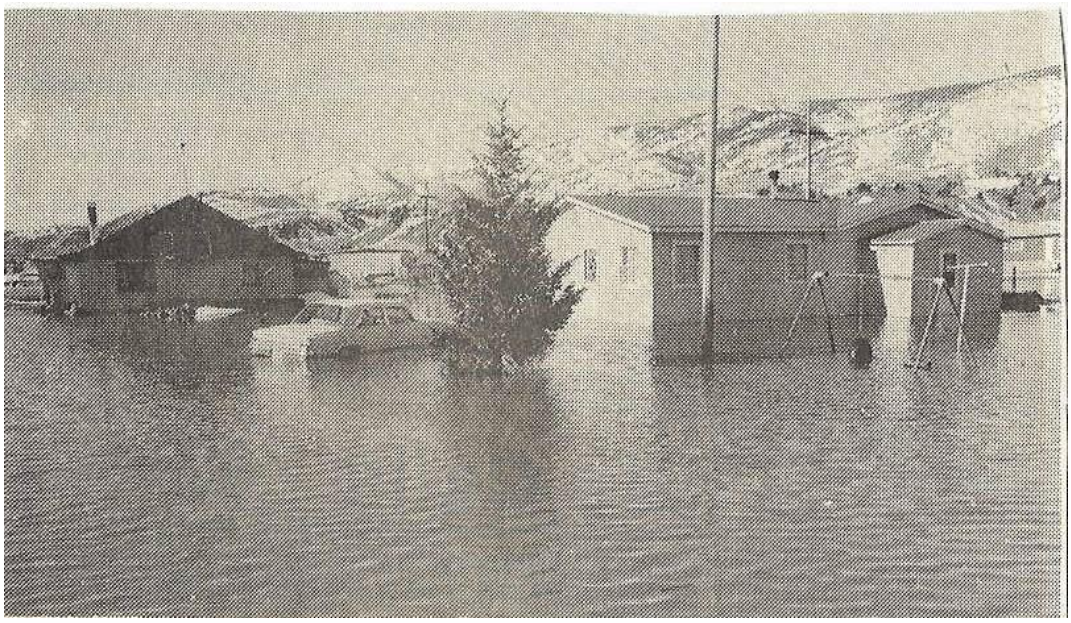
Anaconda – Deer Lodge County, Montana

Hazard Mitigation Plan

September 2013



February 1986 Flooding
Photo Courtesy of The Anaconda Leader

Assistance provided by:

BIG SKY HAZARD MANAGEMENT LLC

406-581-4512 ▪ www.bigskyhazards.com

EXECUTIVE SUMMARY

Disasters can strike at any time in any place. In many cases, actions can be taken before disasters strike to reduce or eliminate the negative impacts. These actions, termed mitigation, often protect life, property, the economy, and other values. The Anaconda – Deer Lodge County Hazard Mitigation Plan addresses twenty-one major hazards with respect to risk and vulnerabilities countywide. Through a collaborative planning process, the Anaconda – Deer Lodge County hazards were identified, researched, and profiled.

The major hazards – aircraft crash; bioterrorism; cyber attack / failure; dam failure; disease outbreak; drought, blight, and infestation; earthquake; flood; hazardous materials release; highway transportation accident; landslide and avalanche; large public event; radioactive release; railroad transportation accident; severe thunderstorms, tornadoes, and wind; severe winter weather; terrorism; urban fire / explosion; utility outage; volcanic ashfall; and wildland and forest fires – are each profiled in terms of their description, history, probability, magnitude, vulnerabilities, and data limitations. The vulnerabilities to critical facilities, critical infrastructure, existing structures, the population, values, and future development are evaluated for each hazard.

Based on the probability and extent of potential impacts identified in the risk assessment, the prioritizations of hazards within Anaconda – Deer Lodge County are as follows:

Anaconda – Deer Lodge County Hazard Prioritizations

Level	Hazard
High Hazard	Flood Wildland and Forest Fires Severe Winter Weather Earthquake
Moderate Hazard	Disease Outbreak Drought, Blight, and Infestation Severe Thunderstorms, Tornadoes, and Wind Hazardous Materials Release Highway Transportation Accident Urban Fire / Explosion Cyber Attack / Failure Dam Failure Large Public Event Utility Outage
Low Hazard	Bioterrorism Radioactive Release Terrorism Volcanic Ashfall Aircraft Crash Landslide and Avalanche Railroad Transportation Accident

The following goals are outlined in the plan's mitigation strategy, based on the results of the risk assessment:

- *Goal 1: Prevent community losses from wildfires and structure fires.*
- *Goal 2: Reduce potential losses from earthquakes.*
- *Goal 3: Reduce future damages from flooding.*
- *Goal 4: Minimize community exposure to hazardous materials releases.*
- *Goal 5: Reduce community risk from communicable disease.*
- *Goal 6: Optimize the use of all-hazard mitigation measures.*

Associated with each of the goals are objectives and mitigation projects ranging from updating land use regulations to protecting infrastructure to public education. The mitigation projects are prioritized based on cost, staff time, feasibility, population benefit, property benefit, values benefit, project maintenance, and the probability and impact of the hazards being mitigated. An implementation plan outlines the suggested course of action, given the limited resources available to Anaconda – Deer Lodge County. Anaconda – Deer Lodge County Disaster and Emergency Services and the Anaconda – Deer Lodge County Local Emergency Planning Committee are responsible for the implementation and maintenance of the plan. Other recommended activities, such integrating this plan into a variety of county plans, regulations, and documents, will further the goals of hazard mitigation in Anaconda – Deer Lodge County.

The Anaconda – Deer Lodge County Hazard Mitigation Plan exceeds the requirements of a local hazard mitigation plan as outlined in the Interim Final Rule published in the Federal Register on February 26, 2002 at Title 44 of the Code of Federal Regulations, Part 201 as part of the Disaster Mitigation Act of 2000. This plan has been approved by the Federal Emergency Management Agency as a hazard mitigation plan, and therefore, the county may be eligible for federal mitigation funds. This plan serves as a guide for understanding the major hazards facing Anaconda – Deer Lodge County and provides a strategy for preventing or reducing some of the impacts.

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1. INTRODUCTION

1.1 Purpose

Anaconda – Deer Lodge County recognizes that hazards, both natural and human-caused, threaten its communities. Rather than wait until disaster strikes, the county can take proactive measures to prevent losses and lessen the impact from these hazards. Actions taken to reduce or eliminate the long-term risk from hazards are defined as mitigation. Disaster mitigation is an investment that can save lives and money.

The purpose of this Hazard Mitigation Plan is to:

- Serve as a consolidated, comprehensive source of hazard information.
- Educate the communities, including government leaders and the public, on their vulnerabilities.
- Fulfill federal, state, and local hazard mitigation planning responsibilities.
- Prioritize and promote cost-effective mitigation solutions.
- Support requests for grant funding.
- Encourage long-term community sustainability.

Effective mitigation planning promotes a broader understanding of the hazards threatening the county and provides a clearer vision and competitive edge for future mitigation grant funding. By integrating mitigation concepts into local thinking, the county will find many more opportunities for disaster resistance beyond grant funding. For example, the consideration of disaster mitigation when designing new facilities or subdivisions will result in cost-effective solutions and greater disaster resistance, thus saving the county money in the long-term and contributing to its sustainability.

The plan's intent is to assist the county in making financial decisions for mitigation projects and clarify actions that could be taken through additional funding. Hopefully through the planning process, the county has become more aware of the hazards and will continue to take a proactive approach to disaster prevention and mitigation.

1.2 Authorities

The Disaster Mitigation Act (DMA) of 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by adding a new section, Section 322 – Mitigation Planning. The requirements of such are outlined in the Interim Final Rule published in the Federal Register on February 26, 2002 at 44 CFR Part 201, with some additional amendments. This legislation requires all local governments to have an approved hazard mitigation plan in place to be eligible to receive Hazard Mitigation Grant Program (HMGP) and other types of disaster and mitigation funding.

Anaconda – Deer Lodge County has adopted this Hazard Mitigation Plan by resolution (see Appendix P). As a consolidated city and county governing body, the Commission and Chief Executive have the authority to promote mitigation activities throughout the countywide jurisdiction.

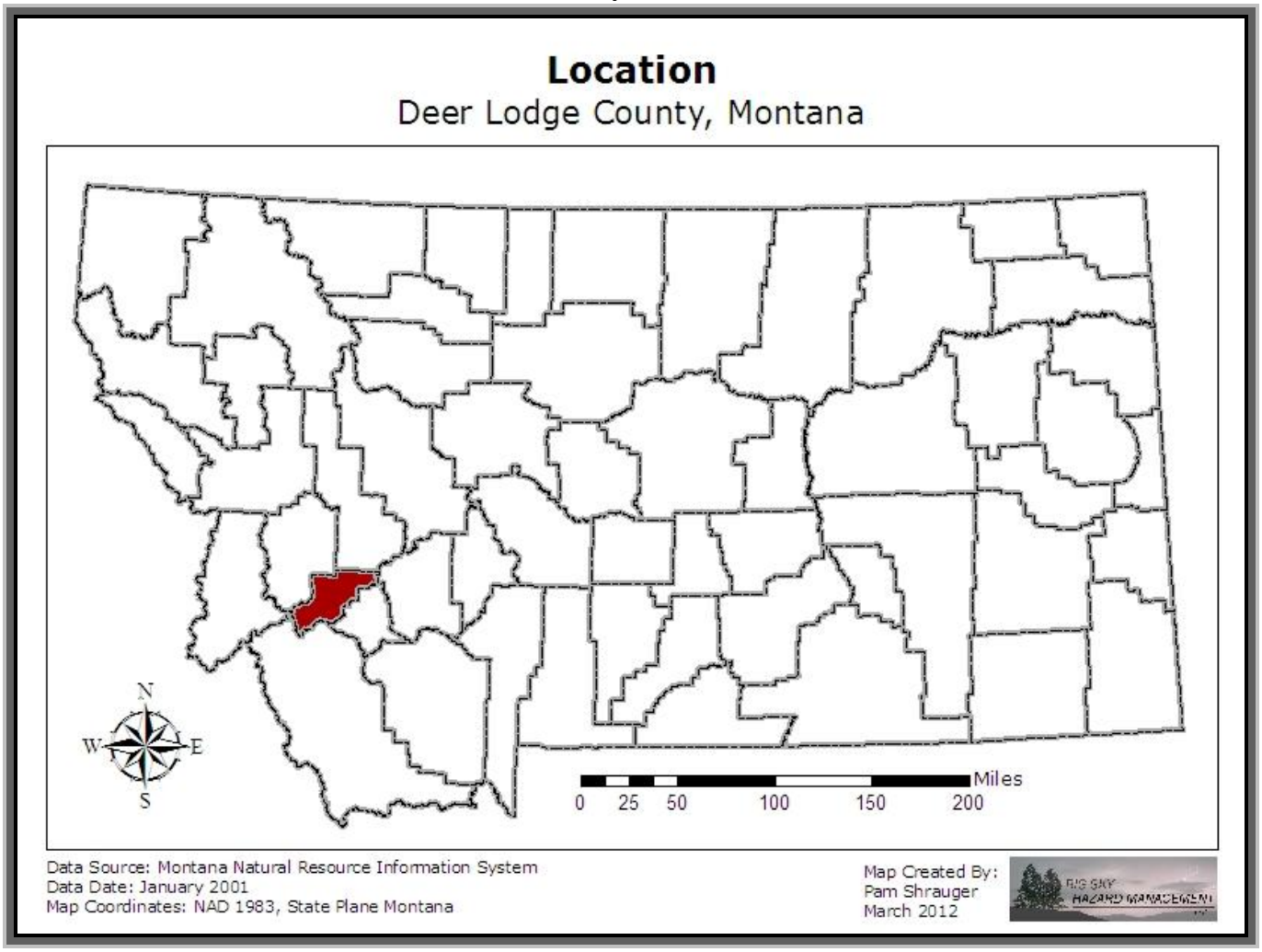
1.3 County and Jurisdictional Profile

Deer Lodge County is located in western Montana, as shown in Map 1.3A, with an area of approximately 737 square miles, the second smallest by area in Montana. Deer Lodge County is bordered on the northwest by Granite County, on the north by Powell County, on the east by Jefferson and Silver Bow Counties, and on the southwest by Beaverhead County and a very small portion of Ravalli County. Anaconda - Deer Lodge County is governed by a consolidated form of city and county government run by a Chief Executive and Commission. This governing body provides all city and county services. Anaconda is the largest community in the county with several smaller communities such as Opportunity, Warm Springs, Galen, and Georgetown. All of these communities fall within the jurisdiction of Anaconda-Deer Lodge County, the largest exception being the Montana State Hospital facilities primarily located in Warm Springs.

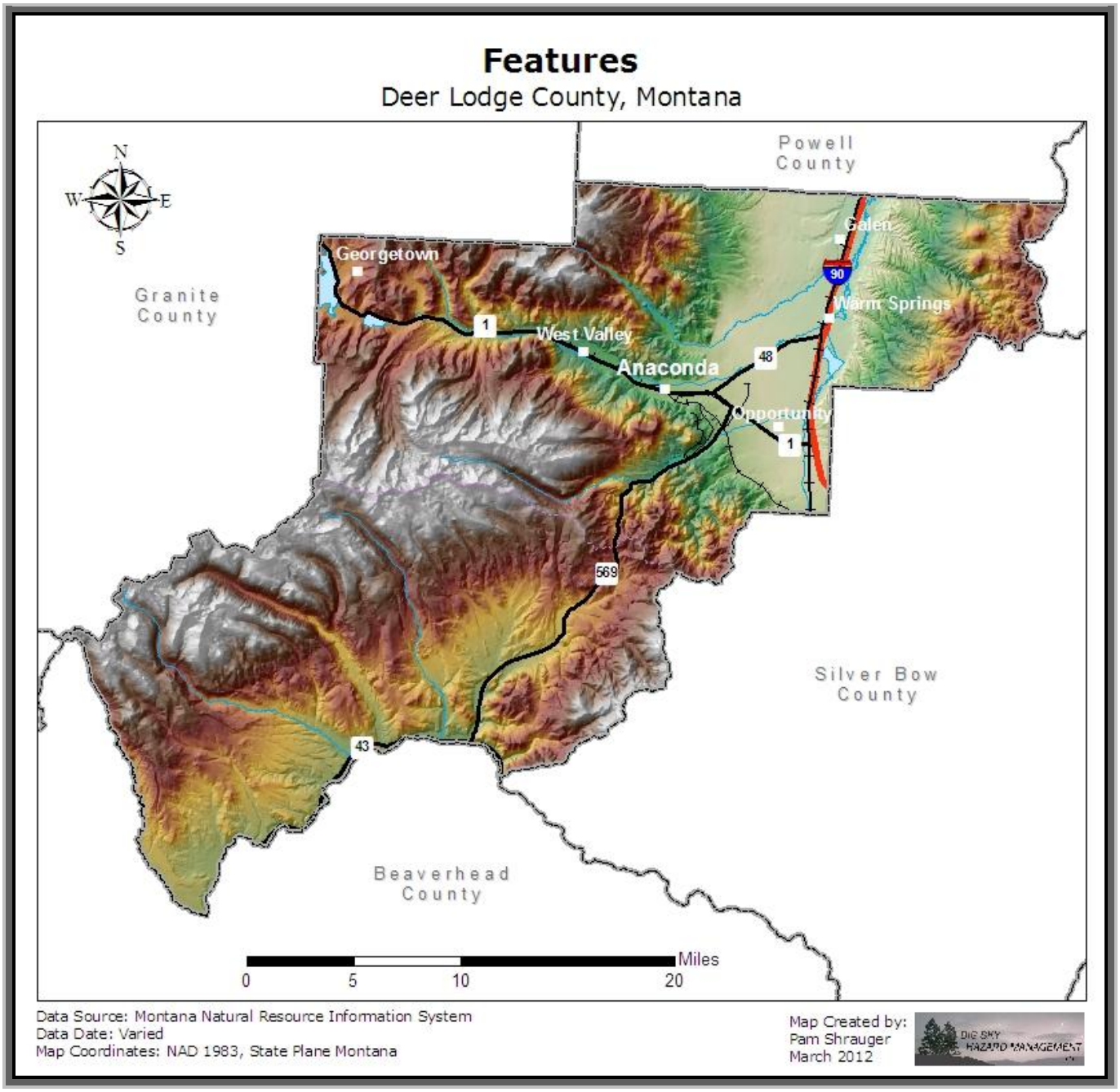
Map 1.3B shows the general features in the county. Proudly known as the "Gateway to the Pintlers," Anaconda is situated close to Interstate 90 and the Pintler Scenic Route. Both passing through Anaconda – Deer Lodge County, residents enjoy the convenience of traveling to nearby Butte while remaining within close proximity to beautiful mountain areas. The Continental Divide passes just south of Anaconda and mountains such as Mt. Haggin tower over the area at over 10,000 feet. Surrounding mountain ranges include the Anaconda Range to the west, the Flint Creek Range to the north, and the Pioneer Mountains to the south. The mountainous Georgetown Lake recreational area is situated in the extreme northwest section of the county. Water bodies in the county include Warm Springs Creek, Silver Bow Creek, and Lost Creek that form the headwaters of the Clark Fork River. The Big Hole River runs along the southwestern border of the county, fed by Pintler, Fishtrap, and Seymour Creeks. Silver Lake and a portion of Georgetown Lake lie in the northwestern part of the county.

Anaconda was once a prominent mining community with the Anaconda Copper Mining Company being the largest producer of copper in the world. Nearly 100 years of smelting copper ore created a waste slag pile (much like sand but harder) estimated at 300,000,000 tons now located on the outskirts of Anaconda. The mining operations led to air, water, and soil contamination problems from over twenty heavy metal contaminants, and the smelter area was designated a Superfund site in 1983. The Environmental Protection Agency (EPA) is actively working in the area to remediate the contamination.

Map 1.3A


Location
Deer Lodge County, Montana
N
W
E
S
Miles
0 25 50 100 150 200
Data Source: Montana Natural Resource Information System
Data Date: January 2001
Map Coordinates: NAD 1983, State Plane Montana
Map Created By:
Pam Shrauger
March 2012

Map 1.3B


Features
Deer Lodge County, Montana
N
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S
Powell County
Granite County
Silver Bow County
Beaverhead County
Georgetown
Galen
Warm Springs
West Valley
Anaconda
Opportunity
90
48
1
569
43
Miles
0
5
10
20
Data Source: Montana Natural Resource Information System
Data Date: Varied
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
March 2012
BIG SKY HAZARD MANAGEMENT

1.4 Climate Overview

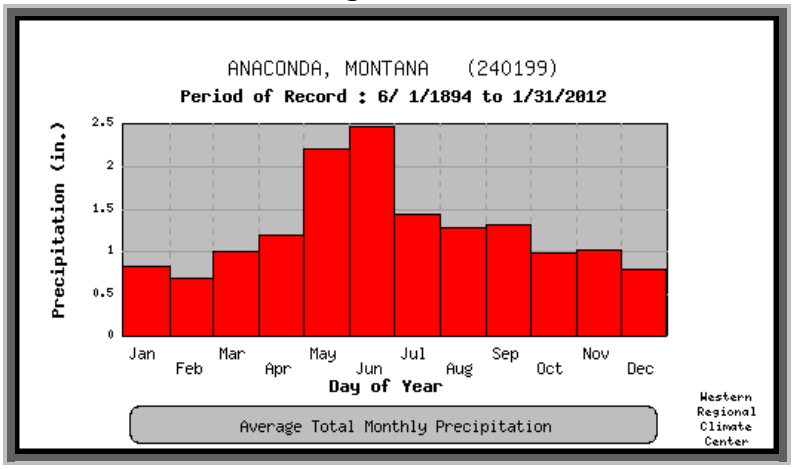
Table 1.4A details the climate statistics recorded by the National Weather Service (NWS) at Anaconda. Figure 1.4B shows the average precipitation by month.

Table 1.4A Deer Lodge County Climate Statistics

	Anaconda 1901 - 2012
Annual Average Maximum Daily Temperature	56.0°F
Annual Average Minimum Daily Temperature	29.8°F
Annual Average Total Precipitation	15.07 inches
Annual Average Total Snowfall	67.6 inches
Highest Temperature Recorded	102°F August 27, 1924
Lowest Temperature Recorded	-38°F December 24, 1983
Annual Average Number of Days Dropping Below Freezing	196.5 days
Annual Average Number of Days Staying Below Freezing	38.2 days
Annual Average Number of Days Reaching 90°F or Higher	8.6 days
Highest Annual Precipitation	35.02 inches 1909
Lowest Annual Precipitation	9.03 inches 1902
1 Day Maximum Precipitation	2.30 inches June 21, 1907
Highest Annual Snowfall	125.5 inches 1989

Source: Western Regional Climate Center, 2012.

Figure 1.4B



Source: Western Regional Climate Center, 2012.

1.5 Plan Scope and Organization

The Anaconda – Deer Lodge County Hazard Mitigation Plan is organized into sections that describe the planning process (Section 2), assets and community inventory (Section 3), risk assessment/hazard profiles (Section 4), mitigation strategies (Section 5), and plan maintenance (Section 6). Appendices containing supporting information are included at the end of the plan.

This plan, particularly the risk assessment section, outlines each hazard in detail and how it may affect Anaconda – Deer Lodge County. The mitigation strategy outlines long-term solutions to possibly prevent or reduce future damages. Additional hazards may exist that were not apparent to local government or participants through the development of this plan, and certainly, disasters can occur in unexpected ways. Although any and all hazards cannot be fully mitigated, hopefully, this plan will help the communities understand the hazards better and become more disaster resistant.

2. PLANNING PROCESS AND METHODOLOGIES

Mitigation planning is a community effort. It also takes time and expertise. For Anaconda – Deer Lodge County, an effective hazard mitigation plan requires input from a variety of stakeholders, including elected officials, first responders, emergency management, healthcare providers, public works, road officials, state and federal agencies, businesses, non-profit organizations, schools, and the public. Following a disaster, many of these stakeholders will be overwhelmed with recovery responsibilities. Therefore, planning for mitigation and involving as many stakeholders as possible before a disaster strikes will make mitigation activities easier following a disaster and may even prevent the disaster in the first place!

2.1 Initial Planning Process

The planning process used to develop the initial mitigation plan attempted to maximize community input and utilize a wide variety of informational resources. The planning process began in February 2004 with an advertised public meeting that was held in conjunction with the Local Emergency Planning Committee (LEPC) meeting. This group consists of representatives from emergency management, fire services, medical and health services, public health, State and Federal government, search and rescue, law enforcement, road maintenance, utility companies, private businesses, planning, education, Red Cross, and the public. This already active committee was determined to be an excellent core group because of its broad representation. Documentation of the newspaper notices can be found in Appendix B. Attendance records can be found in Appendix C.

The initial plan was funded by Montana Disaster and Emergency Services through a Department of Homeland Security, Federal Emergency Management Agency Pre-Disaster Mitigation grant. This grant was used to hire a consultant, Big Sky Hazard Management LLC, based in Bozeman, to assist with the plan's development.

The first public meeting introduced the attendees to the reasons for mitigation planning and hazard analysis and the scope of the plan. Attendees then identified the hazards and prioritized them based on their initial concerns. The second public meeting, held in May 2004, focused on reviewing historical hazard information and identifying critical facilities. An extensive discussion of each hazard's history was conducted with the knowledgeable attendees, including a resident meteorologist and long-time residents. Attendees also reviewed the preliminary critical facilities list. At the third public meeting, held in October 2004, attendees were presented mapping of the hazard areas and were prompted to think about possible mitigation activities. The identified critical facilities were located on a map for comparison with the hazard mapping. At the fourth and fifth public meetings in November 2004 and April 2005, a summary of the risk assessment was presented with potential losses emphasized. Attendees decided on mitigation goals, objectives, and potential actions. The mitigation strategy was developed as a result of these meetings.

A final public meeting was held in May 2005. Comments were invited on the draft plan. Several items were discussed, agreed upon, and incorporated into this final plan document. The draft plan was

available at the Hearst Free Library and the Big Sky Hazard Management LLC website beginning on May 16, 2005. The comment period continued until June 2, 2005, and those comments received were also incorporated into the plan where appropriate.

2.2 Plan Update Process

Upon the required 5-year plan update, Anaconda – Deer Lodge County applied for and received a Federal Emergency Management Agency (FEMA) grant to update its plan in 2011. With the funding, Big Sky Hazard Management LLC, the same contractor used in 2005, was hired to facilitate the plan update and coordinate the planning process in partnership with the county. The contract was managed by Disaster and Emergency Services. A one-year extension was granted for completion in 2013.

The plan update process consisted of the following basic steps:

1. An initial review of the existing plan was conducted by the contractor.
2. A proposed outline for the updated plan was developed.
3. New stakeholders were identified.
4. An initial public meeting (advertised through invitations, a press release, and newspaper ad) was held in Anaconda to educate the public on hazard mitigation planning, to discuss what changes and accomplishments have taken place in the county over the past six years, to brainstorm ideas (new hazards, mitigation strategies) for the updated version, and to solicit comment on the existing plan.
5. All plan sections were updated and new sections were added as needed. Comments received were integrated into the updated plan document.
6. Stakeholders were asked to review the draft plan and provide comments.
7. A public meeting (advertised through invitations, a press release, and newspaper ad) was held in Anaconda to update the communities on the newly revised plan and to solicit comments on the update.
8. Following the public comment period, any comments received were incorporated and the final plan was sent to the state and FEMA for review.
9. The county commission adopted the updated plan.

Planning Team

The core planning team consisted of the Local Emergency Planning Committee (LEPC) that meets on a regular basis regarding a variety of emergency management related issues. A number of additional key stakeholders from local groups, planning, and state and federal agencies were invited. Appendix A lists the invited stakeholders and their level of participation. Major plan issues and discussions were presented to this group and decisions were made through consensus. No significant disagreements or contentious issues were discovered.

Community Changes

A driving force in updating this type of plan is the changes that have occurred in the community over the past eight years. Perhaps the biggest change in Anaconda – Deer Lodge County has been some

residential and industrial growth. Since Anaconda – Deer Lodge County's development permit system has not been strictly enforced until recently, the exact number of new developments is difficult to determine, however, most of the residential development has occurred in the Georgetown Lake area. The Mill Creek Generating Station was a significant industrial development.

A few relatively minor incidents have occurred in the county over the past eight years, but nothing that has led to big changes in communities or policies.

Plan Changes

In order to continue to comply with federal requirements, additions and changes to the plan needed to be made. These types of changes were proposed and made by the contractor and reviewed by the county. Other changes were proposed by community members and made where applicable. Data, methods, and information used in the initial plan were reviewed by the contractor and changes were made if updated information existed. Other items, such as assets, hazard history, mitigation actions, and plan maintenance procedures, were reviewed by local individuals and the contractor, and changes were made as needed.

