assessment approach used for the Flathead County Pre-Disaster Mitigation Plan used Flathead County's Geographic Information System (GIS) system and the FEMA Hazus system to map population centers, structures, and critical facilities and to evaluate those

potential hazards to the identified critical facilities in the county. This type of risk assessment approach is very dependent on the detail and accuracy of the data used during the analysis. The resources available for conducting this risk assessment dictated that existing data be used to perform the assessment. The existing information available is extensive but also has limitations. The data limitations mean that it is important to recognize the relative nature of the risk comparisons of areas within Flathead County.

3.1 HISTORICAL HAZARDS

Flathead County has historically and will in the future be affected by a variety of natural and human caused hazards. Examples of natural hazards that have the potential to impact the region include earthquakes, flooding, wildfire, severe storms, high wind, and landslides, among others. Potential human caused hazards include explosions, urban fires, uncontrolled chemical or hazardous material release (either at a fixed location or in transit), power outage, and dam failure, among others. Human-caused hazards can also be the result of purposeful actions including civil unrest/riots, and terrorism.

Available documentation of historic hazards is a relatively recent phenomenon and is often directly related to the severity of impacts on people and property. Historical data is generally available only for the last 50 to 100 years.

Information on hazards most likely to affect Flathead County was derived from a number of sources. Hazard information was compiled by examining data from the Office of Emergency Services (OES), Federal Emergency Management Agency (FEMA), and the National Weather Service (NWS), reviewing historical newspaper articles, searching relevant databases, and interviewing local experts. Most importantly, residents of Flathead County provided information during public meetings on what hazards had affected their lives and their communities. Table 3-1 lists the Federal and State declared disasters that have occurred in or affected Flathead County.

TABLE 3-1. DECLARED DISASTERS – FLATHEAD COUNTY, MONTANA

STATE DECLARATIONS 1975 To Date					
E.O. No.	**RESP. CTR. PROJ. No.**	**APPRO. No.**	**PA No.**	**APPLICANT**	**COMMENTS**
2003 STATE DECLARATIONS					
14-03	EO14-03 2003 FIRES-BA	850B1	MT-04-03	Flathead County	Robert Fire = FEMA-2484-FM-MT
14-03	EO14-03 2003 FIRES-BA	850B1	MT-04-03	Flathead County	Wedge Canyon Fire = FEMA-2485-FM-MT ($27,889.84 State Only)
16-03	EO14-03 2003 FIRES-BA	850B1	MT-04-03	Flathead County	Flathead Fire Zone = FEMA-2494-FM=MT

FEDERAL DISASTER DECLARATIONS 1974 TO DATE			
Year	**Disaster No.**	**Type of Event**	**Areas Declared Counties and Reservations**
1974	FDAA-417-DR-MT	Flood	Deer Lodge, Flathead, Glacier, Lincoln, Mineral, Missoula & Sanders
1975	FDAA-472-DR-MT	Flood	Broadwater, Cascade, Fergus, Flathead, Glacier, Jefferson, Judith Basin, Lewis & Clark, Meagher, Pondera, Powell, Teton, Toole & Wheatland
1994	FEMA-2110-FSA-MT and	Wildland Fires	Lincoln, Flathead, Sanders, Lake, Mineral, Missoula, Powell, Ravalli, Granite, Deer Lodge, Silver Bow, Beaverhead & Madison
1996	FEMA-1113-DR-MT	Flood	Blaine, Flathead, Hill, Liberty, Phillips & Toole
1997	FEMA-1183-DR-MT	Flood	Broadwater, Carbon, Dawson, Deer Lodge, Flathead, Judith Basin, Lincoln, Madison, Meagher, Missoula, Musselshell, Park, Prairie, Ravalli, Richland, Roosevelt, Sanders, Sweet Grass, Treasure, Valley, Wheatland, Yellowstone & Flathead Reservation
2000	FEMA-2320-FSA-MT	Wildland Fire	Flathead, Lake, Lincoln & Sanders
2000	FEMA-1340-DR-MT	Wildland Fire	Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Deer Lodge, Fallon, Fergus, Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis & Clark, Liberty, Lincoln, Madison,
2003	FEMA-2484-FM-MT	Wildland Fire	Flathead
2003	FEMA-2485-FM-MT	Wildland Fire	Flathead
2003	FEMA-2494-FM-MT	Wildland Fire	Flathead
2005	FEMA-3253-EM-MT	Hurricane Relief	All 56 Counties in the State (Cat B Emergency Assistance Only)

The following hazards were identified, evaluated and prioritized or dismissed as part of Flathead County's PDM development:

Natural Hazards - Avalanche
Wildfire
Floods
Weather
    Winter storms
    Summer storms
Landslide
Earthquake
Volcanic eruption
Insect infestation
Biological Hazards
    Infectious disease
    Animal/agricultural disease
Blight and Drought

Human Caused Hazards - Mass casualty accidents – air, rail, highway, disease
Dam failure
Chemical spill
Terrorism
Civil disturbance
Near Surface Ground Control Failure & Subsidence (Old Mine Workings)

Table 3-2 lists hazards initially identified, evaluated, and prioritized or, in some cases, dismissed from further evaluation as part of Flathead County's PDM development.

TABLE 3-2. HAZARDS IDENTIFIED – FLATHEAD COUNTY, MONTANA

Hazard	How Identified	Why Identified	Evaluated or Dismissed
Wildfire	• USFS National Fire Plan • Subject matter expert input	• History of wildfires • Growth in the urban wildland interface • Mountainous, forested terrain exists throughout the County	Evaluated
Weather Winter Storms Summer Storms	• Data from Western Regional Climate Center • Input from subject matter expert	• Frequent winter storms and extreme cold temperatures each season • Potential for power outages during a cold spell • Hail damage • Damage to utilities and buildings	Evaluated
Flooding	• FEMA Flood Study and FIRM review • FCOES database	• Several creek, rivers, and streams run through the County • History of urban flooding • Presidential declarations for flooding in 1964, 1974, 1975, 1991, 1995, 1996, 1997,	Evaluated
Earthquake	• USGS National Earthquake Information Center • Montana Bureau of Mines and Geology publications	• History of earthquakes • Potential for disrupting utilities, dams, and transportation systems	Evaluated
Subsidence	• Input from planning/public meetings • Data collected by the EPA • Subject matter expert input	• Existence of hundreds of abandoned mines throughout the County and urban areas • History of collapsing mine workings	Evaluated

TABLE 3-2. HAZARDS IDENTIFIED – FLATHEAD COUNTY, MONTANA (continued)

Hazard		How Identified	Why Identified	Evaluated or Dismissed
Human – Caused Hazards	Hazardous Materials	• Records from FCOES database	• Hazardous materials are frequently transported through the County • Several fixed facility hazardous material sites exist • History of frequent spills and leaks	Considered under Human-caused Hazards
	Mass Casualty Accidents – Aviation, Rail, Highway Disease	• FAA records	• Several wilderness airports • Presence of international airport • May be associated with other high population impact hazards	Considered under Human-caused Hazards
	Terrorism and Violence	• Subject matter expert input	• Little protection of hazardous materials and critical facilities • Heightened alert since September 11, 2001 • Large populated events in the County each year	Considered under Human-caused Hazards
	Communicable Disease & Bio-terrorism	• Input from planning/public meetings • Montana Department of Livestock website • Center for Disease Control website	• History of an influenza outbreak during the 1910's • New emerging diseases such as SARS and West Nile Virus • Rapid disease spread potential through urban areas	Considered under Human-caused Hazards
	Civil Unrest	• Subject matter expert input	• Heightened alert since September 11, 2001 • Large populated events in the County each year	Considered under Human-caused Hazards
Dam Failure		• National Inventory of Dams website	• High hazard dams within the County • County ownership of other hazard dams	Evaluated

TABLE 3-2. HAZARDS IDENTIFIED – FLATHEAD COUNTY, MONTANA (continued)

Hazard		How Identified	Why Identified	Evaluated or Dismissed
Avalanche		• State DES Website • State Hazard/ Vulnerability Assessment	• Mountainous terrain exists that may be prone to avalanches • History of avalanches • Impacts to transportation and commerce systems	Evaluated
Hazards not Carried Forward in Risk or Vulnerability Ratings	Landslides	• USGS National Study • Montana Bureau of Mines publications and records	• The County has an area of landslide incidences and susceptibility • Potential for damage to residences	Not carried forward in evaluation
	Volcanic Eruption	• State DES website	• Proximity to active volcanoes that could deposit ash over the County • History of volcanic ash from Mt. St. Helens	Not carried forward in evaluation
	Insect Infestation	• Input from subject matter expert	• Hazards to local economy • Increased threat of wildfire	Not carried forward in evaluation
	Biological Hazards-Infectious Disease	• Input from subject matter expert and public meetings • Montana Department of Live stock • Center for Disease Control website	• Input from Public meetings • New emerging diseases • Possible rapid spread in urban areas	Not carried forward in evaluation
	Biological Hazards-Animal\Agricultural Disease	• Input from subject matter expert • Montana Department of Live stock • Center for Disease Control website	• Input from Public meetings • New emerging diseases • Possible rapid spread in urban areas	Not carried forward in evaluation

TABLE 3-2. HAZARDS IDENTIFIED – FLATHEAD COUNTY, MONTANA (continued)

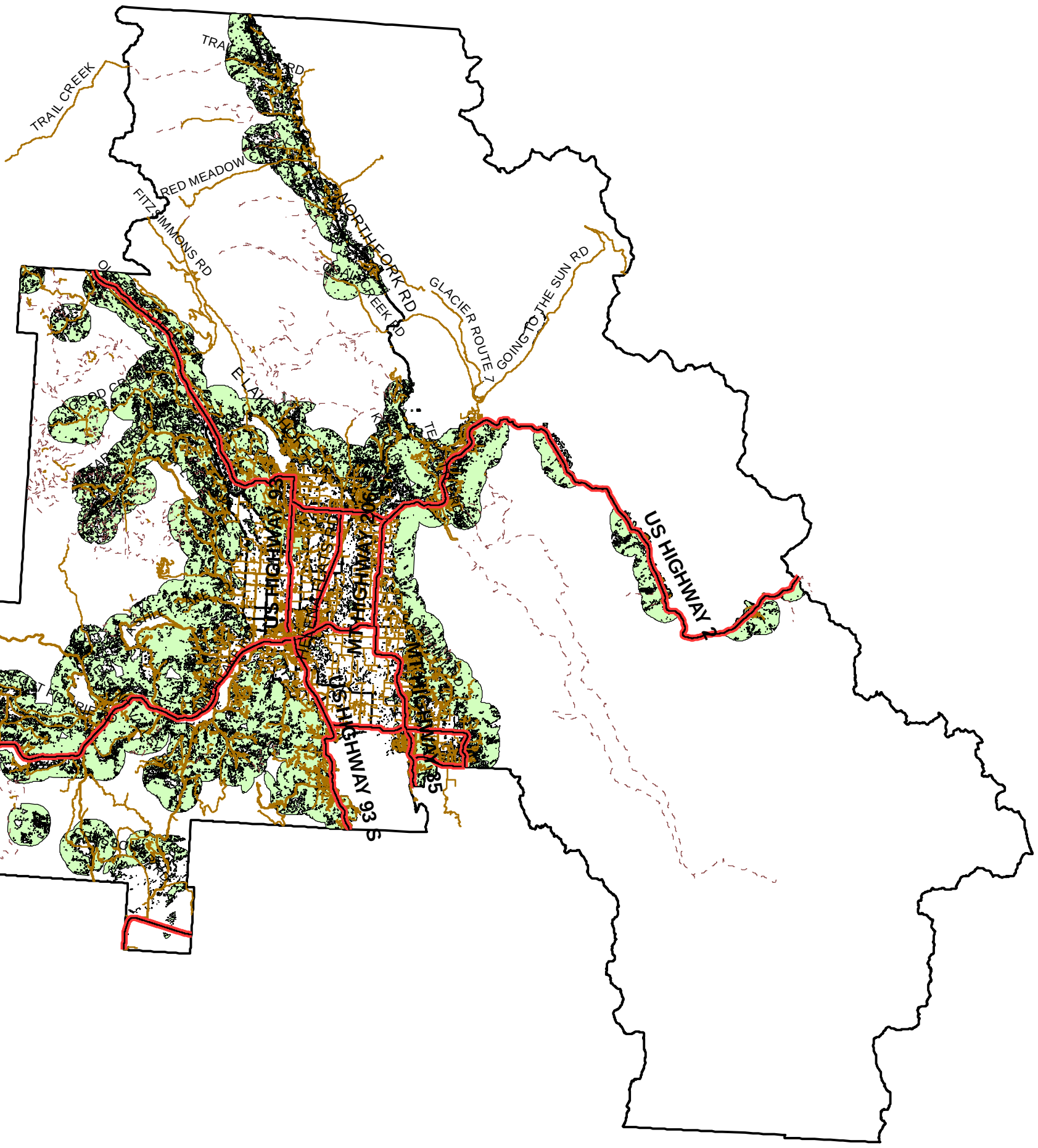
Hazard		How Identified	Why Identified	Evaluated or Dismissed
	Blight & Drought	• Montana Drought Advisory Committee website • National Drought Mitigation Center website • Data from the Western Regional Climate Center • State DES website • NOAA Pale Climatology Program website	• Frequent historical drought events • USDA Disaster Declarations • Relationship to wildfire danger	Not carried forward in evaluation

3.1.1 Wildfire Hazards

Wildfire has historically represented a significant threat of potential property damage within Montana. Although fire is a natural and necessary component of the western Montana forest ecosystem, uncontrolled wildfire has large economic, social and health impacts in Flathead County. Negative impacts of wildfire include loss of life, property and resource damage or destruction, smoke caused health impacts, and environmental degradation. Long periods of warm, dry summer weather combined with lightning storms or human activity are often causes associated with wildfire.

The wildland/urban interface is a zone where structures and other human development meet or intermingle with undeveloped wildland and forest fuels. In northwest Montana, the wildland/urban interface typically is where the edges of local communities are immediately adjacent to forest lands and where suburban development and single-family homes are surrounded by forest. The wildland\urban interface in Flathead County consists of approximately 6,400,000 acres of forested lands (see Figure 3-1). Although Flathead County has not had large losses of life or homes from recent fire seasons there is the potential for significant damage under the right conditions. The combination of continually increasing

WILDLAND-URBAN INTERFACE-FLATHEAD COUNTY, MONTANA



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SCALE:	1:666,600

FILE PATH:
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FLATHEAD COUNTY GIS DEPARTMENT
e-mail: gis_online@co.flathead.mt.us
URL: http://co.flathead.mt.us
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HIGHWAY
MAJOR ROAD
MINOR ROAD
COLLECTOR ROAD
ROAD
FS ROAD
WILDLAND URBAN INTERFACE
COUNTY BOUNTARY

THE AREAS DEPICTED ON THIS MAP ARE FOR ILLUSTRATIVE PURPOSES ONLY AND DO NOT NECESSARILY MEET MAPPING, SURVEYING, OR ENGINEERING STANDARDS. DERIVING CONCLUSIONS FROM THIS MAP IS DONE AT THE USER'S RISK

FIGURE 3-1

fuel loads in second growth forest and increased residential development in and near forested areas makes wildfire one of the highest priority hazard issues to Flathead County residents.

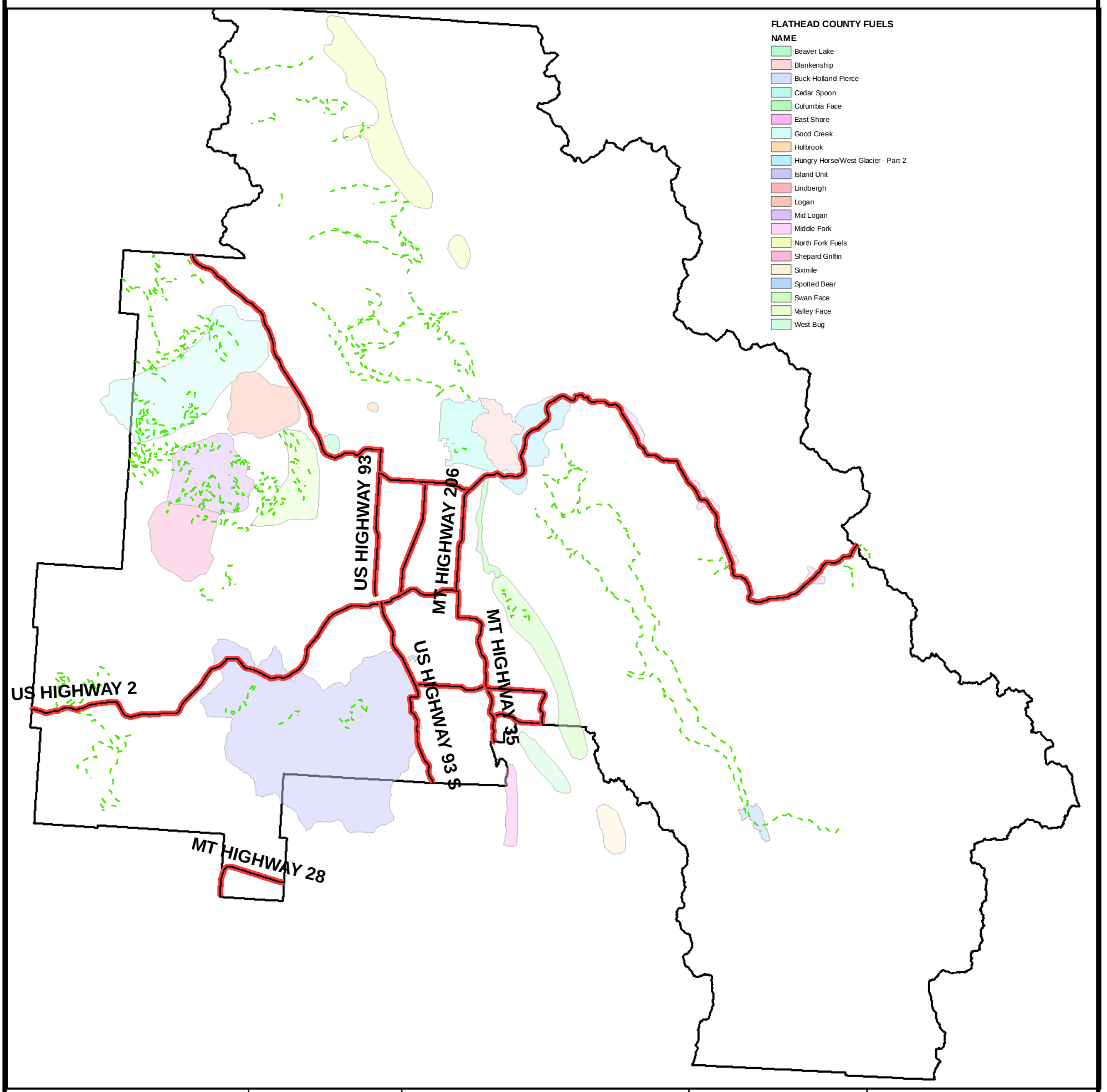
Lightning storms can initiate a number of fires over a broad area under the right conditions. Under dry fuel conditions and hot, windy, dry weather, fires can spread quickly. The rate of spread of a fire varies with wind speed, fuel conditions and topography. Fire suppression can be very effective under favorable conditions and where access is good. However, under some conditions, including dry fuels, difficult terrain and high wind, suppression efforts may have little effect.

3.1.1.1 Location and Extent of Previous Wildfire Events

Significant wildfires occurred in Flathead County during 1988, 2001 and 2003. The Robert and Wedge Canyon fires in 2003 were declared State disasters.

There were no large fires in the North Fork Valley from the late 1920's to 1988 when the Red Bench fire burned 37,000 acres. The Moose fire in 2001 burned approximately 71,000 acres and in 2003 the Wedge Canyon, Trapper Creek and Roberts fires burned over 130,000 acres. The Wedge fire destroyed seven homes and 29 outbuildings. Portions of the Brush Creek Fire (30,000 acres) and Chippy Creek Fire (99,000 acres) burned in Flathead County in 2007. A comprehensive evaluation of fire risk in the North Fork was undertaken and results incorporated into the Flathead County Wildfire NIMS Community Protection Plan (2004). The US Forest Service manages portions of wilderness in Flathead County with minimal fire suppression. The National Park Service allows natural fires to burn uncontrolled in Glacier National Park. The focus of the Flathead County wildfire management as outlined in the 2004 Community Protection Plan is protection of private property. In addition to fire suppression, major components of the Community Protection Plan include fuels management, both around individual residential properties and generally in the wildland/urban interface. Priority fuels reduction areas are shown on Figure 3-2.

PRIORITY FUELS REDUCTION AREAS-FLATHEAD COUNTY, MONTANA



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SCALE:	1:633,600

FILE PATH:
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FLATHEAD COUNTY GIS DEPARTMENT

e-mail: gis_online@co.flathead.mt.us
URL: http://co.flathead.mt.us

800 S MAIN ST
KALISPELL MT 59901

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HIGHWAY
FS ROAD
COUNTY BOUNTARY

THE AREAS DEPICTED ON THIS MAP ARE FOR ILLUSTRATIVE PURPOSES ONLY AND DO NOT NECESSARILY MEET MAPPING, SURVEYING, OR ENGINEERING STANDARDS. DERIVING CONCLUSIONS FROM THIS MAP IS DONE AT THE USER'S RISK

FIGURE 3-2

3.1.2 Weather Hazards

Winter Storms - Numerous severe winter storm events have affected northwestern Montana and impacted Flathead County residents. The NOAA National Climatic Data Center (NCDC) for Flathead County lists eighty-one severe winter weather events between 1950 and 2006 (see Section 1.4 above and Appendix B).

Winter storms can present a number of hazards including cold, high winds, blowing snow that drifts roads and impairs visibility, snow loading on buildings that can collapse roofs, ice accumulations that can both cause tree and power line breakage and ice that causes difficult driving conditions. Dangerous driving conditions, road closures and utility line damage are probably the most common hazards associated with winter storms; however, exceptionally large snowfall or ice loading that causes structural damage to buildings may be the greatest threat to critical infrastructure, public and private property.