The 2012-2013 update of the plan featured changes to all sections to improve readability, usability, and methodologies. Specifically, the following major changes were part of the plan's update:

- Addition of an executive summary.
- The planning process was updated to include the 2012-2013 revision.
- Evaluations of current land use, new development, and future development were added and/or updated.
- The hazard list was modified and new hazards were added to mirror the county's emergency operations plan.
- More detail was added to each hazard profile, including updated and more detailed descriptions, maps, histories, probabilities, magnitudes, vulnerabilities, and data limitations.
- Ranking of hazards was re-done and was based on the updated risk and probability.
- New mitigation strategies and concepts were added and existing ones were modified as needed.
- The projects were more specifically described including responsible agencies, resources needed, and a goal timeframe.
- A funding sources section was added.
- Details regarding the county's planning mechanisms and capabilities were added.
- More specificity was added to the plan maintenance section.
- New appendices were added as needed.

More details on plan changes can be found in Appendix H.

Jurisdiction Participation

Anaconda – Deer Lodge County is a consolidated form of government that encompasses all areas of the county. Therefore, this plan is a single jurisdictional plan. Communities such as Anaconda, Galen, Georgetown, Opportunity, Warm Springs, and West Valley do not have their own governing bodies and are under the jurisdiction of Anaconda – Deer Lodge County.

Anaconda – Deer Lodge County applied for, received, and managed the funding for the plan's development. Representatives from several county offices were active in all aspects of the plan's update. The county adopted the plan through resolution upon completion as shown in Appendix P.

Public Participation

The public was provided with several opportunities to participate in the plan's update. Public meetings were held in February 2012 and August 2013. Each meeting was advertised to the public through press releases and advertisements in the Anaconda Leader newspaper. Copies of the press releases and advertisements can be found in Appendix B. Announcements were also posted on the Big Sky Hazard Management LLC website. Each press release encouraged participation through meeting attendance or the review of documents on the consultant's website. Appendix A shows the list of specific stakeholders identified and invited to the meetings. Invitations were sent to active participants and those in communities beyond Anaconda – Deer Lodge County, thus allowing neighboring communities and regional agencies the opportunity to participate. Appendix C contains the sign-in sheets from each meeting and identifies those that actively participated in the plan's update. Notes from each meeting are included in Appendix D.

In addition to the public meetings, the public was given the opportunity to comment on the plan posted on the Big Sky Hazard Management website. The completed draft was posted from August 23, 2013 through September 5, 2013. Comments could be made via the mail, phone, or email. The consultant then reviewed the comments and all were integrated where applicable. Comments were readily accepted throughout the planning process.

Since county commission meetings are also open, public meetings, the discussions and subsequent adoption of the plan by the governing body were additional opportunities for public comment. The county advertised these meetings using their usual public notification procedures.

Incorporation of Existing Information

Information from existing plans, studies, reports, and technical information related to hazards, mitigation, and community planning was gathered by Big Sky Hazard Management LLC by contacting individuals throughout the planning process and reviewing the 2005 plan. Many national and state plans, reports, and studies provided background information. Documentation on these sources, plans, studies, reports, and technical information can be found in Appendix E. Table 2.2A lists the existing local plans and documents incorporated into this mitigation plan by integrating information into the appropriate sections. Mapping for and updating of the plan was done by Big Sky Hazard Management LLC based on information collected from a wide variety of sources. The information was organized into a clear, usable, and maintainable format that also ensured the federal regulations regarding hazard mitigation plans were met.

Table 2.2A Existing Local Plans and Documents Incorporated

Plan/Report/Study Name	Plan/Document Date
Anaconda – Deer Lodge County Capital Improvements Plan	
Anaconda – Deer Lodge County Community Wildfire Protection Plan	September 2005
Anaconda – Deer Lodge County Development Permit System	December 1992
Anaconda – Deer Lodge County Emergency Operations Plan	
Anaconda – Deer Lodge County Growth Policy	2010
Anaconda – Deer Lodge County Subdivision Regulations	January 1994
Silver Lake West Dam, Storm Lake Dam Emergency Action Plan	November 2003
Warm Springs Ponds Emergency Action Plan	December 2003

Plan Adoption

This plan has been adopted by Anaconda – Deer Lodge County, a governing body that is authorized to formally adopt plans such as this. The adoption process involved verbal and signatory approval of a resolution accepting the plan by the county commission at a regularly scheduled public meeting/hearing. In order for the resolution to be approved, a majority of voting commissioners must agree. The resolution is then also signed by a clerk or recording secretary. This process occurred shortly after the plan was completed and while the plan was being conditionally approved by the state and FEMA. A copy of the resolution, including the date signed, is in Appendix P.

The Anaconda – Deer Lodge County Hazard Mitigation Plan is a living, expandable document that will have new information added and changes made as needed. The plan's purpose is to improve disaster resistance through projects and programs, and therefore, opportunities for changes and public involvement will exist as disasters occur and mitigation continues. Details on the plan's maintenance and continued public involvement are further outlined in Section 6.

2.3 Risk Assessment Methodologies

A key step in preventing disaster losses in Anaconda – Deer Lodge County is developing a comprehensive understanding of the hazards that pose risks to the communities. The following terms can be found throughout this plan.

Hazard:	a source of danger
Risk:	possibility of loss or injury
Vulnerability:	open to attack or damage

Source: Federal Emergency Management Agency, 2001.

This all-hazard risk assessment and mitigation strategy serves as an initial source of hazard information for those in the county. Other plans may be referenced and remain vital hazard documents, but each hazard has its own profile in this plan. As more data becomes available and disasters occur, the individual hazard profiles and mitigation strategies can be expanded or new hazards added. This risk assessment identifies and describes the hazards that threaten the communities and determines the values at risk from those hazards. The risk assessment is the cornerstone of the mitigation strategy and provides the basis for many of the mitigation goals, objectives, and potential projects.

The *assets and community inventory* section includes elements such as critical facilities, critical infrastructure, population, structures, economic values, ecologic values, historic values, social values, current land uses, recent development, and future development potential.

Each hazard or group of related hazards has its own *hazard profile*. A stand-alone hazard profile allows for the comprehensive analysis of each hazard from many different aspects. Each hazard profile contains a *description* of the hazard containing information from specific hazard experts and resources with mapping as applicable and a record of the hazard *history* compiled from a wide variety of databases and sources. Note that the data used was more specific and accurate than the data provided by the SHELDUS database recommended by FEMA. Where spatial differences exist, mapping was used for hazard analyses by geographic location. Some hazards can have varying levels of risk based on location (i.e. near the rivers versus far away from the rivers). Other hazards, such as winter storms or drought, cover larger geographic areas and the delineation of hazard areas is not typically available or useful on the county scale.

Using the local historical occurrence, or more specific documentation if available, a *probability and magnitude* was determined for a specific type of event. In most cases, the number of years recorded was divided by the number of occurrences, resulting in a simple past-determined recurrence interval. If the hazard lacked a definitive historical record, the probability was assessed qualitatively based on regional history or other contributing factors. If the past occurrence was not an accurate representation, general knowledge of the hazard was used to approximate the types of impacts that could be expected. The hazard frequency and impact ranges show the differentiation between high frequency, low impact events and low frequency, high impact events. Table 2.3A provides the basic criteria used to define the “probability of a high impact event.” Generally, a “high impact event” is

defined as one in which the majority of citizens are affected in some way and state and local resources are exceeded.

Table 2.3A Probability of a High Impact Event Criterion

Probability of a High Impact Event	Description
High	Occurs nearly annually
Moderate-High	Occurs roughly once every 50 years
Moderate	Occurs roughly once every 100 years
Low-Moderate	Regional history but no local history
Low	No regional or local history

Vulnerabilities were assessed based on a variety of different resources and methodologies. Additional information on the methodology used to determine the vulnerabilities can be found in each hazard profile. Each type of vulnerability (critical facilities, critical infrastructure, structures, population, values, and future development) was assessed based on a probable impact (100-year) event and an extreme impact (500-year) event. Generalizations were made to categorize the types and ranges of impacts that could be seen.

Critical facilities and structures were mapped using structure data provided by the Anaconda – Deer Lodge County GIS contractor. The mapping of the facilities allowed for the comparison of building locations to the hazard areas where such hazards are spatially recognized. Base maps depicting the critical facility and structure locations were compared to available hazard layers to show the proximity of the buildings to the hazard areas. Given the nature of critical facilities, the functional losses and costs for alternate arrangements typically extend beyond the structural and contents losses. These types of losses can be inferred based on the use and function of the facility. Structure losses were calculated using a combination of point structure data and parcel data used for tax assessment purposes. The structure points were assigned the building value of the closest parcel with a building value greater than zero. These values were then used to determine the potential losses to structures. In more general cases, the median value for housing units in the county was used. For some hazards, the total dollar exposure was multiplied by a damage factor since many hazard events will not result in a complete loss of all structures. These estimates are general in nature, and therefore, should only be used for planning purposes. The approximations, however, are based on current hazard and exposure data. HAZUS-MH MR2, a loss estimation software program developed by the Federal Emergency Management Agency (FEMA), approximated losses from earthquakes. Where GIS mapping was unavailable or not useful, estimations and plausible scenarios were used to quantify potential structure losses.

Critical infrastructure for services such as electricity, heating fuels, telephone, water, sewer, and transportation systems was assessed using history and a general understanding of such systems to determine what infrastructure losses may occur. HAZUS-MH MR2 was also used to determine the potential losses to critical infrastructure from earthquakes.

Population impacts were qualitatively assessed based on the number of structures estimated to be in the hazard area. Depending on the time of year, population concentrations are likely greater due to

non-resident populations. Other factors used in evaluating the population impacts include the ability of people to escape from the incident without casualty and the degree of warning that could be expected for the event. In general, the loss of life and possible injuries are difficult to determine and depend on the time of day, day of the week, time of year, extent of the damage, and other hazard specific conditions.

Qualitative methodologies, such as comparisons to previous disasters, occurrences in nearby communities, and plausible scenarios, helped determine the potential losses to economic, ecologic, historic, and social values. In many cases, a dollar figure cannot be placed on values, particularly those that cannot be replaced.

The assessment on the impact to future development is based on the mechanisms currently in place to limit or regulate development in hazardous areas and the likelihood of development in hazardous areas. Some hazards can be mitigated during development, others cannot.

The impact rating given for each type of vulnerability was generally based on the descriptions shown in Table 2.3B. Some adjustments were made where special circumstances exist.

Table 2.3B Impact Rating Criteria

Impact Rating	Description
High	Causes damages and losses within nearly every aspect of the vulnerability type; community sustainability may be threatened.
Moderate-High	The majority of citizens are affected in some way due to losses in this vulnerability type; state and local resources are likely exceeded.
Moderate	The damages to the vulnerability type are formidable and require a local response.
Low-Moderate	Either a small segment of the vulnerability type is impacted or damages are sporadic. May require a limited local response.
Low	Impacts to the vulnerability type are negligible or are present in only unique situations.

Many unknown variables limit the ability to quantitatively assess all aspects of a hazard with high accuracy. Therefore, *data limitations* provide a framework for identifying the missing or variable information. These limitations were determined by hazard through the risk assessment process. In some cases, the limitations may be resolved through research or data collection. If a limitation can be reasonably resolved through a mitigation project, the resolution is included as a potential project in the mitigation strategy.

The *overall hazard rating* of high, moderate, and low was determined based on the combination of the probability of a high impact event and the vulnerability. These ratings are outlined in the *risk assessment summary* and take into account the number of hazards that threaten the community.

2.4 Hazard Identification

In 2005, sixteen hazards were identified and analyzed. Hazards were initially identified by participants in the first public meeting. Participants included government, the private sector, and the public. Then, a history of past events was gathered and possible future events were recognized through internet research, available GIS data, archives research, public meetings, subject matter experts, and an examination of existing plans. In 2012, the planning group reconsidered the hazard list; a decision was made to have the hazards in this hazard mitigation plan mirror those identified in the county's emergency operations plan. A total of twenty-one hazards were then profiled. Some hazards were broken into separate sections such as communicable disease (disease outbreak) and bioterrorism or terrorism and radioactive release which were combined in the initial 2005 plan. Other hazards were just given a different name such as aviation hazard and aircraft crash. Added hazards include cyber attack / failure and large public event. New data sources, plans, and information for several hazards were identified and incorporated into the appropriate hazard profile.

Table 2.4A shows the hazards and how and why they were identified. The level of detail for each hazard correlates to the relative risk of each hazard and is limited by the amount of data available. As new hazards are identified, they can be added to the hazard list, profiled, and mitigated.

Table 2.4A Identified Hazards

Hazard Profile	How Identified	Why Identified
Aircraft Crash	▪ National Transportation Safety Board	▪ History of aircraft accidents, some with casualties ▪ Potential for commercial aircraft accident
Bioterrorism	▪ Centers for Disease Control and Prevention ▪ Montana Department of Livestock	▪ Possibility of human or animal bioterrorism attack
Cyber Attack / Failure	▪ Scenarios of technology loss	▪ Dependence on information technology
Dam Failure	▪ Dam Emergency Action Plans ▪ Federal Emergency Management Agency ▪ ADLC GIS data ▪ US Army Corps of Engineers	▪ Potential for a loss of life and property from a dam failure from high hazard dams
Disease Outbreak (including human and animal diseases)	▪ Centers for Disease Control and Prevention ▪ Montana Department of Livestock ▪ Pandemic studies ▪ US Department of Agriculture ▪ World Health Organization	▪ Global disease threat ▪ History of pandemics ▪ Dependence on agricultural economy

Table 2.4A Identified Hazards (continued)

Hazard Profile	How Identified	Why Identified
Drought, Blight, and Infestation	▪ Montana Disaster and Emergency Services ▪ National Drought Mitigation Center ▪ National Oceanic and Atmospheric Administration ▪ US Department of Agriculture	▪ History of droughts ▪ Importance of agriculture and natural water resources to the local economy ▪ Several USDA disaster declarations
Earthquake	▪ HAZUS-MH ▪ Montana Bureau of Mines and Geology ▪ Montana Disaster and Emergency Services ▪ National Earthquake Hazards Reduction Program ▪ University of Utah ▪ US Geological Survey	▪ History of nearby earthquakes greater than 6.0 magnitude ▪ Proximity to active earthquake areas
Flood (including riverine, flash, and ice jam floods)	▪ HAZUS-MH ▪ Federal Emergency Management Agency ▪ National Weather Service ▪ ADLC GIS data	▪ History of riverine, flash, and ice jam floods, including Presidential disaster declarations ▪ Identified flood hazard areas
Hazardous Materials Release (including fixed, mobile, and pipeline releases)	▪ National Response Center ▪ ADLC GIS data ▪ US Department of Transportation Emergency Response Guidebook	▪ Regular interstate traffic and railroad transport hazardous materials through the county ▪ Several facilities house hazardous materials
Highway Transportation Accident	▪ Montana Highway Patrol	▪ Interstate 90 and MT Highway 1 traverse the county
Landslide and Avalanche	▪ Avalanche.org ▪ Federal Emergency Management Agency ▪ Montana Department of Transportation ▪ Montana Disaster and Emergency Services	▪ Mountainous terrain exists that is prone to avalanches and landslides ▪ Avalanche deaths have occurred ▪ Roadway landslide priorities have been identified
Large Public Event	▪ Scenarios of problems during large public events	▪ Regional history of large public event requiring high levels of emergency resources
Radioactive Release	▪ Scenarios of radioactive releases	▪ Potential for nuclear war or radiological releases
Railroad Transportation Accident	▪ Federal Railroad Administration ▪ Burlington Northern Santa Fe Railway ▪ Butte, Anaconda and Pacific Railway	▪ Active railroad passes through the county

Table 2.4A Identified Hazards (continued)

Hazard Profile	How Identified	Why Identified
Severe Thunderstorms, Tornadoes, and Wind	▪ Federal Emergency Management Agency ▪ National Climatic Data Center ▪ National Weather Service ▪ Storm Prediction Center	▪ History of strong winds, severe thunderstorms, and tornadoes, including damages
Severe Winter Weather (including blizzards, heavy snow, ice storms, and extreme cold)	▪ National Climatic Data Center ▪ National Weather Service ▪ Western Regional Climate Center	▪ History of impacts such as road closures during winter storms ▪ Potential for power outages during an extended cold period
Terrorism	▪ Anti-Defamation League ▪ Memorial for the Prevention of Terrorism ▪ Southern Poverty Law Center	▪ National indications and foreign threats of future terrorist attacks ▪ Potential for school violence and other domestic attacks
Urban Fire / Explosion	▪ Anaconda Fire Department ▪ US Fire Administration	▪ Economic importance of urban areas ▪ Propensity of historic structures
Utility Outage	▪ Local utility data	▪ Dependence of population on utility services
Volcanic Ashfall	▪ Cascades Volcano Observatory ▪ US Geological Survey ▪ Yellowstone Volcano Observatory	▪ History of volcanic ashfall
Wildland and Forest Fires	▪ Interagency Fire Coordination Center ▪ Montana Department of Natural Resources and Conservation ▪ ADLC Community Wildfire Protection Plan ▪ US Forest Service	▪ Local history of large wildfires ▪ Large areas of government lands within the county ▪ Numerous areas of wildland urban interface

3. ASSETS AND COMMUNITY INVENTORY

In addition to identifying and understanding the hazards of the area, an important aspect of mitigation planning is contemplating the effects such hazards may have on the communities. To thoroughly consider the effects, the assets and values at risk must be first identified. Examples of community assets include the population, critical facilities, businesses, residences, critical infrastructure, natural resources, historic places, and the economy. The following sections identify the specific assets and community inventory.

3.1 Critical Facilities and Infrastructure

Critical facilities and infrastructure protect the safety of the population, the continuity of government, or the values of the community. In many cases, critical facilities fulfill important public safety, emergency response, and/or disaster recovery functions. In other cases, the critical facility may protect a vulnerable population, such as a school or elder care facility. Examples of critical facilities include: 911 emergency call centers, emergency operations centers, police and fire stations, public utility buildings, hospitals, schools, and assisted living facilities.

Utilities such as electricity, heating fuel, telephone, water, and sewer rely on established infrastructure to provide services. The providers of these services use a variety of systems to ensure consistent service in the county. Each of these services is important to daily life in Anaconda – Deer Lodge County, and in some cases, is critical to the protection of life and property. The transportation network is another example of important infrastructure and relies on bridges and road/rail segments.

Critical facilities and infrastructure were identified throughout the planning process, initially identified for the 2005 plan through public meetings, Local Emergency Planning Committee (LEPC) members, and additional research and then reviewed by planning committee members and updated in 2012 and 2013. Replacement values, where shown, are for building and contents based on insurance records provided by Anaconda – Deer Lodge County. Most of the facilities have been digitally mapped and analyzed with respect to the hazards.

Critical Facilities

Table 3.1A Local Government and Emergency Facilities

Name	Address	Replacement Value ($)
Courthouse Complex	800 Main Street Anaconda	$7,204,237 building $768,861 contents
Law Enforcement Center	800 Oak Street Anaconda	$4,517,227 building $112,188 contents
Hearst Free Library	401 Main Street Anaconda	$2,196,881 building $1,005,495 contents
Anaconda Pintler Search and Rescue	1902 Smelter Road Anaconda	
Community Hospital of Anaconda	401 West Pennsylvania Anaconda	
Public Health Department	115 West Commercial Anaconda	

Sources: Anaconda – Deer Lodge County, 2012a; Anaconda – Deer Lodge County, 2012b.

Table 3.1B Fire Stations

Name	Address
Anaconda Fire Station ($794,504 building replacement value)	420 West Commercial Anaconda
Antelope Gulch / Lost Creek Fire Station	2926 Lost Creek Road Anaconda
Georgetown Lake Fire Station #1	100 Fire Lane Anaconda
Georgetown Lake Fire Station #2	Granite County
Georgetown Lake Fire Station #3	1250 Maguire Road Anaconda
Opportunity Fire Station	5 North Hauser Street Anaconda
Racetrack Fire Station	Powell County
West Valley Fire Station	306 Mount Haggin Drive Anaconda

Sources: Anaconda – Deer Lodge County, 2012a; Anaconda – Deer Lodge County, 2012b.

Table 3.1C Transportation Facilities

Name	Address	Replacement Value
BAP Rail Yard	800 West Commercial Avenue Anaconda	
Bowman Field Airport	401 Mertzig Road Anaconda	
City Shop Complex	816 Oak Street Anaconda	$176,355 building $8,941 contents

Sources: Anaconda – Deer Lodge County, 2012a; Anaconda – Deer Lodge County, 2012b.

Table 3.1D Landfill, Water, Wastewater, and Communications Facilities

Name	Address	Replacement Value
"C" Hill Radio Repeater	2724 Alpha Lode Trail Anaconda	$4,851 building $87,227 contents
Interoperability Montana Communications Site	2474 Hoodoo Road Anaconda	$500,000 contents
Landfill	233 Landfill Road Anaconda	
Rumsey Mountain Radio Repeater	Granite County	$7,861 building $87,227 contents
Wastewater Lift Station	4394 Montana Highway 1 Anaconda	
Wastewater Treatment Plant – Anaconda	353 Waste Water Road Anaconda	$1,487,833 building $1,343,847 contents
Wastewater Treatment Plant - Galen	5824 Yellowstone Trail Deer Lodge	
Water Department	8 North Main Anaconda	$308,394 building $9,813 contents
Water Junction House	Tamarack and Washoe Anaconda	$8,902 building $5,997 contents
Water Pump House	623 Marcus Daly Drive Anaconda	
Water Pump Station – Sunnyside	12 Sunnyside Road Anaconda	
Water Tank	Reservoir Hill	$1,674,250 building
Well Houses	½ mi. west of city limits	$24,780 building $424,579 contents

Sources: Anaconda – Deer Lodge County, 2012a; Anaconda – Deer Lodge County, 2012b.

Table 3.1E Energy Facilities

Name	Address
Bonneville Power Substation	456 Willow Glen Road Anaconda
Northwestern Energy Dave Gates Generating Station Northwestern Energy Electric Substation, Mill Creek	241 Willow Glen Road Anaconda
Northwestern Energy Electric Substation, Anaconda City	50 Copper Sands Road Anaconda
Northwestern Energy Electric Substation, Foster Creek	346 Maguire Road Anaconda
Northwestern Energy Electric Substation, Warm Springs	168 Blizzard Way Warm Springs
Northwestern Energy Gas Substation, Anaconda	598 Arbiter Plant Road Anaconda
Northwestern Energy Gas Substation, Galen	5914 Yellowstone Trail Deer Lodge
Northwestern Energy Gas Substation, Galen Regulator	11717 Eastside Road Deer Lodge
Northwestern Energy Gas Substation, Morel Junction	14811 Eastside Road Anaconda
Northwestern Energy Gas Substation, Opportunity	1 Stewart Street Anaconda
Northwestern Energy Gas Substation, Warm Springs	189 Old Game Farm Way Warm Springs

Source: Anaconda – Deer Lodge County, 2012a.

Table 3.1F State and Federal Government Facilities

Name	Address
Montana Department of Natural Resources	1300 Maguire Road Anaconda
Montana Department of Public Health and Human Services	307 East Park Anaconda
Montana Department of Transportation	105 Polk Street Anaconda
Montana National Guard	101 Polk Street Anaconda
Montana State Hospital	100 Garnet Way Warm Springs
US Post Office, Anaconda	218 Main Street Anaconda
US Post Office, Warm Springs	22 Garnet Way Warm Springs

Table 3.1G Vulnerable Populations – Hospitals, Assisted Living, Skilled Nursing, Senior/Low Income Housing, Large Childcare Facilities, Juvenile Detention Facilities, and Special Needs Housing

Name	Address
A.W.A.R.E., Inc.	19 State Street Galen
Anaconda Job Corps	1384 Foster Creek Road Anaconda
Bubash Group Home	318 West 5th Street Anaconda
CCCS Juvenile Detention Center	801 Montana Highway 48 Anaconda
CCCS Start Program	194 Trapper Way Warm Springs
CCCS WATCh Program	725 Orofino Way Warm Springs
Clark Fork Group Home	223 East Pennsylvania Street Anaconda
Community Hospital of Anaconda	401 West Pennsylvania Anaconda
Community Nursing Home of Anaconda	615 Main Anaconda
Discovery House Group Home	65 Sheep Gulch Road Anaconda
Gold Creek Group Home	219 East Pennsylvania Street Anaconda
Hagan Manor (Housing Authority)	201 West Commercial Avenue Anaconda
Head Start	315 West 4th Street Anaconda
Headstart ($449,038 building replacement value)	317 West 4th Street Anaconda
Hearthstone Apartments	400 Oak Street Anaconda
Lost Creek Group Home	14 North Cedar Anaconda
Madison Apartments	107 Madison Anaconda
Maple Street Supported Living Home	312 Maple Street Anaconda
Metcalf Senior Citizen Center	115 East Pennsylvania Anaconda
Montana State Hospital	100 Garnet Way Warm Springs

Table 3.1G Vulnerable Populations – Hospitals, Assisted Living, Skilled Nursing, Senior/Low Income Housing, Large Childcare Facilities, Juvenile Detention Facilities, and Special Needs Housing (continued)

Name	Address
Mt. Haggin Group Home	12 Cedar Street Anaconda
Mt. Powell Group Home	305 East Pennsylvania Street Anaconda
New Horizons Assisted Living	402 Christine Court Anaconda
Pintler Group Home	301 East Pennsylvania Street Anaconda
RYO Correctional Facility	360 Galen Street Deer Lodge
Sharon Court Group Home	309 Sharon Court Anaconda
Sixth Street Supported Living Home	517 West 6th Street Anaconda
Teresa Ann Terrace Group Home	809 Pauline Loop Anaconda
Washoe Group Home	311 East Pennsylvania Street Anaconda

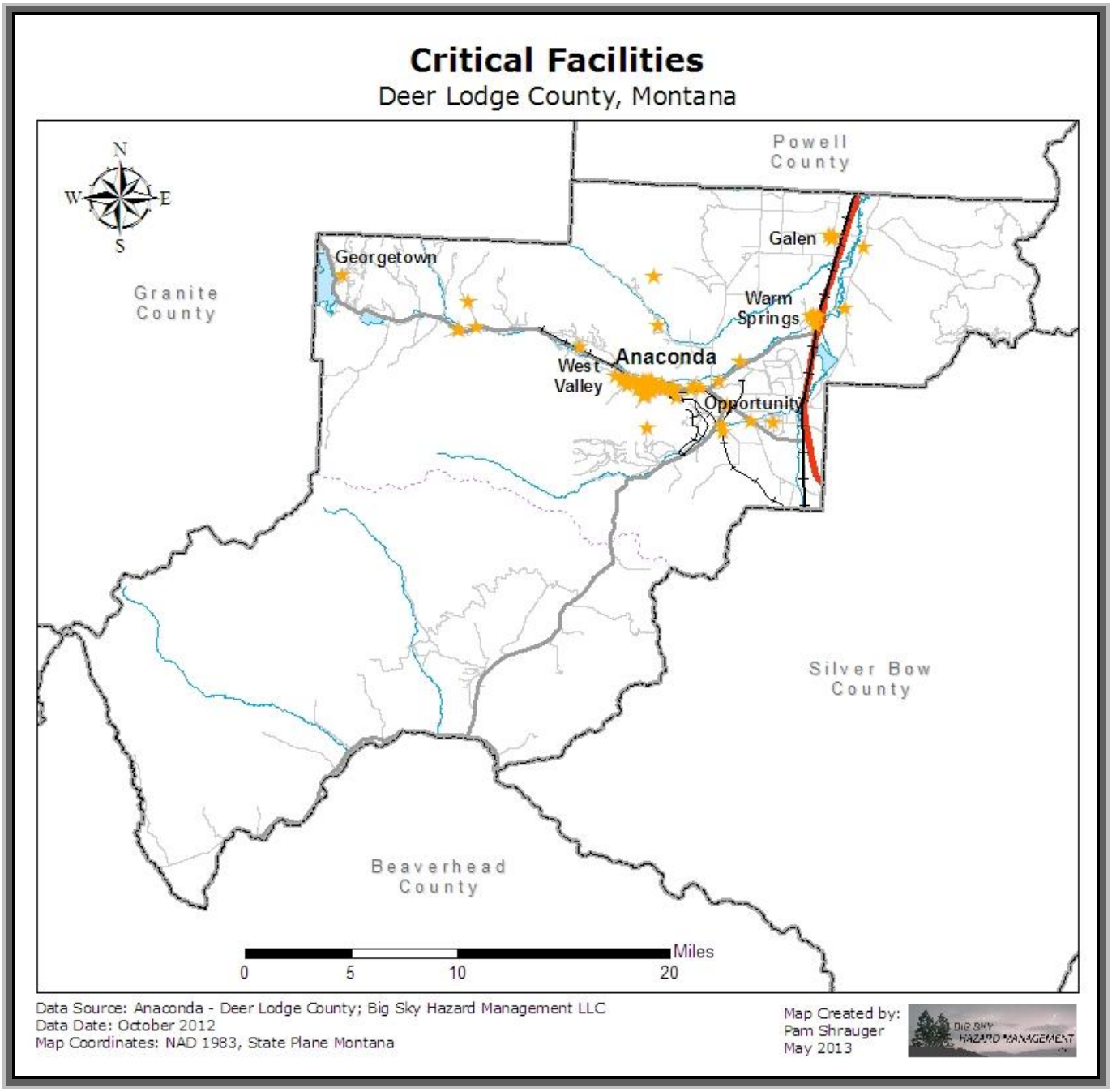
Source: A.W.A.R.E. Inc., 2012; Anaconda – Deer Lodge County, 2012a.