Summer Storms - Severe thunderstorms typically occur in the summer and can be accompanied by high winds, heavy rainfall, hail or dry lightening. These storms can present conditions producing flooding or wildfires. Tornados are uncommon in western Montana, but a few have been recorded in Flathead County and vicinity and they can also be accompanied by high winds, heavy rainfall, hail, and lightening.

3.1.2.1 Location and Extent of Weather Events

Winter Storms - Winter storm events with significant snow accumulations are common in Flathead County, especially in the mountain passes. A winter storm in November 1996 dropped 20 inches of snow in Kalispell in 24 hours and was accompanied by high winds and followed by freezing rain. Two fatalities were recorded as a result of the storm. Heavy snow events have been recorded in 1994, 1997, 1998, 1999, 2000, 2001 in any month between November and March.

Summer Storms - Thunderstorms, hail and high wind are potential hazards to people, property, crops and forests. The NCDC lists 141 severe summer storm or wind events in

Flathead County during the period 1950 to 2006 (Appendix B). Hazards associated with summer storms include the direct effects of lightning and hail, dangerous driving conditions, hazards to outdoor recreationists, and wind damage to utility lines, trees and structures. Secondary effects include wildfire ignition and flooding. Crop damage from hail and forest blow down from high winds can have significant economic local impacts.

Historic weather events are reported to have resulted in thirteen injuries, six from winter storms and seven from summer thunderstorm events. A falling tree limb in a windstorm event killed one person. Reported property losses from these past weather events total over $23 million including $11.66 million from winter storms, $2.69 million from thunderstorms, high winds and hail, and $9.95 million from floods. The historic losses from these recorded events and other weather events are undoubtedly higher than presented in the NCDC listing. Flathead County residents rank weather hazards as some of the most frequent and most potentially damaging of all natural disasters.

3.1.3 Flood Hazards

Floods are natural, recurring events in rivers and streams. Runoff water from snowmelt and rainfall exceeds the channel capacity and overflows onto the banks and adjacent floodplains.

Floodplains are lowlands, adjacent to rivers and lakes, which are subject to recurring floods. Winter or early spring rain-on-snow events and late spring mountain snowmelt are often the cause of flooding in Flathead County. Remapping of the floodplain is currently under way. Draft versions of the new floodplain delineations are shown on Figure 3-3.

Damage to structures, infrastructure and injuries or deaths may result from flooding. 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. Hazardous material issues may result if propane tanks, above ground storage tanks, medical waste containers, or other hazardous material vessels are dislodged and flooded with water. Inundation of sewage lagoons and flooded sewer systems can spread

FLATHEAD COUNTY-FLOODPLAIN DELINEATION

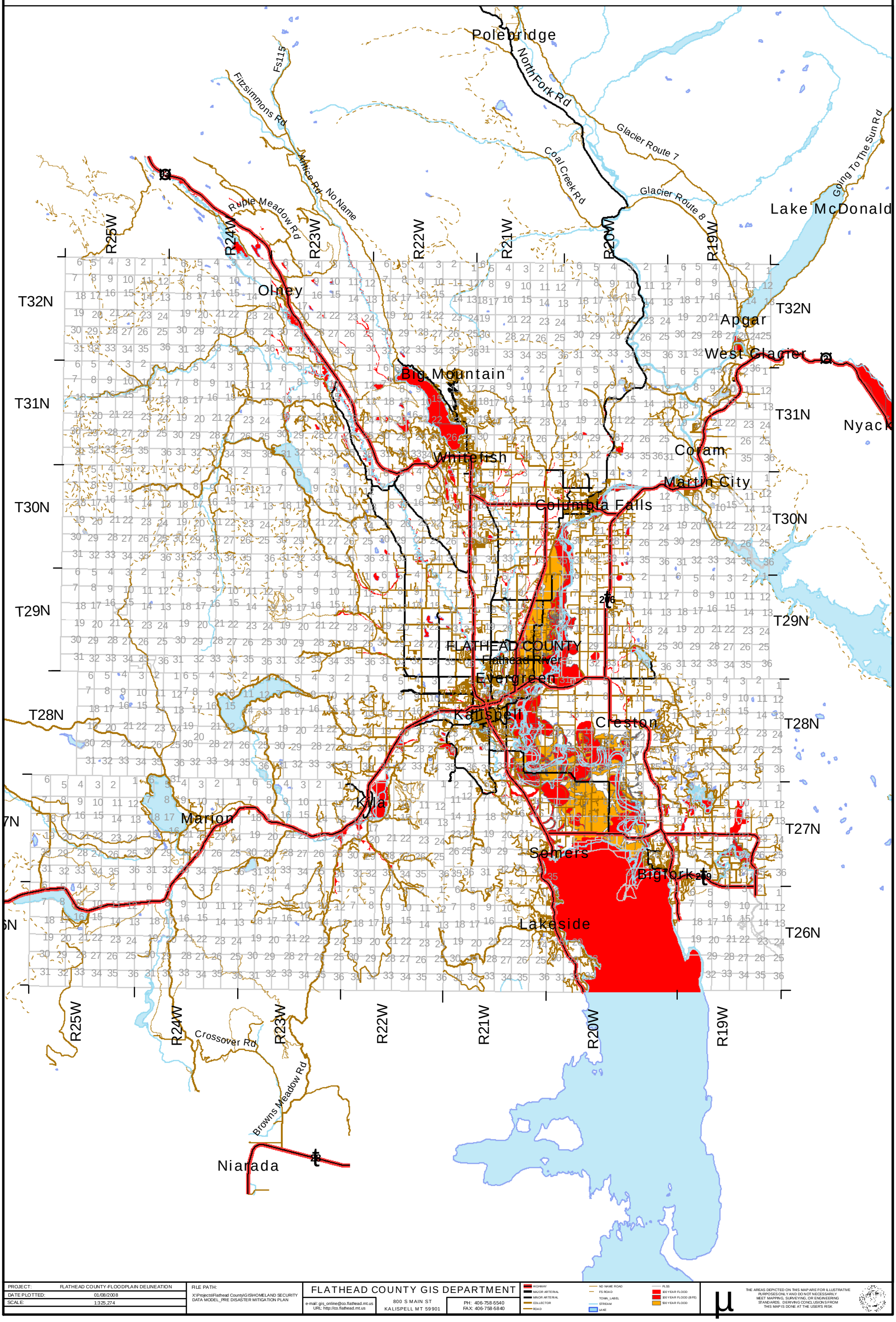


Figure 3-3

infectious germs and microbes. Flooding of built up areas can cause extensive damage to homes and other private property. The National Weather Service lists $20 million in flood damage due to storm events in Flathead County from 1959 to 2006 (Appendix B). Flooding in Flathead County, as well as in other Montana counties has resulted in Federal Disaster Declarations in 1974, 1975, 1996, and 1997. There was also a significant flood in 1964.

3.1.3.1 Location and Extent of Previous Flood Events

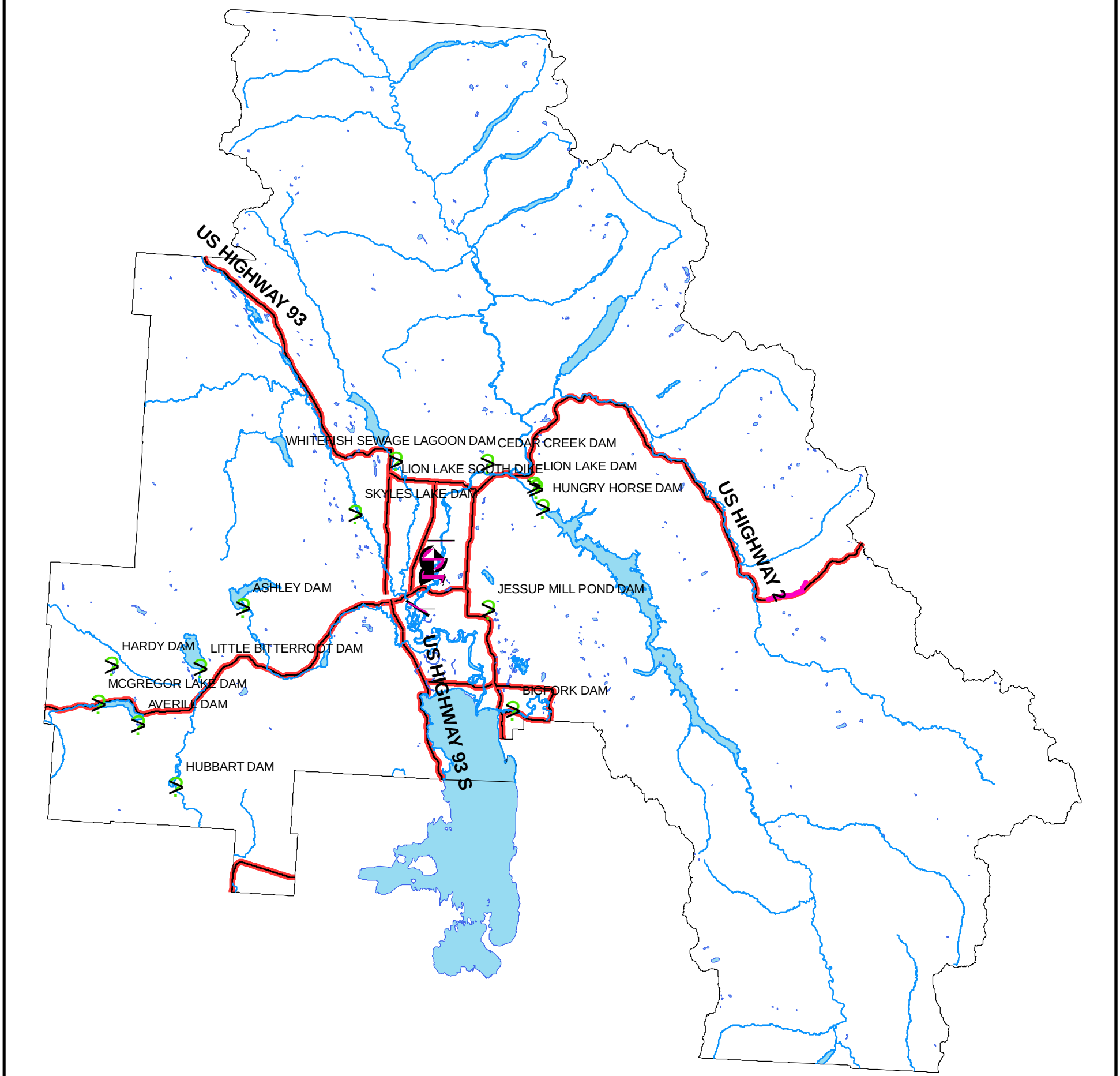
The Flathead River is the dominant stream draining Flathead County. Hungry Horse Dam located five miles upstream of the confluence of the South Fork Flathead and North Fork Flathead Rivers provides significant flood control on the Flathead River. Levees have been constructed along sections of the Flathead River between the Evergreen area and an area east of the airport (See Figure 3-4). Residential development in the flood plains of these streams has resulted in the loss of several homes and related infrastructure, such as roads. Local flooding has also occurred to low lying properties along McDonald Creek and the Stillwater River.

Flathead County received three Federal disaster declarations for flooding, in 1974, 1975, and 1996. There was also flooding in Flathead County in 1964, 1986, 1991, 1995, 1997 and 1999. Historic flood events tend to involve snowmelt runoff that can impact both smaller streams and low lying areas along the Stillwater and Flathead Rivers and intense rainfall events (primarily associated with summer thunder storms) that affect localized areas, primarily ephemeral and intermittent drainages and smaller streams.

Areas burned in wildfires contribute to flood vulnerability. Burn areas have no, or little, vegetation and minimal capacity for storing water. Precipitation in these areas will run off and often generate flash floods.

Possibly the largest flood event with respect to damage was in 1964. The 1964 flood impacted much of the Northern Rockies. In Flathead County, the railroad and highway over Marias Pass incurred significant damage. The Flathead River nearly submerged Highway 2

DAMS, LEVEES AND AVALANCHE AREAS-FLATHEAD COUNTY MONTANA



PROJECT: DAMS, LEVEES AND AVALANCHE-FLATHEAD COUNTY, MONTANA	FILE PATH: X:\Projects\Flathead County\GIS\HOMELAND SECURITY DATA MODEL_PRE DISASTER MITIGATION PLAN	FLATHEAD COUNTY GIS DEPARTMENT	DAMS, AVALANCHE, STREAMS, HIGHWAY, LEVEES, AVALANCHE LAKES	THE AREAS DEPICTED ON THIS MAP ARE FOR ILLUSTRATIVE PURPOSES ONLY AND DO NOT NECESSARILY MEET MAPPING, SURVEYING, OR ENGINEERING STANDARDS. DERIVING CONCLUSIONS FROM THIS MAP IS DONE AT THE USER'S RISK		
DATE PLOTTED: 09/19/2007		e-mail: gis_online@co.flathead.mt.us URL: http://co.flathead.mt.us	800 S MAIN ST KALISPELL MT 59901	PH: 406-758-5540 FAX: 406-758-5840		
SCALE: 1:666,600						

FIGURE 3-4

near the airport and the community of Evergreen was flooded. It was also reported that McDonald Creek in Glacier National Park "ran upstream."

3.1.4 Earthquake Hazard

An earthquake is ground motion that results from the sudden movement of rock beneath the earth's crust. Earthquakes may cause landslides, rupture dams, disrupt power and telephone lines, gas, sewer, or water mains, which, in turn, may set off fires and/or hinder firefighting or rescue efforts. Earthquakes also may cause buildings and bridges to collapse.

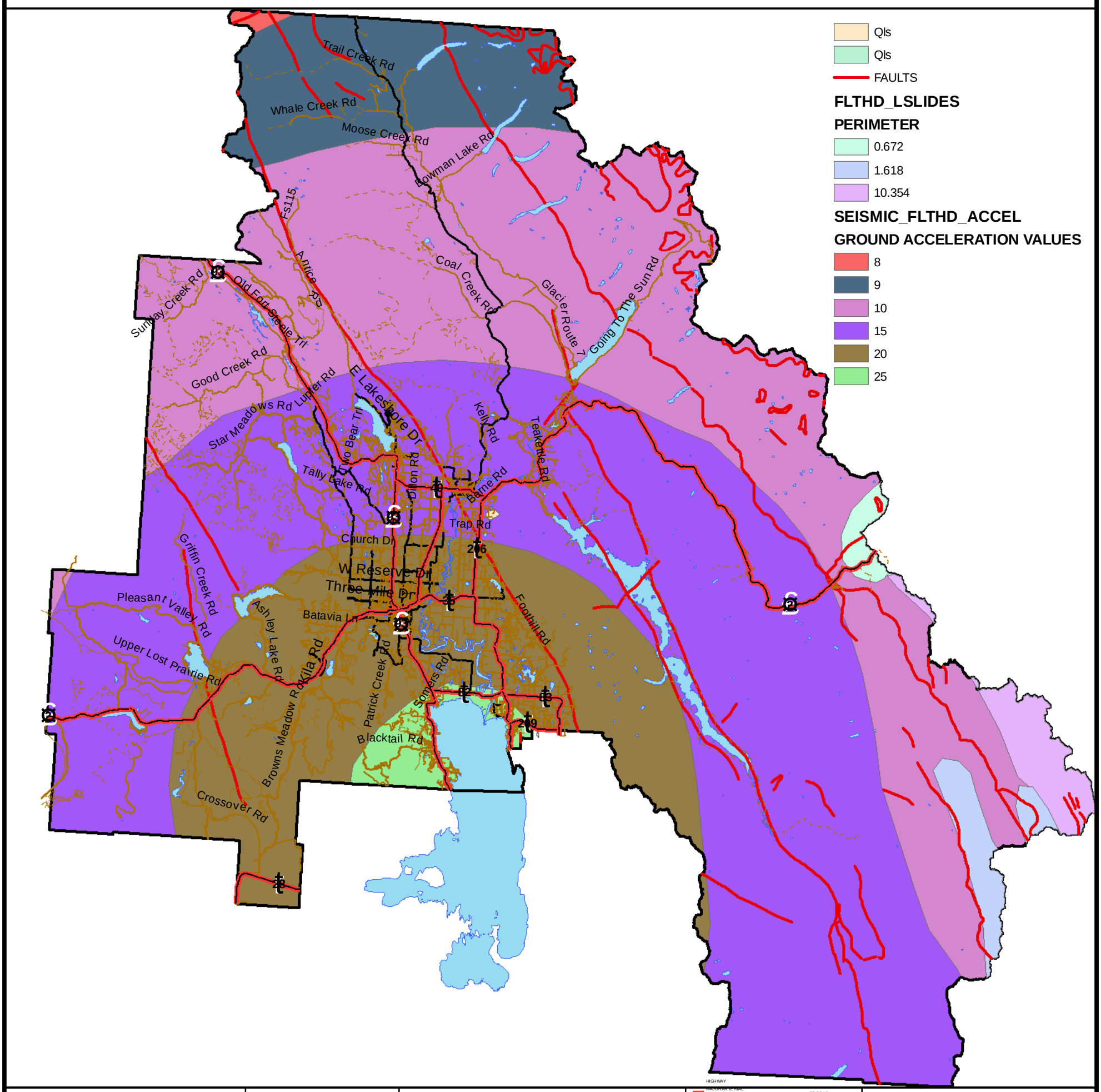
Earthquakes occur along faults, which are fractures, or fracture zones, in the earth, across which there may be relative motion. A number of northwest to southeast trending faults occur in Flathead County (Figure 3-5). In the Flathead area of northwest Montana, small to moderate earthquakes occur frequently. The USGS keeps records of historic earthquakes and prepares maps of potential earthquake hazard.

3.1.4.1 Location and Extent of Previous Earthquake Events

Since the 1970s, there has been considerable study of earthquakes in the Flathead and Mission Valleys. Qamar, A and Stickney (1983) report that 25 earthquakes were felt in the valleys from 1935 through 1980.

In 1975, a magnitude 5.0 quake was recorded and Stickney's evaluation placed its source on the Creston fault, about three to five miles south of Kalispell. Flathead County experienced a damaging earthquake on March 31, 1952. This shock was felt over an area of 35,000 square miles and caused minor damage along the eastern shore of Flathead Lake. A magnitude 4.7 earthquake in the Flathead Lake area on April 1, 1969, caused damage in Big Arm, Dayton, and Proctor. Some damage was also noted in the Lake Mary Ronan area and a water well near Polson went dry. The shock was felt over 10,000 square miles and was followed by a number of aftershocks over the next few weeks.

SEISMIC ACCELERATION-MAJOR FAULTS-LANDSLIDES-FLATHEAD COUNTY, MONTANA



PROJECT:	FLATHEAD COUNTY SEISMIC DATA
DATE PLOTTED:	06/08/2007
PROJECTION	
SCALE:	1:633,600

FILE PATH:
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FLATHEAD COUNTY GIS DEPARTMENT

e-mail: gis_online@co.flathead.mt.us
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800 S MAIN ST
KALISPELL MT 59901

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FIGURE 3-5

Subsequent monitoring has shown frequent, small magnitude earthquakes associated with north-south faults bounding the Flathead and Mission Valleys and the east-west Creston fault south of Kalispell. Since the 1975 magnitude 5.0 event, the USGS National Earthquake Information Center database shows records of 91 quakes of magnitude 2.2 to 4.7 within 100 km of Kalispell (Table 3-3). Fifty-three (53) of the earthquakes registered between 3.0 and 3.9 on the Richter scale and eleven (11) registered between 4.0 and 4.7 on the Richter scale. Earthquakes measuring between 3.0 and 3.9 on the Richter scale are "often felt but unlikely to cause damage." Events measuring between 4.0 and 4.9 on the Richter scale "will cause noticeable shaking of indoor items, and rattling noises, but significant damage is unlikely." Future earthquakes will occur, some with the potential to cause damage to buildings and infrastructure.

The USGS hazard mapping (US Geological Survey Earthquake Data Base, 2002) indicates that nearly all of Flathead County lies within the zone having a 10% probability of exceeding a peak ground acceleration of 10 – 25% of gravity in 50 years (Figure 3-5). Local residents would feel the earthquake ground motion peak acceleration values of up to 10 to 25% gravity, which could result in objects falling from shelves and walls, but at the lower end of this range would be expected to cause significant structural damage to buildings. Although the risk of very large earthquake events with catastrophic damaging results are not considered likely to occur in Flathead County, the general earthquake risk in the County is generally moderate.

3.1.5 Subsidence Hazards

Subsidence is commonly related to earthquake, flood, or landslide activity, but can be related to collapse of historic underground mine workings. Subsidence induced by earthquakes or landslides can impact roads and utility infrastructure.

3.1.5.1 Location and Extent of Previous Subsidence Events

Subsidence hazards are typically limited in size and occur either in remote areas or associated with other hazards. Any subsidence will have limited impacts to populations due to this limited scope and scale. No earthquake, landslide, or mine related subsidence has been identified in Flathead County.