Table 3.1H Vulnerable Populations – Schools

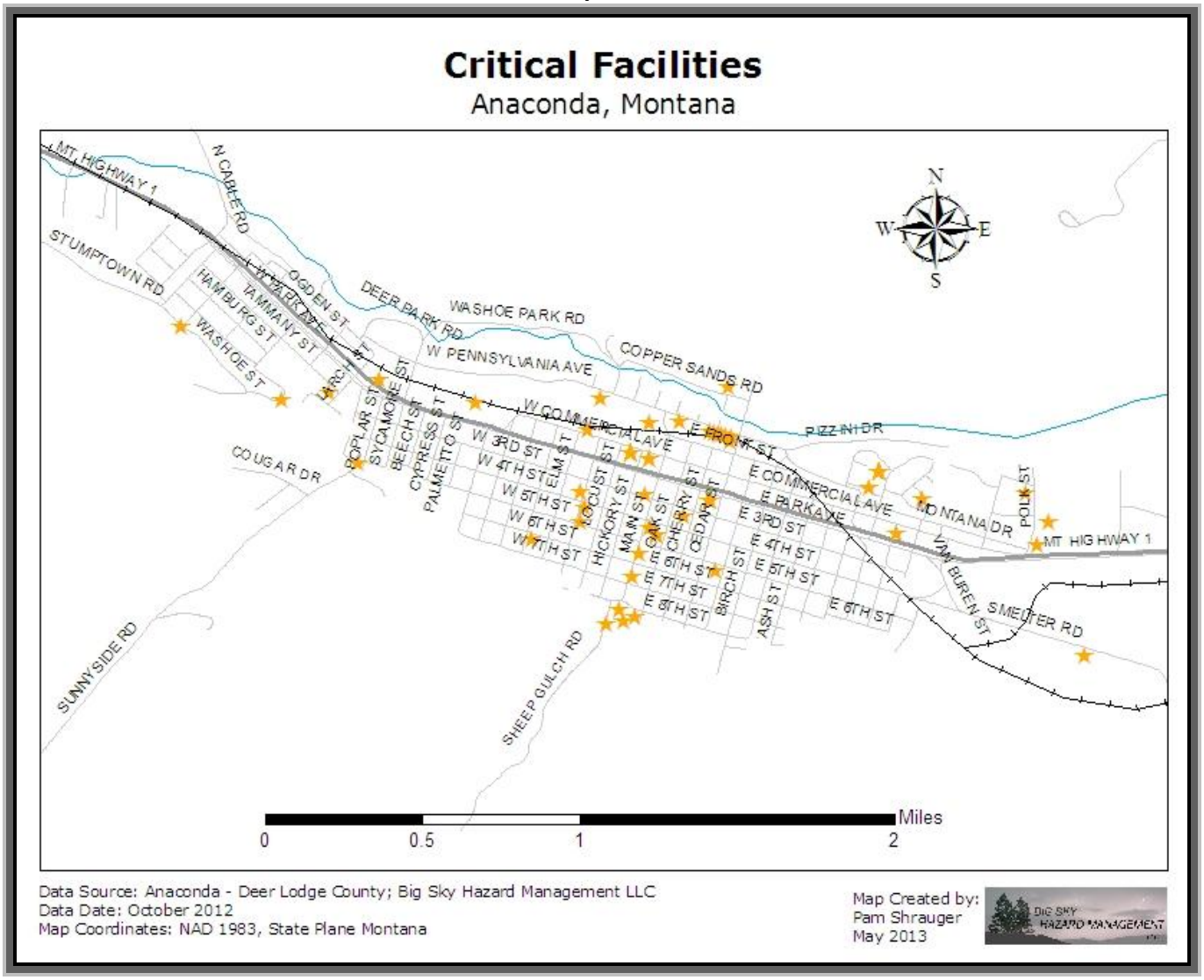
Name	Address
Anaconda High School *2010-2011 Enrollment = 354*	519 Main Street Anaconda
Fred Moodry Middle School *2010-2011 Enrollment = 251*	219 East 3rd Street Anaconda
Dwyer School *2010-2011 Enrollment = 271*	1601 Tammany Street Anaconda
Lincoln School *2010-2011 Enrollment = 230*	506 Chestnut Street Anaconda
Anaconda School Vocational Technical Facility	1410 West Park Anaconda
A.W.A.R.E. Center for Excellence	200 Polk Street Anaconda

Source: Montana Office of Public Instruction, 2011.

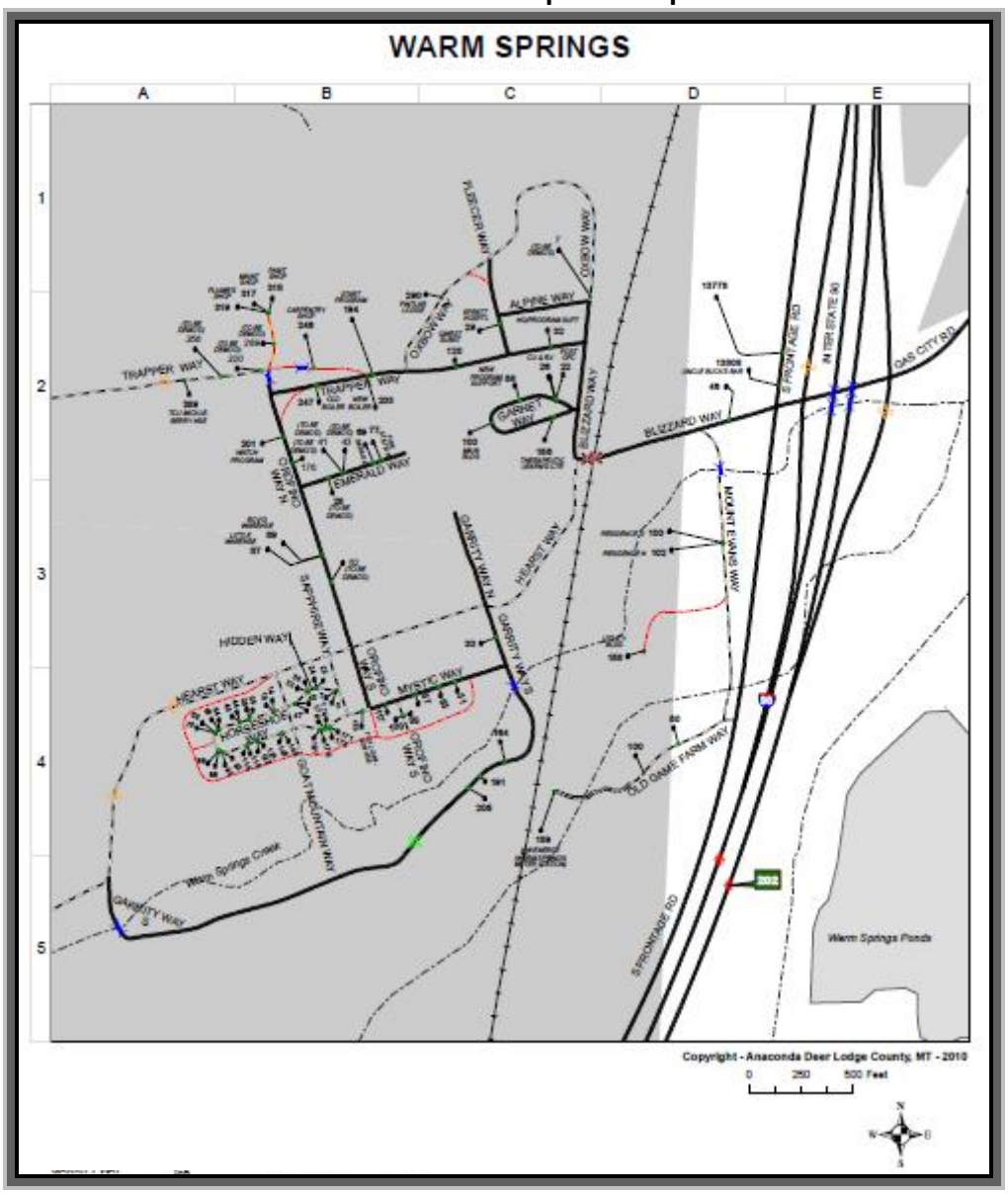
Map 3.1J


Critical Facilities
Deer Lodge County, Montana
N
W
E
S
Powell County
Granite County
Silver Bow County
Beaverhead County
Georgetown
Galen
Warm Springs
West Valley
Anaconda
Opportunity
Miles
0
5
10
20
Data Source: Anaconda - Deer Lodge County; Big Sky Hazard Management LLC
Data Date: October 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
May 2013
BIG SKY HAZARD MANAGEMENT LLC

Map 3.1K


Critical Facilities
Anaconda, Montana
MT HIGHWAY 1
N CABLE RD
STUMPTOWN RD
HAMBURG ST
TAMMANY ST
OGDEN ST
DEER PARK RD
WASHOE PARK RD
WASHOE ST
W PENNSYLVANIA AVE
COPPER SANDS RD
W COMMERCIAL AVE
E FRONT ST
E COMMERCIAL AVE
E PARK AVE
PIZZ IN I DR
MONTANA DR
POLK ST
MT HIGHWAY 1
COUGAR DR
POPLAR ST
SYCAMORE ST
BEECH ST
CYPRESS ST
PALMETTO ST
W 3RD ST
W 4TH ST
ELM ST
LOCUST ST
HICKORY ST
MAIN ST
OAK ST
CHERRY ST
CEDAR ST
E 3RD ST
E 4TH ST
E 5TH ST
E 6TH ST
E 7TH ST
BIRCH ST
ASH ST
W 5TH ST
W 6TH ST
W 7TH ST
VAN BUREN ST
SMELTER RD
SUNNYSIDE RD
SHEEP GULCH RD
N
W
E
S
Miles
0
0.5
1
2
Data Source: Anaconda - Deer Lodge County; Big Sky Hazard Management LLC
Data Date: October 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
May 2013
BIG SKY HAZARD MANAGEMENT

Map 3.1L
Montana State Hospital Campus



Source: Montana State Hospital, 2013.

Critical Infrastructure

Electricity

Electricity runs lights, computers, medical equipment, water pumps, heating system fans, refrigerators, freezers, televisions, and many other types of equipment. Electric providers in Anaconda – Deer Lodge County include NorthWestern Energy, headquartered in Sioux Falls, SD, and Vigilante Electric Cooperative, Inc., headquartered in Dillon, MT. Much of the electric service is run through overhead lines. These lines are supported by poles and have key components such as transformers and substations.

Significant electric infrastructure supporting area communities and the Northwest United States exist throughout Anaconda – Deer Lodge County. Transmission lines pass through the eastern part of the county. Major substations service millions of people in the Northwest. The Dave Gates Generating Station at Mill Creek uses natural gas to produce electricity and provide stability to the entire Northwestern Energy transmission system, especially with the addition of less stable wind energy electric production. Operation of this facility began in 2011. (Northwestern Energy, 2011)

Energy / Heating Fuel

During the cold winter months, the heating of homes and businesses is a necessity. The primary heating fuel used in Anaconda – Deer Lodge County is natural gas. Overall, a variety of fuels are used as shown in Table 3.1M. Most systems ultimately require electricity to run their thermostats and blowers.

Table 3.1M US Census Housing Data on House Heating Fuel

	Anaconda – Deer Lodge County (occupied housing units)
Utility Gas	2,764
Bottled, Tank, or LP Gas	266
Electricity	510
Fuel Oil, Kerosene, etc.	0
Coal or Coke	10
Wood	397
Solar Energy	0
Other Fuel	94
No Fuel Used	0

Source: US Census Bureau, 2013.

Natural gas in most of Anaconda – Deer Lodge County is provided by NorthWestern Energy through underground pipeline infrastructure. A large, high pressure natural gas distribution pipeline passes through the county. The HAZUS-MH MR2 replacement value for the natural gas system is estimated at $7,410,000. Buildings heated with propane typically have a nearby tank that is refilled regularly by a local vendor.

Telephone

Local telephone services in the county are provided by Qwest Telephone. Similar to electric infrastructure, telephone can be run through overhead or underground lines. Much of the telephone infrastructure in Anaconda – Deer Lodge County lies within the road right-of-ways. A number of cell towers exist within the county to provide cellular telephone service, but several areas lack reliable coverage. Internet phone service is another option available to many residents.

Water and Wastewater

Anaconda is served by a public water and wastewater system. The Anaconda water supply comes from six wells near Warm Springs Creek on the western outskirts of Anaconda. The community of Warm Springs is served by the Anaconda water supply, and Galen has its own central water system, owned by the State of Montana. Warm Springs and Galen each have their own wastewater systems. Many subdivisions and housing developments additionally have their own systems based on demand and water quality control requirements. Buildings in the more rural parts of the county are often served by individual wells and septic systems. The HAZUS-MH MR2 replacement value for the potable water systems is estimated at $18,525,000 and for wastewater systems is estimated at $11,115,000.

Transportation

The transportation infrastructure within Anaconda – Deer Lodge County includes the road, rail, and air networks. The primary road transportation routes are Interstate 90 and Montana Highways 1, 43, and 48. Anaconda – Deer Lodge County has 522.6 miles of roadways with public access. (Anaconda – Deer Lodge County, 2010) The major roadways countywide and most of the roads and bridges within city areas are paved. Outside roads, however, are frequently gravel. The HAZUS-MH MR2 replacement value for the highway system is estimated at $366,446,000.

Burlington Northern and Santa Fe Railways (BNSF) operates the railway that runs along Interstate 90 from Garrison to Butte. The railroad transports goods and raw materials along this line. The HAZUS-MH MR2 replacement value for the railway system is estimated at $54,968,000.

Anaconda – Deer Lodge County has one small airport, Bowman Field (3U3) serving private, charter, and/or government aircraft three miles northeast of Anaconda. The HAZUS-MH MR2 replacement value for the airport system is estimated at $5,396,000. The closest commercial service airport is in Butte (BTM).

3.2 Population and Structures

The citizens, visitors, and their property are at all risk from various disasters. In essentially all incidents, the top priority is the protection of life and property. The population of Anaconda – Deer Lodge County in the 2010 census was 9,298 people. The population decreased by 119, or 1.2%, from the 2000 census. (US Census Bureau, 2013)

The median age of 46.0 years in Anaconda – Deer Lodge County is significantly older than the statewide median age of 39.8 years. According to 2010 US Census data, 19.2% of the residents, or 1,782 people, are 65 years old or older, compared to the state figure of 14.8%. Therefore, Anaconda – Deer Lodge County has a greater elderly population by percentage than other parts of the state. (US Census Bureau, 2013)

Like critical and special needs facilities, structures such as residences and businesses are also vulnerable to hazards. The following tables detail some of the statistics for Anaconda – Deer Lodge County. Much of the data was derived from FEMA's HAZUS-MH loss-estimation modeling software, version 2.0.

Table 3.2A Number of Buildings by Type

Building Type (HAZUS code)	Number
Single Family Dwelling (RES1)	3,744
Mobile Home (RES2)	260
Duplex (RES3A)	34
3-4 Units (RES3B)	19
Temporary Lodging (RES4)	1
Institutional Dormitory (RES5)	9
Personal and Repair Services (COM3)	5
Banks (COM5)	2
Hospital (COM6)	1
Medical Office/Clinic (COM7)	1
Entertainment and Recreation (COM8)	16

Source: Federal Emergency Management Agency, HAZUS-MH 2.0 database.

Table 3.2B Number of Buildings by Structural Classification Type

Description (HAZUS code)	Number
Wood, Light Frame ≤ 5,000 sq. ft. (W1)	3,711
Wood, Commercial and Industrial (W2)	3
Steel Moment Frame, Low-Rise (S1L)	4
Steel Braced Frame, Low-Rise (S2L)	2
Steel Light Frame (S3)	1
Steel Frame with Cast-in-Place Concrete Shear Walls, Low-Rise (S4L)	3
Concrete Moment Frame, Low-Rise (C1L)	1
Concrete Shear Walls, Low-Rise (C2L)	9
Precast Concrete Tilt-Up Walls (PC1)	2

Table 3.2B Number of Buildings by Structural Classification Type (continued)

Description (HAZUS code)	Number
Precast Concrete Frames with Concrete Shear Walls, Low-Rise (PC2L)	1
Reinforced Masonry Bearing Walls with Wood or Metal Deck Diaphragms, Low-Rise (RM1L)	85
Reinforced Masonry Bearing Walls with Precast Concrete Diaphragms, Low-Rise (RM2L)	1
Unreinforced Masonry Bearing Walls, Low-Rise (URML)	5
Mobile Homes (MH)	263

Source: Federal Emergency Management Agency, HAZUS-MH 2.0 database.

Table 3.2C Housing Census Data

	Anaconda – Deer Lodge County
Number of Housing Units	5,122
Median Value of Specified Owner-Occupied Housing Units	$105,700
Number of Mobile Homes	266

Source: US Census Bureau, 2013.

Table 3.2D Year Structure Built Based on US Census Data

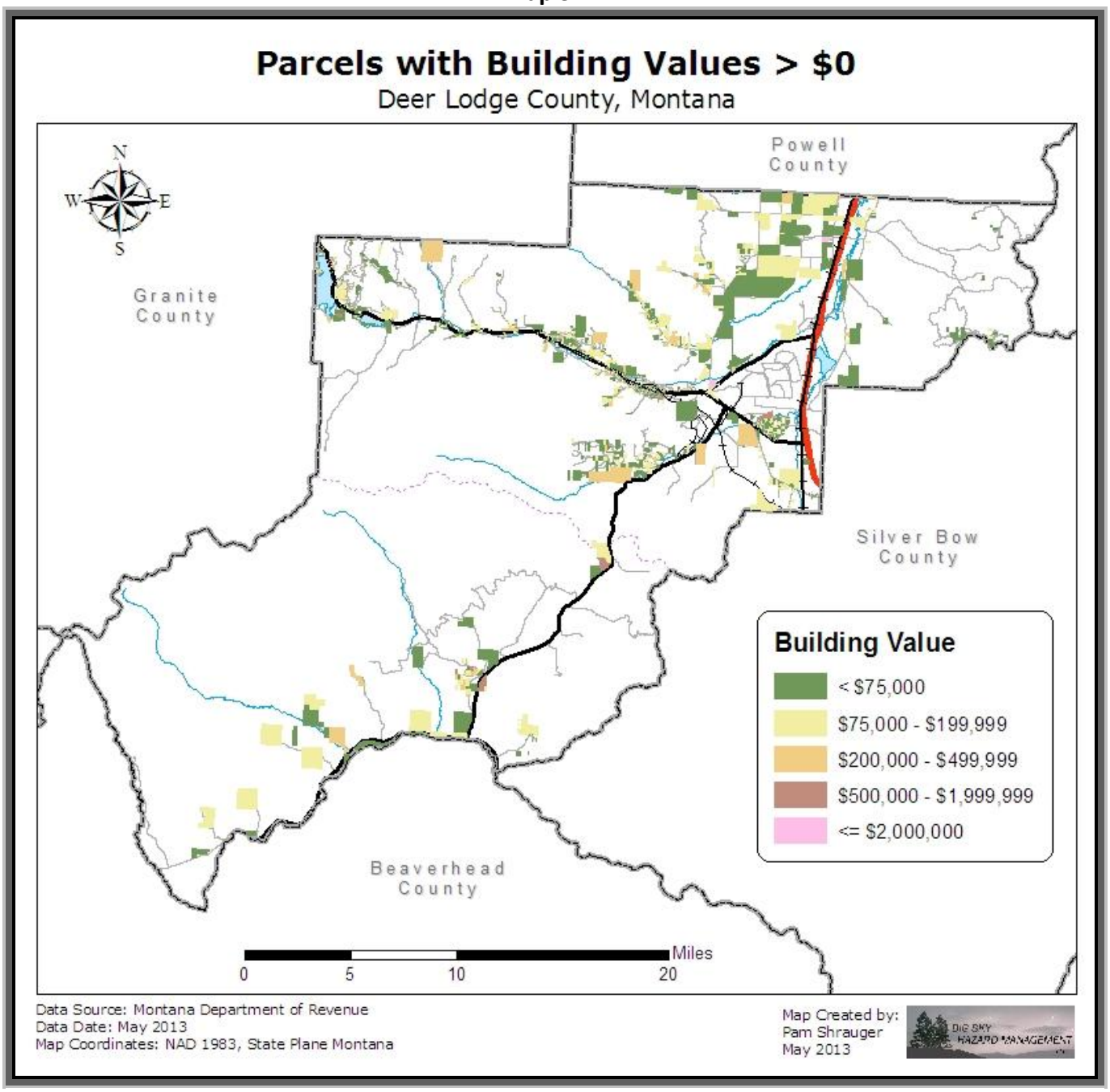
	Anaconda – Deer Lodge County
2005 or later	156
2000 to 2004	111
1990 to 1999	336
1980 to 1989	213
1970 to 1979	577
1960 to 1969	326
1950 to 1959	834
1940 to 1949	572
1939 or earlier	1,990

Source: US Census Bureau, 2013.

The total value of residential structures in Anaconda – Deer Lodge County can be estimated in a variety of ways. Census values were estimated by multiplying the number of housing units (5,122) by the median unit value ($105,700) for a total housing unit value of $541,395,400. (US Census Bureau, 2013) Data from the Montana Department of Revenue Computer Assisted Mass Appraisal System (CAMA) can be also used to show the estimated building value. This database lists for each parcel of land the associated taxable land and building market values. The CAMA data for Anaconda – Deer Lodge County has 4,584 parcels listed with a building value greater than zero and a total value of $383,422,313. Note that this figure includes non-residential buildings. (Montana Department of Revenue, 2013) In comparison, the Federal Emergency Management Agency's HAZUS-MH loss estimation software gives the residential building stock in Anaconda – Deer Lodge County a replacement value of $567,785,000 for 4,067 residences. (Federal Emergency Management Agency, HAZUS-MH MR2 database) Map 3.2E

shows the locations of structures provided by the Anaconda – Deer Lodge County GIS contractor integrated with values based on the closest CAMA parcel with a building value greater than $0.

Map 3.2E



3.3 Economic, Ecologic, Historic, and Social Values

Anaconda – Deer Lodge County has an abundance of natural resources and scenic beauty. The county is home to beautiful mountains, rivers, and lakes and the largest wildlife management area in Montana. Historic buildings and the artifacts of one of the largest copper mining operations in the world are shifting the economy from one of mining to that of recreation. Anaconda – Deer Lodge County's population is older than the average Montana county, with nearly 20% of the population age 65 and over, and as such, services supporting this population are another significant contributor to the economic base. In 2011, the county's largest private employer was the Community Hospital and Nursing Home. (Montana Department of Labor and Industry, 2012)

Disasters of any magnitude can threaten the fragile economies and well-being of residents. Some basic economic statistics follow:

- Median household income (2007-2011): $34,095
- Persons below poverty (2007-2011): 20.9%
- Total number of companies/firms (2007): 756

Source: US Census Bureau, 2013.

The top fifteen private employers (excluding railroad and government) in the county in 2011 included:

- AFFCO
- Albertsons
- Anaconda Copper City Bowling Alley
- Aware Inc (group homes)
- Barclay II
- Community Counseling and Correctional Facilities
- Community Hospital and Nursing Home
- Dee Motor Company
- Fairmont Hot Springs Resort
- Jordan Contracting
- McDonalds
- Pioneer Technical Services
- Safeway
- The Haufbrau
- Town Pump

Source: Montana Department of Labor and Industry, 2012.

Based on data from the US Census of Agriculture in 2007, Anaconda – Deer Lodge County had:

- Number of farms: 123 farms
- Acres in farmland: 79,335 acres
- Total market value of agricultural products sold: $4,025,000
- Market value of livestock, poultry, and their products sold: $3,529,000
- Number of cattle and calves: 6,216
- Number of sheep and lambs: 839
- Number of horses and ponies: 381

- Number of poultry (layers): 64
- Number of mules, burros, and donkeys: 35
- Market value of crops sold: $497,000
- Primary crops (based on number of acres): Forage/Hay and Wheat

Source: US Department of Agriculture, 2007.

The ecologic, historic, and social values of Anaconda – Deer Lodge County each tie in to the quality of life for residents and visitors. Without these values, lives and property may not be threatened, but the way of life and connections to history and the environment could be disrupted. These values can have deep emotional meaning and investment.