TABLE 3-3. HISTORIC EARTHQUAKE DATA – FLATHEAD COUNTY, MONTANA

EARTHQUAKES IN AREA OF FLATHEAD COUNTY						
Year	**Month**	**Day**	**Latitude**	**Longitude**	**Magnitude**	**Depth**
1974	7	26	48.72	-114.89	3.7	13
1975	1	17	48.36	-114.1		6
1975	1	31	48.17	-114.14	4.1	5
1975	2	4	48.21	-114.11	5	8
1975	10	20	48.2	-114.28	4.3	25
1976	1	21	48.22	-114.1	3.1	5
1976	4	18	47.87	-114.21		5
1976	4	24	48.26	-114.09	3.5	5
1979	7	21	47.72	-114.15	3.5	5
1979	10	16	48.24	-114.54	3.1	5
1982	2	22	48.1	-113.96	3.1	5
1982	8	5	47.85	-114.35	2.5	5
1982	8	8	47.93	-114.36	2.3	5
1982	8	8	47.93	-114.34	2.8	5
1983	11	8	48.1	-114.16	3.1	5
1984	2	11	49.19	-114.41	4.5	18
1984	5	3	47.88	-113.68	3.4	5
1985	11	13	47.59	-113.73	2.5	5
1986	8	11	48.17	-114.64	3.1	5
1987	5	1	47.56	-113.73	3.2	5
1987	5	2	48.97	-114.87	2.9	5
1987	7	23	47.6	-113.71	3.2	5
1987	7	23	47.72	-113.67	4.2	5
1989	3	19	47.9	-114.01	3	5
1990	4	8	48.57	-114.61	3	5
1991	2	16	48.38	-113.9	3	5
1991	5	29	47.74	-114.75	3	5
1991	7	18	47.82	-113.75	3.9	5
1992	4	1	47.88	-113.73	4.2	5
1992	7	2	48.51	-113	3.8	10
1992	11	21	48.86	-113.68	3.4	5
1993	12	22	47.82	-114.81	2.5	5
1994	6	17	48.18	-113.91	3	5
1994	11	11	48.18	-114.49	3.2	8
1995	1	29	48.05	-114.5	3.2	5
1995	5	2	48.14	-114.48	4.5	9
1995	5	2	48.15	-114.54	2.7	9

TABLE 3-3. HISTORIC EARTHQUAKE DATA – FLATHEAD COUNTY, MONTANA (continued)

EARTHQUAKES IN AREA OF FLATHEAD COUNTY						
Year	**Month**	**Day**	**Latitude**	**Longitude**	**Magnitude**	**Depth**
1995	5	2	48.13	-114.49	4	9
1995	5	3	48.16	-114.5	2.8	9
1995	5	3	48.14	-114.51	3.7	9
1995	5	4	48.11	-114.58	3	9
1995	5	5	48.18	-114.49	2.5	9
1995	5	20	48.12	-114.52	3.4	9
1995	5	25	48.14	-114.46	3.4	9
1995	5	25	48.15	-114.46	3	9
1995	5	25	48.14	-114.48	3.8	9
1995	6	29	48.14	-114.47	4.1	5
1995	6	30	48.14	-114.49	3.8	9
1995	10	2	47.72	-113.81	3.7	5
1996	1	16	47.7	-113.57	3.1	5
1996	5	3	47.69	-113.88	3.1	14
1997	1	21	47.83	-114.29	2.6	4
1997	1	21	47.84	-114.28	2.2	5
1997	1	23	47.69	-113.74	3.1	6
1997	2	2	47.82	-114.22	3.6	5
1997	2	3	47.78	-114.22	2.9	1
1997	2	5	47.57	-113.94	3	18
1997	3	3	47.84	-114.12	2.8	4
1998	1	20	47.95	-115.05	4	7
1998	4	15	48.01	-113.75	4.1	4
1998	4	15	48.01	-113.74	3	4
1998	12	22	47.99	-115.21	4.7	12
1999	8	19	48.12	-114.98	3.7	13
1999	10	18	47.68	-114.17	2.6	10
1999	10	26	47.91	-114.89	3.6	12
1999	11	15	47.79	-114.27	2.9	5
1999	11	21	47.67	-113.69	3	5
2000	3	4	49.17	-114.03	4.6	1
2000	3	8	47.8	-113.88	3.2	3
2000	4	25	47.63	-114.31	3	2
2000	9	24	47.95	-114	3.3	6
2000	10	15	49.19	-114.06	3.2	1
2000	11	25	47.58	-113.97	3.4	15
2001	7	29	48.32	-114.41	2.8	12
2001	12	18	47.57	-114.01	2.9	17

TABLE 3-3. HISTORIC EARTHQUAKE DATA – FLATHEAD COUNTY, MONTANA (continued)

EARTHQUAKES IN AREA OF FLATHEAD COUNTY						
Year	**Month**	**Day**	**Latitude**	**Longitude**	**Magnitude**	**Depth**
2002	1	28	47.93	-114.27	2.9	8
2002	9	11	48.09	-115.14	3.2	9
2002	9	16	48.1	-115.14	3.3	8
2002	11	7	48.3	-114.29	3	9
2004	8	23	48.09	-114.54	2.7	11
2004	9	26	47.57	-114.31	3.8	17
2005	1	1	48.08	-115.15	2.8	13
2005	5	5	47.71	-113.67	3	6
2005	6	27	47.71	-113.68	3.2	12
2005	7	3	47.7	-113.7	3.4	12
2005	7	12	47.71	-113.68	2.9	11
2005	12	20	47.63	-114.15	2.9	12
2005	12	21	47.71	-113.68	3.2	8
2006	2	7	47.72	-113.66	3.3	8
2006	3	22	48.83	-115.2	4.2	8
2006	7	31	47.63	-114.16	2.5	13
2007	5	9	48.11	-115.13	3.1	9
2007	7	3	47.62	-113.82	2.8	15

SOURCE:*USGS National Earthquake Information Center*

Search area is 100 km radius centered on 48.400N: 114.200W

3.1.6 Human-Caused Hazards

Human-caused hazards include accidental events and intentional acts that provide threats to human health and property. These are distinct from natural hazards primarily in that they originate from human activity. Accidental incidents include those that arise from human activities including transportation, manufacture, storage, and use of hazardous materials. Incidents arising from mass transportation accidents such as plane or train accidents are also considered human-caused hazards. The term "terrorism" refers to intentional, criminal, malicious acts. Terrorism hazards include the intentional use of biological, chemical, nuclear, and radiological weapons; arson, incendiary, explosive, and armed attacks, industrial sabotage and intentional chemical releases.

Whether intentional or accidental, human-caused disasters involve the application of one or more modes of harmful force to the built environment. These modes are defined as contamination (chemical, biological, radiological, or nuclear hazards), energy (explosives, arson, and electromagnetic waves), or failure or denial of service (sabotage, infrastructure breakdown, and transportation service disruption). These hazards can be triggered by malicious intent or accidents related to storage and transportation. Hazards, such as structural fires, may also be related to accidents associated with normal day-to-day operations. Potentially significant human-caused hazard risks to northwest Montana communities include damage to infrastructure including dams, power lines and fuel storage facilities and chemical releases or spills (particularly fuels in transit or at bulk storage facilities).

3.1.6.1 Location and Extent of Human-Caused Hazards

Record research has not found any incidents of previous events involving hazardous waste. Nor were any records found documenting terrorism, violence, bio-terrorism, or spread of communicable diseases. The flu epidemic in the early 1900's probably had some impact to the county's population.

The proximity of the Canadian Border and the security of the Border crossing is a potential concern with respect to both unintentional and intentional human caused hazards. Health threats from disease brought across the Border (either unintentionally or intentionally) could be a threat to Flathead County residents and those outside the County. The level of security at the remote rural Border crossings only provides superficial health screening and there are no facilities to safely detain or isolate any suspected health threats. The length of uncontrolled Border and limited Border security at the designated Eureka crossing are a potential concern related to unwanted infiltration or potential terrorist threat. Although the low population density and lack of major military or industrial facilities makes Flathead County a low risk for terrorist activities, the potential for accidents related to transport of terrorists and hazardous or biologic materials through the county must be considered.

Large-scale accidents involving mass casualty are a concern associated with a variety of human activities including transportation, large gatherings and population centers. Transportation accidents involving aircraft, railroad and highway systems have the potential for involving a large number of people. The risk of such accidents is a function of the volume of traffic; the condition of the transportation system and natural and man caused influences. Many of the causes of potential mass casualty events are described elsewhere in this Plan and the Flathead County Emergency Response Plan (OES, 2004). Possible causes, or contributing causes, to a mass casualty event include such things as weather, structural fire, flood, dam failure, health emergency, hazardous material spill or even terrorism. However, some potential risk factors related to potential mass casualty incident may be essentially technological in nature, such as a mechanical failure that results in an aircraft or train crash. Although the likelihood of a mass casualty accident or incident in Flathead County is low, this situation is addressed in this Plan and the Flathead County Emergency Operations Plan.

Transportation of hazardous materials including chemicals, pesticides and fuels through Flathead County occurs on a daily basis. A number of businesses, hospitals and government agencies produce, utilize or store hazardous substances as part of their routine activities. Spill or release of hazardous materials has the potential to occur from transportation accidents, pipeline breaks, fuel storage leakage or work place incidents. Although most hazardous materials spills are small and quickly contained without significant impact to human health or the environment, a large or difficult to control release could affect a large number of people. Hazardous substance releases to air or water could affect both human health and the environment. Fuel or chemical spills can impact surface and groundwater resources and pose fire risk. Hazardous materials releases are addressed by the Flathead County Emergency Operations Plan, by local fire and law enforcement and by workplace safety regulations and procedures.

3.1.7 Dam Failure Hazards

Montana Department of Fish Wildlife and Parks (MT FWP) lists 17 dams in Flathead County (Figure 3-4). Five dams are considered high hazard structures and one as significant hazard under the DNRC hazard classification (Table 3-4). Two dams, McGregor Lake and Skyles Lake, have not been hazard classified. Montana DNRC classifies dams based on potential damage resulting from a dam breach, as follows: "high" - significant loss of life and property; "significant" - no loss of life and significant property damage; and "low" - minor property damage. These dams are used for hydropower, flood control, fire protection, irrigation, recreation, stock watering and water supply. Emergency Action Plans related to potential failure of high hazard dams in Flathead County are kept in the County OES office.

3.1.7.1 Location and Extent of Previous Dam Failure Events

There is no record of significant dam failures in Flathead County, but there have been failures in Montana. Swift Dam, an earthen dam in Pondera County, failed in 1964 due to heavy rainfall. Another earth filled dam in Lewis and Clark failed in 1975 when heavy rain fell in that area. The high and significant hazard dams in Flathead County range from a 5 foot tall irrigation dam to the 564 foot high Hungry Horse hydroelectric dam, on the South Fork of the Flathead River, capable of storing over two million nine hundred thousand (2,900,000) acre feet of water. Catastrophic failure of any of the five high hazard dams would cause downstream flooding that could impact residential structures and/or public roads. Failure of the Hungry Horse dam has the potential to inundate roads, critical facilities and a large number of homes and businesses. Catastrophic release from the dam certainly would have impacts following the Flathead River and its flood plain as far as Flathead Lake.

TABLE 3-4. DAMS LOCATED IN FLATHEAD COUNTY, MONTANA

DAM NAME	RIVER	NID HEIGHT (ft)	NID STORAGE (acre feet)	YEAR COMPLETED	DRAINAGE AREA (square miles)	HAZARD
ASHLEY	ASHLEY CREEK	10	27600	1928	?	L
AVERILL	TR-LITTLE	32	214	1964	?	L
BIG MEADOWS IRRIGATION DAM	FISHER RIVER	6	920	1967	?	L
CEDAR CREEK	CEDAR CREEK	86	2720	1971	13	H
HARDY DAM	TR-FISHER	10	200	1957	3	L
HUBBART	LITTLE BITTERROOT	-10	-10	1923	117	H
HUNGRY HORSE	SOUTH FORK	564	2982026	1952	1640	H
JESSUP MILL POND	MILL CREEK	28	358	1941	125	H
LION LAKE DAM	WHELP CREEK	23	1621	1948	200	L
LION LAKE SOUTH DIKE	WHELP CREEK	23	800	1948	?	L
LITTLE BITTERROOT	LITTLE BITTERROOT	-10	-10	1918	32	S
MCGREGOR LAKE	MCGREGOR CREEK	5	2	1932	?	?
ROBERT MONK IRRIGATION DAM	FISHER RIVER	6	600	1971	?	L
SMITH LAKE DAM		15	131	?	3	H
SWAN RIVER DIVERSION DAM	SWAN RIVER	12	109	1902	655	L
WHITEFISH SEWAGE LAGOON	WHITEFISH	9	106	1962	?	L

Levees along the Flathead River protect low areas in local floodplains and historic river channels from flooding during high water events. Failure of the levees would have significant impacts to relatively few properties.

There has been at least one episode of vandalism to a dam that could have compromised the dam structure leading to flooding. A small explosive charge was detonated in a pipe in the Hubbart Dam in 2005.

3.1.8 Avalanche Hazards

When snow accumulations on a slope do not have adequate strength to support the load, avalanches can occur. An avalanche can bury and/or move things in its path. The majority

of avalanches occur in remote high mountain locations and do not cause any damage to humans or property; occasionally however, people, roads and property may fall in their paths. Avalanches can create temporary dams in streams. Damage to highways and other infrastructure may be incurred when these dams are breached or cause flooding. The State of Montana DES website identifies slopes where avalanches can occur: "If it is assumed that an accumulation of snow is possible anywhere in Montana, then we can evaluate the potential for hazard solely on the basis on terrain characteristics. The most important factor by far is terrain steepness. Wet snow avalanches can start on slopes of 20 degrees or less, but the optimum slope angle for avalanche initiation is 25 - 45 degrees. Slopes steeper than 45 degrees will not normally retain enough snow to generate large avalanches, but they may produce small sluffs that trigger major avalanches on the slopes below. Therefore, all slopes of 20 degrees and greater should be considered as potential avalanche sites."

The Colorado Avalanche Information Center has compiled statistics on a national basis on avalanche fatalities. Montana ranks fifth in the nation with over 75 fatalities from 1950/51 to 2007/08. Activities the affected individuals were undertaking at the time of the avalanche accidents show that climbing, backcountry skiing, and snowmobiling rank as the top three activities triggering the fatal avalanches. A map titled Vulnerability to Avalanches in Montana, published in the Montana Hazard/Vulnerability Analysis (1987), indicates that Flathead County is generally an area of moderate avalanche vulnerability.

3.1.8.1 Location and Extent of Previous Avalanche Events

Avalanche hazards most directly threaten winter recreationists, homes and businesses in mountainous areas, communication infrastructure, utility lines, and transportation systems. Recreationists trigger avalanches while snowmobiling, backcountry skiing\snowshoeing, and occasionally while skiing at developed resorts. Natural avalanches occur without human activity. Avalanches can result in temporary dams when snow and debris block streams, sometimes resulting in highway closure due to flooding (Butler, 1989).

Highway 2 and the Burlington Northern Santa Fe railroad (BNSF) both traverse mountainous terrain heading over the continental divide at Marias Pass in the eastern part of Flathead County. Between 32 and 44 trains per day go over Marias Pass carrying 61 million tons of freight per year (Reardon, et al., 2004). Approximately 1,000 cars per day use the pass in the winter (Reardon, et al., 2004). Both the train and vehicular traffic may carry hazardous materials.

Snowslides have crossed both the railroad and the highway on numerous occasions, most notably in the John F. Stevens Canyon (See Figure 3-4). Snow sheds over the railroad have been installed to mitigate the hazard, but avalanches still interrupt rail, as well as highway traffic. Approximately 90 avalanches leading up to rail and\or highway closures have been documented in the John F. Stevens Canyon between 1976 and 2004, prompting closures on ten occasions (Reardon, et al., 2004). These events destroyed a bridge, dammed a creek, partially dammed the Middle Fork of the Flathead River, buried cars, moved a microwave tower building, destroyed utility lines, and interrupted train traffic for up to 48 hours (Reardon, et al., 2004).

Big Mountain Ski resort exercises avalanche control on a regular basis. However, there is no avalanche control in out of bounds areas. Skiers venturing out of bounds do so at their own risk and have triggered slides. One such event in 2008 resulted in the death of two skiers. Backcountry recreationists are the most vulnerable to avalanches. There were two incidents in Flathead County in 2007, one near Marion Lake triggered by a skier and the other triggered by a snowmobile in Jewel Basin.

The greatest vulnerability to avalanches is to recreationists who may trigger, or otherwise be caught in, an avalanche. These victims are at high risk of losing their lives. Avalanche incidents involving the railroad and highway have yet to result in loss of life, but significant financial losses have been incurred.

Avalanche vulnerability areas generally coincide with National Forests and other government lands with higher elevation and steep slopes. The areas within the County with vulnerability to avalanche hazards is small; however, people using the mountainous areas in winter risk encountering avalanches. Some probability warning capabilities exist for avalanches; however, some individuals may not receive the warnings or may choose to ignore them. Loss of life is a real possibility.

3.1.9 Landslide Hazards

Landslides occur in steeper terrain where geology and soil conditions present unstable conditions. Planar weaknesses in bedrock and\or low strength soils can fail, especially when lubricated by heavy rainfall or snowmelt. Movement on incipiently weak bedrock and soil masses can be initiated when the toe of the mass is cut into for road or building construction. Landslides also can be triggered by seismic activity.

3.1.9.1 Location and Extent of Previous Landslide Events

The United States Geological Survey considers most of Flathead County to be of low landslide incidence (Godt, J.W., 1977), with portions of the mountain fronts on the east side of the valley being moderate to high landslide susceptibility and incidence. However, there have been several small (<50 acre) landslides mapped in the Valley (Figure 3-5). These slides are predominantly in glacial and alluvial deposits and located above road cuts or riverbanks, which may have triggered movement. They may also be older (Pleistocene) slides developed in wetter climates.

The Montana Bureau of Mines and Geology has mapped nine landslides in the county. Six of these slides are in mountainous terrain in the Bob Marshall Wilderness, two are in glacial deposits adjacent to Flathead Lake, and one is next to the Little Bitterroot River downstream from the Hubbart Reservoir.

A block of bedrock slid down from a road cut on Highway 93 in 1995. This slide occurred where a planar weakness, a bedding plane, failed and the overlying bedrock block slid onto

the road. This type of failure could reoccur where similar geologic conditions exist in road cuts.

The "Columbia Mountain Slide," located approximately three miles southeast of Columbia Falls, is described as a periglacial, bedrock landslide (Smith, 2001). The toe of this landslide is undergoing suburban development. The landslide covers nearly 500 acres and may have originally developed during waning stages of the last ice age. A strong seismic event could possibly reactivate movement and cause significant damage to housing and possibly jeopardize human life.

3.1.10 Volcanic Eruption Hazards

Volcanic eruptions can generate lava flows, flooding of rivers and streams, seismic activity and ash falls and flows. Impacts from a volcanic eruption decrease as distance from the eruption increase. The closest active volcanoes to Flathead County are in the Cascade Mountains approximately 300 miles to the west.

3.1.10.1 Location and Extent of Previous Volcanic Events

Impacts in Flathead County from volcanic eruption are from ash fall and possibly minor seismic activity. Significant accumulations of ash fell in the Kalispell area when Mount St. Helens erupted in 1980. Air traffic, ground traffic, car finishes, and human health were impacted which affected local economies. Volcanoes in the northern Cascades will erupt again, but when an eruption will occur is difficult to predict.

3.1.11 Hazards Not Carried Forward in Risk or Vulnerability Ratings

Some identified hazards were dismissed from risk and vulnerability ratings because impacts to populations, properties or economies are perceived to be minor or because of overlap with other hazards. Insect infestation for example overlaps with wildfire hazards, in that bug-killed timber presents hazardous fuel conditions. Similarly, biological hazards in the form of infectious disease, animal disease, blight and agricultural disease are considered human caused hazards which are difficult to mitigate without excessive cost benefits. Some of these

can also be caused, or at least made worse by, warm winters/drought conditions. Subsidence hazards in the County are primarily related to historic mine workings and are in relatively remote locations and on Forest Service land. The Forest Service and the State have programs addressing the hazard. Hazards related to Volcanic eruptions are a low probability and there is little one can do to prepare or mitigate for them on an ongoing basis. Landslide hazards are not carried forward because probabilities are low and, in part, can be a subset of summer storms and earthquakes.

3.2 HAZARD PRIORITIZATION

Between 1974 and the present, 14 federal and/or state disasters have been declared in Flathead County (Table 3-1). Declared disasters have included wildfire and flood events.

Hazards discussed and evaluated during the interviews and public meetings are presented in Table 3-5. This table, which is setup as a matrix to list and prioritize hazards based on probability and magnitude, was developed and used in public meetings held in Flathead County.

A probability rating was assigned to each hazard based on the potential to affect Flathead County residents in the future. Probability ratings were assigned as high, medium or low indicating probabilities of once every 1 to 2 years, once every five to ten years, or once every ten or more years.

Magnitude ratings were assigned based on a combination of which hazards had caused prior fatalities, resulted in property damage or had the potential to cause the most economic hardship within the County. The number of people affected by the hazard was also factored into the rating. In general low magnitude ratings indicate property impacts of $100,000 or less and fewer than 100 people affected; a medium magnitude indicates property impacts of $100,000 to $500,000 and 100 to 2,000 people potentially affected; and a high rating indicates property impacts greater than $500,000 and more than 2,000 people affected.

Based on review of the historical record and local knowledge, coupled with the probability and magnitude ratings, Flathead County residents identified three major hazards that consistently affect this geographic area: wildfire, winter storms, and flooding (Table 3-5).

TABLE 3-5. HAZARD PRIORITY RANKING SURVEY RESULTS FOR FLATHEAD COUNTY, MONTANA

Hazard		Probability of Disastrous Event (chance in any given year)	Magnitude (severity/impact to community)	Priority Rank
Wildfire		High	Moderate-High	1
Weather Winter Storms Summer Storms		Moderate-High	Moderate	2
Flooding		Moderate	Moderate	3
Earthquake		Low	High	4
Human Caused	Hazardous Materials	Moderate	Moderate-High	5
	Mass Casualty	Low	Low-Moderate	6
	Terrorism & Violence	Low	Moderate-High	7
	Communicable Disease & Bio-Terrorism	Moderate	Moderate	8
	Civil Unrest	Low-Moderate	Moderate-High	9
Dam Failure		Low	High	10
Avalanche		Moderate	Low	11

3.3 VULNERABILITY ASSESSMENT

Assessing vulnerability requires understanding the function, location and importance of those things that the community values. For purposes of this risk assessment, key critical infrastructure, primarily buildings that house critical community services and key transportation facilities, were identified as valued community resources. Other critical infrastructures identified by the community included certain bridges and communications

facilities that are key to emergency response. To assess the vulnerability of these community assets, their locations were mapped on the County GIS system and compared to risk factors associated with wildfire, flooding and landslide risk. Some of the identified hazard risks such as winter storms and earthquake had similar risk factors throughout most of the inhabited area of the county.