Ecologic values represent the relationship between organisms and their environment. For humans, these values include clean air, clean water, a sustainable way of life, and a healthy, natural environment including a diversity of species. Natural hazards, such as floods and wildfires, are usually part of a healthy ecosystem but often human-caused hazards damage ecologic values. Ecologic values in Anaconda – Deer Lodge County include Beaverhead-Deerlodge National Forest, Anaconda Pintler Wilderness, Mount Haggin Wildlife Management Area, rivers, creeks, lakes, and wildlife. Anaconda – Deer Lodge County does not have any generally known listed endangered species, however, the Bull Trout is a listed threatened species in the county. Proposed and candidate species include the Arctic Grayling, Wolverine, and Whitebark Pine. (US Fish and Wildlife Service, 2013)

Historic values capture a piece of history and maintain a point in time. Historic values can include sites, buildings, documents, and other pieces that preserve times past and have value to people. Anaconda – Deer Lodge County has 32 resources listed in the National Register of Historic Places. (National Park Service, 2013)

Social values often cannot be quantified but are an important aspect of quality of life and interpersonal relationships. Examples of social values in Anaconda – Deer Lodge County may include gatherings to promote community building, personal achievement, freedom from tyranny, the ability to communicate with others, pride in making the world a better place, and friendships. The realm of social values is only limited by the human imagination and usually relates to how a person feels. Disasters, both natural and human-caused, can disrupt important social activities and sometimes have lasting effects on society.

3.4 Current Land Use

Anaconda – Deer Lodge County has varied land use but is primarily rural with most of the land use devoted to agriculture, forest uses, residential, undeveloped areas, and government ownership. The Anaconda area is the most developed. Small communities, such as Opportunity, Galen, Warm Springs, Georgetown Lake, and West Valley, and individual homes and ranches are interspersed. Map 3.4A shows the federal, state, and local government ownership and conservation easement areas in the county and Map 3.4B shows the land cover throughout the county.

Over half of the land in Anaconda – Deer Lodge County is government owned, much of it part of the Beaverhead – Deerlodge National Forest. Wildlife management areas and state trust lands account much of the state lands. Atlantic Richfield Company (ARCO) is a significant private land owner.

The following excerpts describing different areas of Anaconda – Deer Lodge County are from the county's 2010 Growth Policy:

Big Hole
The Big Hole area of Anaconda – Deer Lodge County is characterized by very large land holdings, wide open spaces, and working agriculture. Two-lane Montana Highway 43 runs along the north bank of the Big Hole River, and Mill Creek Highway connects the Big Hole with the Anaconda area. Significant public lands in the Big Hole include the Beaverhead - Deerlodge National Forest and the Mount Haggin Wildlife Management Area. However, the area's major natural resource is the Big Hole River, a Blue Ribbon trout stream that also supports Arctic grayling and attracts anglers from all over the world. Residents said that they do not want to see houses in the floodplains. The most significant local regulation is Ordinance 208, Big Hole Conservation Development Standards and Permitting Process. This ordinance requires a permit and establishes a "setback" of 150 feet from the ordinary high water mark (OHWM) of the main stem of the river. (Anaconda – Deer Lodge County, 2010)

Opportunity
The unincorporated community of Opportunity and surrounding area has a very strong sense of community, and residents place high value on the small town friendliness, the peace and quiet, and their unique quality of life. Two of the relevant issues for this community are the lack of development regulations and the ongoing need for environmental remediation. (Anaconda – Deer Lodge County, 2010)

Lost Creek
Like most rural communities in Anaconda – Deer Lodge County, the Lost Creek area has no special land development regulations that include setbacks and buffer areas from Lost Creek. Lost Creek residents have expressed that they place a high value on the safety and security of their community. They like the rural character and the "wild land" that is the backdrop to their unique community. Concerns about new development include, among other things, the impact to existing services such as fire protection. Occasional flooding from undersized culverts was also mentioned as a problem. Steep slopes are generally thought of as an unfavorable place to build. (Anaconda – Deer Lodge County, 2010)

Mill Creek – Aspen Hill – Clear Creek
Located east of Mt. Haggin and north and west of the Mill Creek Highway, Aspen Hill and Clear Creek are two connected large-lot subdivisions. While they are very close to Anaconda, their orientation and terrain give this area a distinctly rural, almost alpine character. (Anaconda – Deer Lodge County, 2010)

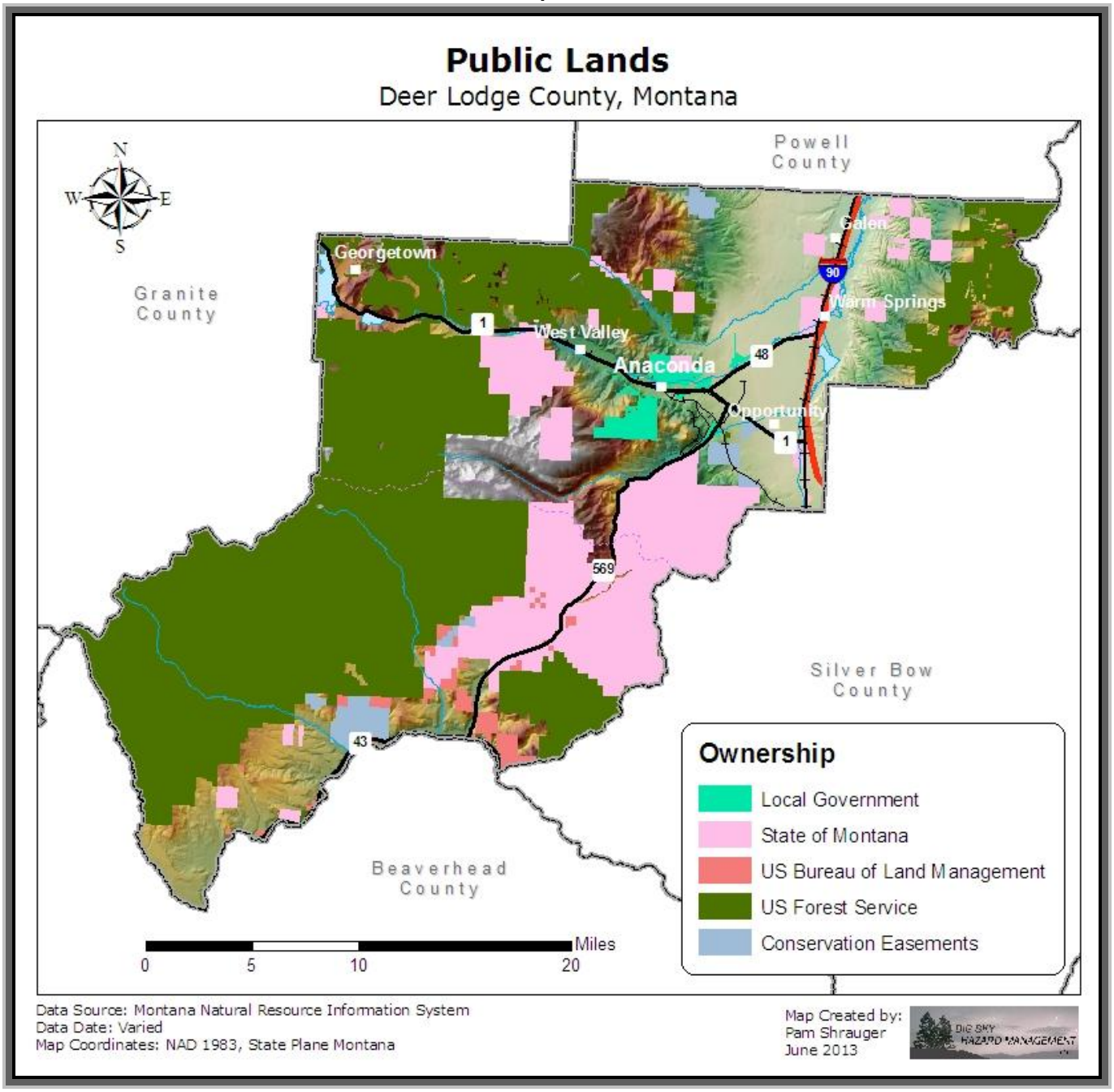
East Valley
The East Valley area, including Galen and Warm Springs, is characterized by open rangelands and working agriculture. Residents appreciate the Clark Fork for the recreational fishing and floating it provides, and most residents do not want to see their area change to any great degree. Sub-standard roads and a lack of road signs were noted as problems. Residents are interested in a conservation development ordinance and standards for the Clark Fork River similar to Ordinance 208 which addresses riparian setbacks and land uses on the Big Hole River. (Anaconda – Deer Lodge County, 2010)

Georgetown Lake
While Georgetown Lake has probably been ADLC's most developmentally active planning area in the past 10 years, it is also the most environmentally sensitive. The combination of second homes and year-round residents make Georgetown Lake one of the most populated areas of the County. Residents were most vocal that steep slopes, stream banks, wetlands, and wildlife habitat should be protected from development. Among the issues that Georgetown Lake residents want addressed are fire protection, good roads, and help with beetle kill trees. Residents feel a county-wide critical areas ordinance to address development on steep slopes and to protect stream banks, wetlands, wetland buffers, and wildlife habitat is needed. (Anaconda – Deer Lodge County, 2010)

West Valley
If and when additional development is proposed in West Valley, residents want it to have substantial open space and respect the character and qualities of the existing community. Perhaps the most significant issue in West Valley is the lack of central sewer service. Not only does it inhibit additional growth, it could pose serious health hazards. (Anaconda – Deer Lodge County, 2010)

Spring Hill
Although it is bisected by Montana Highway 1, Spring Hill is one of the County's most rural areas. What development exists is mostly residential. There are some mines and mining claims north of the highway and much of the public land on the south side of Highway 1 has been timbered. (Anaconda – Deer Lodge County, 2010)

Map 3.4A


Public Lands
Deer Lodge County, Montana
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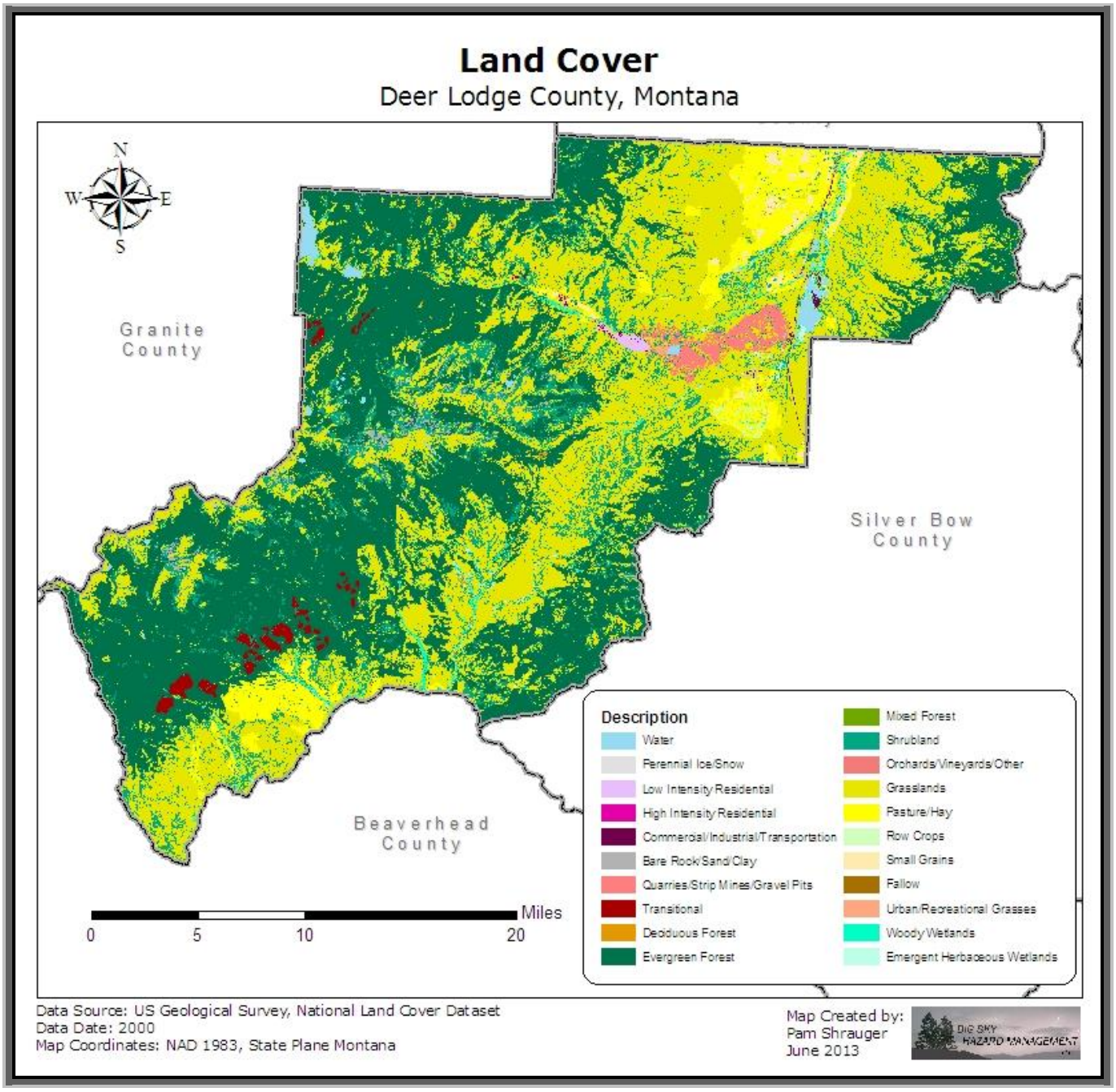
Powell County
Granite County
Silver Bow County
Beaverhead County
Georgetown
Galen
Warm Springs
West Valley
Anaconda
Opportunity
90
48
1
569
43
Miles
0
5
10
20
Ownership
Local Government
State of Montana
US Bureau of Land Management
US Forest Service
Conservation Easements
Data Source: Montana Natural Resource Information System
Data Date: Varied
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
June 2013
BIG SKY HAZARD MANAGEMENT

Map 3.4B


Land Cover
Deer Lodge County, Montana
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Granite County
Silver Bow County
Beaverhead County
Miles
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5
10
20
Description
Water
Perennial Ice/Snow
Low Intensity Residential
High Intensity Residential
Commercial/Industrial/Transportation
Bare Rock/Sand/Clay
Quarries/Strip Mines/Gravel Pits
Transitional
Deciduous Forest
Evergreen Forest
Mixed Forest
Shrubland
Orchards/Vineyards/Other
Grasslands
Pasture/Hay
Row Crops
Small Grains
Fallow
Urban/Recreational Grasses
Woody Wetlands
Emergent Herbaceous Wetlands
Data Source: US Geological Survey, National Land Cover Dataset
Data Date: 2000
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
June 2013
DIG SKY HAZARD MANAGEMENT

3.5 Recent Development

From 2000 to 2010, Anaconda – Deer Lodge County's population decreased from 9,417 to 9,298. Overall population decreases have been the trend for many years in Anaconda – Deer Lodge County. Despite the net loss of population, some areas, such as the Georgetown Lake area, have experienced population increases and development. Table 3.5A shows annual building permit data since 2005. Compliance with the development permit system has been difficult in the past, but improving in recent years. Permit data is now starting to enter the GIS system.

Table 3.5A Annual New Privately-Owned Residential Building Permits

Year	Units Constructed	Construction Costs
2005	33	$3,577,447
2006	27	$3,864,075
2007	30	$4,859,005
2008	11	$2,110,040
2009	6	$886,183
2010	17	$2,381,023
2011	15	$2,338,555
2012	4	$907,668

Source: US Census Bureau, 2013.

Notable non-residential development projects in Anaconda – Deer Lodge County in recent years include:

- Dave Gates Generating Station at Mill Creek (a Northwestern Energy gas-fired electric generating plant and compressor station) in 2011 at an investment of about $200 million
- Community, Counseling, and Correctional Services, Inc. (CCCS) facility (152 bed Sanction, Treatment, Assessment, Revocation, and Transition (START) Center 6 miles northeast of Anaconda) in 2010 at an investment of about $12.3 million
- Southwest Montana Community Federal Credit Union building in Anaconda
- Restoration of the historic Anaconda – Deer Lodge County Courthouse at an investment of about $1.2 million
- Numerous infrastructure projects including: water main replacements, sewer line extensions, park, recreation, and trail development, public parking, airport runways, street lighting, and roadway improvements

Source: Anaconda – Deer Lodge County, 2010.

3.6 Future Development

Existing land uses and the review processes and regulations for new development play important roles in disaster mitigation. Often, smart development is an inexpensive and effective way to reduce the impact of future disasters on the community. The following mechanisms are used by Anaconda – Deer Lodge County to guide future development.

Anaconda – Deer Lodge County Growth Policy, 2010

Anaconda – Deer Lodge County has a growth policy, as required by state law. This policy does not provide regulatory authority but rather outlines the future of growth in the jurisdiction. Regulatory authorities such as subdivision regulations and zoning are then guided by the growth policy. Growth policies are essentially the new version of comprehensive plans. The Anaconda – Deer Lodge County Growth Policy emphasizes sustainability, and while not explicitly stated, a safe community can be inferred. Remediation of contaminated land is an important focus as well. This growth policy makes reference to the county Hazard Mitigation Plan, specifically as it relates to flood and earthquake hazards.

During the development of this growth policy, residents of the Big Hole area expressed that they do not want to see houses in the floodplain. As a result, a recommendation to revise the Big Hole River Conservation Development Standards and Permitting Process to clarify activities subject to the 150 foot setback is included in the current policy. An expansion of this type of ordinance is recommended countywide with involvement from local watershed groups.

The growth policy also suggests that regulations related to development on steep slopes in the wildland urban interface are needed in all areas of the county, not just Georgetown Lake.

Anaconda – Deer Lodge County Subdivision Regulations, January 1994

The subdivision regulations govern the creation of subdivisions throughout the county. Minor subdivisions are considered to be five or less lots and major subdivisions greater than five lots. The documented purposes of the regulations address some of the topics related to hazard mitigation. For example, one purpose of the regulations is, “The avoidance of danger or injury by reason of natural hazard or the lack of water, drainage, access, transportation or other public services.” This purpose calls for the protection of life but does not go as far as addressing the protection of property. Additionally supporting this purpose is the requirement, “The planning board shall consider the following: relevant evidence relating to the public health, safety, and welfare;” (II-B-3,a,1).

“Low Impact” Minor Subdivisions do not have as restrictive development requirements as other subdivisions, but the regulations state that the subdivision must not be located on land “subject to natural or man-made hazards.” All subdivisions must “be suitable for subdivision” which considers flooding, snow avalanches, rock falls, landslides, and other hazards. Additional restrictions are placed on

land in the floodway or deemed subject to flooding by the governing body. Proper drainage is also required and the governing body can require fire fighting facilities.

With respect to wildland fire, subdivisions are not prohibited in high fire hazard areas (as determined by the US Forest Service or Montana Department of Natural Resources and Conservation), but they must conform to special standards. These special standards include two entrance/exit roads, the road right of way be cleared of slash, and bridges be designed for loads of 20 tons and constructed from non-flammable materials. Structures are prohibited on forested slopes greater than 25% and on specific topographical features. The minimum lot sizes are as follows:

% Slope	Open Grass	Forest & Brush
0-10	1 acre	2 acres
10-20	2 acres	3 acres
20-25	3 acres	4 acres
Over 25	5 acres	Not permitted

The subdivision regulations also contain water supply requirements:

- 500 gallons/minute for lots one acre or more
- 750 gallons/minute for lots one acre or less with no central water
- 500 gallons/unit with a minimum of 4,000 gallons available

Anaconda – Deer Lodge County Development Permit System, December 1992

The permit system in Anaconda – Deer Lodge requires a land use permit for all development with specific standards for Anaconda and Georgetown Lake. A key objective is, "Protect public health, safety and welfare."

As part of the development permit system, Anaconda – Deer Lodge County has an adopted building code and is a certified local government program through the state.

The only specific requirements related to hazard mitigation for Anaconda pertain to flooding. This document creates a floodplain overlay district that recognizes the National Flood Insurance Program requirements outlined in Anaconda – Deer Lodge County Ordinance 106. The permit system also requires culverts and bridges on natural watercourse be designed by a professional engineer and pass the 100-year flood without damage to the bridge or culvert and without diverting floodwaters. Those culverts and bridges not on a natural watercourse must pass runoff from a 10-year, 6 hour storm event.

The Georgetown Lake Development District outlined in the permit system has more robust mitigation requirements. This district requires runoff and erosion control measures for large developments and includes enhanced wetland, stream, and lakeshore protections. The district also requires a wildfire prevention plan and mitigation. Development is restricted on slopes over 25% or those identified as unstable.

Although a joint ordinance adopted by Anaconda – Deer Lodge, Madison, Beaverhead, and Butte – Silver Bow Counties, a 150 foot structural setback is enforced along the Big Hole River.

Anaconda – Deer Lodge County Capital Improvements Plan

The Capital Improvements Plan for Anaconda-Deer Lodge County establishes priorities for large scale infrastructure projects. The majority of priorities/projects are not specific to disaster mitigation but are related to the upkeep of existing systems and facilities and the purchase of equipment to enhance public safety. In 2010, the county conducted a Storm Water Monitoring and Assessment Study.

East Anaconda Reuse Plan, 2008

The East Anaconda Reuse Plan, adopted by the County in 2008, provides redevelopment concepts and economic development strategies for former industrial lands on both sides of Highway 1 in East Anaconda, the Mill Creek area, and the Opportunity Triangle. (Anaconda – Deer Lodge County, 2010)

Development Projections

Future development is so dependent on economic and regulatory conditions that predicting growth, particularly in a quantitative manner, is difficult. Since the 1960s, when the population was over 18,000, the population of Anaconda – Deer Lodge County has declined steadily, especially with the closure of the copper smelter. Population decreases are still being seen, but not as dramatically. In recent years, Superfund issues have likely limited growth, but the public lands and high resource values could attract future development. Projections are now for the county population to slowly increase. (Montana Census and Economic Information Center, 2013) Most of the population losses have been in the developed parts of the county such as Anaconda, Opportunity, and West Valley. Areas that are seeing an increase in development and population are Georgetown Lake and the mountainous regions south of Anaconda. These areas are generally expected to continue to grow but the exact locations where development will occur in the future and the numbers of structures are unknown. The types of structures are primarily residential, but new commercial projects are also likely to continue.

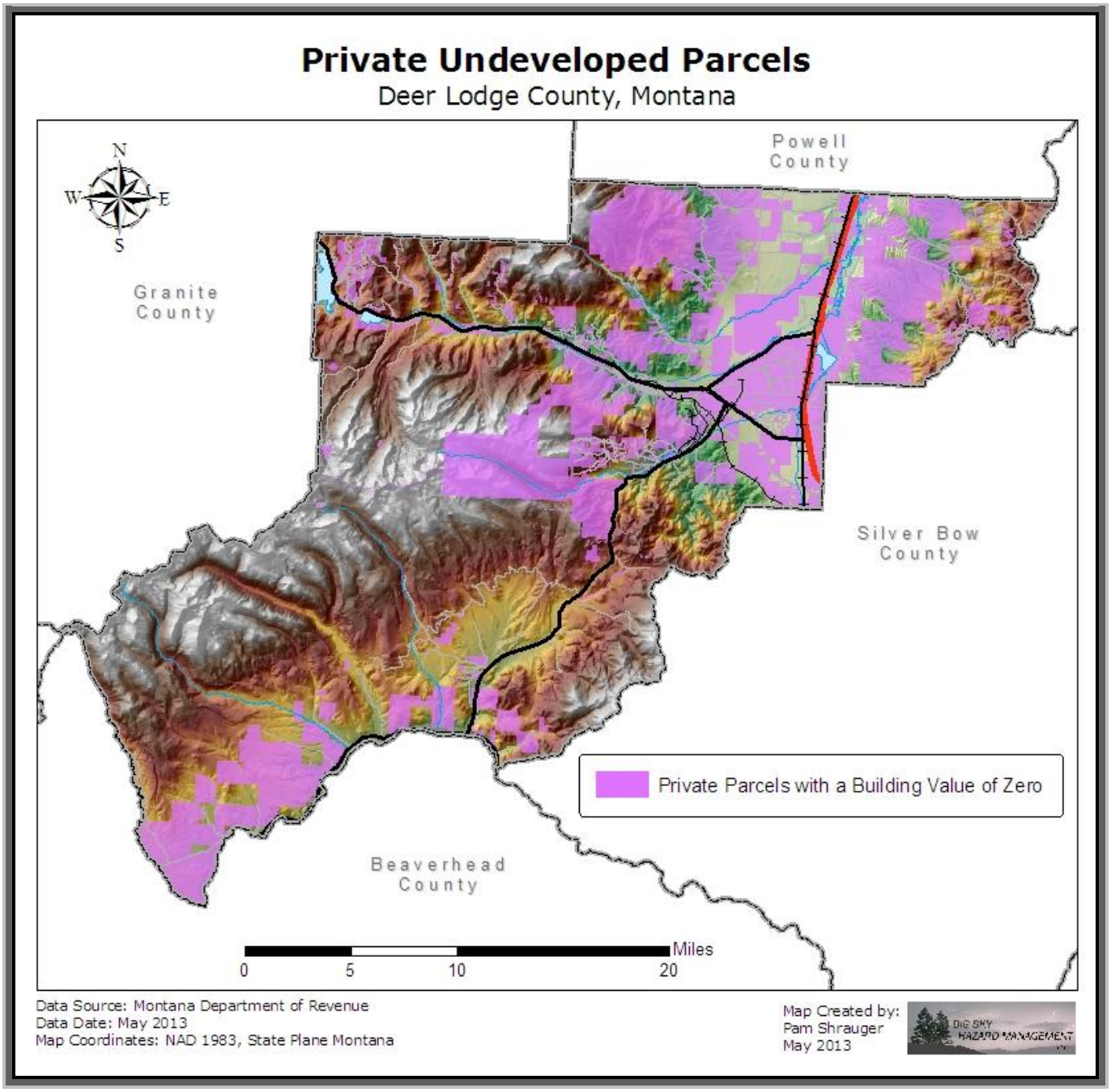
Projected federal and state highway construction projects for 2013-2017 include:

- Reconstruction north of Montana Highway 43 (2013)
- Silverbow Creek Bridge Replacement south of Opportunity (2014)
- State Route 273 Rumble Strips near Galen (2014)
- Montana Highway 1 Mill and Fill in Anaconda (2014)
- Moose Creek Road Reconstruction (2014)

Source: Montana Department of Transportation, 2013.

Map 3.6A shows the private undeveloped land parcels in Anaconda – Deer Lodge County. These parcels were calculated using Montana Department of Revenue parcel data. Those parcels with a building value of zero, excluding government lands and conservation easements, were selected. An estimated 2,060 parcels of private undeveloped lands totaling about 133,095 acres exist in Anaconda – Deer Lodge County.

Map 3.6A


Private Undeveloped Parcels
Deer Lodge County, Montana
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Powell County
Granite County
Silver Bow County
Beaverhead County
Private Parcels with a Building Value of Zero
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Miles
Data Source: Montana Department of Revenue
Data Date: May 2013
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
May 2013
BIG SKY HAZARD MANAGEMENT

4. RISK ASSESSMENT / HAZARD PROFILES

4.1 Aircraft Crash

Table 4.1A Hazard Summary

Overall Hazard Rating	Low	
Probability of High Impact Event	Low	History indicates that a high impact event is a low probability.
Vulnerability	Low	Aviation accidents are most likely to impact rural, unpopulated areas.