3.3.1 Property Values

The US Census Bureau's database for Flathead County indicates a total of 36,674 housing units in 2005 with a median value of $125,600. Approximately 73% of homes in Flathead County are owner-occupied (US Census Bureau, 2007). Estimating valuation for all commercial and public buildings and infrastructure is not easy because public records are not organized to readily provide this data. There were 3,774 private non-farm businesses in Flathead County in 2004 (US Census Bureau, 2007). These businesses range from one-person in-home establishments to large stores and industrial facilities. Data from the Montana Cadastral Database lists 5,783 commercial, non-farm properties with a total taxable value of $2,613,805,819 with an average value of approximately $451,980. Property values in the Cadastral Database range from less than $10,000 for small business buildings to over $28 million for the Flathead Hospital.

To estimate valuation for this Plan, a value of $200,000 per commercial establishment or $2 million per commercial block, was used. Similarly there is a wide range in value of publicly owned buildings and infrastructure from small metal buildings housing a rural fire district or ambulance with a replacement value of $100,000 or less to the Hungry Horse Dam with a replacement cost of hundreds of millions of dollars.

3.3.2 Critical Facilities and Infrastructure

Critical facilities are of particular concern because they provide, or are used to 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 are defined as facilities critical to government response and recovery activities (i.e., life safety and property and environmental protection) (Table 3-6). Critical facilities include: emergency services such as police and fire stations, emergency dispatch/ 911 emergency call centers; medical facilities (hospitals and ambulance); transportation infrastructure (roads, bridges, railroads, airports); and utilities.

Critical facilities data were obtained and mapped and then reviewed and corrected during public review process. Future GIS mapping is intended to periodically update and increase the accuracy of facility locations. Maps showing the location of emergency response facilities (law enforcement – Figure 3-6 and fire stations – Figure 3-7), emergency medical facilities (hospitals and ambulance Figure 3-8), critical transportation infrastructure (airfields and heliports - Figure 3-9; major roads and rail lines– Figure 3-10, and bridges - Figure 3-11), high hazard dams (Figure 3-4) and energy infrastructure\power generation facilities (Figure 3-12) services continually update this information, particularly that serving vulnerable populations, such as schools, day care facilities and nursing. Flathead County OES will add and update critical infrastructure as information becomes available.

3.3.3 Future Growth and Land Use Trends

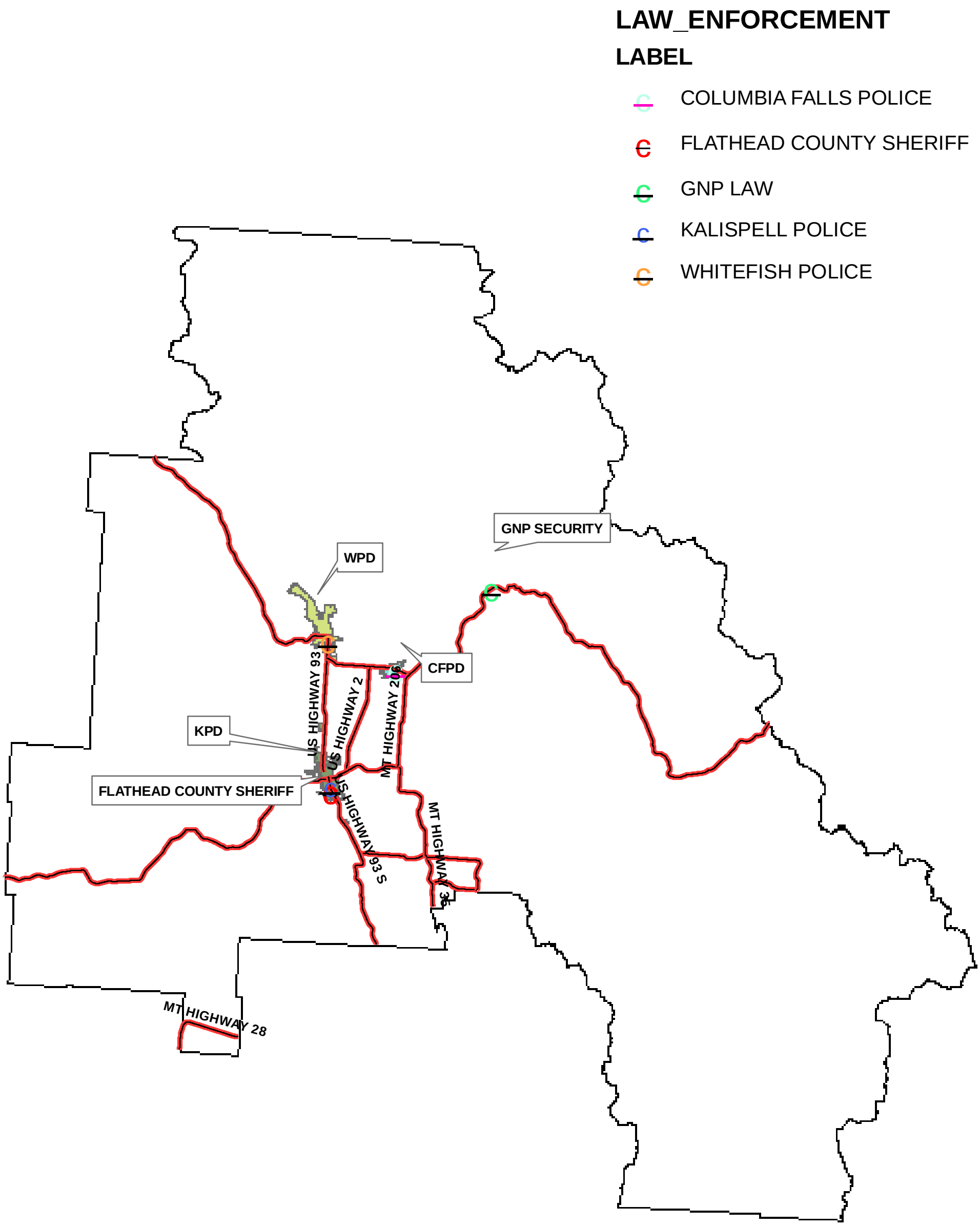
Flathead County has been gaining population since the 1990 census. The U.S. Census indicates that between 1990 and 2000, Flathead County gained 26% in population. Between 2000 and 2006 the population is estimated to have increased an additional 14.6%. The Flathead County Planner suggests that this trend will continue into the future. Much of Flathead County's growth is occurring outside of incorporated communities. In addition to requiring expansion of services for this rural growth, this trend will place new development in areas where natural hazards, particularly fire, are an issue.

Forest products and service jobs are the basis of the Flathead County economy and this is not expected to change in the near future.

TABLE 3-6. CRITICAL FACILITIES – FLATHEAD COUNTY, MONTANA

EMERGENCY SERVICE			
Fire	**Law Enforcement**	**Public Health**	**Search & Rescue**
Badrock Fire – Columbia Falls	Columbia Falls Police	Alert Aeromedical – Kalispell	Middlefork Quick Response Unit
Big Fork Fire & Ambulance	Flathead County Sheriff	Big Mountain Ambulance	Flathead County Search and Rescue
Big Mountain Fire & Rescue	Kalispell Police Department	Big Fork Ambulance	Also most Fire Departments
Columbia Falls Fire Department	Whitefish Police Department	Kalispell Station 62	
Coram/West Glacier Fire	Montana Highway Patrol	Flathead Co. Health Dept.	
Creston Fire Department		Marion Ambulance	
Glacier National Park Fire		Olney Ambulance	
Hungry Horse Volunteer Fire Department		Smith Valley Medical - Kalispell	
Kalispell Fire Department		Three Rivers Ambulance	
Marion Fire		Whitefish Ambulance	
Olney Volunteer Fire Department		Glacier National Park Medics	
Smith Valley Fire Department		Kalispell Regional Medical Center	
Somers/Lakeside Fire		North Valley Hospital - Whitefish	
South Kalispell Volunteer Fire Department			
West Valley Volunteer Fire and Rescue			
Whitefish Fire Department, Fire and Ambulance			

LOCATION OF LAW ENFORCEMENT FACILITIES-FLATHEAD COUNTY, MONTANA



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DATE PLOTTED:	09/11/2007
PROJECTION	
SCALE:	1 inch equals 10 miles

FILE PATH:

FLATHEAD COUNTY GIS DEPARTMENT

e-mail: gis_online@co.flathead.mt.us
URL: http://co.flathead.mt.us

800 S MAIN ST
KALISPELL MT 59901

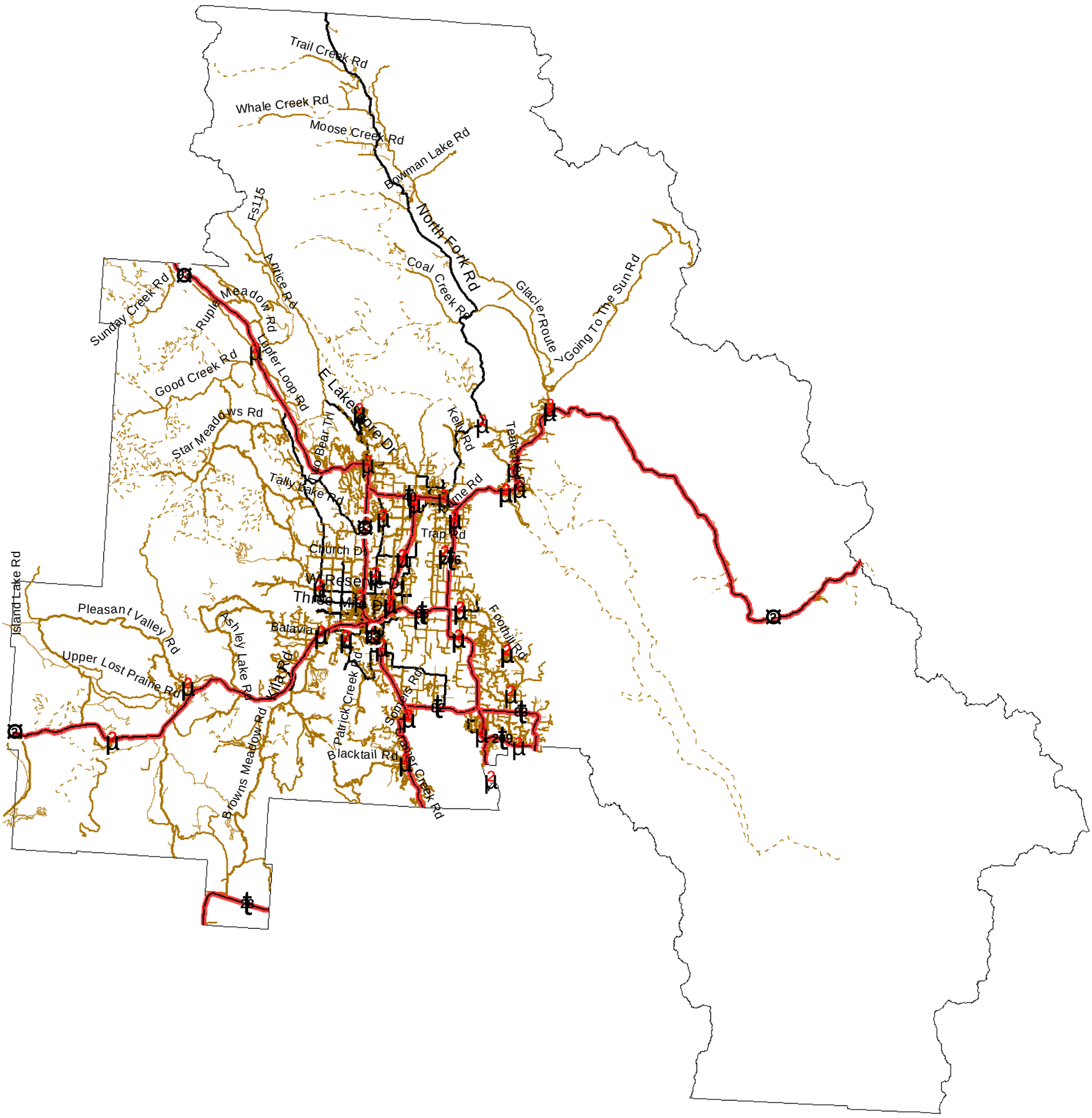
PH: 406-758-5540
FAX: 406-758-5840

CITY LIMIT
COLUMBIA FALLS
KALISPELL
WHITEFISH
CITY LIMIT

HIGHWAY
COUNTYBDY

FIGURE 3-6

LOCATION OF FIRE STATIONS-FLATHEAD COUNTY, MONTANA



PROJECT:	FLATHEAD COUNTY FIRE DEPARTMENTS
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PROJECTION	
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FLATHEAD COUNTY GIS DEPARTMENT
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FIGURE 3-7

LOCATION OF MEDICAL FACILITIES FLATHEAD COUNTY

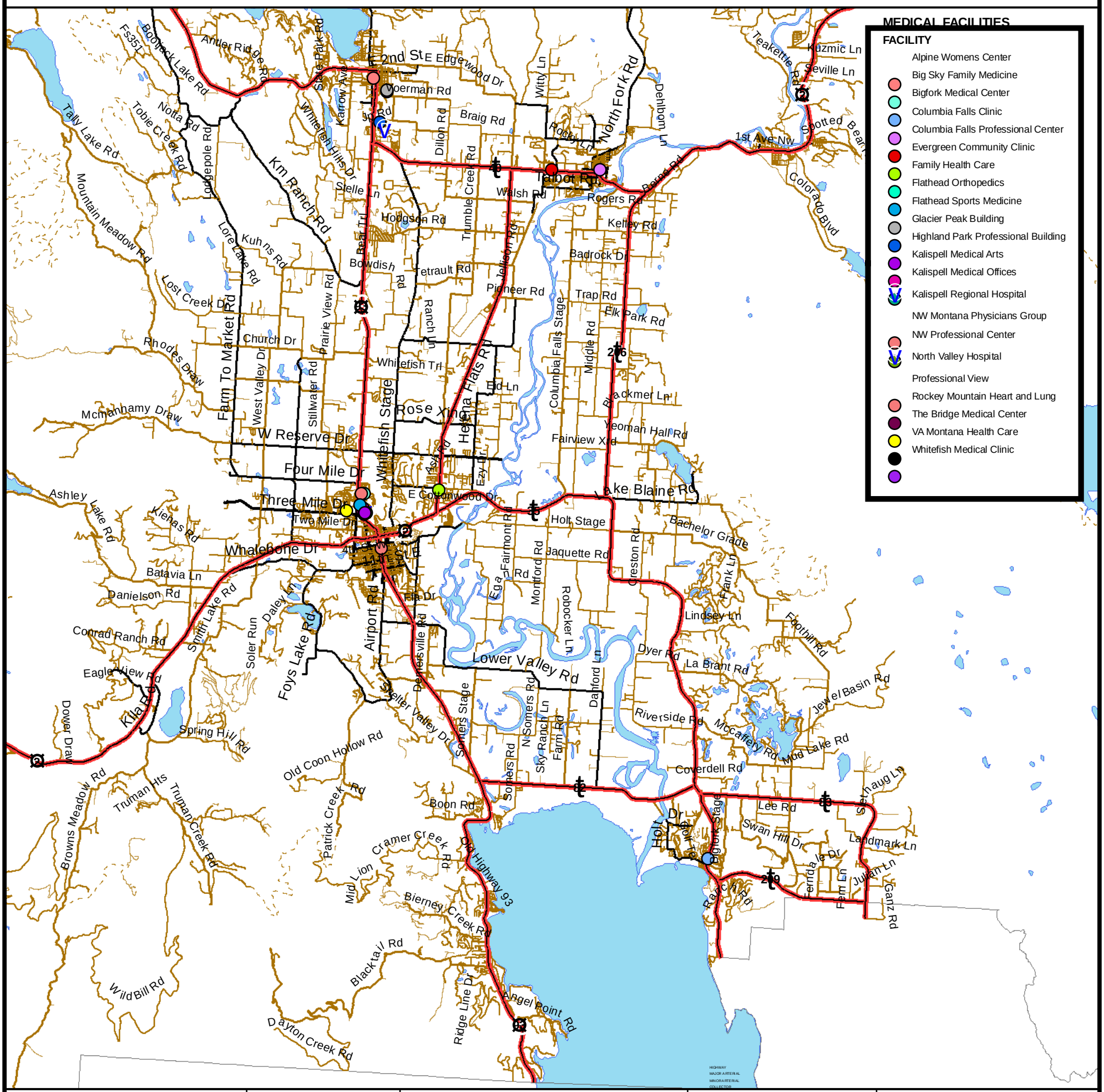
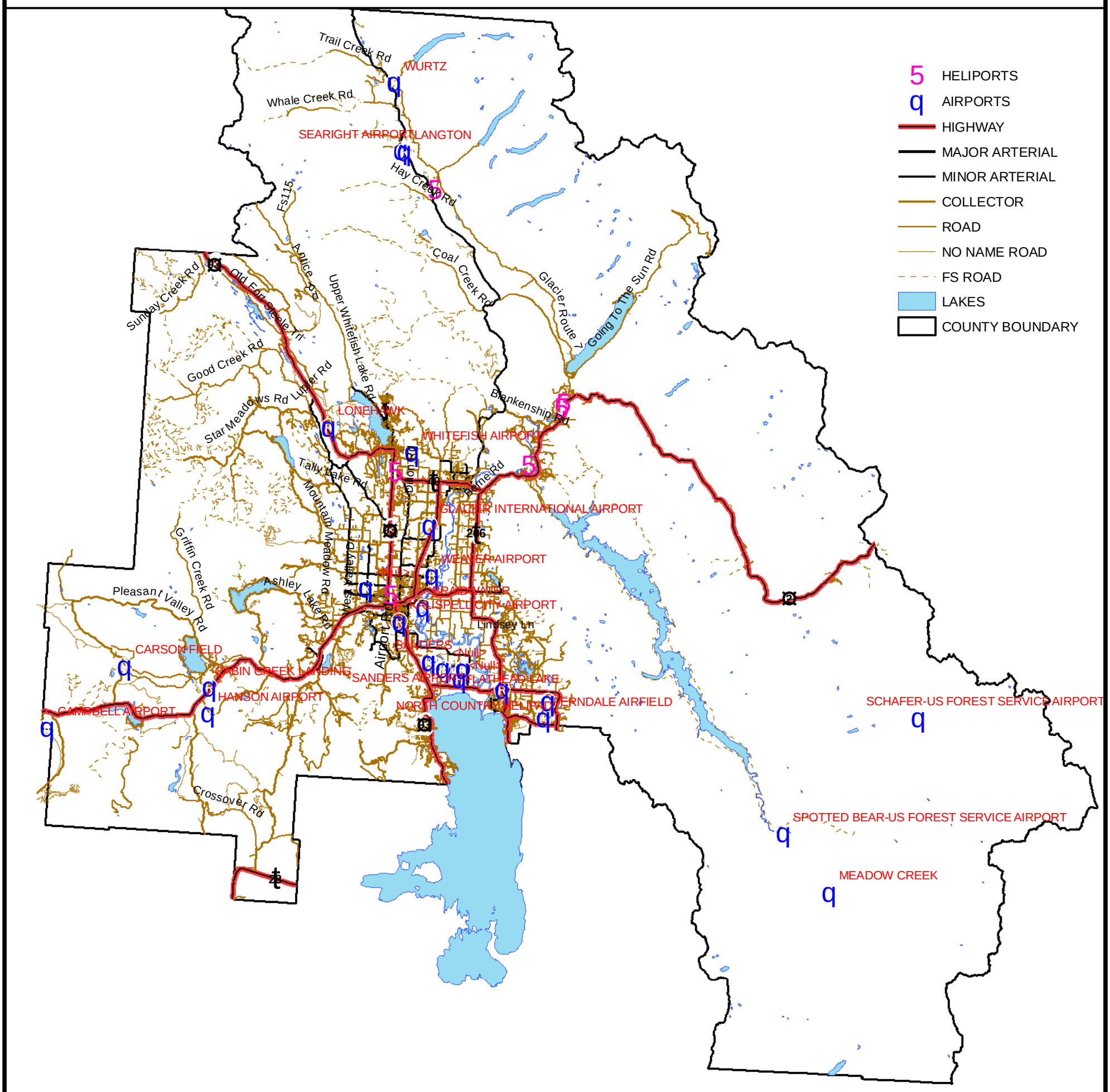


FIGURE 3-8

LOCATION OF AIRPORTS & HELIPORTS FLATHEAD COUNTY



PROJECT:	FLATHEAD COUNTY AIRPORTS & HELIPORTS
DATE PLOTTED:	07/27/2007
PROJECTION	
SCALE:	1:633,600

FILE PATH:
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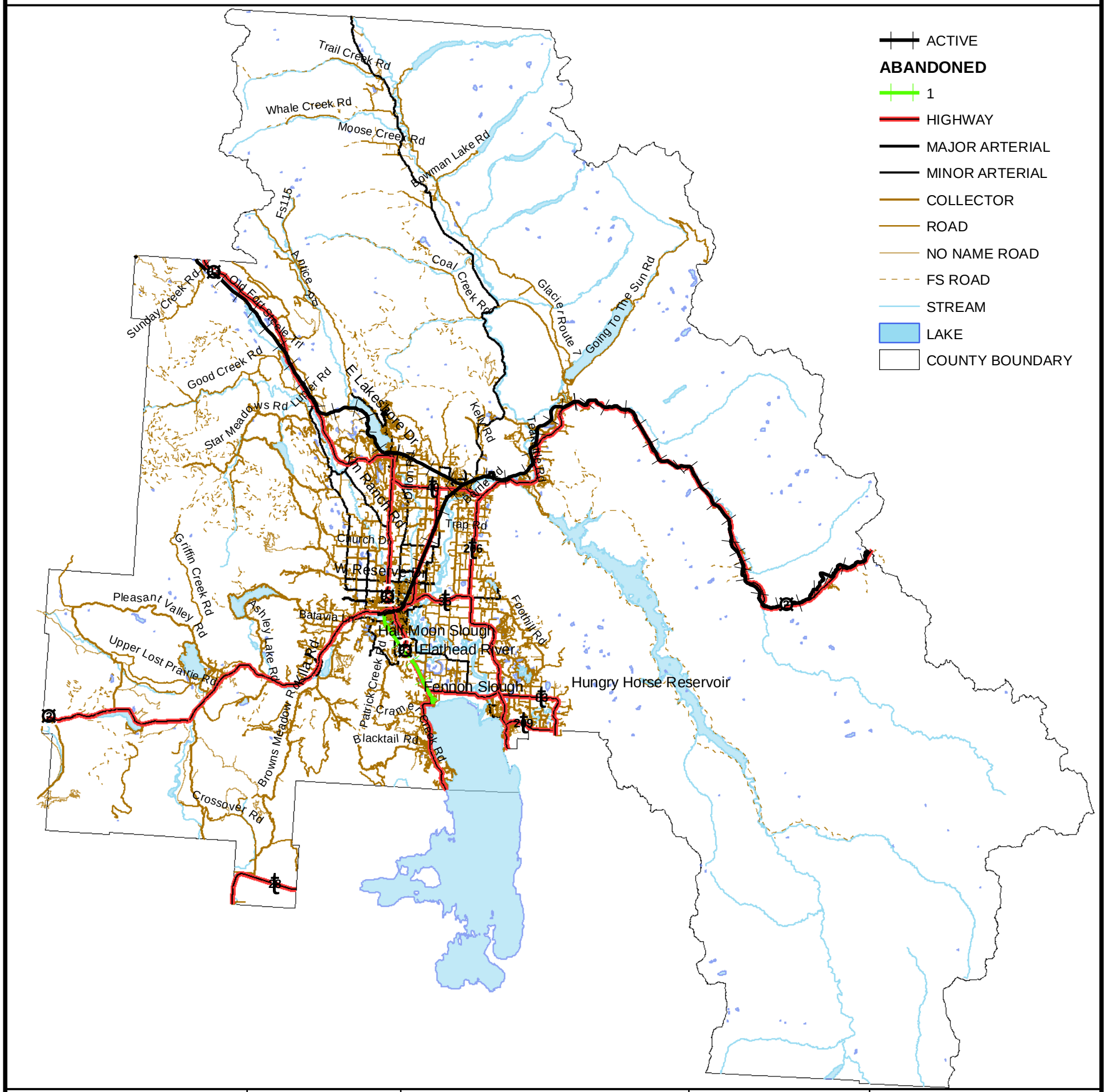
FIGURE 3-9

MAJOR ROADS & RAILROADS-FLATHEAD COUNTY



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PROJECTION	
SCALE:	1:633,600

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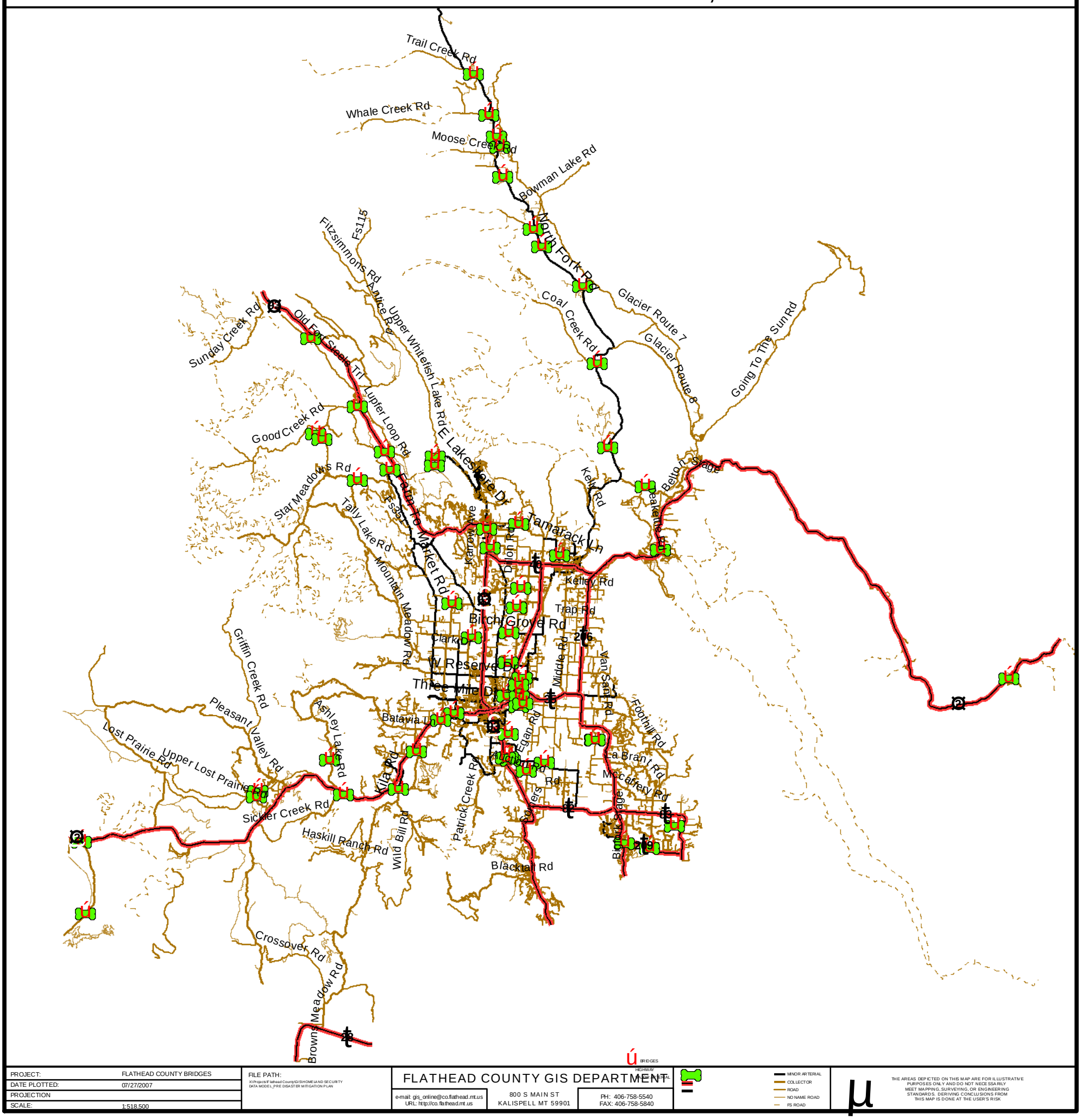
FIGURE 3-10

BRIDGES-FLATHEAD COUNTY, MONTANA



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PROJECTION	
SCALE:	1:518,500

FILE PATH:
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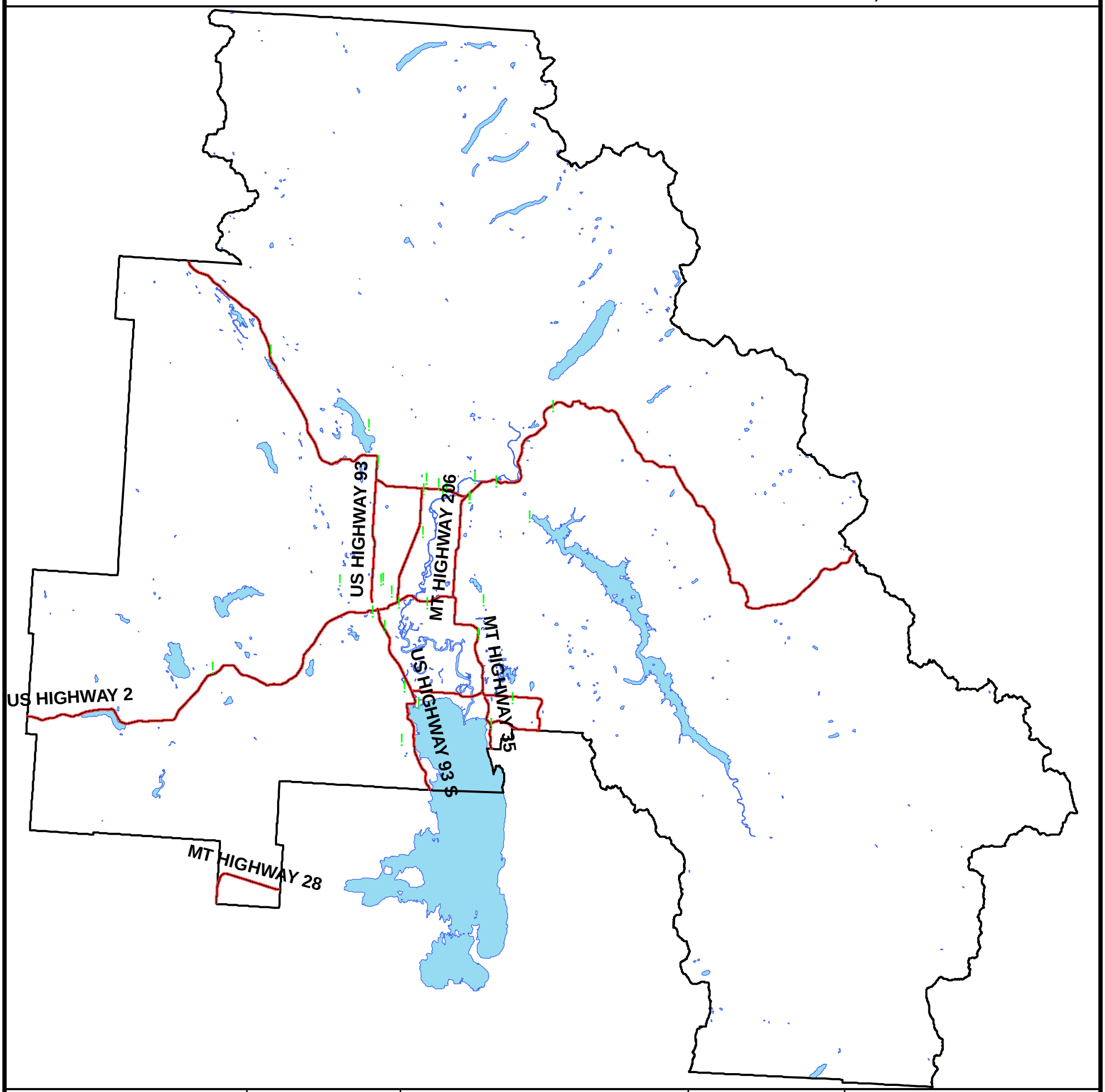
FIGURE 3-11

ENERGY INFASTRUCTURE-FLATHEAD COUNTY, MONTANA



PROJECT:	FLATHEAD ELECTRIC COOP SUBSTATIONS
DATE PLOTTED:	07/30/2007
PROJECTION	
SCALE:	1:633,600

FILE PATH:
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FEC_SUBSTATIONS
HIGHWAY
COUNTYBDY
LAKES

THE AREAS DEPICTED ON THIS MAP ARE FOR ILLUSTRATIVE PURPOSES ONLY AND DO NOT NECESSARILY MEET MAPPING, SURVEYING, OR ENGINEERING STANDARDS. DERIVING CONCLUSIONS FROM THIS MAP IS DONE AT THE USER'S RISK

FIGURE 3-12

Although at this time Flathead County does not have regional zoning, location of proposed buildings, infrastructure or critical facilities located in identified hazard areas can be evaluated relative to hazard risk in future facility location decisions. Development of GIS based mapping of critical facilities as part of this PDM Plan development provides a tool for county residents and service providers to evaluate risks of various hazards.

3.3.4 Vulnerable Populations

In addition to property damage, the major focus of the pre-Disaster Mitigation Planning process is on the impact of any hazard on people. The severity of the impact is related to the intensity of the hazard, the population affected, and the population's ability to protect itself. In addition to the geographic location of potential hazards, the evaluation of hazard risks also highlighted sensitive populations that may be more vulnerable to hazards. Locations of facilities housing or serving vulnerable populations are in the process of being mapped in Flathead County. Vulnerable populations include the young, the old and the infirm. Schools, day cares, nursing homes, clinics and hospitals are facilities serving vulnerable populations and are given special weighting in evaluating risk in the PDM planning process. Fifty percent of the schools, police stations, hospitals, retirement homes, and City offices, are estimated to be located in the 100-year flood plain mapped in Flathead County. Greater than 25% of the County population is located in the wildland/urban interface zone mapped by the U.S. Forest Service (Figure 3-1).

3.4 HAZARD EVALUATION

The frequency, location, intensity and likelihood of recurrence of hazards were, major factors used in prioritizing hazards that the community identified as being of most concern during public meetings.

3.4.1 Hazard Recurrence

The frequency of past hazard events and, when available, tools for predicting occurrence of future events were used as a guide to evaluate the probability of future hazards occurring. Accurate records have not been kept for some of the identified hazards. Where records are

available, they may be biased towards hazards that occurred in the more populated areas. This is a potential concern as current growth in areas like Flathead County is expanding into rural areas outside city boundaries.

Data from the NOAA National Climate Data Center Storm Events database, local records, USGS earthquake modeling and input from the local public were used to evaluate the likelihood of recurrence of natural hazards. Recurrence intervals range from an average of several times per year for severe winter storm events to a 25% probability of a low level earthquake event with a 50 year recurrence interval. FEMA flood plain maps delineate the 100-year and 500 year flood plains, which correlate to a 1% and a 0.2% probability of flooding in any given year. Wildfires that threaten human activity and residences, although not known on a statistical basis, seem to recur several times per decade based on historical records and the memory of local citizens. The frequencies of wildfire events seem to be increasing over the last few years.

3.4.2 Hazard Geographic Distribution

The geographic distribution of hazards has been mapped and utilized to evaluate potential impacts on critical facilities and the general population.

3.4.2.1 Wildfire

Forest fires in the vicinity of developed residential areas represent a significant risk for Flathead County. Many of Flathead County's communities are surrounded by forestlands and residential expansion is common in heavily timbered areas. Wildfire threat is a function of fuel load, fuel conditions and ignition sources. Historic occurrence and fuel characteristics indicate that much of the county is at high risk for future wild fire. Areas with steep slopes and locations where road access may be limited are particularly vulnerable to fast spreading fire conditions and contribute to risk for loss of life and/or property. According to the Urban Wildland Interface Code, 2000, published by the International Fire Code Institute (IFCI), a "Heavy Fuel" is vegetation consisting of herbaceous plants and round wood greater than 3 inches in diameter – the forested areas of Flathead County would fall in this category. Figure 3-1 depicts fire risk areas based on proximity of forest and

developed areas and fuel conditions mapped by the U.S. Forest Service for Flathead County. Many of the communities in the county are in close proximity to forested areas and are concerned about forest fire potential. Some areas of the valley bottoms are more strongly influenced by risk of grass/range fire.

3.4.2.2 Weather

Winter Storms - The entire project area is subject to winter storm conditions. Although severity of winter storms, particularly snowfall, varies significantly with elevation and topography, the populated valley bottoms can be characterized as having a similar risk throughout the County. Therefore the hazard profile area for winter storms is the entire project area.

Summer Storms - Historical data indicates that thunderstorms, hail and microburst wind events can cause damage to structures, forest and crop land and endanger people out of doors throughout Flathead County. Based on review of weather data and the determinations made for tornadoes, windstorms and thunderstorms, the entire project area is considered to have a similar level of risk for severe thunderstorms, including high winds and hail.

3.4.2.3 Flooding

Historically, flooding has been documented using floodplain maps. Floodplain maps have been developed by FEMA to show flood-prone areas in the County. The floodplain areas in the County are shown on Figure 3-3. FEMA is currently revising the floodplain maps for Flathead County, but these revisions were not available at the time of the PDM planning. Flooding can also occur along other streams throughout the county where FEMA mapping has not been completed. Population density is generally much lower along streams outside of communities in the County, but continued development and lack of mapping or floodplain regulations may result in increasing risk of flood damage in other areas of the County.

3.4.2.4 Earthquakes

An earthquake would impact the entire county. Buildings and residences located on certain types of soils may experience more damage due to liquefaction or low-density soils. Rocks and boulders may be loosened and roll down steeper slopes impacting buildings near the bottom. As mentioned in Section 3.1.9, the Columbia Mountain Landslide may be reactivated with a seismic event.

3.4.2.5 Human-Caused Hazards

Based on review of historical accounts of human-caused and technological hazards, and input from the public meetings, it was determined that a significant component of risk in this category was related to transportation of hazardous materials and the transportation infrastructure. Location of major transportation arteries, which included highways and railroad lines, are shown on Figure 3-10. Impacts from a dam failure will vary with the size of the impoundment. Failure of low risk dams, as defined by the DNRC, will inflict "minor property damage," while failure of a high risk dam will result in "significant" loss of life and property. Certainly the most significant potential damage would result from failure of the Hungry Horse Dam, which would impact Kalispell and Columbia Falls and all lower lying areas as far as Flathead Lake.

3.4.2.6 Avalanche Hazards

Highest risk of significant human exposure to avalanches is associated with short sections of Highway 2 and the railroad tracks in the Flathead River canyon, east of Columbia Falls. Winter recreators will be exposed to avalanches any time they are in the mountains.

3.5 VULNERABILITY ASSESSMENT: ESTIMATING POTENTIAL LOSSES

3.5.1 Hazard Probability

The probability or likelihood of a hazard occurrence affects the assessment of vulnerability from that hazard. For this risk assessment, hazard probability estimates were developed based on historical disaster records, potential for occurrence estimates and input from those involved in development and review of the Plan. Hazard probabilities in the vulnerability

assessment are categorized as high, medium or low based on the likelihood of an occurrence within a 5, 10 or 20 year period, respectively.

3.5.2 Extent of Exposure

The number of structures or people potentially affected by the occurrence of a disaster event is expressed as the Potential Extent of Exposure. The Potential Extent of Exposure is based on an estimate of structures impacted by a given hazard. For this risk assessment, Extent of Exposure estimates are expressed as a range. Hazard Potential Extent of Exposure magnitudes are expressed as a rating of Very High, High, Moderate or Low as a function of the numbers of structures or people impacted. Very High exposure would impact greater than 100 residential or commercial structures or greater than five critical facilities (Table 3-6); High would impact 50 to 100 residential or commercial structures or two to five critical facilities; Medium would impact 10 to 50 residential or commercial structures or one critical facility; Low would impact less than 10 residential or commercial structures and no critical facilities.

Some hazards, such as winter storm events and smoke inhalation, have the potential to affect essentially all of the structures and population of Flathead County. Other hazards, such as wildfire, summer storms or flooding are likely to put a smaller subset of the structures and population at risk. The Extent of Exposure values used in this vulnerability assessment are intended to reflect the likely maximum level of impact.

3.5.3 Severity of Impacts

Severity of impacts is a weighting factor intended to account for differences in type, extent and cost of property damages inflicted by various hazard events. For example, weather related damage could be downed power lines, trees across roads or collapsed roofs; flooding damage could be bridge and culvert destruction or water damage to structures; and fire damage could range from smoke damage to complete destruction of structures. Severity ratings are set at arbitrary values of 25% or low, 50% or medium, 75% or high and 100%,

very high damage to property or structures based on the likely maximum level of impact for a given hazard.

3.5.4 Human Health and Life Impacts

Human health and threats to human life are separated from affects of hazard events on property because they are qualitatively different. Human health impacts (disease, accident, etc.) or loss of life are quantified in this evaluation as High, Medium or Low as an estimate of the likelihood of human health impact or loss of life from individual hazard events. Historic records, potential for life or health threatening situations and input from local health officials were considered in this rating.

3.5.5 Vulnerability Calculations

Vulnerability calculations present a quantitative assessment of the vulnerability of structures, people, and critical facilities to individual hazards and cumulatively to all hazards. The equation used to develop the overall relative risk values in this Plan is:

> Overall Vulnerability = Probability + Extent of Exposure + Severity + Human Health/Life Impacts (where appropriate)

Where:

- Probability = Score (3, 2, 1) based on probability of event occurring within the next 5 (High), 10 (Moderate) or greater than 10 years (Low) (Section 3.5.1);
- Exposure = Score 4 (Very High), 3 (High), 2 (Moderate), 1 (Low) based on numbers of structures or critical facilities at risk as described in Section 3.5.2
- Severity = Score (4, 3, 2, 1) percent of damage expected as described in Plan Section 3.5.3; and
- Human Impacts = Score (3-High, 2-Moderate, 1- Low) as described in Section 3.5.4.

Overall Vulnerability scores were categorized into High (greater than 10), Moderate (8-10) and Low (less than 8).

Table 3-7 presents the results of the vulnerability calculations for all of Flathead County.

TABLE 3-7. VULNERABILITY ASSESSMENT – FLATHEAD COUNTY, MONTANA

Hazard		Probability	Extent of Exposure	Severity	Human Impacts	Vulnerability	Rank
Wildfire		High	High	High	Moderate	High	1
Weather Winter Storms and Summer Storms		High	Very High	High	Moderate	High	2
Flooding		Moderate	Very High	Moderate	Moderate	High	3
Earthquake		Low	High	High	Moderate	Moderate	4
Human Caused Hazards	Hazardous Materials	Moderate	Low	Low	Moderate	Low	5
	Mass Casualty	Moderate	Low	Low	Low	Low	6
	Terrorism & Violence	Low	Low	Moderate	Low	Low	7
	Communicable Disease & Bio-Terrorism	Low	High	Low	Moderate	Low	8
	Civil Unrest	Low	Low	Low	Moderate	Low	9
Dam Failure		Low	Very High	Very High	High	High	10
Avalanche		Low	Low	Low	Low	Low	11

3.5.6 Future Vulnerabilities

As discussed in Section 3.3.3, growth in Flathead County will continue to cause increased demands on County services and continue to put new residences in locations of potential natural hazards. Of particular note is the increased number of residences located in forested areas peripheral to existing development. Not only are the residents at risk of eventual wildfire, but also County resources for fire protection are increasingly stretched. Revised floodplain mapping is expected to be available soon, and will allow better definition of areas at risk for flooding from area streams.