Table 4.1B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.1.1 Description

Aviation accidents can occur for a multitude of reasons from mechanical failure to poor weather conditions to intentional causes. Accidents can vary from small single engine aircraft to large commercial jets. The location of the accident, such as a remote area versus a populated location, also plays an important role in the amount of destruction caused.

Anaconda – Deer Lodge County has one small airport, Bowman Field (3U3), three miles northeast of Anaconda. Bowman Field serves non-commercial, private commuter, medical transport, and recreational aircraft. The airport is owned by Anaconda – Deer Lodge County, has two paved runways, and serves an average of 94 aircraft operations per week. (AirNav.com, 2013)

Commercial service is provided by a number of area airports including Butte, Missoula, and Helena. Large passenger aircraft serving these airports often fly over Anaconda – Deer Lodge County. Small aircraft accidents may be relatively minor in nature involving none or few casualties, whereas, a large commercial aircraft could create a mass casualty incident requiring outside assistance.

In addition to established airports and fixed wing traffic, helicopters and other aircraft can be found in most other areas of the county. An active wildfire season increases spotting and suppression activities by air, and heliports may be set up in many locations.

The hazard of aviation accidents can involve multiple factors. The two most significant include the location of the accident and the cargo on board. The location of an aviation accident will determine the significance of ground casualties and damages. An aircraft accident in a populated downtown area has a much greater potential for additional casualties and property damage than one that occurs in a remote part of the county. The location also affects the ability of responders to get to the crash site. The mountainous terrain in Anaconda – Deer Lodge County can make rescues and recovery difficult, particularly during inclement weather. The statistics show that incidents occur both on and off airport

facilities. Therefore, determining hazard areas based on airport locations would only be minimally beneficial and would not show all hazard areas.

The cargo is an important factor if such cargo would create a hazardous material release or increased fire hazard. Should the contents of the aircraft be hazardous, the situation would need to be treated not only as an aviation accident but also as a contaminated site. The possibility of an aviation accident as an intentional act cannot be ruled out, in which case, the accident site would also become a crime scene and possibly involve mass casualties.

4.1.2 History

Table 4.1.2A briefly summarizes the fatal accident reports filed by the National Transportation Safety Board (NTSB) as occurring in Anaconda – Deer Lodge County. Another fatal accident by the Champion Mine in the 1990s was recalled by residents but a record of this accident was not found in the NTSB database.

Table 4.1.2A NTSB Fatal Incident Report Summary

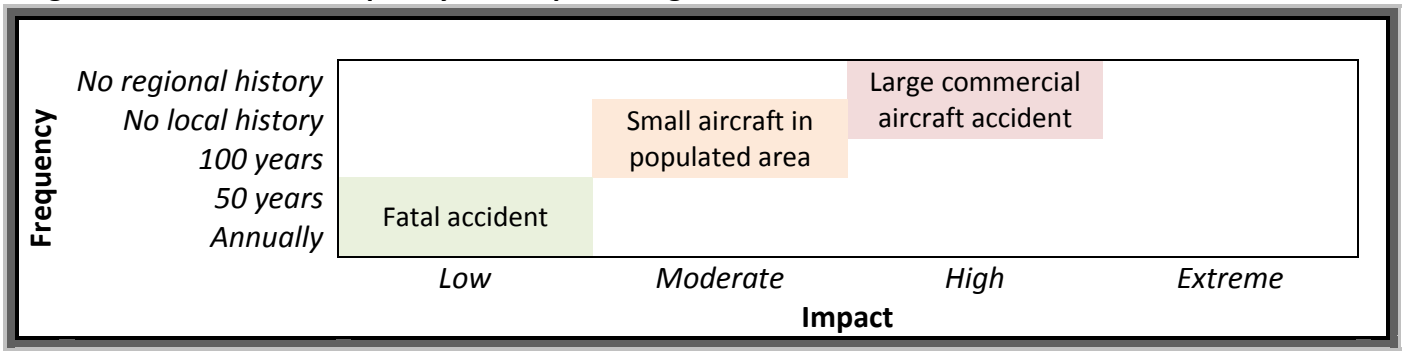
Date	Location	Casualties	Additional Information
April 16, 1965	Near Anaconda	1 fatal	Pilot, not instrument rated and having not flown in 8 years, took off in instrument conditions and crashed.
December 28, 1977	Near Anaconda	2 fatal	Pilot, not instrument rated, took off during poor weather conditions and crashed shortly after takeoff.
August 18, 1978	Hill above Evergreen Street, Anaconda	6 fatal	Pilot error during private flight to Butte, MT from Yelm, WA carrying a baseball team.
March 6, 1986	Goat Flats	3 fatal, 1 injured	Water in fuel and engine power problems prompted the pilot to attempt a forced landing but crashed into a tree.
September 8, 1987	Bund Gulch	2 fatal	Big Horn Sheep hunters crashed into the east wall of Bund Gulch while flying at low altitude.

Source: National Transportation Safety Board, 2013.

4.1.3 Probability and Magnitude

As the historical record demonstrates, the probability for a private, small aircraft accident is much greater than one involving a large commercial jet in Anaconda – Deer Lodge County. Although an incident involving a commercial passenger flight and mass casualties cannot be ruled out, the probability is considered low.

Figure 4.1.3A Hazard Frequency and Impact Ranges



4.1.4 Vulnerabilities

Methodology

Since the location and probability of a significant aviation accident is extremely difficult to determine, two scenarios were used to determine potential losses. The first is a small aircraft accident that impacts two homes. The second is a large commercial aircraft impacting an entire city block.

Exposure

Critical Facilities and Infrastructure

All critical facilities in Anaconda – Deer Lodge County are considered to be at risk from aircraft accidents. Given the nature of historic events and the probability of a specific facility being hit, the overall vulnerability of any given critical facility is considered very low. The only infrastructure that can be considered at a slightly higher risk are the tall communications towers and power lines.

Existing Structures

In most aviation accidents in Anaconda – Deer Lodge County, the losses are limited to the people on board and the aircraft itself. Should an accident occur in a developed area, structural losses in the neighborhood of $210,000 (2 homes x $105,700/average home) plus ground casualties could be found. A large commercial jet in a developed area could potentially destroy an entire city block for a loss of roughly $1,000,000 (assuming 10 or so structures were destroyed).

Population

The population impacts are going to be directly related to the type of aircraft involved, the number of people on board, the location of the accident, and the number of people in the area of the crash site. Typically, with aircraft accidents, very little warning exists so the population would be unaware until after the event occurred.

Values

In the case of an entire city block being destroyed, several local businesses could experience significant losses related to the destruction of their storefront and business facility. More likely, the emotional impacts of such an event would be significant and impact the community for many years.

Future Development

Due to the somewhat random location of aircraft accidents, the impact of future development is generally the same wherever development occurs, with the possible exception of in the immediate vicinities of the airports. The airport development district in Anaconda - Deer Lodge County restricts development in the area directly surrounding the airport. The Development Permit System contains an "Airport Safety Overlay Zone" which regulates building height and land use within the vicinity of the airport. (Anaconda – Deer Lodge County, 2010)

Vulnerabilities and Impacts

Table 4.1.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities		・ $250,000 losses ・ Structural losses ・ Contents losses ・ Critical functional losses ・ Critical data losses ・ Clean-up/debris removal costs	Low-Moderate
Critical Infrastructure		・ $200,000 losses ・ Road closures ・ Loss of electricity ・ Loss of telephone service	Low-Moderate
Existing Structures		・ $1,000,000 losses ・ Structural losses ・ Contents losses ・ Displacement/functional losses ・ Clean-up/debris removal costs	Low-Moderate
Population	・ Injuries ・ Fatalities		Moderate
Values	・ Emotional impacts	・ Business disruption losses ・ Service industry losses ・ Agricultural losses ・ Reduced air quality ・ Reduced water quality ・ Soil contamination ・ Historic structure losses ・ Historic site losses ・ Historic item losses ・ Aesthetic value losses	Low-Moderate

Table 4.1.4A Hazard Vulnerabilities and Impacts (continued)

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Future Structures		• Increases the total hazard exposure • All types of future structures are at risk	Low-Moderate

* in addition to probable (100-year) impacts

4.1.5 Data Limitations

Data limitations include:

- Difficulties in predicting the location and magnitude of future accidents. The National Transportation Safety Board keeps very detailed records of damaging aircraft incidents. These records allow for in-depth analysis of individual accidents. The randomness of aircraft accidents, however, limits the usefulness of such information in determining the potential for losses and areas of greatest hazard.
- Lack of data outlining the number of aircraft passing over Anaconda – Deer Lodge County and the areas they typically traverse to quantify the potential for major accidents.

4.10 Highway Transportation Accident

Table 4.10A Hazard Summary

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Moderate	The interstate and highways can experience relatively high volumes of traffic.
Vulnerability	Low-Moderate	The greatest vulnerability is to the population.

Table 4.10B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.10.1 Description

A highway transportation accident, for the purposes of this plan, is any large scale vehicular accident involving mass casualties. The most likely locations for an incident of this magnitude would be on Interstate 90, Highway 1, Highway 43, Highway 48, or one of the secondary routes. Interstate 90 crosses eastern Anaconda – Deer Lodge County in a north-south direction. This Interstate is widely used by large trucks, area residents, and distance travelers. Highway 1, also known as the Pintler Scenic Route, provides a scenic alternative to Interstate 90. The other highways serve as the primary routes for many rural communities in Anaconda – Deer Lodge County and beyond. Table 4.10.1A shows the average daily traffic volumes for selected road segments in Anaconda – Deer Lodge County in 2007. All of these routes can become very treacherous during winter storms. Map 4.10.1B shows the roadways in Anaconda – Deer Lodge County.

Table 4.10.1A Average Daily Traffic on Selected Road Segments in 2007

Road Segment	Average Daily Vehicles
US Hwy 1 (from I-90 to MT Hwy 441)	4,210
US Hwy 1 (from MT Hwy 441 to Mill Creek Road)	5,730
US Hwy 1 (from Mill Creek Road to Warm Springs Road)	6,170
US Hwy 1 (from Warm Springs Road to Anaconda Urban Limits)	7,130
US Hwy 1 / Commercial Avenue (from east urban limits to Cedar Street)	5,467
US Hwy 1 / Commercial Avenue (from Cedar Street to Main Street)	3,970
US Hwy 1 / Commercial Avenue (from Main Street to end of one-way	3,560
US Hwy 1 (from end of one-way to west Anaconda)	6,207
US Hwy 1 (from west Anaconda to Granite County line)	929
Park Avenue (from Adams Street to Pine Street) (from 2008)	4,200-5,800
MT Hwy 569 (from Mill Creek Road)	207
MT Hwy 48 (from Warm Spring Road)	1,479
MT Hwy 273	496
MT Hwy 441	505

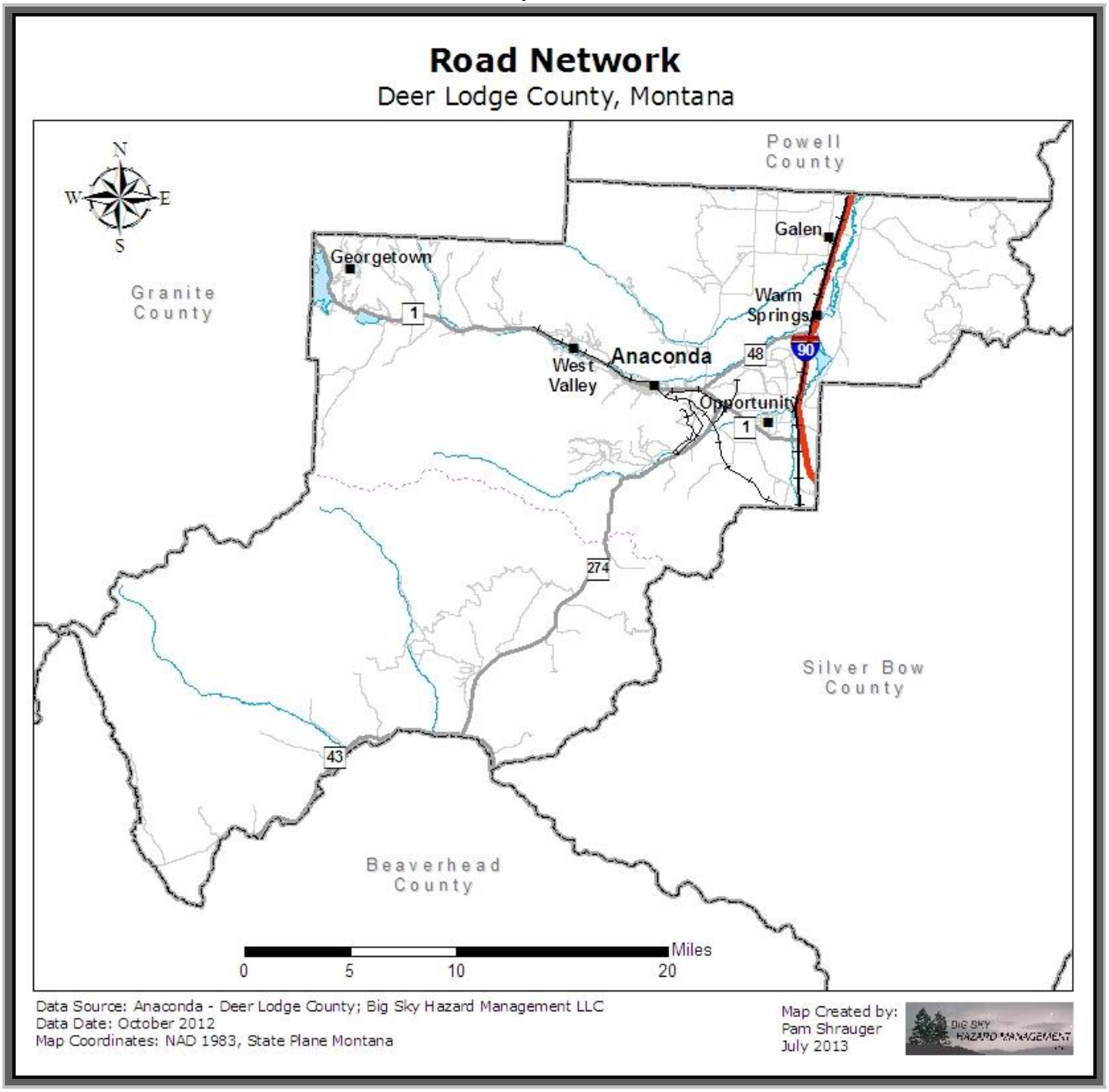
Source: Montana Department of Transportation as listed in Anaconda – Deer Lodge County Growth Policy, 2010.

A significant concern in ground transportation accidents is the release of hazardous materials. This hazard is addressed in the hazardous materials release profile.

A unique problem linked to highway transportation accidents is that of wildlife. Wildlife collisions, particularly deer, elk, and big horn sheep, are another common cause of transportation accidents in the county.

Plan development stakeholders noted that about half of the bridges in the county are deficient.

Map 4.10.1B



4.10.2 History

The history of highway transportation accidents in Anaconda – Deer Lodge County consists primarily of small magnitude incidents, some with fatalities, but most with very little effect on the entire community. Traffic accidents along the roadways occur regularly, usually inconveniencing travelers, overwhelming local emergency resources, and occasionally causing delays. Table 4.10.2A shows the traffic fatalities in Anaconda – Deer Lodge County from 1980-2011.

Table 4.10.2A Traffic Fatalities

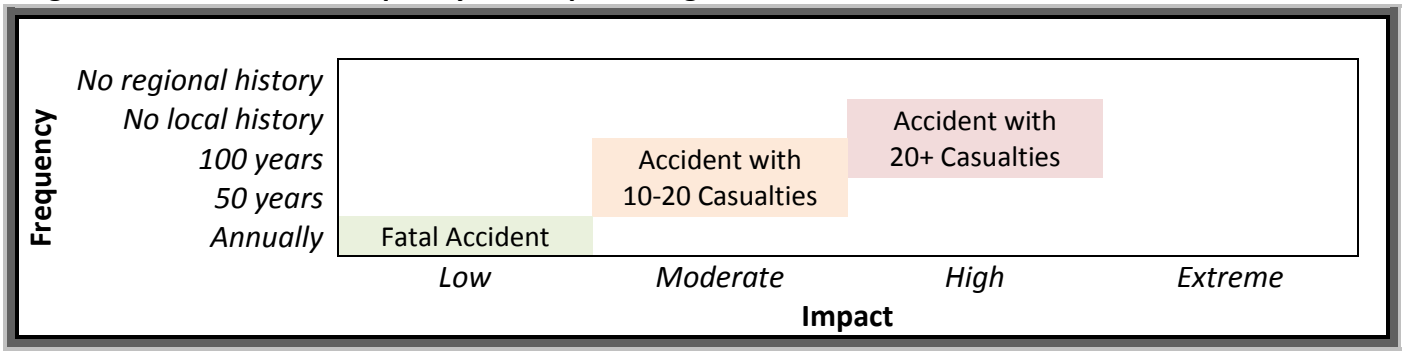
Year	Fatalities	Year	Fatalities	Year	Fatalities	Year	Fatalities
1980	3	1990	6	2000	1	2010	0
1981	1	1991	2	2001	2	2011	1
1982	1	1992	0	2002	2		
1983	4	1993	1	2003	2		
1984	2	1994	1	2004	1		
1985	5	1995	7	2005	3		
1986	2	1996	2	2006	3		
1987	5	1997	7	2007	2		
1988	0	1998	6	2008	1		
1989	7	1999	3	2009	3		
Annual Average	3.0	Annual Average	3.5	Annual Average	2.0	Annual Average	0.5

Source: Montana Highway Patrol, 2012.

4.10.3 Probability and Magnitude

Despite a relatively low history of major highway transportation accidents, the potential for an accident with much more pronounced impacts exists. The probability of a large wreck with mass casualties is further increased during the frequent snow storms, periods of poor visibility with blowing snow or smoke, and during times of heavy tourist traffic.

Figure 4.10.3A Hazard Frequency and Impact Ranges



4.10.4 Vulnerabilities

Methodology

Since the location and probability of a significant highway transportation accident is extremely difficult to determine, two scenarios were used to determine potential losses. The first is an accident involving a bus and resulting in 10-15 casualties. The second is a multi-vehicle accident resulting in 20-25 casualties, damage to electric infrastructure, and damage to two structures.

Exposure

Critical Facilities and Infrastructure

The critical facilities are not anticipated to be impacted by a highway transportation accident. A critical facility could be damaged in or made inaccessible from the impact of an accident, but the likelihood is considered low and uniform throughout the county. Should the incident be large enough, the largest expenditures would probably be in responding agency costs.

Existing Structures

Typically, most losses from a highway transportation accident are covered by insurance. Losses of two structures would be about $210,000 (2 homes x $105,700/average home).

Population

Population losses are highly likely in highway transportation accidents. A highway transportation accident has the potential to kill and injure large numbers of people. Any accident involving a bus or many vehicles has the potential for casualties numbering from 10 to 100.

Values

Should vehicle fluids or hazardous materials seep into a water supply, the quality of that water body could be threatened. More likely, the emotional impacts of such an event would be significant and impact the community for many years.

Future Development

Future development, except for the associated increase in vehicles in the area, will not impact or will just slightly increase the probability of a large highway transportation accident. Otherwise, the specific locations of where development occurs should not significantly affect the vulnerabilities from this hazard, especially since appropriate road improvements are usually required with new development per subdivision regulations.

Vulnerabilities and Impacts

Table 4.10.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities		・ $0 losses	Low
Critical Infrastructure	・ Road closures	・ $100,000 losses ・ Loss of electricity ・ Loss of telephone service ・ Loss of internet service	Low-Moderate
Existing Structures		・ $200,000 losses ・ Structural losses ・ Contents losses ・ Displacement/functional losses ・ Clean-up/debris removal costs	Low-Moderate
Population	・ Injuries ・ Fatalities		High
Values	・ Emotional impacts	・ Business disruption losses ・ Service industry losses ・ Agricultural losses ・ Habitat damages ・ Reduced water quality ・ Soil contamination ・ Historic structure losses ・ Historic site losses ・ Historic item losses ・ Aesthetic value losses	Low-Moderate
Future Structures		・ Unlikely to occur in hazard areas ・ Increases the total hazard exposure	Low-Moderate

* in addition to probable (100-year) impacts

4.10.5 Data Limitations

Data limitations include:

- Difficulties in predicting the location and magnitude of future accidents.

4.11 Landslide and Avalanche

Table 4.11A Hazard Summary

Overall Hazard Rating	Low	
Probability of High Impact Event	Low	History does not indicate a high impact event is probable.
Vulnerability	Low	Most assets are located outside of the hazard areas.

Table 4.11B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.11.1 Description

Avalanches and landslides are similar in nature such that both occur when a material on the surface of the earth cannot be supported any longer and gives way to gravity. In the case of an avalanche, the substance is snow, and for a landslide, the substance is mud, rock, or other geologic material. Both can occur rapidly with little warning.

When snow accumulations on a slope cannot be supported any longer, the snow support structure may break and fall creating an avalanche. The subsequent rush of unsupported snow can bury and move things in its path. The majority of avalanches do not cause any damage; occasionally however, people and property may fall in their paths.

According to the Montana Disaster and Emergency Services website, "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 of 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 starting zones 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." (Montana Disaster and Emergency Services, 2011)

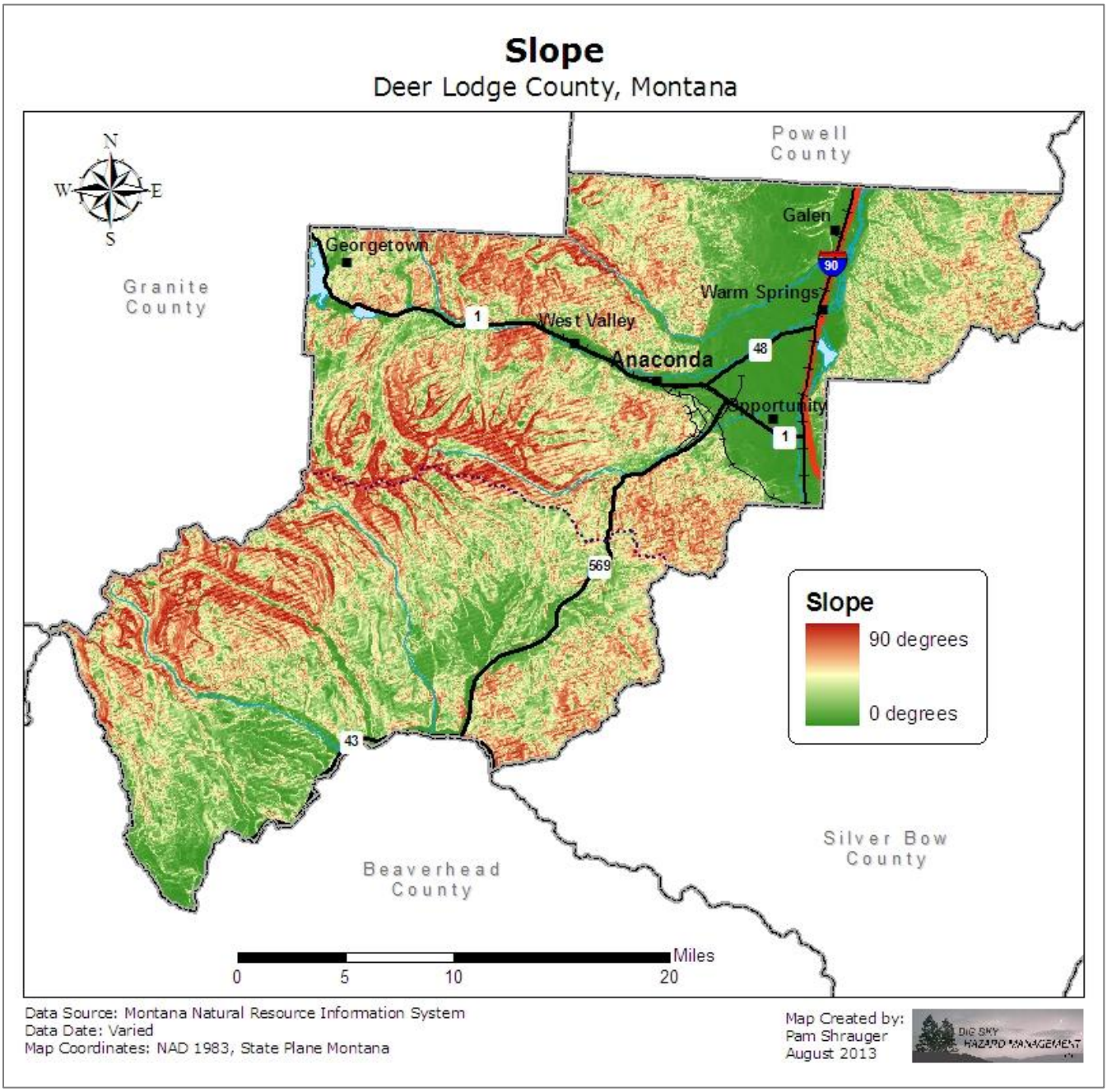
In order for an avalanche to occur, factors such as slope, snow cover, a weak layer in the snow, and a trigger must be present. Avalanche danger increases with major snowstorms and periods of thaw. Approximately 90% of avalanches start on slopes of 30-45 degrees, most often on slopes above the timberline facing away from prevailing winds. Most avalanches occur in the backcountry. (Utah Department of Public Safety, 2011) Map 4.11.1A shows the slope in Anaconda – Deer Lodge County.

In the case of landslides, some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. Gravity is the force driving landslide movement. Factors that allow the force of gravity to overcome the resistance of

earth material to landslide movement include: storms, earthquakes, volcanic eruptions, fires, alternate freezing or thawing, and steepening of slopes by erosion or human modification. Landslides are typically associated with periods of heavy rainfall or rapid snow melt and tend to worsen the effects of flooding that often accompanies these events. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. (Federal Emergency Management Agency, 2011a)

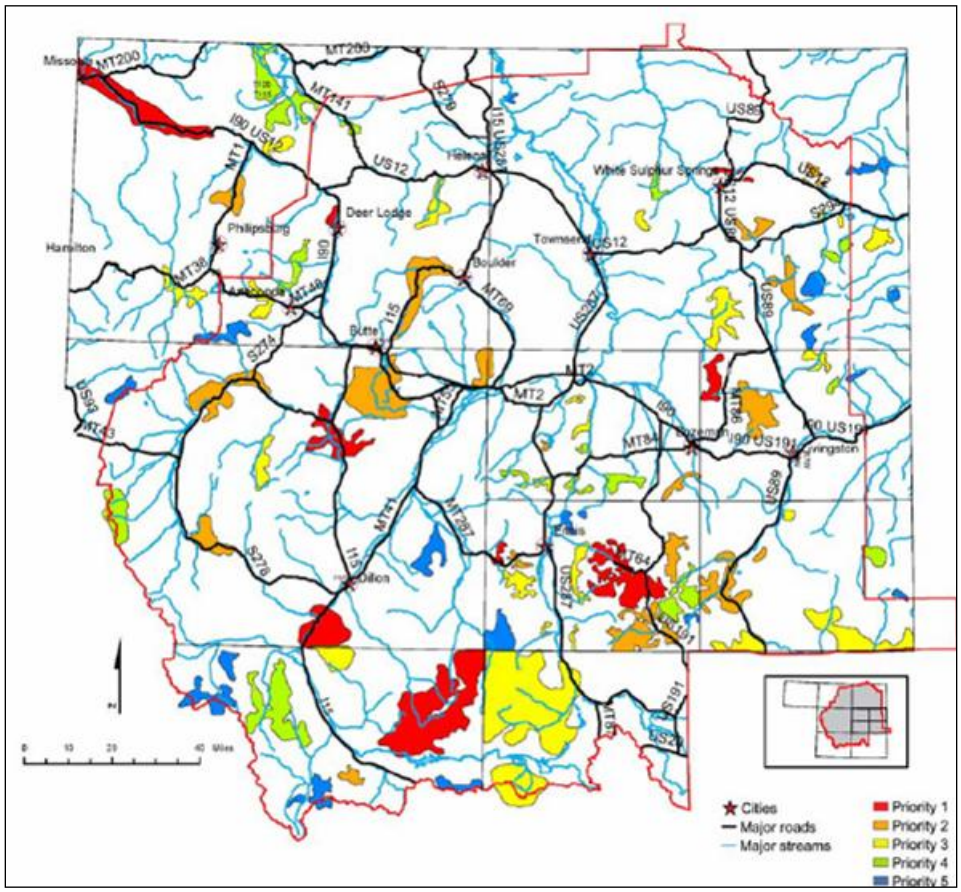
Ground or soil failure may occur in areas of unstable soils or sinkholes. Mining in the region may have also left behind unknown shallow mines that, given the right conditions, can cave in.

Map 4.11.1A



The Montana Department of Transportation, District 2 has mapped the priority areas for landslide vulnerability. The determination of priorities was based on an inventory of landslides and their proximity to state highways. Anaconda – Deer Lodge County, the western section of District 2 in Figure 4.11.1B, has Priority 3, 4, and 5 areas.

Figure 4.11.1B
Montana Department of Transportation, District 2 Landslide Priority Areas



Source: Montana Department of Transportation, 2002.

4.11.2 History

The history of landslides and avalanches in Anaconda – Deer Lodge County is quite limited. Both, however, have occurred. Table 4.11.2A outlines the impacts of avalanches since 1998 listed in historical records or as noted by Local Emergency Planning Committee members. Most avalanches in Anaconda – Deer Lodge County do not cause any damages. The primary concerns are when people or property lie in the path.

The only area known to have mudslides, as identified by Anaconda residents, is above Maple Street on the south side of Anaconda. Mud frequently flows down from this area during periods of heavy rain. Minor landslides did occur on Mt. Haggin during the Borah Peak earthquake.

Table 4.11.2A Anaconda – Deer Lodge County Avalanches

Date and Location	Result
February 28, 1967 Anaconda	Two small houses lost.
Mid 1980s Near Cable Creek	Avalanche noted.
Early 1990s Near Miller Lake	Two people killed.
December 26, 2000 Discovery Basin Ski Resort	Three boys injured while skiing in closed area.

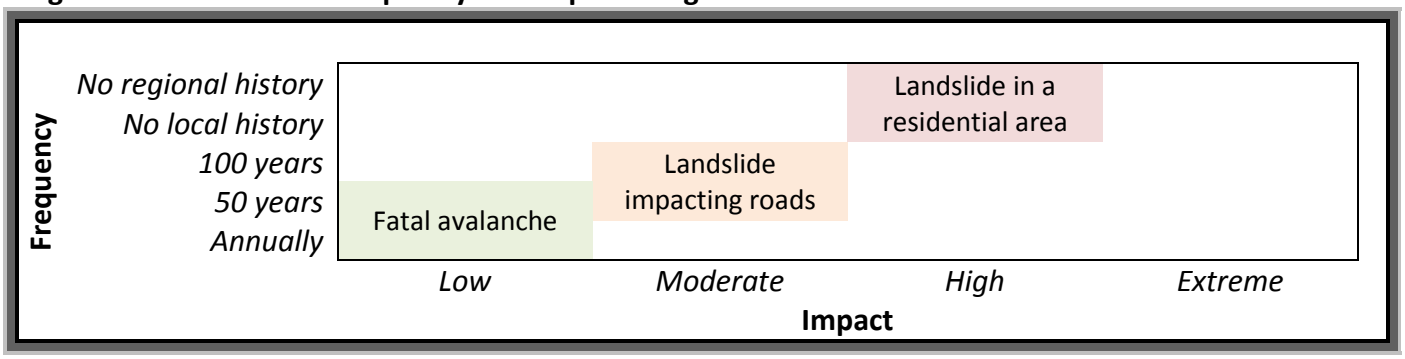
Sources: CyberSpace Avalanche Center, 2005; LEPC members.

4.11.3 Probability and Magnitude

The Colorado Avalanche Information Center has compiled statistics on a statewide basis on avalanche fatalities. Montana ranks second in the nation with 48 fatalities from 1999/2000 to 2009/2010. Looking at the activities the individuals were undertaking at the time of the avalanche, snowmobiling, skiing, and climbing rank as the top three. Based on the statistics from 1998-2012, fatalities in Anaconda – Deer Lodge County are somewhat rare as only two people have been killed in the past 20 years or so.

Landslides have an even lower probability of creating a disaster based on a very limited history of events. Should landslides occur in this area, they typically do not affect life or property. The probability of a damaging landslide could greatly increase if development were to occur in landslide prone areas. Wildfire burn areas also greatly increase the probability of a landslide triggered by precipitation.

Figure 4.11.3A Hazard Frequency and Impact Ranges



4.11.4 Vulnerabilities

Methodology

Given a limited history of avalanches or landslides causing losses, with the exception of population losses, loss estimates were generally figured based on a scenario of a landslide or avalanche impacting a rural interface area of three homes.

Exposure

Critical Facilities and Infrastructure

Critical facilities in Anaconda – Deer Lodge County historically have not suffered losses or been threatened by avalanches or landslides. Not that a critical facility could not be impacted, but the probability is very low. Most facilities are located outside of steep slope areas. The primary exceptions are roadways and communications equipment. Some sections of state highways and county roads are known to have possible landslide hazards. Typically, communications equipment, such as radio towers, are located on mountain peaks and are somewhat protected due to their locations near the peaks but not immune to avalanches and landslides. Potential losses to roadways and communications equipment could easily total into the hundreds of thousands of dollars, but the probability of such an event is considered low.

Existing Structures

Most avalanche and landslide prone areas are located on federal or state lands and do not have significant numbers of structures. An avalanche or landslide impacting three rural homes in the interface areas would result in losses of about $317,100 (3 homes x $105,700 median value of homes in Anaconda – Deer Lodge County).

Population

Based on historical records of avalanches, deaths and injuries are often the greatest losses from avalanches. Fortunately, with advisories being issued by centers, such as the West Central Montana Avalanche Center, some warning does exist as to the potential for avalanches. Training also educates outdoor enthusiasts on the signs of avalanche danger. The potential for population impacts from avalanches, especially when compared to other hazards, is still considered low.

Related to landslides, the National Weather Service issues flash flood warnings during periods of rainfall or snow melt that have a high likelihood of causing flash flooding. Such flooding and rapid runoff may trigger land and mud slides. Without any documentation supporting any deaths or injuries from landslides in Anaconda – Deer Lodge County, this potential is also considered low.

Values

The potential for economic losses is more likely yet probably not significant. An avalanche or landslide could destroy an area designated for logging; however, such an event may also create fallen timber for harvesting. With tourism being an important part of the regional economy, severe avalanche seasons could have an impact on the snowmobiling economy.

Future Development

Some undeveloped parcels of land in Anaconda – Deer Lodge County do coincide with the areas at greatest risk for avalanche and landslide losses. Development of these lands could result in more structures in the hazard areas. Fortunately, the building permit and subdivision review processes consider the hazards to new development. Development on slopes of more than 25% grade in the Georgetown Lake Zoning District is prohibited. Therefore, the development potential in these areas is limited by these regulations. The most likely type of future development in hazard areas is residential, and given the large tracts of land in the hazard areas and common sense building practices, the number of future structures in the hazard areas is probably less than 10.

Vulnerabilities and Impacts

Table 4.11.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities		• $100,000 losses • Structural losses • Contents losses • Critical functional losses • Critical data losses • Clean-up/debris removal costs	Low
Critical Infrastructure	• $200,000 losses • Road closures	• Loss of electricity • Loss of telephone service	Low-Moderate
Existing Structures		• $317,100 losses • Structural losses • Contents losses • Displacement/functional losses • Clean-up/debris removal costs	Low-Moderate
Population	• Injuries • Fatalities		Moderate
Values		• Service industry losses • Cancellation of activities • Restrictions on activities • Aesthetic value losses	Low-Moderate
Future Structures		• Unlikely to occur in hazard areas • Up to 10 residential structures estimated	Low-Moderate

* in addition to probable (100-year) impacts

4.11.5 Data Limitations

Data limitations include:

- Limited studies of the landslide and avalanche hazards in Anaconda – Deer Lodge County.
- Difficulties quantifying vulnerabilities due to the site-specific nature of landslides and avalanches.

4.12 Large Public Event

Table 4.12A Hazard Summary

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Low-Moderate	History does not indicate these types of incidents with high impacts are likely.
Vulnerability	Moderate	Populations, larger than that of the county, and values could be at risk.

Table 4.12B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.12.1 Description

Large public events have the potential to result in population losses for number of reasons just due to the high number of people in one location. The causative event could range from weather to terrorism to human-caused accidental in nature. Ultimately, the health and safety of the population are of greatest risk and concern. Damages to structures and the environment could also occur. These events usually require a high level of support from emergency services to monitor and protect the public. If the event did become an emergency situation, emergency services could quickly become overwhelmed due simply to the number of people needing assistance and the limited amount of local resources.

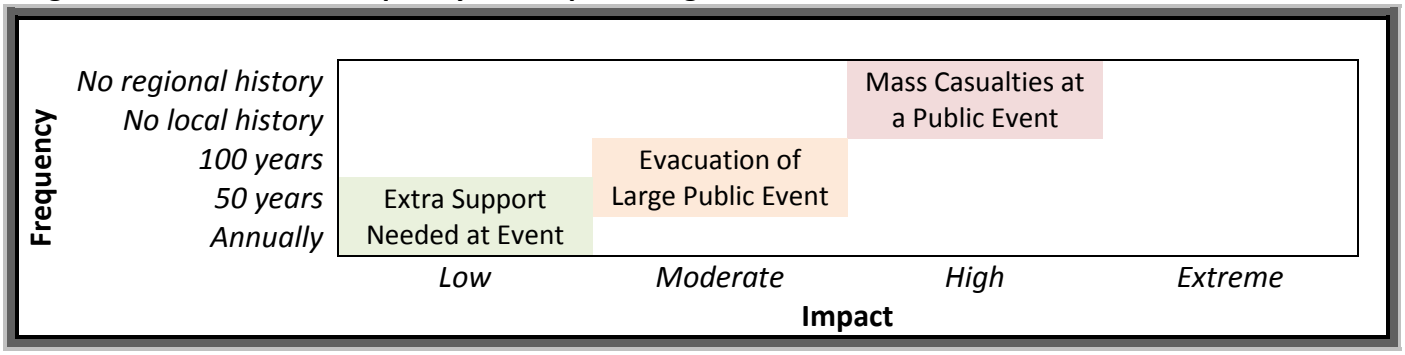
An example of a very large public event is a Rainbow Gathering. These gatherings on National Forest lands are usually peaceful, but the large influx of people into a rural community is taxing on local resources and can bring with it increased crime and leave behind environmental damage. Should another hazard complicate such a large event, the population losses could be much more substantial.

4.12.2 History

Anaconda – Deer Lodge County has been home many large public events. Extra support from emergency services has been needed but none have resulted in a disaster situation.

4.12.3 Probability and Magnitude

Figure 4.12.3A Hazard Frequency and Impact Ranges



4.12.4 Vulnerabilities

Methodology

A large public event that results in mass casualties was assumed for the purposes of this plan and the estimation of vulnerabilities.

Exposure

Critical Facilities and Infrastructure

Critical facilities and infrastructure should not be affected by a large public event.

Existing Structures

Existing structures should not be affected by a large public event, with the exception of any structures hosting or supporting the event.

Population

As indicated by definition, a large public event involves a high number of people. Therefore, the population losses could be significant should some other event harm the population. Anaconda – Deer Lodge County generally does not have emergency support resources to handle such a large influx of people or mass casualties. The number of people affected will depend on size of the event, but as an example, the Rainbow Gatherings often involve tens of thousands of people, larger than the entire population of Anaconda – Deer Lodge County.

Values

The most common loss to values from large public events is ecologic due to sanitation requirements without adequate facilities. Other losses, such as emotional or historic, could be seen if a precipitating event occurs that involves civil unrest or mass casualties.

Future Development

Future development should have little impact from large public events.

Vulnerabilities and Impacts

Table 4.12.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities			Low
Critical Infrastructure			Low
Existing Structures		• $1,000,000 losses	Low-Moderate
Population	• Illness	• Injuries • Fatalities	High
Values		• Reduced water quality • Soil contamination • Historic site losses • Aesthetic value losses • Emotional impacts • Restrictions on activities	Moderate
Future Structures			Low

* in addition to probable (100-year) impacts

4.12.5 Data Limitations

Data limitations include:

- Inability to identify which large public events may result in large scale emergencies or disasters.

4.13 Radioactive Release

Table 4.13A Hazard Summary

Overall Hazard Rating	Low	
Probability of High Impact Event	Low	History does not indicate these types of incidents are likely.
Vulnerability	Moderate	The population, economy, and environment are at greatest risk from a release.

Table 4.13B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.13.1 Description

A radioactive release is the uncontrolled release of radiation that could cause harm to the population. Ionizing radiation is a form of energy that occurs naturally by the sun and many other natural substances, but also through the production of radioactive or nuclear substances. When exposed to high levels of radiation in an uncontrolled manner, damage to living tissues can occur.

A release could be the result of warfare through a nuclear weapon, a more rudimentary dirty bomb, or through the lawful transportation or use of radioactive materials. In the case of a nuclear weapon, the radiation that precipitates is called fallout. Fallout can be immediate or occur for months or even years following a release. The intensity of the fallout is dependent on the length of time since the release and the distance from the fallout. Acute radiation exposure can cause illness, burns, and even death.

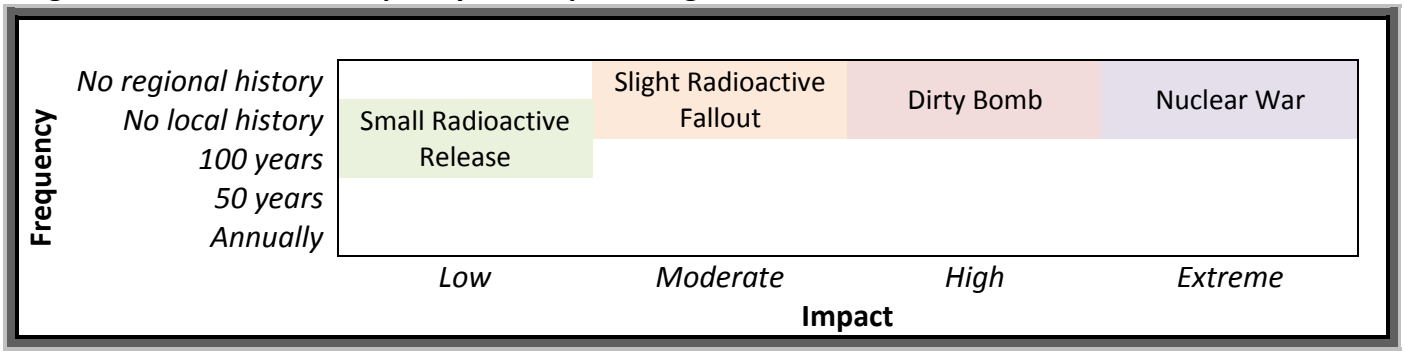
Anaconda – Deer Lodge County is not in close proximity to nuclear reactors or close to any nuclear waste transportation routes. Nuclear warheads have been housed in Montana under careful control of the US military. Small amounts, such as that used in medical applications and transported by private delivery services, may exist in the county. Otherwise, a release from an act of war is the most likely source in the county.

4.13.2 History

Fortunately, Anaconda – Deer Lodge County has not been the location of a modern radioactive release. The history of such events in the United States is limited as well. The accidental release from a nuclear reactor in Japan following a massive earthquake is the most notable recent incident.

4.13.3 Probability and Magnitude

Figure 4.13.3A Hazard Frequency and Impact Ranges



4.13.4 Vulnerabilities

Methodology

To estimate potential losses, a scenario of countywide exposure to enough fallout to require protective actions, but not a catastrophic amount, is theorized.

Exposure

Critical Facilities and Infrastructure

A radioactive release would not affect the structural integrity of critical facilities and infrastructure, but the functionality could be lost. Some critical facilities would likely become central locations for emergency operations, but the ability to respond to incidents due to the risk to responders may be limited.

Existing Structures

Existing structures should not be affected by a radioactive release and may provide some protection to the population. In extreme situations, the entire community may need to be abandoned, but in most cases, the radioactive fallout would become less hazardous with time.

Population

The population is the most vulnerable to a radioactive release. The degree of population loss is highly dependent on the amount of radiation exposure. If protective actions are taken and effective, the immediate impacts could be limited. If not, the losses could be much more substantial. In most scenarios, the long-term impacts, such as increased cancer risk and birth defects, are more likely.

Values

Depending on the type and location of the incident, economic losses could range from local economic impacts to national financial collapse. A radioactive release could have major impacts on animals such as livestock and wildlife. The economic and ecologic impacts could be substantial, second only to the population impacts. The emotional effects, such as the fear of future attacks, would likely be present countywide for a long time.

Future Development

Future development should not be affected by a radioactive release, except for the increase in population exposure.

Vulnerabilities and Impacts

Table 4.13.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities		• Critical functional losses • Clean-up/debris removal costs	Low-Moderate
Critical Infrastructure			Low
Existing Structures		• Displacement/functional losses • Clean-up/debris removal costs	Low-Moderate
Population	• Illness	• Fatalities	High
Values		• Business disruption losses • Cancellation of activities • Agricultural losses • Reduced air quality • Reduced water quality • Soil contamination • Wildlife and habitat losses • Emotional impacts	Moderate-High
Future Structures		• Increases the total hazard exposure	Low-Moderate

* in addition to probable (100-year) impacts

4.13.5 Data Limitations

Data limitations include:

- Inability to quantify the probability and magnitude of a radioactive release.
- General uncertainties related to how and when a radioactive release may occur.

4.14 Railroad Transportation Accident

Table 4.14A Hazard Summary

Overall Hazard Rating	Low	
Probability of High Impact Event	Low	Very limited history of significant railroad incidents.
Vulnerability	Low	Most structures are located outside the immediate railroad vicinity.

Table 4.14B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.14.1 Description

Goods, including hazardous materials, are transported by Burlington Northern Santa Fe (BNSF) via the rail network across Anaconda – Deer Lodge County in a north-south direction, roughly parallel to Interstate 90. This segment connects Butte and Garrison and bridges between other railroads, namely Montana Rail Link and Union Pacific. A short line railroad, the Butte, Anaconda and Pacific Railway, runs through Anaconda to Butte where it meets up with BNSF Railways. This railway primarily hauls scrap, copper slag, and copper concentrates.

A railroad accident is hazardous to those in close proximity to and inside the train due to physical impacts, but others may be threatened by associated hazards. A hazardous material release is the most probable associated hazard. Those effects are described in detail in the hazardous materials release profile.

4.14.2 History

Table 4.14.2A outlines the accidents in Anaconda – Deer Lodge County documented by the Federal Railroad Administration since 1980.

Table 4.14.2A Railroad Accidents 1980-2012

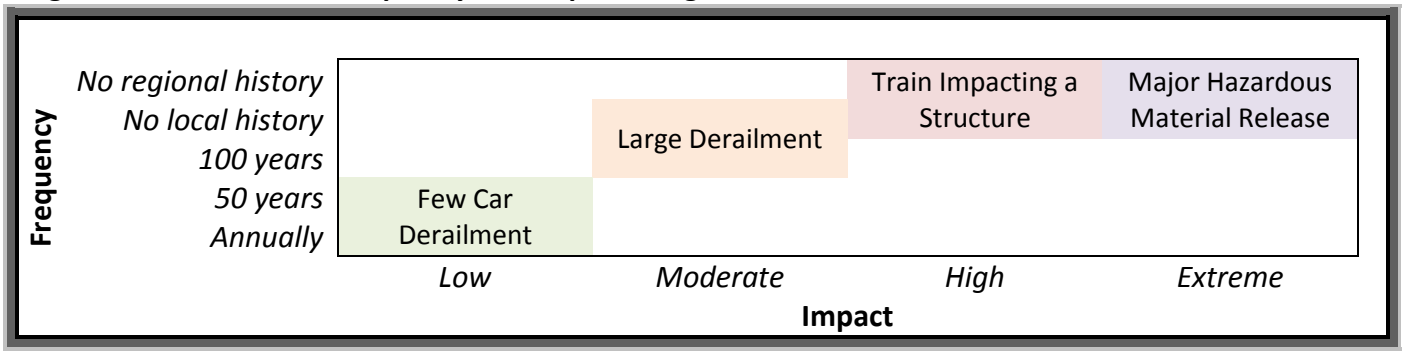
Year	# of Accidents	Fatalities	Injuries
1980	2	0	0
1982	1	0	0
1983	1	0	0
1990	1	0	0
1997	1	0	1
1998	3	0	3
1999	2	0	2
2002	2	0	2
2007	1	0	0
2008	1	0	1
2010	1	0	1
TOTAL	16	0	10

Source: Federal Railroad Administration, 2013.

4.14.3 Probability and Magnitude

Using the historical record, on average, a railroad accident occurs about once every two years (16 accidents / 33 years) in Anaconda – Deer Lodge County with an injury about once every three years.

Figure 4.14.3A Hazard Frequency and Impact Ranges



4.14.4 Vulnerabilities

Methodology

Since the location and probability of a significant railroad accident is extremely difficult to determine, two scenarios were used to determine potential losses. The first is a large derailment causing road closures and extended clean-up efforts. The second is a derailment and collision with two structures, resulting in casualties and structural losses.

Exposure

Critical Facilities and Infrastructure

Anaconda – Deer Lodge County critical facilities that are at enhanced risk from a railroad accident are Montana State Hospital, Northwestern Energy Electric and Gas Substations at Warm Springs, and the Warm Springs Post Office, as they are within 500 feet of the BNSF railroad.

Most of the losses from a railroad accident are paid for by the railroad company or their insurance. Potential community losses are most probable to infrastructure such as roadways. Should a derailment occur on a state or county road, that road could be unusable for several days or weeks. Staff time in coordinating the clean up or response could be considered additional railroad accident losses.

Existing Structures

In terms of structures that could be impacted by a derailment, 14 structures are within 250 feet of the BNSF railroad and 2 structures are within 250 feet of the Butte, Anaconda and Pacific Railway. Most accidents would probably only impact one or two structures. Damages could vary in the hundreds of thousands of dollars depending on the structure or structures impacted.

Population

Since the active railroad in Anaconda – Deer Lodge County no longer serves passengers, the potential for high casualties from the impact of a railroad accident is low. The potential certainly exists, however, for casualties to railroad workers and those in the general vicinity.

Values

Economic losses due to a train derailment are possible. Emotional impacts, such as a fear of trains, may occur should an accident result in the loss of life.

Future Development

Future development should have little to no impact on the railroad accident hazard. Most development is occurring in areas away from the railroad's immediate impact area. Little restrictions are in place, however, to prevent such development.

Vulnerabilities and Impacts

Table 4.14.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities		• $0 losses	Low
Critical Infrastructure	• Road closures		Low
Existing Structures		• $200,000 losses • Structural losses • Contents losses • Displacement/functional losses • Clean-up/debris removal costs	Low-Moderate
Population		• Injuries • Fatalities	Low-Moderate
Values		• Business disruption losses • Historic structure losses • Historic site losses • Historic item losses • Emotional impacts • Cancellation of activities • Restrictions on activities • Aesthetic value losses	Low-Moderate
Future Structures		• Somewhat likely to occur in hazard areas • Increases the total hazard exposure	Low-Moderate

* in addition to probable (100-year) impacts

4.14.5 Data Limitations

Data limitations include:

- Difficulties in predicting the location and magnitude of future accidents.

4.15 Severe Thunderstorms, Tornadoes, and Wind

Table 4.15A Hazard Summary

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Moderate	History of large hail, strong winds, and tornadoes.
Vulnerability	Moderate	Critical infrastructure and structures are vulnerable.

Table 4.15B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.15.1 Description

Severe thunderstorms, tornadoes, and wind can be hazardous under the right conditions and locations. Thunderstorms in Montana develop when moisture in the air rises, often from daytime ground heating, an unstable atmospheric condition, synoptic front, or by terrain uplift, and cools higher in the atmosphere, condensing into rain droplets or ice crystals. The cloud grows as these conditions continue and the atmospheric instability allows. Lightning can be produced, with or without rain, as a charge builds up in the cloud. With the right atmospheric conditions, updrafts and downdrafts form in the thunderstorm structure. These strong updrafts and downdrafts can produce hail, strong straight-line winds, and even tornadoes. Strong winds from tornadoes, thunderstorms, or on their own can take down trees, damage structures, tip high profile vehicles, and create high velocity flying debris. Large hail can damage crops, dent vehicles, break windows, and injure or kill livestock, pets, and people.

Hail

Hail develops when a supercooled droplet collects a layer of ice and continues to grow, sustained by the updraft. Once the hail stone cannot be held up any longer by the updraft, it falls to the ground. Hail one inch or greater in diameter is considered “severe” by the National Weather Service. Severe hail has occurred in Anaconda – Deer Lodge County. Nationally, hailstorms cause nearly $1 billion in property and crop damage annually, as peak activity coincides with peak agricultural seasons. Major hailstorms also cause considerable damage to buildings and automobiles, but rarely result in loss of life.

Downbursts

Downburst winds, which can cause more widespread damage than a tornado, occur when air is carried into a storm’s updraft, cools rapidly, and comes rushing to the ground. Cold air is denser than warm air, and therefore, wants to fall to the surface. On warm summer days, when the cold air can no longer be supported up by the storm’s updraft, or an exceptional downdraft develops, the air crashes to the ground in the form of strong winds. These winds are forced horizontally when they reach the ground and can cause significant damage. These types of strong winds can also be referred to as straight-line

winds. Thunderstorm winds of 58 miles per hour (mph) or greater are considered "severe" by the National Weather Service. Downbursts with a diameter of less than 2.5 miles are called microbursts and those with a diameter of 2.5 miles or greater are called macrobursts. A derecho, or bow echo, is a series of downbursts associated with a line of thunderstorms. This type of phenomenon can extend for hundreds of miles and contain wind speeds in excess of 100 mph.