4.0 MITIGATION STRATEGY

Specific mitigation goals and projects were developed for Flathead County and cooperating Cities in conjunction with input from the public meetings, the LEPC and others contacted regarding the proposed Plan. During the period of PDM Plan development, Flathead County developed a Wildfire Community Protection Plan to address wildfire issues Countywide. The fire mitigation planning process and PDM Plan development have areas of overlap and are intended to complement each other.

Attendees of the spring, 2004 public meetings were individually polled on the probability of a disastrous event occurring from each hazard, the magnitude or impact of that event to the community, and provided input to the ranking of each identified hazard.

Following is a description of goals and objectives intended to direct mitigation of potential natural and potential man-caused hazards that builds on the community's existing capabilities. Plan implementation and legal framework are also discussed in this section.

4.1 LOCAL HAZARD MITIGATION GOALS

The Plan goals describe the overall direction that Flathead County agencies, organizations and citizens propose to take toward mitigating risk from natural and man-caused hazards. Goals and objectives of the Plan were developed during interviews and meetings with public officials and at the public meetings held to solicit input. Hazards due to avalanches were not selected to be included in mitigation goals as avalanche vulnerability (Table 3-5), hazard ranking (Table 3-7) were low (in fact the lowest for all hazards in both ranking efforts) and the location of potential avalanche areas are primarily on federal lands. Flathead County hazard mitigation goals are identified below:

- Minimize Risk of Wildfire at Urban Interface;
- Reduce Impacts of Severe Weather Events;
- Reduce Impacts from Flooding;
- Increase Earthquake Preparedness;

- Reduce Risk and Impacts of Hazardous Material Incidents; and
- Reduce Risks with Dam Failure.

4.2 MITIGATION OBJECTIVES AND ACTIONS

Mitigation objectives and specific actions or potential projects identified by the County and cooperating Cities as part of the Pre-Disaster Mitigation Planning process are described in this Section. These mitigation activities are applicable to the entire county including all participating jurisdictions. A variety of funding sources may be available to assist with these projects, including Federal funds through FEMA, the Forest Service and the Bureau of Land Management. Flathead County and cooperating Cities will seek to secure funding sources to implement these projects in the future. To the extent practical, Flathead County will try to coordinate the Objectives and Actions of this PDM Plan with the Goals and Policies of Flathead County.

4.2.1 Wildfire

Objective 1: Reduce fuels in the wildland urban interface (WUI).

Types of potential actions:

- Homeowner fuel reduction programs. RC&D Grant programs in place and active at present. RC&D are also working on other areas of the Flathead to get landowners to do fuel reduction on private properties.
- Land owner education. DNRC, USFS, RC&D and the local Volunteer Fire Departments are currently conducting landowner education on wildfire and fuel reduction of the wildland interface and adjoining lands (WUI).
- Controlled burns.
- Forest fuel reduction. DNRC and the Flathead National Forest are currently working on projects to reduce fuels in the areas of high risk to neighboring landowners in the WUI.
- Streamlined permitting process for fuel reduction.
- Ingress and egress fuel reduction.
- Fuel reduction in utility right-of-ways.

- Insurance incentives.
- Farmer, rancher, and homeowner education specific to wildland fire problems.
- Ordinances restricting WUI acreage near communities.
- Abandoned building removal/regulations.
- Weed control or mowing along railroads, county roads, and USFS roads.
- Support alternative methods to burning when reducing fuel hazards, such as chipping and harvest.

Objective 2: Accurately assess and address the current wildland urban interface (WUI) problems at the subdivision level.

- Require new subdivisions to have adequate on-site water capacity and recharge for fire protection (Flathead County Growth Policy, P 32.1).
- Support mutual aid agreements between rural and municipal fire districts (Flathead County Growth Policy, P 32.2).
- Subdivisions outside of existing rural fire districts should be annexed into the nearest district if possible (Flathead County Growth Policy, P 32.3).
- Ensure convenient access to and within all subdivisions for the largest emergency service vehicles (Flathead County Growth Policy, P 32.4).
- Encourage two or more subdivision access points in areas of high and extreme fire hazard (Flathead County Growth Policy, P 32.5).

Types of potential actions:

- Implement County fire mitigation plan.
- Coordination with federal and state land management agencies.
- Water supply systems in existing subdivisions.
- Statewide consistent fire risk assessment system.

Objective 3: Discourage unsustainable growth in wildland hazard areas.

Types of potential actions:

- Promotion of fire-resistant building materials.
- Enforce emergency access regulations.
- Structure sprinkler system program.
- Real estate disclosures.
- Restrict commercial development in unsafe, inaccessible, remote rural areas (Flathead County Growth Policy, P 6.2).

Objective 4: Improve Fire Fighting Capabilities

Types of potential actions:

- Develop water storage capacity and identify water supply sites to enhance fire-fighting capability.
- Improve fire agency infrastructure (training facility; additional fire equipment storage; enhanced communications systems).
- Provide for shared database between fire suppression agencies on: road closures, water sources, fuel ratings, district boundaries, ignition hazards and railroads.
- Use enhanced 911 inventory to identify residences and critical infrastructure.
- Identify areas with high number of fire starts and inadequate suppression equipment.

4.2.2 Weather

Objective 1: Reduce response time for maintenance and repairs associated with severe weather events.

Types of potential actions:

- Utilize 911 mapping.
- Train maintenance crews (power lines, etc.).
- More snowplows.

- Public education addressing emergency preparedness.
- Alternative heat and power sources for facilities with vulnerable populations and critical facilities.
- Develop recommendations for disaster supply kit contents.

4.2.3 Floods

Objective 1: Prevent flooding of structures and infrastructure from inadequate storm drainage and poorly designed irrigation waterways.

Types of potential actions:

- Flood resistant landscape guidelines (berms, ponds, irrigation, etc.).
- New driveway/private road bridge and culvert guidelines.
- Evaluate bridges and culverts at risk from flooding and develop schedule and funding to replace or upgrade as necessary.
- Stream bank restoration.
- Backflow valves.
- Storm drains.
- Elevate roadways.
- Water retention basins.
- Identify areas that could be turned into parks etc.
- Discourage high density development within the 500-year floodplain (Flathead County Growth Policy, P 10.1).
- Discourage high density development within the 100-year floodplain (Flathead County Growth Policy, P 10.2).

Objective 2: Provide adequate warning of flooding events.

Types of potential actions:

- River warning systems.
- Real time automated river gauges (11 in place).
- Snotel sights in place (6).

- Mapping of burn areas to be provided to NWS.
- Continue and promote additional use of NOAA Weather Radios/Storm Ready Program.

Objective 3: Improve the effectiveness of flood insurance programs.

Types of potential actions:

- Flood insurance education, especially insurance agents and home\business owners living in floodplain.
- Floodplain mapping of unmapped areas. Updated floodplain mapping of mapped areas. Adopt FEMA maps and existing floodplain studies as they become available. (Flathead County Growth Policy, P 38.1).
- Review and revise floodplain regulations. This could include appropriate setback requirements from floodplains (Flathead County Growth Policy, P 38.2).
- Development in floodway or floodway fringe should not create a net increase in the floodplain area (Flathead County Growth Policy, P 38.3). Consider density guidelines in the floodplain regulations (Flathead County Growth Policy, P 38.4). Discourage development that displaces floodwaters within the 100-year floodplain (Flathead County Growth Policy, P 38.5).

Objective 4: Reduce the risk of dam or levee failure.

Types of potential actions:

- Removal of high hazard, inadequate flood control structures.
- Repair of dams or levees.
- Dam failure alert systems.

4.2.4 Earthquakes

Objective 1: Strengthen existing residential, commercial, and government structures.

Types of potential actions:

- Site evaluations of critical facilities.
- Window film for shatter prevention in schools.
- Non-structural mitigation program for public schools, i.e., equipment/furniture straps.
- Non-structural and structural retrofits of government buildings, particularly critical facilities.
- Residential and business retrofit programs.
- Education.

Objective 2: Provide for earthquake resistance in new construction.

Types of potential actions:

- Enforcement of current building codes.
- Model seismic building codes.
- Mapping of earthquake risk zones and faults at a local government scale.
- Higher building standards for critical facilities and structures housing vulnerable populations.

Objective 3: Educate the public in earthquake mitigation and readiness.

Types of potential actions:

- Require earthquake drills in schools in Flathead County.
- Public education regarding household tie- down of heavy items and furniture.
- Workplace earthquake drills in Western Montana.
- Expand earthquake-monitoring network.
- Continue “Earthquake Preparedness Month” outreach activities during October.
- Presentations and distribution of earthquake awareness materials.

Objective 4: Upgrade community infrastructure for seismic hazards.

Types of potential actions:

- Retrofits of bridges and overpasses for seismic stability.
- Retrofits of public utility systems for seismic resistance.
- Public utility shut off valves.
- Seismic evaluations of dams.
- Educate transportation and utility employees on seismic hazards.

4.2.5 Human Caused Hazards

Objective 1: Identify the areas within the county, which are most vulnerable.

Types of potential actions:

- Maintain and update GIS mapping of critical infrastructure.
- Ensure emergency service personnel have current training and equipment for response.

4.2.6 Dam Failure

Objective 1: Identify areas that are most vulnerable.

Types of potential actions:

- Coordinate with Bureau of Reclamation as to emergency procedures.
- Maintain and update GIS mapping of critical infrastructure.
- Develop and maintain early warning systems.

4.3 PROJECT RANKING AND PRIORITIZATION

The public input process was used to obtain information to rank hazards and associated mitigation objectives. Input in the public LEPC meetings led to consensus values for local community priorities. Objectives identified by Flathead County as top priorities are presented in Section 4.2.

Public concerns and priorities and vulnerability to specific hazards (identified in the Vulnerability Assessment ranking values Table 3-7) provide a focus on which hazards are of most concern to Flathead County. Potential mitigation projects to address the identified hazards were provided by the public and agency review. The relation of project costs to potential benefits can be used to further focus on mitigation projects that may be of higher priority in Flathead County. Table 4-1 presents a summary of mitigation objectives associated with the hazards identified for Flathead County and provides an analysis of costs and benefits of potential mitigation action items.

Costs, benefits and feasibility of each potential mitigation project were evaluated to provide input into development of the overall mitigation priority list. The cost benefit analysis uses the following factors: cost (including management costs), feasibility (politically, socially, and environmentally), population benefit, property benefit, and community priorities are the primary tool in the cost-benefit analysis. Each of the factors was ranked low, moderate, or high for each of the projects. The categories and the associated scoring method are as follows:

Cost (including management):	3 Score	Low <$10,000
	2 Score	Moderate $10,000 - $50,000
	1 Score	High <$50,000
Feasibility:	3 Score	Low
(Politically, Socially	2 Score	Moderate
Environmentally)	1 Score	High
Population Benefit:	3 Score	Low < 25% of population benefits
	2 Score	Moderate 25% - 75% of population benefits
	1 Score	High > 75% of population benefits
Property Benefit:	3 Score	Low < 25% of property benefits
	2 Score	Moderate 25% - 75% of property benefits
	1 Score	High > 75% of property benefits
Community Priorities:	3 Score	Low – Priority 11-18 hazards
(Comment at Public Meetings)	2 Score	Moderate – Priority 4-10 hazards
	1 Score	High – Priority 1-3 hazards

The overall cost-benefit was then calculated by adding the total score for each project (see Table 4-1).

TABLE 4-1. COST BENEFIT RANKING OF POTENTIAL MITIGATION PROJECTS

Cost Benefit for Proposed Projects						
Project	*Cost*	*Feasibility*	*Population Benefit*	*Property Benefit*	*Community Priorities*	*Score*
WILDFIRE						
Objective 1: Reduce fuels in the wildland urban interface						
Forest fuel reduction	2	3	3	3	3	14
Homeowner fuel reduction	3	2	3	3	2	13
Land owner fuel reduction	3	2	3	3	2	13
Streamlined permitting for fuel reduction projects	3	2	2	2	3	12
Restrictive ordinances	3	1	3	3	1	11
Weed control on transportation & utility ROWs	1	3	3	2	2	11
Controlled burning	1	1	3	3	2	10
Insurance incentives	3	2	2	2	1	10
Utility ROW fuel reduction	1	3	2	2	1	9
Ingress/regress fuel reduction	1	2	3	1	1	8
Abandoned building removal / regulation	3	1	2	1	1	8
Alternatives to burning for fuel reduction	1	2	2	1	1	7
Objective 2: Address the current wildland urban interface problems at the subdivision level.						
Mutual aid agreements rural and municipal FDs	2	2	2	2	2	10
Encourage multiple access to subdivisions	3	2	2	2	1	10
Consistent state-wide fire risk assessment system	3	2	2	2	1	10
Subdivision requirement to provide fire water storage	3	1	2	2	1	9
Implement County fire mitigation plan	1	2	2	2	2	9
Coordination with state and federal agencies	2	2	2	2	1	9
Annex subdivisions to nearest FD	2	1	2	2	1	8
Water storage for existing subdivisions	1	1	2	2	1	7

TABLE 4-1. COST BENEFIT RANKING OF POTENTIAL MITIGATION PROJECTS (continued)

Cost Benefit for Proposed Projects						
Project	*Cost*	*Feasibility*	*Population Benefit*	*Property Benefit*	*Community Priorities*	*Score*
WILDFIRE						
Objective 3: Discourage unsustainable growth in wildland hazard areas						
Promote fire resistant building materials	3	2	2	2	2	11
Real estate disclosure	3	2	2	2	2	11
Discourage growth in high hazard areas	3	1	2	2	2	10
Enforce emergency access regulations	2	2	3	2	1	10
Restrict commercial development	2	1	2	2	1	8
Structure sprinkler systems	1	1	1	3	1	7
Objective 4: Improve Fire Fighting Capabilities						
Identify areas of high risk	3	3	3	3	2	14
Develop/identify water storage capabilities	3	2	2	3	2	13
Share data between agencies	3	3	2	2	3	13
Improve agency infrastructure	3	2	2	3	2	12
Enhanced 911 inventory	1	2	3	2	2	10
WEATHER						
Objective 1: Reduce response time for maintenance and repairs associated with severe weather events						
Public education	3	3	2	2	2	12
Training for maintenance crews	2	3	2	2	2	11
Utilize 911 program	2	2	2	2	2	10
More snow plows	1	3	2	2	2	10
Information on disaster kits	3	3	1	1	1	9
Alternative heat sources for critical facilities	1	1	2	2	1	7

TABLE 4-1. COST BENEFIT RANKING OF POTENTIAL MITIGATION PROJECTS (continued)

Cost Benefit for Proposed Projects						
Project	*Cost*	*Feasibility*	*Population Benefit*	*Property Benefit*	*Community Priorities*	*Score*
FLOODS						
Objective 1: Prevent flooding of structures and infrastructure from inadequate storm drainage and poorly designed irrigation waterways						
Discourage development in 100-yr floodplain	3	2	2	3	2	12
Discourage development in 500-yr floodplain	3	2	2	3	1	11
Road, bridge and culvert guidelines	3	2	2	2	1	10
Identify greenway areas	3	3	1	1	2	10
Upgrade bridges and culverts at risk	1	2	2	3	2	9
Strom drains	1	2	2	2	2	9
Water retention basins	1	3	2	2	1	9
Flood resistant landscape guidelines	3	2	1	1	1	8
Stream bank restoration	1	2	1	2	2	8
Elevate roadways	1	2	2	2	1	8
Backflow valves	1	2	1	1	1	6
Objective 2: Provide adequate warning of flooding events						
Promote awareness of NOAA weather radio system	3	3	2	1	2	11
Real-time automated river gauges	1	2	2	1	2	8
River warning systems	1	2	2	1	1	7
Snotel sites	1	3	1	1	1	7
Mapping of burn areas	1	3	1	1	1	7
Objective 3: Improve effectiveness of flood insurance programs						
Restrict/regulate development in floodplain areas	1	1	2	3	1	8
Map unmapped floodplains	1	3	1	1	1	7
Revise floodplain regulations	2	1	1	2	1	7
Flood insurance education	1	2	1	1	1	6
Objective 4: Reduce Risk of Dam and Levee Failure						
Remove high hazard / inadequate flood control structures	1	2	2	2	1	8
Dam failure alert system	1	3	2	1	1	8
Repair dams and levees	1	2	1	1	1	6

TABLE 4-1. COST BENEFIT RANKING OF POTENTIAL MITIGATION PROJECTS (continued)

Cost Benefit for Proposed Projects						
Project	*Cost*	*Feasibility*	*Population Benefit*	*Property Benefit*	*Community Priorities*	*Score*
EARTHQUAKE						
Objective 1: Strengthen existing residential, commercial and government structures						
Education	2	3	2	1	3	11
Site evaluations of critical facilities	1	3	2	2	2	10
Window film in schools	1	2	3	1	1	8
Non-structural mitigation in schools (furniture straps etc.)	1	2	2	1	2	8
Non-structural mitigation in critical facilities (furniture straps etc.)	1	2	2	1	2	8
Residential and business retrofit programs	1	1	1	1	1	5
Objective 2: Provide for earthquake resistance in new structures						
Model seismic building code	3	2	2	3	1	11
Enforcement of building code	1	2	3	3	1	10
Higher building standards for critical facilities	1	2	2	2	2	9
Map risk zones on local scale	1	1	1	1	1	5
Objective 3: Educate public in earthquake mitigation and readiness						
Continue "Earthquake Preparedness Month" activities	3	3	2	2	2	12
Require earthquake drills in schools	2	2	3	1	3	11
Public education	1	3	2	1	2	9
Workplace drills	3	2	2	1	1	9
Expand monitoring network	1	1	1	1	1	5
Objective 4: Upgrade community infrastructure for seismic hazards						
Install utility shutoff valves	1	3	2	2	1	9
Seismic evaluation of dams	1	3	2	2	1	9
Educate transportation and utility employees	2	2	1	1	2	9
Retrofit bridges and overpasses	1	2	2	1	2	8
Retrofit public utility systems	1	2	1	1	1	6

TABLE 4-1. COST BENEFIT RANKING OF POTENTIAL MITIGATION PROJECTS (continued)

Cost Benefit for Proposed Projects						
Project	*Cost*	*Feasibility*	*Population Benefit*	*Property Benefit*	*Community Priorities*	*Score*
HUMAN CAUSED HAZARDS						
Objective 1: Identify areas in county that are most vulnerable						
Maintain and update GIS mapping of critical facilities	2	3	2	2	2	11
Ensure emergency personnel have current training and equipment for response	1	3	2	2	2	10
DAM FAILURE						
Objective 1: Identify most vulnerable areas						
Coordinate with Bureau of Reclamation on emergency procedures	3	3	2	1	2	11
Maintain and update GIS mapping of critical facilities	2	3	2	2	2	11
Develop and maintain early warning systems	1	3	3	1	2	10

Mitigation projects were then prioritized by ranking as high medium or low priority in order to provide some overall guidance to policy makers and for planning/budgeting. The priority ranking includes input from the public, agencies, the cost benefit analysis and the OES. Mitigation priority ranking is shown in Table 4-2.

4.4 PROJECT IMPLEMENTATION AND LEGAL FRAMEWORK

Once the Flathead County PDM Plan is formally adopted, the County will use the Plan to focus project prioritization and direct funding efforts. Mitigation projects will be considered for funding through federal and state grant programs, and when other funds are made available through the Cities/County. The LEPC, consisting of local officials and disaster planning personnel, would likely have input to hazard mitigation projects. The LEPC and the OES have the capacity to organize resources, prepare grant applications, and oversee project implementation, monitoring, and evaluation. Coordinating organizations may include local, county, or regional agencies that are capable of, or responsible for, implementing

TABLE 4-2. HAZARD MITIGATION RANKING – FLATHEAD COUNTY, MONTANA

Hazard Category	Hazard	Potential Impacts	Priority Rating	Mitigation
Fire	Wildfire	Road Closure	High	Fuel control projects such as thinning and fire breaks; improve fire control capability.
		Building Damage	High	
		Injury or loss of life	High	
		Smoke Inhalation	High	
Weather	Winter Storm	Power Outage	Medium	Improve 911 dispatching, prepare maintenance crews (roads/utilities), purchase more snowplows.
		Road Closure	High	
		Building Damage	Medium	
	Summer Storm	Power Outage	Low	Improve 911 dispatching, prepare maintenance crews (roads/utilities), purchase more snowplows.
		Road Closure	Low	
		Building Damage	Low	
Flood	Snowmelt	Drowning/stranding	High	Educate on flood prone areas, control projects, upgrade bridges and culverts
		Power Outage	Low	
		Road Closure	Low	
		Building Damage	High	
	Rain	Drowning/stranding	High	Educate on flood prone areas, control projects, upgrade bridges and culverts
		Power Outage	Low	
		Road Closure	Low	
		Building Damage	Medium	
Earthquake	Earth Movement	Power Outage	Low	Education: Building codes for seismic risks, earthquake drills in schools
		Road Closure	Low	
		Building Damage	Low	
		Injury or loss of life	Low	
		Railroad Blockage	Low	
Human Caused	Hazardous Materials	Human Health Threat	Low	Improve emergency response training and upgrade communications
		Environmental Threat	Low	
	Mass Casualty	Multiple Deaths or Injuries	Low	Improve emergency response training and upgrade communications
		Damage to infrastructure	Low	
	Terrorism and Violence	Bio-human Disease	Medium	Improve emergency response training and upgrade communications
		Bio-animal Disease	Low	
		Infrastructure Damage	Low	

TABLE 4-2. HAZARD MITIGATION RANKING – FLATHEAD COUNTY, MONTANA (continued)

Hazard Category	Hazard	Potential Impacts	Priority Rating	Mitigation
Human Caused	Communicable Disease and Bioterrorism	Hospital Facilities	Low	Develop and maintain GIS database of critical facilities. Improve emergency response training and upgrade communications.
		At Risk Populations	Low	Develop and maintain GIS database of at risk populations. Improve emergency response training and upgrade communications.
	Civil Unrest	Infrastructure Damage	Low	Improve emergency response training and upgrade communications.
	Dam Failure	Drowning/Stranding	Medium	Develop early warning system, define vulnerable areas.
		Power Outage	Medium	
		Road Closure	Medium	
		Building Damage	Medium	

activities and programs. The County Commissioners and chief elected officials, depending on jurisdictional responsibility, would generally determine project coordination and administration responsibilities.