Lightning

Although not considered severe by National Weather Service definition, lightning and heavy rain can also accompany thunderstorms. Lightning develops when ice particles in a cloud move around, colliding with other particles. These collisions cause a separation of electrical charges. Positively charged ice particles rise to the top of the cloud and negatively charged ones fall to the middle and lower sections of the cloud. The negative charges at the base of the cloud attract positive charges at the surface of the Earth. Invisible to the human eye, the negatively charged area of the cloud sends a charge called a stepped leader toward the ground. Once it gets close enough, a channel develops between the cloud and the ground. Lightning is the electrical transfer through this channel. The channel rapidly heats to 50,000 degrees Fahrenheit and contains approximately 100 million electrical volts. The rapid expansion of the heated air causes thunder. (National Weather Service, 2011b)

Tornadoes

Tornadoes form when the right amount of shear is present in the atmosphere and causes the updraft and downdraft of a thunderstorm to rotate. A funnel cloud is the rotating column of air extending out of a cloud base, but not yet touching the ground. The funnel cloud does not become a tornado until it touches the ground. Once in contact with the surface, it can create great damage over a small area. In 1971, Dr. Theodore Fujita developed the Fujita tornado damage scale to categorize various levels of tornado damage. In 2006, enhancements to this scale resulted in more accurate categorizations of damage and the associated wind speeds. Both scales are shown in Table 4.15.1A.

Table 4.15.1A Tornado Scales

Fujita Scale		Enhanced Fujita Scale	
Scale	**Estimated Wind Speed**	**Scale**	**Estimated Wind Speed**
F0	<73 mph	EF0	65-85 mph
F1	73-112 mph	EF1	86-110 mph
F2	113-157 mph	EF2	111-135 mph
F3	158-206 mph	EF3	136-165 mph
F4	207-260 mph	EF4	166-200 mph
F5	261-318 mph	EF5	>200 mph

Source: Storm Prediction Center, 2011.

Strong Winds

Strong winds are a common theme with many severe weather events; however, they can also occur outside tornadoes, thunderstorms, and winter storms. These winds typically develop with strong

pressure gradients and gusty frontal passages. The closer and stronger two systems (one high pressure, one low pressure) are, the stronger the pressure gradient, and therefore, the stronger the winds are. These types of winds frequently occur throughout Montana and have been known to cause damage.

4.15.2 History

Severe weather reports are collected from weather observing stations and trained spotters by the National Weather Service (NWS) office in Missoula. These records are archived by the National Climatic Data Center. Since official records can only indicate events that have been reported to the National Weather Service, events are often underreported in rural areas and areas lacking trained spotters.

Hail

Since 1996, nine severe hail events (1 inch or greater) have been recorded in Anaconda – Deer Lodge County with a recurrence interval of about two years. Table 4.15.2A lists the severe hail events of 1 inch in diameter or greater.

Table 4.15.2A Severe Hail Reports

Location	Date	Size	Impacts
Deer Lodge County	06/16/1959	1.00 inch	
Anaconda, 3 miles W	07/03/1998	1.50 inches	
Georgetown Lake	08/07/1998	1.75 inches	
Anaconda, 8 miles SE	06/16/2005	1.75 inches	
Anaconda	08/16/2006	1.00 inch	
Anaconda	07/04/2008	1.00 inch	
Southern Cross	07/06/2009	1.00 inch	
Anaconda	07/24/2009	1.00 inch	
Southern Cross	06/30/2010	1.00 inch	
Southern Cross	06/04/2012	1.00 inch	

Sources: National Climatic Data Center, 2005 and 2013.

Downbursts

Since 1996, four severe thunderstorm wind reports (58 mph or greater) have been recorded in Anaconda – Deer Lodge County recurrence interval of about 4-5 years. Table 4.15.2B lists the severe thunderstorm wind events.

Table 4.15.2B Severe Thunderstorm Wind Reports

Location	Date	Speed	Impacts
Deer Lodge County	07/19/1968	100 mph	
Deer Lodge County	06/08/1988	63 mph	
Deer Lodge County	07/05/1988	69 mph	
Deer Lodge County	07/20/1989	Unknown	
Deer Lodge County	08/08/1990	Unknown	

Table 4.15.2B Severe Thunderstorm Wind Reports (continued)

Location	Date	Speed	Impacts
Anaconda	07/11/1998	69 mph	Three cars were destroyed Two people hospitalized with minor injuries 20 trees blown down in Washoe Park
Anaconda	08/06/1998	70 mph	Windows broken and siding torn off a few homes Highway signs knocked over
Anaconda	07/01/2004	69 mph	Downed trees Power outages
Anaconda	08/05/2010	58 mph	Roof damage

Sources: National Climatic Data Center, 2005 and 2013.

Lightning

Lightning is not an event usually reported, except when damages occur. Table 4.15.2C shows damaging lightning events in Anaconda – Deer Lodge County since 1996.

Table 4.15.2C Damaging Lightning Reports

Location	Date	Impacts
Opportunity	06/06/1997	Lightning struck the Opportunity Store and started a fire.
Anaconda	09/09/2005	Three high school golfers were struck by lightning at a golf tournament at the Anaconda Country Club. One boy was not breathing and had no pulse prior to CPR. He spent a few days in the hospital. The other two golfers were not seriously injured.
Anaconda, 4 miles W	07/26/2009	The roof of a home caught fire and was extinguished by the fire department.

Source: National Climatic Data Center, 2013.

Tornadoes

Since 1950, only one tornado has been reported in Anaconda – Deer Lodge County. The September 15, 1997 tornado, F0 on the Fujita scale, touched down in Opportunity at 11:30am. The report indicates it was a very brief touchdown. A funnel cloud was reported over Anaconda on June 21, 2002. (National Climatic Data Center, 2013)

Strong Winds

In November 2007, a strong wind event of about 70 miles per hour preceded a snowstorm, knocked down trees, destroyed business signs, and caused power outages for many residents for several hours.

4.15.3 Probability and Magnitude

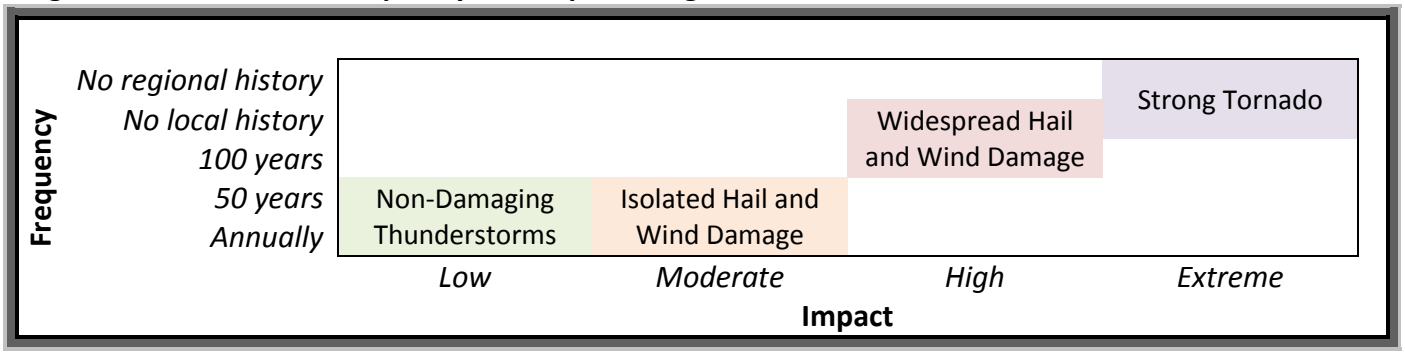
Generally, June, July, and August are the months when the probability of severe thunderstorms in Anaconda – Deer Lodge County is highest.

Based on the historical record, the following can be expected on average:

- In an average 50 year period, 1 tornado.
- In an average 10 year period, 5 severe hail events.
- In an average 10 year period, 2 severe thunderstorm wind events.
- In an average 10 year period, 2 damaging lightning events.

The Federal Emergency Management Agency places this region in Zone II (160 mph) for structural wind design. (Federal Emergency Management Agency, 2008)

Figure 4.15.3A Hazard Frequency and Impact Ranges



4.15.4 Vulnerabilities

Methodology

Severe thunderstorms, tornadoes, and wind are a threat to all areas of the county, and therefore, specific hazard areas are not applicable. Therefore, for the purposes of assessing the vulnerabilities, a 100-year event of large hail and strong winds damaging property was used as a scenario for each jurisdiction. For a 500-year event, a tornado in a populated area was considered.

Exposure

Critical Facilities and Infrastructure

All critical facilities and vulnerable populations are considered to have the same vulnerability to severe thunderstorms and tornadoes, unless specific reinforcements have been made to protect them from strong winds. Many of the critical facilities, although adequate for most events, may not be able to withstand 160 mph winds, as recommended by the Federal Emergency Management Agency. (Federal Emergency Management Agency, 2008) Most structures should be able to provide adequate protection from hail but the structures could suffer broken windows, damaged roofs, and dented exteriors.

The Storm Prediction Center has developed damage indicators to be used with the Enhanced Fujita Scale for different types of buildings. Table 4.15.4A shows the indicators for institutional buildings.

Table 4.15.4A Institutional Buildings

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	59-88 mph (72 mph)
Loss of roof covering (<20%)	72-109 mph (86 mph)
Damage to penthouse roof and walls, loss of rooftop HVAC equipment	75-111 mph (92 mph)
Broken glass in windows or doors	78-115 mph (95 mph)
Uplift of lightweight roof deck and insulation, significant loss of roofing material (>20%)	95-136 mph (114 mph)
Façade components torn from structure	97-140 mph (118 mph)
Damage to curtain walls or other wall cladding	110-152 mph (131 mph)
Uplift of pre-cast concrete roof slabs	119-163 mph (142 mph)
Uplift of metal deck with concrete fill slab	118-170 mph (146 mph)
Collapse of some top story exterior walls	127-172 mph (148 mph)
Significant damage to building envelope	178-268 mph (210 mph)

Source: Storm Prediction Center, 2011.

Above ground infrastructure, namely overhead power lines, communications towers and lines, and structures, are very susceptible to severe thunderstorms and tornadoes. High winds and falling trees can damage this type of infrastructure and disrupt services. Table 4.15.4B shows the Enhanced Fujita Scale Damage Indicators for electric transmission lines.

Table 4.15.4B Electrical Transmission Lines

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	70-98 mph (83 mph)
Broken wood cross member	80-114 mph (99 mph)
Wood poles leaning	85-130 mph (108 mph)
Broken wood poles	98-142 mph (118 mph)
Broken or bent steel or concrete poles	115-149 mph (138 mph)
Collapsed metal truss towers	116-165 mph (141 mph)

Source: Storm Prediction Center, 2011.

Existing Structures

With the entire county at risk from severe thunderstorms and tornadoes, estimates of damages are hard to determine. Realistically, an event involving a tornado or severe thunderstorm would most likely significantly affect only a small area. A large hail and strong wind event damaging the roofs, siding, and windows of 25 homes, estimating a loss of approximately 25% of the structure's value, losses would be about $660,625 (25 homes x $105,700/home x 25% damage). A tornado through the same community causing structural damage with a loss of approximately 50% of the structure's value, losses would be about $1,321,250 (25 homes x $105,700/home x 50% damage).

Tables 4.15.4C and 4.15.4D show the damage indicators for various types of residential and ranch structures. In Anaconda – Deer Lodge County, about 266 residences are mobile homes. (US Census Bureau, 2013)

Table 4.15.4C One and Two Family Residences

Damage Description	**Wind Speed Range** (expected in parentheses)
Threshold of visible damage	53-80 mph (65 mph)
Loss of roof covering material (<20%), gutters, and/or awning; loss of vinyl or metal siding	63-97 mph (79 mph)
Broken glass in doors and windows	79-114 mph (96 mph)
Uplift of roof deck and loss of significant roof covering material (>20%); collapse of chimney; garage doors collapse inward; failure of porch or carport	81-116 mph (97 mph)
Entire house shifts off foundation	103-141 mph (121 mph)
Large sections of roof structure removed, most walls remain standing	104-142 mph (122 mph)
Top floor exterior walls collapsed	113-153 mph (132 mph)
Most interior walls of top story collapsed	128-173 mph (148 mph)
Most walls collapsed in bottom floor, except small interior rooms	127-178 mph (152 mph)
Total destruction of entire building	142-198 mph (170 mph)

Source: Storm Prediction Center, 2011.

Table 4.15.4D Single Wide Manufactured Homes

Damage Description	**Wind Speed Range** (expected in parentheses)
Threshold of visible damage	51-76 mph (61 mph)
Loss of shingles or partial uplift of one-piece metal roof covering	61-92 mph (74 mph)
Unit slides off block piers but remains upright	72-103 mph (87 mph)
Complete uplift of roof, most walls remain standing	73-112 mph (89 mph)
Unit rolls on its side or upside down, remains essentially intact	84-114 mph (98 mph)
Destruction of roof and walls leaving floor and undercarriage in place	87-123 mph (105 mph)
Unit rolls or vaults, roof and walls separate from floor and undercarriage	96-128 mph (109 mph)
Undercarriage separates from unit, rolls, tumbles, and is badly bent	101-136 mph (118 mph)
Complete destruction of unit, debris blown away	110-148 mph (127 mph)

Source: Storm Prediction Center, 2011.

Population

The National Weather Service in Missoula warns for strong winds, tornadoes, and severe thunderstorms when recognized on Doppler radar or by other means. The warnings are broadcast over NOAA weather radio and may be transmitted over television scrolls and cable networks such as the Weather Channel.

Some events have 15-20 minutes warning time and others have little to no warning. Depending on the effectiveness of the warning reaching the population, those at greatest risk may or may not receive the warning and take precautionary measures. A NOAA weather radio transmitter is located in Butte, and those with specially built receivers can be automatically alerted to weather hazards. Campgrounds can become particularly vulnerable populations if the warnings are not received. Depending on the significance of the storm, much of the population can be at risk if they do not take appropriate action.

Mobile homes, even if tied down, and automobiles are not safe places to be during a tornado. With 266 mobile homes in Anaconda – Deer Lodge County, approximately 479 people (1.8 people/housing unit x 266 mobile homes) are at enhanced risk from tornadoes and strong winds. Besides structure failure, wind-driven projectiles and shattered glass can injure or kill occupants. Lightning strikes can occur with little to no warning, causing injury or death to those in the area.

Values

Severe thunderstorms, tornadoes, and wind can cause economic losses such as business closures and associated disruption losses and crop and livestock losses. Often, the agriculture losses can be the most significant. Historic values may also be lost if a historic structure is damaged. Population losses may also lead to lasting emotional impacts.

Future Development

The severe thunderstorms, tornadoes, and wind risk is assumed to be uniform countywide. Therefore, the location of development does not increase or reduce the risk necessarily. Building codes adopted and enforced within Anaconda – Deer Lodge County decrease the threat to future development from severe thunderstorms, tornadoes, and wind.

<u>Vulnerabilities and Impacts</u>

Table 4.15.4E Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities	• $250,000 losses	• $500,000 losses • Structural losses • Contents losses • Critical functional losses • Critical data losses • Clean-up/debris removal costs	Moderate
Critical Infrastructure	• $500,000 losses • Loss of electricity	• $1,000,000 losses • Road closures • Loss of potable water • Loss of sanitary sewers • Loss of telephone service • Loss of internet service	Moderate-High

Table 4.15.4E Hazard Vulnerabilities and Impacts (continued)

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Existing Structures	▪ $660,000 losses	▪ $1,300,000 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses ▪ Clean-up/debris removal costs	Moderate
Population	▪ Injuries	▪ Fatalities	Moderate
Values	▪ Agricultural losses ▪ Cancellation of activities ▪ Restrictions on activities ▪ Aesthetic value losses	▪ Business disruption losses ▪ Service industry losses ▪ Habitat damages ▪ Historic structure losses ▪ Historic site losses ▪ Historic item losses ▪ Emotional impacts	Moderate-High
Future Structures		▪ Likely to occur in hazard areas ▪ Increases the total hazard exposure ▪ Enforces building codes to minimize losses	Low-Moderate

* in addition to probable (100-year) impacts

4.15.5 Data Limitations

Data limitations include:

- Severe weather events are only recorded if observed and reported to the National Weather Service; the rural nature of the area leaves many areas without weather spotters.
- Only a limited number of weather observing stations are located in the county.

4.16 Severe Winter Weather

including blizzards, heavy snow, ice storms, and extreme cold

Table 4.16A Hazard Summary

Overall Hazard Rating	High	
Probability of High Impact Event	Moderate-High	Frequent history of heavy snow and winter storms.
Vulnerability	Moderate	Residents are especially at risk during extended power outages and blizzards.

Table 4.16B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.16.1 Description

Snow storms and bitterly cold temperatures are common occurrences in Anaconda – Deer Lodge County and generally do not cause any problems as residents are used to winter weather and are prepared for it. Snow falls regularly during all seasons, except summer, and roads become slippery quite often. Residents understand that this is part of living in Montana. Sometimes, however, blizzards can occur and overwhelm the ability to keep roads passable. Heavy snow and ice events, particularly late season events, have the potential to bring down power lines and trees. The extreme wind chills, often dropping below zero, may harm residents if unprotected outdoors or if heating mechanisms are disrupted.

Blizzards

Blizzards, as defined by the National Weather Service, are a combination of sustained winds or frequent gusts of 35 mph or greater and visibilities of less than a quarter mile from falling or blowing snow for three hours or more. A blizzard, by definition, does not indicate heavy amounts of snow, although they can happen together. The falling or blowing snow usually creates large drifts from the strong winds. The reduced visibilities make travel, even on foot, particularly treacherous. The strong winds may also support dangerous wind chills.

Heavy Snow

Large quantities of snow may fall during winter storms. In general, six inches or more in 12 hours or eight inches or more in 24 hours constitutes conditions that may significantly hamper travel or create hazardous conditions. Smaller amounts can also make travel hazardous, but in most cases, only results in minor inconveniences. Heavy wet snow before the leaves fall from the trees in the fall or after the trees have leafed out in the spring may cause problems with broken tree branches and power outages.

Ice Storms

Ice storms develop when a layer of warm (above freezing), moist air aloft coincides with a shallow cold (below freezing) pool of air at the surface. As snow falls into the warm layer of air, it melts to rain, and then freezes on contact when hitting the frozen ground or cold objects at the surface, creating a smooth layer of ice. This phenomenon is called freezing rain. Similarly, sleet occurs when the rain in the warm layer subsequently freezes into pellets while falling through a cold layer of air at or near the Earth's surface. Extended periods of freezing rain can lead to accumulations of ice on roadways, walkways, power lines, trees, and buildings. Almost any accumulation can make driving and walking hazardous. Thick accumulations can bring down trees and power lines.

Extreme Cold

Extended periods of cold temperatures frequently occur throughout the winter months in Anaconda – Deer Lodge County. Heating systems compensate for the cold outside. Most people limit their time outside during extreme cold conditions, but common complaints usually include pipes freezing and cars refusing to start. When cold temperatures and wind combine, dangerous wind chills can develop.

Wind chill is how cold it "feels" and is based on the rate of heat loss on exposed skin from wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature, and eventually, internal body temperature. Therefore, the wind makes it feel much colder than the actual temperature. For example, if the temperature is 0°F and the wind is blowing at 15 mph, the wind chill is -19°F. At this wind chill, exposed skin can freeze in 30 minutes. Wind chill does not affect inanimate objects. (National Weather Service, 2011c)

4.16.2 History

Snow and cold are normal occurrences in Anaconda – Deer Lodge County throughout the late fall, winter, and early spring months. From 1996-2012, the Butte / Pintler zone, which includes Anaconda – Deer Lodge County, had 29 heavy snow, 6 winter storm (usually a combination of snow and wind), 2 blizzard, and 2 wind chill reports. (National Climatic Data Center, 2013)

Newspaper records highlight some of the more significant winter weather events that have affected the community. On December 15, 1924, the temperature dropped by 56 degrees in four hours from 53°F at noon time to -3°F at 4pm. On May 29, 1927, Georgetown and Silver Lakes received 30-40 inches of snow. Not only was that event notable for the amount of snow that fell, but also for its occurrence in late May. During June 1949, the East Anaconda weather station measured 13 inches of snow.

Table 4.16.2A Winter Weather Records

Location	Period of Record	Low Temperature Record	Annual Snowfall Record
Anaconda	1894-2012	-38°F, December 24, 1983	125.5 inches, 1989
East Anaconda	1905-1980	-35°F, February 7, 1936	129.7 inches, 1975
Silver Lake	1950-1983	Not applicable	210.3 inches, 1951
Wise River, 3 miles WNW	1943-2012	-38°F, January 5, 2004	57.0 inches, 1957

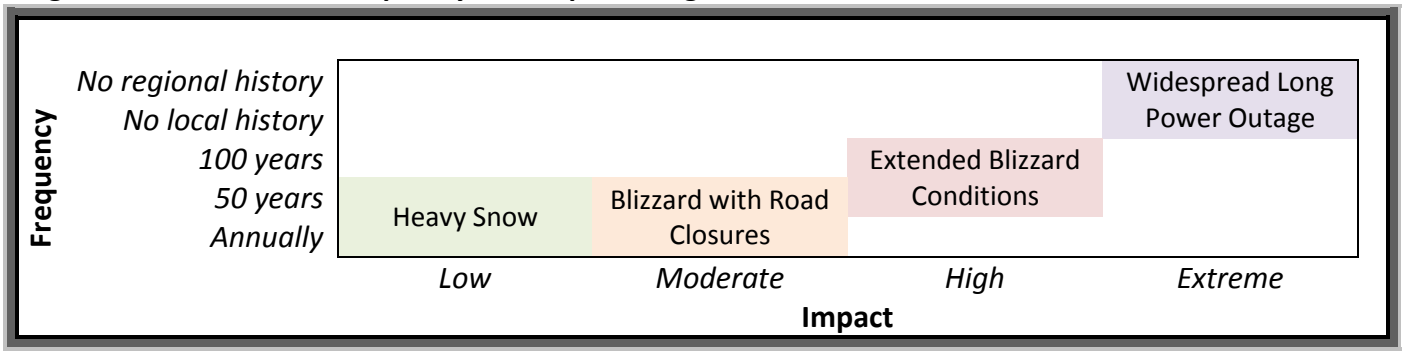
Source: Western Regional Climate Center, 2012.

4.16.3 Probability and Magnitude

The probability of winter storms each season is almost a certainty. The probability of an event that overwhelms the community capabilities, though, is harder to determine. To date, Anaconda – Deer Lodge County has not had any winter weather events that have lead to a Presidential Disaster Declaration, but such an event is certainly possible and cannot be overlooked. Based on the historical record, the following can be expected on average:

- 1-2 heavy snow events annually.
- A winter storm event every 2-3 years.
- Blizzards, ice storms, and extreme wind chills less frequently, but likely at least once each decade.
- The weather records for East Anaconda and Anaconda indicate that snow totals over 4 inches have occurred in June four times since 1905. Therefore, a significant winter weather event can be expected in June once every 25 years.

Figure 4.16.3A Hazard Frequency and Impact Ranges



4.16.4 Vulnerabilities

Methodology

Since the severe winter weather risk extends countywide and the impacts can widely vary, to assess the vulnerabilities, two scenarios were considered. First is an extended, multi-day blizzard that closes roadways, creates major snow drifting, and isolates communities and residents. The second is a widespread power outage for a week or more during extreme cold and blizzard conditions, leaving most residents without heat and other supplies. Persistent heavy snow events may also create conditions favorable for roof collapses.

Exposure

Critical Facilities and Infrastructure

All critical facilities are assumed to have the same vulnerability from severe winter storms. Those facilities with back-up generators are better equipped to handle a winter storm situation should the power go out. Otherwise, all are designed to withstand winter storms but may not be able to provide heat if electric service is lost.

Existing Structures

Snow in Anaconda – Deer Lodge County generally does not cause the communities to shut down or disrupt activities. Occasionally, though, extreme winter weather conditions can cause problems. The most common incidents in these conditions are motor vehicle accidents due to poor road conditions. These losses are usually covered by insurance. Losses to structures are usually minimal. Most structures are built to withstand reasonable snow loads in this region.

Population

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

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

Values

Extended winter storms and cold can force the closure of businesses due to road closures and power outages. Depending on the length of the event, several days' worth of business revenue could be lost.

These storms can often lead to substantial livestock losses and impact the agricultural economy. Activities such as school and sporting events may be cancelled or postponed.

Future Development

Future development should have little to no impact from winter storms and extended cold weather. The most significant challenge may be, as homes go up in more remote parts of the county, to access those residents should sheltering or emergency services be needed in an extreme event. The building codes of Anaconda – Deer Lodge County reduce the risk of structure collapses due to heavy snow loads to future development.

Vulnerabilities and Impacts

Table 4.16.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities		・ $0 losses	Low
Critical Infrastructure	・ Road closures	・ $1,000,000 losses ・ Loss of electricity ・ Loss of potable water ・ Loss of sanitary sewers ・ Loss of telephone service ・ Loss of internet service ・ Fuel/energy shortages	Moderate-High
Existing Structures		・ $500,000 losses ・ Structural losses ・ Contents losses ・ Displacement/functional losses	Low-Moderate
Population	・ Injuries ・ Fatalities		Moderate
Values	・ Business disruption losses ・ Service industry losses ・ Agricultural losses ・ Cancellation of activities ・ Restrictions on activities	・ Emotional impacts	Moderate
Future Structures		・ Likely to occur in hazard areas ・ Increases the total hazard exposure ・ Building codes minimize losses	Low

* in addition to probable (100-year) impacts

4.16.5 Data Limitations

Data limitations include:

- Severe weather events are only recorded if observed and reported to the National Weather Service; the rural nature of the area leaves many areas without weather spotters.

- Lack of a countywide, multi-agency, historic winter weather database containing information on the winter weather conditions (snow depth, temperature, wind, snowfall rates, water content, and duration) and the associated problems (number of accidents, conditions of roadways, and services needed).

4.17 Terrorism

Table 4.17A Hazard Summary

Overall Hazard Rating	Low	
Probability of High Impact Event	Low	History does not indicate these types of incidents with high impacts are likely.
Vulnerability	Moderate	Critical infrastructure is present throughout the county.

Table 4.17B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.17.1 Description

Terrorism, civil unrest, and violence are human caused hazards that are intentional and often planned. Terrorism, both domestic and international, is a violent act done to try and influence government or the population of some political or social objective. Terrorist acts can come in many recognized forms or may be more subtle using untraditional methods. The primary recognized forms of terrorism are chemical, explosive, biological, radiological, nuclear, and cyber; however, terrorism's only limitation is the human imagination.

Chemical terrorism is the use of chemical agents to poison, kill, or incapacitate the population or animals, destroy crops or natural resources, or deny access to certain areas. Chemical agents can be broken into five different categories: nerve agents, vesicants, cyanide, pulmonary agents, and incapacitating agents.