A number of state and local regulations and policies form the legal framework available to implement Flathead County's hazard mitigation goals and projects. A list of these regulations and plans is presented below.

State of Montana

- Montana Subdivision and Platting Act
- Montana Building Codes
- Montana Sanitation Regulations
- Uniform Fire Code

Subdivision Local

- Septic Sewer Permits
- Fire Threat Assessment
- Growth Plan

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

- Initiate a planning and public education effort in conjunction with flood mitigation projects to prevent development in flood-prone areas.
- 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 city/county resources and assistance for mitigation projects.
- Partner with other organizations and agencies in northwest Montana to support hazard mitigation activities.

5.0 PLAN MAINTENANCE PROCEDURES

The Plan maintenance section of this document details the formal process that will ensure that the Flathead County Pre-Disaster Mitigation Plan remains an active and up-to-date document. The Plan maintenance process includes a schedule for monitoring and evaluating the Plan and producing a Plan revision every five years. This section describes how the county will integrate public participation throughout the Plan maintenance process. Also included in this section is an explanation of how Flathead County government intends to incorporate the mitigation strategies outlined in this Plan into existing planning mechanisms.

5.1 MONITORING, EVALUATING AND UPDATING THE PLAN

The Flathead County Pre-Disaster Mitigation Plan will be reviewed every two years, or as deemed necessary as knowledge of new hazards, and vulnerabilities becomes available. The review will determine whether a Plan update is needed prior to the required five-year update. The Plan review will identify new mitigation projects and evaluate the effectiveness of mitigation priorities and existing programs.

The Office of Emergency Services will be responsible for scheduling meetings with the Flathead County Commissioners and City officials at Kalispell, Columbia Falls and Whitefish to review and update the Plan. The meetings will be open to the public and advertised in the local newspaper to solicit public input. The County Commissioners, assisted by the OES, the LEPC and the public, will review the goals and mitigation projects to determine their relevance to changing situations in the county, as well as changes in state or federal policy, and to ensure they are addressing current and expected conditions. The LEPC and public will also review the risk assessment portion of the Plan to determine if this information should be updated or modified, given any new available data. The list of critical facilities will also be reviewed and enhanced with additional details. The Office of Emergency Services will give a status report detailing the success of various mitigation projects, difficulties encountered, success of coordination efforts, and which strategies

should be revised. The status report will be published in the local newspaper and posted on city and county Web sites to update local citizens.

The Office of Emergency Services, assisted by the LEPC, will be responsible for the five-year update of the Plan, and will have six months to make appropriate changes to the Plan before submitting it to the County Commissioners, City officials and the public for review and approval. Before the end of the five-year period, the updated Plan will be submitted to the State Hazard Mitigation Officer and FEMA for acceptance. The Office of Emergency Services will notify all holders of the county Plan when changes have been made.

5.2 IMPLEMENTATION THROUGH EXISTING PROGRAMS

Flathead County has an Emergency Operations Plan that provides details on emergency response to a variety of hazards. This Pre-Disaster Mitigation Plan references the Emergency Operations Plan and where feasible utilizes Emergency Operations Plan resources and procedures to help meet mitigation objectives.

The County has developed a Wildfire Community Protection Plan (Flathead County, 2004). The PDM Plan has placed a high priority on mitigating wildfire impacts. Coordination of the PDM Plan and fire mitigation plan will be under the direction of OES and the county fire warden, the fire plan steering committee and fire chiefs with jurisdiction in targeted areas.

Flathead County has no zoning or countywide building codes other than those established at a State level. State level codes apply to commercial structures and multi-dwelling unit structures. Floodplain development and Lakeshore Protection Zone permits are required. The cities of Kalispell, Whitefish and Columbia Falls have Building Inspectors responsible for administering building codes in their respective cities. Countywide the State Fire Marshal enforces the Uniform Fire Code. These offices will continue to work with the State Building Code Office to ensure that the County is enforcing the standards established in the State Building Codes. In addition, the incorporated Cities and Flathead County will work

with other agencies at the state level to review, develop and ensure that building codes are adequate to mitigate or prevent damage by natural hazards.

The County Planning Department will utilize the Plan to the extent feasible to supplement future planning efforts and as an educational tool to inform the public about natural hazards.

5.3 CONTINUED PUBLIC INVOLVEMENT

Flathead County is dedicated to involving the public directly in review and updates of the Pre-Disaster Mitigation Plan. The public will have many opportunities to provide feedback about the Plan. Copies of the Plan will be catalogued and kept at the County Commissioners offices in Kalispell and in public libraries in Kalispell, Whitefish, and Columbia Falls. City offices in Kalispell, Columbia Falls and Whitefish will also be provided copies. Section 2.0 of the Plan includes the address and the phone number of the Office of Emergency Services who is responsible for keeping track of public comments on the Plan.

Public meetings will be held as part of each two-year review and the required five-year update of the Plan. The meetings will provide a forum for public input to the Plan. The Office of Emergency Services will be responsible for using county resources to publicize future public meetings and maintain public involvement through the local media including the OES web site, newspapers and radio.

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APPENDIX A

RESOLUTIONS AND DOCUMENTATION OF PDM PLAN ACCEPTANCE BY LOCAL JURISDICTIONS

APPENDIX B

FLATHEAD COUNTY SEVERE WEATHER EVENTS
SOURCE: NOAA CLIMATE DATA WEB SITE

FLATHEAD COUNTY SEVERE WEATHER EVENTS
SOURCE: NOAA CLIMATE DATA WEB SITE

234 event(s) were reported in Flathead County, Montana between 01/01/1950 and 03/31/2007 (High Wind limited to speed greater than 0 knots).

Mag: Magnitude
Dth: Deaths
Inj: Injuries
PrD: Property Damage
CrD: Crop Damage

Date	Time	Type	Mag	Dth	Inj	PrD	CrD
6/22/1955	2300	Tstm Wind	0 kts.	0	0	0	0
7/13/1956	1700	Hail	1.00 in.	0	0	0	0
9/11/1958	2055	Tstm Wind	83 kts.	0	0	0	0
8/3/1960	1930	Hail	1.50 in.	0	0	0	0
7/14/1966	1500	Hail	2.50 in.	0	0	0	0
7/24/1966	2137	Hail	0.75 in.	0	0	0	0
8/11/1968	1800	Tstm Wind	0 kts.	0	0	0	0
8/11/1968	1813	Tstm Wind	52 kts.	0	0	0	0
4/23/1969	1730	Tstm Wind	0 kts.	0	0	0	0
7/6/1971	1245	Hail	0.75 in.	0	0	0	0
6/16/1972	1806	Hail	0.75 in.	0	0	0	0
5/18/1974	1624	Hail	0.75 in.	0	0	0	0
6/23/1974	2204	Hail	0.75 in.	0	0	0	0
6/24/1974	40	Hail	1.00 in.	0	0	0	0
8/25/1976	1630	Tstm Wind	0 kts.	0	0	0	0
8/18/1981	1600	Hail	0.75 in.	0	0	0	0
6/27/1982	1615	Tstm Wind	0 kts.	0	0	0	0
6/27/1982	1645	Hail	0.75 in.	0	0	0	0
6/29/1982	1855	Tstm Wind	54 kts.	0	0	0	0
7/25/1983	1800	Tstm Wind	0 kts.	0	0	0	0
8/12/1984	1834	Tstm Wind	50 kts.	0	0	0	0
8/23/1984	1400	Hail	1.00 in.	0	0	0	0
8/27/1985	1850	Hail	1.00 in.	0	0	0	0
6/16/1987	1830	Tstm Wind	60 kts.	0	2	0	0
6/28/1988	1115	Hail	0.75 in.	0	0	0	0

6/28/1988	1130	Hail	1.00 in.	0	0	0	0
6/28/1988	1200	Hail	1.75 in.	0	0	0	0
7/10/1989	1600	Hail	1.00 in.	0	0	0	0
7/15/1989	1645	Hail	1.00 in.	0	0	0	0
7/20/1989	1800	Hail	0.75 in.	0	0	0	0
7/20/1989	2000	Hail	0.75 in.	0	0	0	0
7/26/1989	2030	Tstm Wind	0 kts.	0	0	0	0
7/26/1989	2100	Tstm Wind	0 kts.	0	0	0	0
7/31/1989	1900	Tstm Wind	0 kts.	0	1	0	0
9/1/1989	2030	Tstm Wind	0 kts.	0	0	0	0
7/5/1990	1915	Hail	1.25 in.	0	0	0	0
8/20/1990	1700	Hail	1.00 in.	0	0	0	0
8/20/1990	1725	Tstm Wind	57 kts.	0	0	0	0
8/20/1990	1728	Tstm Wind	60 kts.	0	0	0	0
8/20/1990	1735	Hail	1.00 in.	0	0	0	0
1/22/1993	400	Heavy Snow	N/A	0	0	5K	0
1/25/1993	500	High Winds	82 kts.	0	0	0	0
2/27/1993	600	Ground Blizzard	N/A	0	0	50K	0
3/15/1993	930	Heavy Snow	N/A	0	0	50K	0
5/31/1993	1945	Thunderstorm Winds	N/A	0	0	5K	0
5/31/1993	2100	Thunderstorm Winds	N/A	0	0	500K	0
8/6/1993	2100	Hail	1.75 in.	0	0	5K	0
8/29/1993	1700	Heavy Snow	N/A	0	0	0	0
9/11/1993	2000	Heavy Snow	N/A	0	0	0	0
9/20/1993	800	Heavy Snow	N/A	0	0	0	0
10/7/1993	2000	Winter Storm	N/A	0	0	500K	0
11/1/1993	600	Heavy Snow	N/A	0	0	0	0
11/3/1993	200	High Winds	78 kts.	0	0	50K	500K
11/3/1993	1800	Heavy Snow	N/A	0	0	5K	0
11/15/1993	436	High Winds	58 kts.	0	0	0	0
12/3/1993	1000	High Winds	65 kts.	0	0	50K	0
2/13/1994	1100	High Winds	70 kts.	0	0	0	0
3/2/1994	800	Ice Jam Flooding	N/A	0	0	5.0M	5.0M
3/4/1994	2035	High Winds	55 kts.	0	0	0	0

3/21/1994	1000	Dust Storm/high Winds	N/A	0	0	50K	500K
4/15/1994	735	High Winds	52 kts.	0	0	0	0
5/15/1994	1645	Thunderstorm Winds	N/A	0	0	500K	0
5/15/1994	1715	Thunderstorm Winds	N/A	0	0	500K	0
6/13/1994	2200	Heavy Snow	N/A	0	0	0	0
6/26/1994	1000	High Winds	64 kts.	0	0	500K	0
8/3/1994	1700	High Winds	0 kts.	0	0	500K	0
8/14/1994	1645	Thunderstorm Winds	N/A	0	0	0	0
9/2/1994	2145	Thunderstorm Winds	N/A	0	0	1K	0
10/2/1994	0	Heavy Snow	N/A	0	0	0	0
10/15/1994	0	Heavy Snow	N/A	0	0	0	0
10/20/1994	600	High Winds	0 kts.	0	0	0	0
10/26/1994	1730	High Winds	0 kts.	0	0	0	0
11/1/1994	1900	Heavy Snow	N/A	0	0	0	0
11/16/1994	1800	Heavy Snow	N/A	0	0	500K	0
11/23/1994	700	High Winds	100 kts.	0	0	50K	0
11/25/1994	1200	Heavy Snow	N/A	0	0	500K	0
12/22/1994	454	High Winds	53 kts.	0	0	0	0
2/9/1995	2100	Heavy Snow	N/A	0	0	0	0
2/17/1995	300	Heavy Snow	N/A	0	0	0	0
2/17/1995	1200	High Winds	72 kts.	0	0	0	0
2/19/1995	800	High Winds	79 kts.	0	0	0	0
2/26/1995	200	Heavy Snow	N/A	0	0	0	0
3/4/1995	2200	Heavy Snow	N/A	0	0	0	0
3/24/1995	200	Winter Storm	N/A	0	0	5.0M	0
3/26/1995	1925	Hail	1.00 in.	0	0	0	0
4/8/1995	200	Heavy Snow	N/A	0	0	0	0
4/29/1995	0	Heavy Snow	N/A	0	0	0	0
5/11/1995	1145	Tornado	F0	0	0	0	0
5/12/1995	600	Winter Storm	N/A	0	0	0	0
5/20/1995	1800	Hail	0.75 in.	0	0	0	0
5/20/1995	1945	Hail	1.00 in.	0	0	0	0
5/26/1995	1200	Heavy Snow	N/A	0	0	0	0
7/9/1995	1940	Tstm Wind	0 kts.	0	0	0	0

8/4/1995	2300	Thunderstorm Winds	N/A	0	0	0	0
8/10/1995	1905	Hail	0.75 in.	0	0	0	0
8/10/1995	1950	Hail	1.75 in.	0	0	0	0
8/11/1995	1855	Hail	0.88 in.	0	0	0	0
8/11/1995	1910	Hail	1.75 in.	0	0	0	0
8/11/1995	1920	Hail	1.00 in.	0	0	0	0
8/11/1995	1945	Hail	1.75 in.	0	0	0	0
10/4/1995	0	Heavy Snow	N/A	0	0	0	0
10/10/1995	600	High Wind	0 kts.	0	0	0	0
10/18/1995	800	Heavy Snow	N/A	0	0	0	0
11/6/1995	1200	Winter Storm	N/A	0	0	0	0
11/9/1995	0	Heavy Snow	N/A	0	0	0	0
11/18/1995	1100	High Winds	77 kts.	0	0	0	0
11/26/1995	1200	Winter Storm	N/A	0	0	0	0
12/4/1995	200	High Winds	0 kts.	0	0	0	0
12/10/1995	0	Winter Storm	N/A	0	0	0	0
1/1/1996	12:00 AM	Heavy Snow	N/A	0	0	0	0
1/3/1996	7:00 AM	Winter Storm	N/A	0	0	0	0
1/12/1996	3:00 AM	High Wind	0 kts.	0	0	0	0
1/16/1996	6:00 AM	Heavy Snow	N/A	0	0	0	0
1/30/1996	3:00 AM	Extreme Cold	N/A	0	0	0	0
2/1/1996	11:30 PM	Extreme Cold	N/A	0	0	1K	0
2/2/1996	6:00 AM	Extreme Cold	N/A	0	0	0	0
2/7/1996	12:00 AM	Flood	N/A	0	0	733K	0
2/10/1996	2:00 AM	Heavy Snow	N/A	0	0	0	0
2/24/1996	12:00 AM	Winter Storm	N/A	0	0	0	0
3/3/1996	4:00 AM	Heavy Snow	N/A	0	0	0	0
3/11/1996	6:00 AM	Flood	N/A	0	0	1.5M	0
3/22/1996	12:00 AM	Winter Storm	N/A	0	0	0	0
3/27/1996	12:00 AM	Heavy Snow	N/A	0	0	0	0
4/1/1996	1:00 AM	Heavy Snow	N/A	0	0	0	0
4/10/1996	6:00 PM	Heavy Snow	N/A	0	0	0	0
4/12/1996	6:00 PM	Heavy Snow	N/A	0	0	0	0
4/24/1996	2:25 PM	Urban/sml Stream Fld	N/A	0	0	0	0

4/24/1996	3:00 AM	High Wind	70 kts.	0	0	0	0
5/4/1996	12:00 AM	Heavy Snow	N/A	0	0	0	0
5/8/1996	12:00 AM	Heavy Snow	N/A	0	0	0	0
5/23/1996	1:00 AM	Heavy Snow	N/A	0	0	0	0
7/2/1996	6:45 PM	Hail	1.00 in.	0	0	0	0
7/2/1996	7:15 PM	Hail	2.75 in.	0	0	0	0
7/2/1996	9:10 PM	Hail	1.75 in.	0	0	0	0
7/2/1996	9:20 PM	Hail	1.00 in.	0	0	0	0
10/19/1996	1:00 PM	Winter Storm	N/A	0	0	0	0
10/21/1996	6:33 PM	High Wind	75 kts.	0	0	0	0
10/22/1996	11:00 AM	High Wind	53 kts.	0	0	0	0
10/29/1996	1:00 AM	High Wind	62 kts.	0	0	0	0
11/18/1996	8:00 AM	Winter Storm	N/A	2	1	0	0
12/1/1996	7:00 AM	Heavy Snow	N/A	0	0	0	0
12/2/1996	7:00 AM	Heavy Snow	N/A	0	0	0	0
12/20/1996	7:00 AM	Winter Storm	N/A	1	0	0	0
2/26/1997	12:00 AM	Heavy Snow	N/A	0	0	0	0
3/12/1997	8:00 AM	Winter Storm	N/A	0	0	0	0
5/1/1997	12:01 AM	Flood	N/A	0	0	2.3M	0
5/31/1997	6:00 PM	Tstm Wind	52 kts.	0	0	0	0
7/21/1997	7:30 PM	Hail	1.00 in.	0	0	0	0
8/1/1997	6:25 PM	Hail	1.50 in.	0	0	0	0
8/7/1997	1:00 PM	Hail	1.75 in.	0	0	0	0
9/14/1997	8:10 PM	Hail	1.00 in.	0	0	0	0
3/3/1998	7:00 AM	Heavy Snow	N/A	0	0	0	0
5/20/1998	5:35 PM	Tstm Wind	52 kts.	0	0	0	0
5/25/1998	6:00 PM	Tstm Wind	52 kts.	0	0	0	0
5/26/1998	5:00 PM	Tstm Wind	52 kts.	0	0	0	0
1/22/1999	3:15 PM	Heavy Snow	N/A	0	0	0	0
2/1/1999	8:00 PM	Winter Storm	N/A	0	0	0	0
2/18/1999	11:00 PM	Heavy Snow	N/A	0	0	0	0
7/21/1999	8:30 PM	Hail	1.50 in.	0	0	0	0
8/3/1999	4:50 PM	Tstm Wind	52 kts.	0	0	0	0
8/30/1999	4:50 PM	Hail	0.75 in.	0	0	0	0

10/31/1999	11:54 AM	High Wind	65 kts.	0	0	0	0
1/9/2000	3:30 PM	Winter Storm	N/A	0	0	0	0
2/23/2000	9:00 AM	Heavy Snow	N/A	0	0	0	0
4/4/2000	7:00 PM	Tstm Wind	51 kts.	0	0	0	0
4/13/2000	8:00 AM	Winter Storm	N/A	0	0	0	0
6/19/2000	1:55 PM	Tstm Wind	52 kts.	0	0	0	0
7/22/2000	7:30 PM	Tstm Wind	50 kts.	1	1	0	0
9/10/2000	2:10 PM	Tornado	F0	0	0	0	0
11/29/2000	8:00 AM	Heavy Snow	N/A	0	0	0	0
12/14/2000	5:00 PM	Winter Storm	N/A	0	0	0	0
12/16/2000	2:00 PM	Heavy Snow	N/A	0	0	0	0
2/4/2001	7:00 AM	Heavy Snow	N/A	0	0	0	0
2/15/2001	6:00 AM	Winter Storm	N/A	0	0	0	0
4/2/2001	4:00 PM	Heavy Snow	N/A	0	0	0	0
3/5/2002	5:00 PM	Heavy Snow	N/A	0	0	0	0
3/20/2002	4:30 AM	Blizzard	N/A	0	0	0	0
4/14/2002	11:30 AM	High Wind	74 kts.	0	2	0	0
5/19/2002	6:00 PM	Tstm Wind	52 kts.	0	0	0	0
5/19/2002	8:00 PM	Hail	1.00 in.	0	0	0	0
6/27/2002	6:20 PM	Hail	0.75 in.	0	0	0	0
7/13/2002	9:40 PM	Tstm Wind	57 kts.	0	0	0	0
8/16/2002	6:00 AM	High Wind	69 kts.	0	0	0	0
12/26/2002	4:00 PM	Winter Storm	N/A	0	0	0	0
1/22/2003	12:00 AM	Winter Storm	N/A	0	0	0	0
3/14/2003	4:35 PM	Tstm Wind	53 kts.	0	0	0	0
5/25/2003	3:53 PM	Tstm Wind	52 kts.	0	0	0	0
8/1/2003	12:00 AM	Wildfire	N/A	0	0	0	0
11/18/2003	6:00 AM	High Wind	64 kts.	0	0	0	0
1/1/2004	8:00 AM	Winter Storm	N/A	0	0	0	0
1/3/2004	7:00 AM	Winter Storm	N/A	0	0	0	0
1/5/2004	6:00 AM	Extreme Cold/wind Chill	N/A	0	0	0	0
1/7/2004	8:00 AM	Winter Weather/mix	N/A	1	6	0	0
3/18/2004	11:00 AM	Strong Wind	N/A	0	0	2K	0
6/25/2004	6:30 PM	Hail	1.25 in.	0	0	0	0

6/25/2004	7:40 PM	Hail	1.00 in.	0	0	0	0
6/30/2004	4:30 PM	Heavy Rain	N/A	0	0	0	0
7/14/2004	3:00 PM	High Wind	55 kts.	0	0	0	0
7/19/2004	2:10 PM	Hail	0.75 in.	0	0	0	0
7/19/2004	2:50 PM	Hail	0.88 in.	0	0	0	0
7/19/2004	3:00 AM	Flash Flood	N/A	0	0	20K	0
9/1/2004	1:15 PM	Hail	0.88 in.	0	0	0	0
12/14/2004	6:00 AM	Winter Weather/mix	N/A	0	0	0	0
1/7/2005	7:00 AM	Winter Storm	N/A	0	0	0	0
1/11/2005	4:00 PM	Winter Storm	N/A	0	0	0	0
1/14/2005	6:00 AM	Winter Weather/mix	N/A	0	0	0	0
1/18/2005	12:00 AM	Ice Storm	N/A	0	0	0	0
6/2/2005	12:00 AM	Flood	N/A	0	0	701K	0
6/5/2005	4:30 PM	Tstm Wind	52 kts.	0	0	12K	0
8/10/2005	2:57 PM	Hail	0.75 in.	0	0	0	0
12/4/2005	10:00 PM	Winter Storm	N/A	0	0	0	0
12/21/2005	6:00 AM	Winter Weather	N/A	0	0	0	0
2/16/2006	12:00 PM	Extreme Cold/wind Chill	N/A	0	0	0	0
5/16/2006	2:00 PM	Flood	N/A	0	0	0	0
6/13/2006	4:45 PM	Hail	0.75 in.	0	0	0	0
6/13/2006	8:06 PM	Hail	0.75 in.	0	0	0	0
6/13/2006	8:08 PM	Hail	0.88 in.	0	0	0	0
6/13/2006	9:05 PM	Hail	0.75 in.	0	0	0	0
6/13/2006	10:10 PM	Hail	1.00 in.	0	0	0	0
6/15/2006	9:00 PM	Flood	N/A	0	0	0	0
6/15/2006	10:00 PM	Flash Flood	N/A	0	0	0	0
6/15/2006	10:00 PM	Flood	N/A	0	0	0	0
7/6/2006	2:40 PM	Tstm Wind	70 kts.	0	0	0	0
7/6/2006	3:20 PM	Tstm Wind	60 kts.	0	0	0	0
7/10/2006	2:03 PM	Hail	1.00 in.	0	0	0	0
7/24/2006	2:00 PM	Tstm Wind	70 kts.	0	0	0	0
8/8/2006	7:25 PM	Hail	1.00 in.	0	0	0	0
8/31/2006	12:03 PM	Hail	0.75 in.	0	0	0	0
8/31/2006	12:07 PM	Hail	0.75 in.	0	0	0	0

11/5/2006	12:00 AM	Flash Flood	N/A	0	0	4.7M	0K
11/13/2006	9:00 AM	High Wind	150 kts.	0	0	0K	0K
11/26/2006	2:00 AM	Winter Storm	N/A	0	0	0K	0K
11/27/2006	11:00 AM	Winter Storm	N/A	0	0	0K	0K
12/15/2006	12:00 AM	High Wind	75 kts.	0	0	10K	0K

SOURCE: NOAA NATIONAL CLIMATIC DATA CENTER:http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms

APPENDIX C

FLATHEAD COUNTY PDM DEVELOPMENT
CONTACT LIST

APPENDIX D

PDM MEETINGS
AND PUBLIC INVOLVEMENT DOCUMENTATION
FLATHEAD COUNTY, MONTANA

APPENDIX E

FEMA CROSSWALK

REVIEW AND APPROVAL STATUS

Jurisdiction: Flathead County, Montana	**Title of Plan:** Flathead County Pre-Disaster Mitigation Plan	**Date on Plan and Draft:** May 2008
Local Plan submitted by: Cindy Mullaney	**Address:** 920 South Main Street Kalispell, MT 59901	
Title: Acting Director		
Agency: Flathead County Office of Emergency Services		
Phone Number: 406-758-5560	**E-Mail:** cmullaney@flathead.mt.us	

State Review:	**Title:**	**Date:**

FEMA Review:	**Title:**	**Date:**
Date Received in FEMA Region 2		
Plan Not Approved		
Plan Approved		
Date Approved		

Single jurisdiction ☐
Multi-jurisdiction ☐

	Jurisdiction	Type Jurisdiction (County, Town, etc)	NFIP Status: Participating	Mapped but not Participating	Not Mapped	CRS Class
1	Flathead County		X			
2	Kalispell		X			
3	Columbia Falls		X			
4	Whitefish		X			
5						
6						

LOCAL MITIGATION PLAN REVIEW SUMMARY

Attached is a Region 2 version of the Plan Review Crosswalk based on the *Multi-Hazard Mitigation Planning Guidance under the Disaster Mitigation Act of 2000*, published by FEMA, dated March 2004. This Plan Review Crosswalk is consistent with the *Disaster Mitigation Act of 2000* (P.L. 106-390), enacted October 30, 2000 and *44 CFR Part 201 – Mitigation Planning, Interim Final Rule* (the Rule), published February 26, 2002.

Scoring System

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments *must* be provided.
S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

The plan cannot be approved if the plan has not been formally adopted. Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing. Reviewer's comments must be provided for requirements receiving a "Needs Improvement" score. Optional summary tables for assisting in the review of sections on profiling hazards, assessing vulnerability, and identifying and analyzing mitigation actions are included in appropriate sections. States that have additional requirements can add them in the appropriate sections of the Multi-Hazard Mitigation Planning Guidance or create a new section and modify this Plan Review Crosswalk to record the score for those requirements.

Prerequisite(s) (Check Applicable Box)	**NOT MET**	**MET**
Adoption by the Local Governing Body: §201.6(c)(5) OR		
Multi-Jurisdictional Plan Adoption: §201.6(c)(5) **AND** Multi-Jurisdictional Planning Participation: §201.6(a)(3)		

Planning Process	**N**	**S**
Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)		

Risk Assessment	**N**	**S**
Identifying Hazards: §201.6(c)(2)(i)		
Profiling Hazards: §201.6(c)(2)(i)		
Assessing Vulnerability: Overview: §201.6(c)(2)(ii)		
Assessing Vulnerability: Identifying Structures: §201.6(c)(2)(ii)(A)		
Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)		
Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)		
Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii)		

Mitigation Strategy	**N**	**S**
Local Hazard Mitigation Goals: §201.6(c)(3)(i)		
Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)		
Implementation of Mitigation Actions: §201.6(c)(3)(iii)		
Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)		

Plan Maintenance Process	**N**	**S**
Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(i)		
Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)		
Continued Public Involvement: §201.6(c)(4)(iii)		

Additional State Requirements	**N**	**S**
Insert State Requirement		
Insert State Requirement		

LOCAL MITIGATION PLAN APPROVAL STATUS

Plan Not Approved ☐

Plan Approved ☐

General Comments
•

PREREQUISITE(S)

Adoption by the Local Governing Body
***Requirement §201.6(c)(5)*:** *[The local hazard mitigation plan **shall** include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).*

Element	Location in Plan (section and page #)	Reviewer's Comments	Score	
			Not Met	Met
A. Has the local governing body adopted the plan?	YES Appendix A	•		
B. Is supporting documentation, such as a resolution, included?	YES Appendix A	•		
		Summary Score		

Multi-Jurisdictional Plan Adoption
*Requirement §201.6(c)(5): For multi-jurisdictional plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted.*

Element	Location in Plan (section and page #)	Reviewer's Comments	Score	
			Not Met	Met
A. Does the plan indicate the specific jurisdictions represented in the plan?	Yes Section 1.1 – p 1-2	•		
B. For each jurisdiction, has the local governing body adopted the plan?	Yes Section 1.1 – p 1-2; Appendix A	•		
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?	YES Appendix A	•		
		Summary Score		

Multi-Jurisdictional Planning Participation ***Requirement §201.6(a)(3):*** *Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process … Statewide plans will not be accepted as multi-jurisdictional plans.*				
Element	Location in Plan (section and page #)	Reviewer's Comments	Score	
			Not Met	Met
A. Does the plan describe **how** each jurisdiction participated in the plan's development?	YES Section 2, pp 2-1..2-3	•		
		Summary Score		

PLANNING PROCESS: *§201.6(b): An open public involvement process is essential to the development of an effective plan.*

Documentation of the Planning Process ***Requirement §201.6(b):*** *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:* *(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;* *(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and* *(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.* ***Requirement §201.6(c)(1):*** *[The plan **shall** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*				
Element	Location in Plan (section and page #)	Reviewer's Comments	Score	
			N	S
A. Does the plan provide a narrative description of the process followed to prepare the plan?	YES Section 2, pp 2-1..2-3	•		
B. Does the plan indicate who was involved in the planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, etc.?)	YES Section 2.0, p 2-1; Appendix C	•		
C. Does the plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)	YES Section 2.1..2-3; pp 2-1..2-2	•		

D. Was there an opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?	YES Section 2, pp 2-1..2-3	•		
E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?	YES Section 2.4 p2-3 & References	•		
		Summary Score		

RISK ASSESSMENT*: §201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.*

Identifying Hazards
Requirement §201.6(c)(2)(i): *[The risk assessment **shall** include a] description of the type … of all natural hazards that can affect the jurisdiction.*

Element	Location in Plan (section and page #)	Reviewer's Comments	Score N	Score S
A. Does the plan include **a description** of the types of **all natural hazards** that affect the jurisdiction? If the hazard identification omits (without explanation) any hazards commonly recognized as threats to the jurisdiction, this part of the plan cannot receive a Satisfactory score. Consult with the State Hazard Mitigation Officer to identify applicable hazards that may occur in the planning area.	YES Section 3.1 pp3-2..3-33 Table 3.2 Pp 3-5..3-8	•		
		Summary Score		

Profiling Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment **shall** include a] description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan **shall** include information on previous occurrences of hazard events and on the probability of future hazard events.*

Element	Location in Plan (section and page #)	Reviewer's Comments	Score N	Score S
General Profiling Hazards Comments		•	N/A	N/A
A. Does the risk assessment identify the **location** (i.e., geographic area affected) of each natural hazard addressed in the plan?	YES Section 3.1 pp3-2..3-33	•		
B. Does the risk assessment identify the **extent** (i.e., magnitude or severity) of each hazard addressed in the plan?	YES Section 3.1 pp3-2..3-33	•		
C. Does the plan provide information on **previous occurrences** of each hazard addressed in the plan?	YES Section 3.1 pp3-2..3-33	•		
D. Does the plan include the **probability of future events** (i.e., chance of occurrence) for each hazard addressed in the plan?	YES Section 3.2 pp3-34,3-35	•		
		Summary Score		

Identifying and Profiling Natural Hazards
Summary Table for Local Communities

Note that this table is included to assist FEMA and the State in scoring each hazard.
Local communities may find it useful to ensure that its plan addresses each requirement.

Hazard Type	Identified Hazards of Concern	A. Geographic Location		B. Extent/ Magnitude		C. Previous Occurrences		D. Probability of Future Events	
	Yes	N	S	N	S	N	S	N	S
Avalanche	☒	☐	☐	☐	☐	☐	☐	☐	☐
Coastal Erosion [4]	☐	☐	☐	☐	☐	☐	☐	☐	☐
Drought	☒	☐	☐	☐	☐	☐	☐	☐	☐
Earthquake	☒	☐	☐	☐	☐	☐	☐	☐	☐
Expansive Soils	☐	☐	☐	☐	☐	☐	☐	☐	☐
Extreme Heat	☐	☐	☐	☐	☐	☐	☐	☐	☐
Extreme Cold/Ice/Snow [3] [4]	☒	☐	☐	☐	☐	☐	☐	☐	☐
Flood – Riverine/Stormwater [1] [4]	☒	☐	☐	☐	☐	☐	☐	☐	☐
Flood – Coastal [2] [4]	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hailstorm	☒	☐	☐	☐	☐	☐	☐	☐	☐
Landslide	☒	☐	☐	☐	☐	☐	☐	☐	☐
Subsidence	☒	☐	☐	☐	☐	☐	☐	☐	☐
Tornado [4]	☒	☐	☐	☐	☐	☐	☐	☐	☐
Tsunami	☐	☐	☐	☐	☐	☐	☐	☐	☐
Volcano	☒	☐	☐	☐	☐	☐	☐	☐	☐
Wildfire	☒	☐	☐	☐	☐	☐	☐	☐	☐
Wind [4]	☒	☐	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐	☐	☐

(1) Riverine and storm-water flooding may include overflow from a river channel, flash floods, alluvial fan floods, mudflows and debris flows, ice-jam floods, flooding due to dam failure, local drainage or high groundwater levels, and fluctuating lake levels.

(2) Coastal flooding includes storm surge, tidal flooding, and wave action.

(3) Extreme cold may include ice and snowstorms.

(4) Tropical and extratropical storms (such as hurricanes, northeasters and winter storms) are typically associated with multiple hazards, such as winds, tornadoes, coastal flooding, coastal erosion, and/or extreme cold.

Assessing Vulnerability: Overview

Requirement §201.6(c)(2)(ii): *[The risk assessment **shall** include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.*

Element	Location in Plan (section and page #)	Reviewer's Comments	SCORE N	SCORE S
General Assessing Vulnerability Comments		•	N/A	N/A
A. Does the plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?	Yes Section 3.3 pp3-35..3-46	•		
B. Does the plan address the **impact** of each hazard on the jurisdiction?	Yes Sections 3.2, 3.3, 3.5 Table 3-5	•		
		Summary Score		

Assessing Vulnerability: Identifying Structures

Requirement §201.6(c)(2)(ii)(A): *The plan **should** describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area … .*

Element	Location in Plan (section and page #)	Reviewer's Comments	Score N	Score S
C. Does the plan describe vulnerability in terms of the **types and numbers** of **existing** buildings, infrastructure, and critical facilities located in the identified hazard areas? *Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.*	Yes Section 3.5.2; Table 3-7	•		
D. Does the plan describe vulnerability in terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas?	Yes Section 3.5.2; Table 3-7	•		

Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.				
		Summary Score		

Assessing Vulnerability: Estimating Potential Losses

Requirement §201.6(c)(2)(ii)(B): *[The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate … .*

Element	Location in Plan (section and page #)	Reviewer's Comments	SCORE N	SCORE S
E. Does the plan estimate **potential dollar losses** to vulnerable structures located in the identified hazard areas? *Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.*	Yes Sections 3.2; Table 3-5	•		
F. Does the plan describe the **methodology** used to prepare the estimate? *Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.*	Yes Section 3.5; pp 3-49..3-52	•		
		Summary Score		

Assessing Vulnerability: Analyzing Development Trends

Requirement §201.6(c)(2)(ii)(C): *[The plan **should** describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.*

Element	Location in Plan (section and page #)	Reviewer's Comments	Score N	Score S
A. Does the plan describe land uses and development trends? *Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.*	Yes Section 3.5.6	•		
		Summary Score		

Vulnerability Assessment Summary Table for Local Communities

Note that this table is included to assist FEMA and the State in scoring each hazard. Local communities may find it useful to ensure that its plan addresses each requirement. Note also that receiving an "N" for elements C, D, E or F does not preclude the plan from passing.

Hazard Type	Identified Hazards of Concern	Overview				Identifying Assets by Jurisdiction				Estimating Potential Loss by Jurisdiction			
		A. Overall Summary Description of Vulnerability		B. Hazard Impact		C. Types and Number of Existing Structures in Hazard Area (Estimate)		D. Types and Number of Future Structures in Hazard Area (Estimate)		E. Dollar Loss Estimate		F. Methodology/ Documentation	
	Yes	N	S	N	S	N	S	N	S	N	S	N	S
Avalanche	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Coastal Erosion [4]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Drought	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Earthquake	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Expansive Soils	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Extreme Heat	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Extreme Cold/Ice/Snow [3] [4]	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Flood – Riverine/Stormwater [1] [4]	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Flood – Coastal [2] [4]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hailstorm	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Landslide	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Subsidence	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Tornado [4]	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Tsunami	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Volcano	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Wildfire	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Wind [4]	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(1) Riverine and storm-water flooding may include overflow from a river channel, flash floods, alluvial fan floods, mudflows and debris flows, ice-jam floods, flooding due to dam failure, local drainage or high groundwater levels, and fluctuating lake levels.

(2) Coastal flooding includes storm surge, tidal flooding, and wave action.

(3) Extreme cold may include ice and snowstorms.

(4) Tropical and extratropical storms (such as hurricanes, northeasters and winter storms) are typically associated with multiple hazards, such as winds, tornadoes, coastal flooding, coastal erosion, and/or extreme cold.

Multi-Jurisdictional Risk Assessment ***Requirement §201.6(c)(2)(iii):*** *For multi-jurisdictional plans, the risk assessment **must** assess each jurisdiction's risks where they vary from the risks facing the entire planning area.*				
			Score	
Element	Location in Plan (section and page #)	Reviewer's Comments	N	S
A. Does the plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?	Yes Section 3.5; pp 3-49..3-52	•		
		Summary Score		

MITIGATION STRATEGY*: §201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.*

Local Hazard Mitigation Goals ***Requirement §201.6(c)(3)(i):*** *[The hazard mitigation strategy **shall** include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*				
			Score	
Element	Location in Plan (section and page #)	Reviewer's Comments	N	S
A Does the plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards? (**GOALS** are long-term; represent what the community wants to achieve, such as "eliminate flood damage"; and are based on the risk assessment findings.)	Yes Sections 4 and 4.1 pp 4-1…4-2	•		
		Summary Score		

Identification and Analysis of Mitigation Actions ***Requirement §201.6(c)(3)(ii):*** *[The mitigation strategy **shall** include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*				
Element	Location in Plan (section and page #)	Reviewer's Comments	Score	
			N	S
A. Does the plan identify and analyze a **comprehensive range** of specific mitigation actions and projects for each hazard?	Yes Section 4.2 pp 4-2..4-9	•		
B Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure?	Yes Sections 3.5.6 & 4.2 pp 3-52 & 4-2..4-9	•		
C. Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?	Yes Section 4.2 pp 4-2..4-9	•		
		Summary Score		

Mitigation Measures Summary Table for Local Communities

Note that this table is included to assist FEMA and the State in scoring each hazard. Local communities may find it useful to ensure that its plan addresses each requirement.

Natural Hazard Type	Identified Hazards of Concern	A. Evaluation of Actions and Projects	
	Yes	N	S
Avalanche	☒	☐	☐
Coastal Erosion [4]	☐	☐	☐
Drought	☒	☐	☐
Earthquake	☒	☐	☐
Expansive Soils	☐	☐	☐
Extreme Heat	☐	☐	☐
Extreme Cold/Ice/Snow [3] [4]	☒	☐	☐
Flood – Riverine/Stormwater [1] [4]	☒	☐	☐
Flood – Coastal [2] [4]	☐	☐	☐
Hailstorm	☒	☐	☐
Landslide	☒	☐	☐
Subsidence	☒	☐	☐
Tornado [4]	☒	☐	☐
Tsunami	☐	☐	☐
Volcano	☒	☐	☐
Wildfire	☒	☐	☐
Wind [4]	☒	☐	☐
Other Human Caused	☒	☐	☐
Other	☐	☐	☐

To check boxes, double click on the box and change the default value to "checked."

(1) Riverine and storm-water flooding may include overflow from a river channel, flash floods, alluvial fan floods, mudflows and debris flows, ice-jam floods, flooding due to dam failure, local drainage or high groundwater levels, and fluctuating lake levels.

(2) Coastal flooding includes storm surge, tidal flooding, and wave action.

(3) Extreme cold may include ice and snowstorms.

(4) Tropical and extratropical storms (such as hurricanes, northeasters and winter storms) are typically associated with multiple hazards, such as winds, tornadoes, coastal flooding, coastal erosion, and/or extreme cold.

Implementation of Mitigation Actions

Requirement: §201.6(c)(3)(iii): *[The mitigation strategy section **shall** include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization **shall** include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

Element	Location in Plan (section and page #)	Reviewer's Comments	Score N	Score S
A. Does the mitigation strategy include how the actions are **prioritized**? (For example, is there a discussion of the process and criteria used?)	Yes Section 4.3 pp 4-3..4-20; Table 4-2	•		
B. Does the mitigation strategy address how the actions will be **implemented and administered**? (For example, does it identify the responsible department, existing and potential resources, and timeframe?)	Yes Section 4.4 pp 4-18	•		
C. Does the prioritization process include an emphasis on the use of a **cost-benefit review** (see page 3-36 of *Multi-Hazard Mitigation Planning Guidance*) to maximize benefits?	Yes Section 4.3 Pp 4-9 & Table 4-1	•		
		Summary Score		

Multi-Jurisdictional Mitigation Actions

Requirement §201.6(c)(3)(iv): *For multi-jurisdictional plans, there **must** be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*

Element	Location in Plan (section and page #)	Reviewer's Comments	Score N	Score S
A Does the plan include at least one identifiable **action item** for each jurisdiction requesting FEMA approval of the plan?	Yes Section 4.2 pp 4-2..4-9	•		
		Summary Score		

PLAN MAINTENANCE PROCESS

Monitoring, Evaluating, and Updating the Plan

Requirement §201.6(c)(4)(i): *[The plan maintenance process **shall** include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

Element	Location in Plan (section and page #)	Reviewer's Comments	Score N	Score S
A. Does the plan describe the method and schedule for **monitoring** the plan? (For example, does it identify the party responsible for monitoring and include a schedule for reports, site visits, phone calls, and meetings?)	Yes Section 5.1 p 5-1	•		
B. Does the plan describe the method and schedule for **evaluating** the plan? (For example, does it identify the party responsible for evaluating the plan and include the criteria used to evaluate the plan?)	Yes Section 5.1 p 5-1	•		
C. Does the plan describe the method and schedule for **updating** the plan within the five-year cycle?	Yes Section 51 p 5-2	•		
		Summary Score		

Incorporation into Existing Planning Mechanisms

Requirement §201.6(c)(4)(ii): *[The plan **shall** include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

Element	Location in Plan (section and page #)	Reviewer's Comments	**Score** N	**Score** S
A. Does the plan identify other local planning mechanisms available for incorporating the requirements of the mitigation plan?	Yes Section 5.2 p 5-2	•		
B. Does the plan include a process by which the local government will incorporate the requirements in other plans, when appropriate?	Yes Section 5.2 p 5-2	•		

Summary Score		

Continued Public Involvement

Requirement §201.6(c)(4)(iii): *[The plan maintenance process **shall** include a] discussion on how the community will continue public participation in the plan maintenance process.*

Element	Location in Plan (section and page #)	Reviewer's Comments	Score N	Score S
A. Does the plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)	Yes Section 5.3 p 5-3	•		
		Summary Score		

Other Comments
•