Terrorism using *explosive and incendiary* devices includes bombs and any other technique that creates an explosive, destructive effect. Bombs can take many forms from a car bomb to a mail bomb. They can be remotely detonated using a variety of devices or directly detonated in the case of a suicide bomb.

Bioterrorism is the use of *biological* agents. See the Bioterrorism Hazard Profile for more details.

Radiological terrorism involves the use of radiological dispersal devices or nuclear facilities to attack the population. Exposure to radiation can cause radiation sickness, long-term illness, and even death. Terrorism experts fear the use of explosive and radiological devices in the form of a "dirty bomb" to attack the population. A "dirty bomb" is a low-tech, easily assembled and transported device made up of simple explosives combined with a suitable radioactive agent. See the Radioactive Release Hazard Profile for more details.

Nuclear weapons have the potential for causing catastrophic damage through an explosion and subsequent radiation exposure. Many countries have nuclear capabilities. Such weapons at the control

of terrorists could cause significant devastation, particularly in an urban area. Most nuclear threats have been related to international unrest. See the Radioactive Release Hazard Profile for more details.

Cyberterrorism is the attack or hijack of information technology infrastructure and is addressed in the Cyber Attack or Failure Hazard Profile.

Civil unrest and violence typically occur on a smaller scale than terrorism when large groups, organizations, or distraught individuals take action with potentially disastrous or disruptive results. Civil unrest can result following a disaster that creates panic in the community. Forms of civil unrest can range from groups blocking sidewalks, roadways, and buildings to mobs rioting and looting. Civil unrest may be spontaneous, as when a mob erupts into violence, or they may be planned, as when a demonstration or protest intentionally interferes with another individual's or group's lawful business.

Most times, terrorist acts, both domestic and international, are driven by a group or hate organization. Occasionally, individuals, as was the case in the Oklahoma City bombing, perform independent acts. Usually, the perpetrators have an underlying belief that drives the act. Table 4.17.1A lists several, but not all, types of organizations existing in the United States that could initiate a terrorist incident.

Table 4.17.1A Types of Domestic Hate and Terrorist Organizations and Movements

Type	Description
Anti-Gay	These groups go beyond mere disagreement with homosexuality by subjecting gays and lesbians to campaigns of personal vilification.
Anti-Immigrant	These groups generally attack immigrants as individuals, rather than merely disagreeing with immigration policy. Some have close ties to white supremacist ideas, groups, and individuals.
Black Separatists	They typically oppose integration and racial intermarriage, and they want separate institutions, or even a separate nation, for blacks. Most forms of black separatism are strongly anti-white and anti-Semitic.
Christian Identity	This religion asserts that whites, not Jews, are the true Israelites favored by God in the Bible. For decades, Identity has been one of the most influential ideologies for the white supremacist movement.
Ecoterrorism	These groups aim to end the exploitation of animals and the destruction of the environment, typically by causing damage to the operations of companies in related industries or terrorizing executives and employees of these and associated companies.
General Hate	These groups espouse a variety of hateful doctrines, and this type generally captures those groups not included in another category.
Holocaust Denial	These groups insist that Nazi Germany did not engage in a conscious attempt to commit genocide against European Jews.
Ku Klux Klan	This organization, with its long history of violence, is the most infamous, and oldest, American hate group. Although black Americans have typically been the Klan's primary target, it has also attacked Jews, immigrants, homosexuals, and, until recently, Catholics.

Table 4.17.1A Types of Domestic Hate and Terrorist Organizations and Movements (continued)

Type	Description
Militia	This movement consists of right-wing extremist, armed, paramilitary groups with an anti-government, conspiracy-oriented ideology, often with a prominent focus on firearms.
Neo-Confederate	Many groups celebrate traditional Southern culture and the Civil War's dramatic conflict between the Union and the Confederacy, but some groups go further and embrace racist attitudes towards blacks, and in some cases, white separatism.
Neo-Nazi	These groups share a hatred for Jews and a love for Adolf Hitler and Nazi Germany. While they also hate other minorities, homosexuals, and even sometimes Christians, they perceive "the Jew" as their cardinal enemy, and trace social problems to a Jewish conspiracy that supposedly controls governments, financial institutions, and the media.
Racist Music	These groups are typically white power music labels that record, publish, and distribute racist music in a variety of genres.
Racist Skinhead	These groups form a particularly violent element of the white supremacist movement. Racist Skinheads often operate in small "crews" that move from city to city with some regularity.
Racist Traditionalist Catholic	These organizations embrace anti-Semitism and the theology is typically rejected by the Vatican and mainstream Catholics in general.
Sovereign Citizen	These groups embrace anti-government ideologies and some have white supremacist elements. They often believe that all existing government in the United States is illegitimate and seek to restore an idealized, minimalist government that never actually existed.
Tax Protest	These anti-government groups believe that income taxes are illegitimate and often engage in tax evasion activities and sometimes violence.
White Nationalist	These groups espouse white supremacist or white separatist ideologies, often focusing on the alleged inferiority of non-whites.

Sources: Southern Poverty Law Center, 2013; Anti-Defamation League, 2011.

Montana has traditionally attracted activist/extremist individuals and groups because of its low population and large geographic area. Groups active in Montana vary from white supremacists to single issue groups, such as environmental extremists. These groups are attracted to the state and many of them view Montana as their "home" or safe haven. Because of these views, they commit their illegal activities outside of the state. An example of this would be the Unabomber, Ted Kaczynski. Kaczynski advocated the destruction of technology and the protection of the environment. The Unabomber was responsible for sixteen bombings and three deaths around the United States.

According to the Southern Poverty Law Center Intelligence Project, Christian Identity, Ku Klux Klan, Neo-Nazi, and White Nationalist groups exist in Montana, but none are listed in Anaconda – Deer Lodge County. (Southern Poverty Law Center, 2013)

The populated areas, such as Anaconda, could be considered the areas at greatest risk for terrorism with the highest concentration of critical facilities. Domestic and international terrorism can be hard to predict, and therefore, specific targets are not easily identified. In general, locations and events in Anaconda – Deer Lodge County are not considered to be high risk terrorism targets, but surprise and unpredictability are often attributes favored by terrorists.

4.17.2 History

Fortunately, Anaconda – Deer Lodge County has not been the location of a modern terrorism or civil unrest incident. Some small local level events, however, have required a government response. On April 20, 1992, a pipeline worker was injured while repairing a Montana Power Company natural gas pipeline leak near Warm Springs. The leak was intentionally caused by individuals drilling the pipes during a union dispute and riots. In 1987, the graduation of Anaconda High School was disrupted by a bomb threat and over the course of two years, 27 threats were made to the high school. Significant terrorist incidents occurring in the United States are shown in Table 4.17.2A.

Table 4.17.2A Significant Modern US Terrorist Incidents

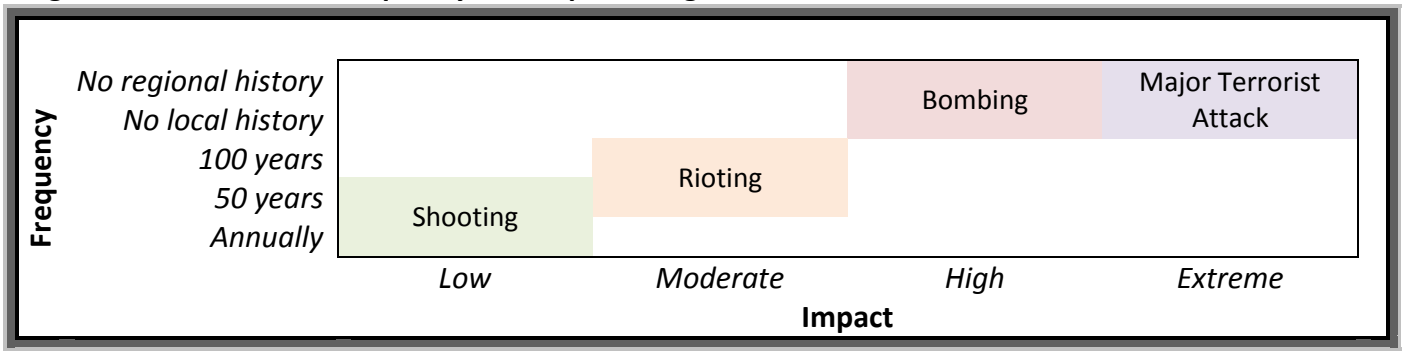
Incident	Date	Description
World Trade Center Bombing	02/29/1993	A bombing in the parking area of the World Trade Center killed 6 and wounded about 1,000. The bombing was organized by the foreign terrorist organization, Al Qaeda.
Oklahoma City Bombing	04/19/1995	Domestic terrorist Timothy McVeigh blew up the Alfred P. Murrah Federal Building in Oklahoma City, killing 168 people and injuring hundreds more.
September 11th Attacks	09/11/2001	Four commercial planes hijacked by 19 members of the Al Qaeda terrorist organization were intentionally crashed into buildings; two planes hit the World Trade Center buildings in New York City, one into the Pentagon outside Washington, DC, and one into a field in Pennsylvania after passengers stormed the cockpit. Nearly 3,000 people were killed.
Boston Marathon Bombings	04/15/2013	Two backpack bombs were detonated near the finish of the Boston Marathon by US immigrant brothers of Chechen decent.

Source: Memorial Institute for the Prevention of Terrorism, 2010.

4.17.3 Probability and Magnitude

With very little experience and data locally on this hazard, a specific probability for future terrorism, civil unrest, and violence is hard to determine. Based on the historical record and the terrorism threat present for the area, the probability of a large scale terrorism, civil unrest, or violence event is considered low.

Figure 4.17.3A Hazard Frequency and Impact Ranges



4.17.4 Vulnerabilities

Methodology

Since the location and probability of a terrorism, civil unrest, or violence incident is extremely difficult to determine, two scenarios were used to determine potential losses. The first is the bombing of a critical facility. The second is a major terrorist attack with direct impact on the county.

Exposure

Critical Facilities and Infrastructure

Critical facilities in Anaconda – Deer Lodge County are considered to be at greatest risk from terrorism, civil unrest, and violence. Often, terrorists target facilities that are highly important for government services and community stability or are particularly vulnerable. Threat data is not specific enough to identify what facilities are most vulnerable, and therefore, all critical facilities are considered to have the same risk countywide. Those facilities with barriers, security, and other forms of protection could be considered to be at lower risk. Most facilities in Anaconda – Deer Lodge County, however, do not have those protections.

Critical infrastructure often relies on complex and interdependent systems. A major system failure usually has widespread consequences.

Existing Structures

Residential structure losses are possible from terrorism, civil unrest, and violence but are not likely. Often the losses are at critical facilities or to the population. Looting, however, can be commonly found in association with these types of events. Therefore, this hazard places both the population and property at risk. Urban areas, places of public gathering, and important government or economic assets are generally going to be the areas of greatest risk.

Population

The effects of terrorism, civil unrest, and violence are usually felt by the population. The greatest risk is to human lives during times of unrest. Terrorists typically try to make a dramatic impact that will generate media interest. Attacking the population through a large loss of life is a common tactic. Depending on the type of attack, casualties could be light or involve much of the Anaconda – Deer Lodge County population.

Values

Depending on the type and location of the incident, economic losses could range from general national economic slowdowns to the destruction of local businesses. Livestock and the environment are additionally at risk from biological, chemical, and radiological attacks.

Future Development

Development should have little to no impact on the terrorism, civil unrest, and violence threat. The exception would be the increase in population and the associated increase of potential losses to life and property within the county. With larger communities around, however, development should have little effect in this regard. Given the goals of eco-terrorists, however, future development could serve as the basis for an event over controversial development.

Vulnerabilities and Impacts

Table 4.17.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities	・ $100,000 losses ・ Critical functional losses ・ Clean-up/debris removal costs	・ $500,000 losses ・ Structural losses ・ Contents losses ・ Critical data losses	Moderate-High
Critical Infrastructure	・ Road closures	・ $1,000,000 losses ・ Loss of electricity ・ Loss of utility gas ・ Loss of potable water ・ Loss of sanitary sewers ・ Loss of telephone service ・ Loss of internet service ・ Fuel/energy shortages	Moderate-High
Existing Structures	・ Displacement/functional losses ・ Clean-up/debris removal costs	・ $1,000,000 losses ・ Structural losses ・ Contents losses	Low-Moderate
Population	・ Illness ・ Injuries ・ Fatalities		High

Table 4.17.4A Hazard Vulnerabilities and Impacts (continued)

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Values	・ Business disruption losses ・ Emotional impacts ・ Cancellation of activities ・ Restrictions on activities	・ Service industry losses ・ Agricultural losses ・ Reduced air quality ・ Reduced water quality ・ Soil contamination ・ Historic structure losses ・ Historic site losses ・ Historic item losses ・ Aesthetic value losses	Moderate-High
Future Structures		・ Somewhat likely to occur in hazard areas ・ Increases the total hazard exposure	Low-Moderate

* in addition to probable (100-year) impacts

4.17.5 Data Limitations

Data limitations include:

- Inability to quantify the probability and magnitude of a terrorist, civil unrest, or violence incident.
- General uncertainties related to how and when future terrorist, civil unrest, and violence incidents may occur.

4.18 Urban Fire / Explosion

Table 4.18A Hazard Summary

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Moderate	Several critical facilities and businesses present unique firefighting challenges.
Vulnerability	Low-Moderate	Many rural businesses and critical facilities are at risk from urban fires.

Table 4.18B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.18.1 Description

Fire is the result of three components: a heat source, a fuel source, and an oxygen source. When combined, these three sustaining factors will allow a fire to ignite and spread. Within a structure, a small flame can get completely out of control and turn into a major fire within seconds. Thick black smoke can fill a structure within minutes. The heat from a fire can be 100°F at floor level and rise to 600°F at eye level. In five minutes, a room can get so hot that everything in it ignites at once; this is called flashover. (US Fire Administration, 2011)

Fires classified as urban fires generally occur in cities or towns. These fires have the ability to spread quite rapidly to adjoining buildings or structures. Urban fires damage and destroy a great number of schools, homes, commercial buildings, and vehicles across the nation every year.

Although structure fires are usually individual disasters and not community-wide ones, the potential exists for widespread structure fires that displace several businesses or families. Communities with buildings relatively close together and older wood construction, such as Anaconda, are especially vulnerable. Fires that rage uncontrollably despite firefighting efforts and burn several structures or an important community facility could have significant economic and quality of life impacts. Strong winds common to the area are known to carry fire easily. Large fires of this nature have also been known to require significant community resources if lives are lost.

The mining industry of the area employed much of the population at one time. During those times, many workers would bring home dynamite and sometimes store it in their basements. Now, many years later, dynamite can still be found in basements around Anaconda, sometimes without the residents knowing it. The possibility of explosions during structure fires is an increased hazard for firefighters and the general population.

Smoke detectors, automatic fire alarm systems, automatic sprinkler systems, fire doors, and fire extinguishers can all prevent deaths, injuries, and damages from fire. Automatic sprinkler systems are especially important in preventing a small fire from becoming a conflagration. Some downtown

buildings have been retrofitted with sprinklers while others have not. Businesses with flammable inventory could also potentially have large fires and explosions. The release of a hazardous material, such as natural gas, could result in an explosion and associated fire.

4.18.2 History

Anaconda – Deer Lodge County has experienced devastating fires for individuals and businesses. Table 4.18.2A list some of the more disastrous urban fires based on fire department records and newspaper archives. A pictorial history can be found at the Copper Village Museum.

Table 4.18.2A Large Structure and Mine Fires

Date	Location
01/12/1887	Palace Hotel at Front and Cedar
12/17/1887	Half block on Main Street from Cohen's Store to the Depot
09/11/1889	Main and First Street
11/24/1889	Anaconda Mine
12/04/1889	Mitchell and Snyder Hospital at Third and Main
09/24/1901	Anaconda Standard Composing Room
02/04/1902	Olson Gulch Concentrator
03/03/1903	Arthur Fortier's Barber Shop
11/03/1906	114 East Commercial Apartment Building
08/20/1907	Washoe Coal Bunkers
1929	Margaret/Sundial Theater
03/22/1931	O.K. Store
05/27/1931	Marbleton Block
08/24/1931	Baltimore Rooming House
01/24/1933	Turner Hall
Mid 1940s	Montgomery Ward Fire, days later a man was killed when a wall fell
1946	Turgeson Motors
1953	Ford Motor Company Explosion, windows blown out 4 blocks away
10/30/1953	Flood Block Explosion and Fire, 9 people killed
1959	MacIntyres Clothing Store and Copper Bowl
Late 1960s	Pals Bar
1972	Reno Supper Club
1975	Woolworth's Building
12/1976	A1 Lumber
Late 1970s	Washoe Market
1978	Fashion Flair
1985	Durston Block at 101 South Main
12/24/1985	Knights of Columbus Building
Late 1980s	Mayflower Garage
Late 1980s	Lucky Lady

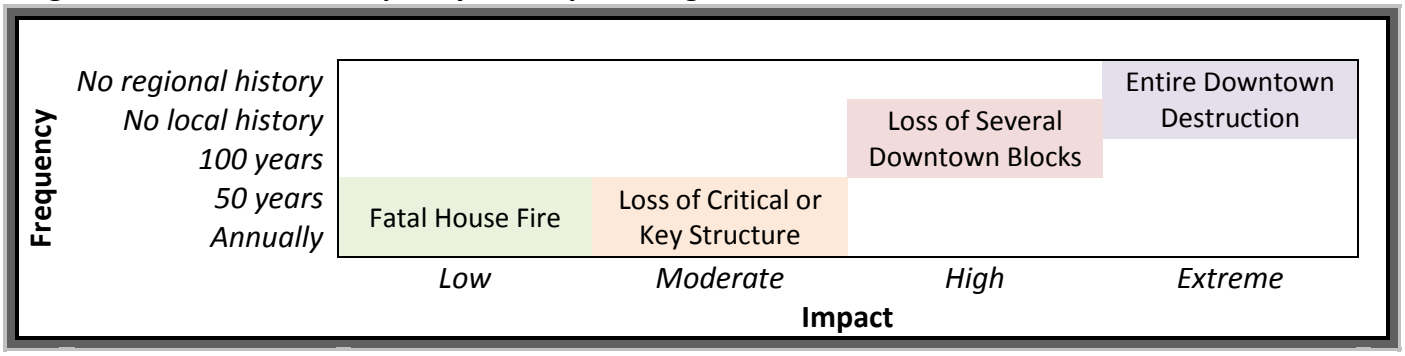
Table 4.18.2A Large Structure and Mine Fires (continued)

Date	Location
Late 1990s	McDonald Fire at East Sixth Street, 1 child died
1998	Montana Power Substation Fire, $1,000,000 loss
07/13/1999	Alder Street Fire, 4 structures burned (3 homes, 1 garage)
01/10/2001	Carmel's Bar on East Third
10/31/2001	305 East Front, 2 people killed
08/22/2002	Cook's Collision on East Park
03/25/2011	House Fire on Chestnut Street, 1 killed

4.18.3 Probability and Magnitude

Several important structures exist that could have significant impacts to community members should they be lost. Estimating the probability of fires in these buildings is difficult to determine. The structures lacking automatic sprinkler systems have a greater probability of a major structure fire. The fire death rate in 2010 was 10.1 people per million in Montana. The national death rate was 11.1 people per million. (US Fire Administration, 2010)

Figure 4.18.3A Hazard Frequency and Impact Ranges



4.18.4 Vulnerabilities

Methodology

Since the location and probability of a significant urban fire or explosion is extremely difficult to determine, two scenarios were used to determine potential losses. The first is the loss of a critical or important business facility. The second is the loss of several downtown blocks in Anaconda.

Exposure

Critical Facilities and Infrastructure

All critical facilities are at risk from fire. Structure fires at a critical facility could lead to losses in critical functions, records, and supplies or temporary delays in emergency response. Facilities housing

vulnerable populations present building evacuation challenges, depending on the type of facility, and may result in special needs sheltering or school cancellations. Sprinklered facilities are obviously at lower risk for a large urban fire.

Depending on the type of infrastructure, an urban fire could result in short-term disruptions while services are rerouted. In the case of a supporting facility, such as a water or sewer treatment plant, long-term disruptions could be seen. For example, a fire at an electric substation may leave an area without power for several hours or days. A fire at the water treatment plant may leave the community without water for days or weeks.

Existing Structures

Fire losses to residential and commercial structures are usually covered by insurance, but can be devastating to the building occupants, particularly for primary residences. These types of events often do not result in community-wide disasters, unless the structure is critically important to the economy or many structures are lost.

Population

Depending on the time and location, a major urban fire could result in the loss of life either to firefighters or building occupants. Fires in theaters, restaurants, hotels, and enclosed event locations all have the possibility of resulting in mass casualties if the fire spreads rapidly or the facility is overcrowded. The potential for this type of loss is difficult to determine due to advances in firefighter safety and the installation of sprinkler and alarm systems in some structures. Those structures lacking smoke detectors or adequate exits are especially dangerous to the population. Should lives be lost, significant resources could be needed to manage the recovery.

Values

Urban fires often result in significant business disruption losses. Historic values can are also frequently lost in urban fires. The loss of life may result in lasting emotional impacts.

Future Development

Most development, unless urban or industrial in nature, will have little impact on the potential for a significant urban fire. All structures, including new development, will continue to be at risk for fire, but development that includes fire suppression and alerting systems will better protect contents and occupants. In the Anaconda – Deer Lodge County, new development must meet current fire building codes.

Vulnerabilities and Impacts

Table 4.18.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities	・ $100,000 losses ・ Structural losses ・ Contents losses ・ Critical functional losses ・ Critical data losses ・ Clean-up/debris removal costs	・ $500,000 losses	Moderate
Critical Infrastructure		・ $500,000 losses ・ Physical losses ・ Road closures ・ Loss of electricity ・ Loss of utility gas ・ Loss of potable water ・ Loss of sanitary sewers ・ Loss of telephone service ・ Loss of internet service	Low-Moderate
Existing Structures		・ $3,000,000 losses ・ Structural losses ・ Contents losses ・ Displacement/functional losses ・ Clean-up/debris removal costs	Moderate
Population	・ Injuries ・ Fatalities		Moderate
Values	・ Business disruption losses ・ Reduced air quality ・ Historic structure losses ・ Historic site losses ・ Historic item losses ・ Aesthetic value losses	・ Emotional impacts ・ Cancellation of activities ・ Restrictions on activities	Moderate
Future Structures		・ Likely to occur in hazard areas ・ Increases the total hazard exposure ・ Building codes minimize losses	Low-Moderate

* in addition to probable (100-year) impacts

4.18.5 Data Limitations

Data limitations include:

- Quantifying the risk of urban fires and explosions given the unique fire hazards of each structure.

4.19 Utility Outage

Table 4.19A Hazard Summary

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Low-Moderate	Limited history of significant utility outages.
Vulnerability	Moderate	Rural residents may become isolated and/or need additional resources during utility outages.

Table 4.19B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.19.1 Description

A utility outage is an interruption in the distribution of services or supplies or interruption in the collection of waste materials. Utilities include, but are not limited to, potable water supplies, electricity, propane, sewage treatment/disposal, natural gas, gasoline/diesel fuels, telephone and internet services, and garbage disposal. Normal activities usually cannot be sustained in a specific area or region because of the failure.

The public has come to rely upon utility, communication, energy, and fuel services for everyday life and basic survival. Many in Anaconda – Deer Lodge County depend on the typical utility, energy, and communication infrastructure such as water, sewer, electricity, propane, natural gas, telephone, internet, and gasoline. Water and sewer services are either provided through a public system or through individual wells and septic systems. Electricity is primarily provided by regional electric companies through overhead or buried lines. Homes and businesses are heated with fuels such as natural gas, propane, and electricity. Those buildings heated with propane typically have a nearby tank that is refilled regularly by a local vendor but still rely on electricity to power their heating systems. Natural gas is provided through underground piping. Telephone, cellular telephone, and internet services are provided by several local and national companies. Privately-owned gas stations are located throughout the county.

Almost any hazard can cause a utility outage, but disruptions can also occur due to human error, equipment failures, global markets, or low supplies. The most common hazards that interrupt electric services are heavy snow, ice, and wind. Terrorist activities have to be one of the major concerns for such failures. A geomagnetic storm or electromagnetic pulse from a solar flare or terrorist attack could have major impacts on our nation's electric and communications infrastructure. Water supplies may be threatened by drought. Sewer services can be disrupted by flood. Often these types of outages are short lived. Crews quickly respond and resolve the problem causing the failure. During a widespread or complicated outage, services may be down for days or even weeks. Most problems arise during these longer term outages. For example, electricity is needed to maintain water supplies and sewer systems, but also to run blowers for heating systems. Essentially, without electricity, most facilities are without heat, water, fuel, or other appliances during a long term outage. This problem becomes particularly

significant during the cold winter months. Telephone services are important for day-to-day business, but are most important for 911 communications in an emergency. Without telephone service, emergency services can be severely delayed. In most cases, a long term utility failure would force many businesses to close until the services were restored. Gasoline shortages are also common during times of disaster. Oil embargos, wars, and world politics are all events that could affect the availability of petroleum products in Anaconda – Deer Lodge County.

Anaconda – Deer Lodge County and its communities could experience a number of different types of utility outages. The most likely failures are in the distribution of electricity, natural gas, and gasoline/diesel. These types of outages could prove to be most devastating during the winter months. Winters can be long and very cold. Homes and businesses need heating fuels, while the agriculture industry must have diesel and gasoline in order to keep the farm or ranch operating. During summer months, the agriculture industry again requires large quantities of fuel in order to complete their farming operations.

Electrical service is provided by two power companies. Vigilante Electric Cooperative, Inc. supplies part of the county with electricity while NorthWestern Energy is responsible for supplying electricity and natural gas. Several major transmission lines cross the county. Along with above ground electrical utility lines, the electric companies have numerous substations. The substations in Anaconda – Deer Lodge County service about 1.6 million people in the Northwest. NorthWestern Energy also has a network of underground natural gas lines. The county and/or businesses are responsible for the care and operation of other utilities including water treatment plants, wastewater treatment plants, and gasoline, diesel, and propane bulk plants.

4.19.2 History

Residents of Anaconda – Deer Lodge County regularly experience short-term utility and energy outages for a variety of reasons. Typically, these short-term outages do not cause significant problems.

On October 17, 1973, the Organization of the Petroleum Exporting Countries (OPEC) imposed an oil embargo on the United States. The embargo came at a time when 85% of American workers drove to their places of employment each day. President Nixon set the nation on a course of voluntary rationing. He called upon homeowners to turn down their thermostats and for companies to trim work hours. Gas stations were asked to hold their sales to a maximum of ten gallons per customer. In the month of November 1973, Nixon proposed an extension of Daylight Savings Time and a total ban on the sale of gasoline on Sundays. The price at the pump rose from 30 cents a gallon to about $1.20 at the height of the crisis.

Anaconda – Deer Lodge County has not experienced gasoline shortages like large metropolitan areas, however, drastic price fluctuations have occurred, thus affecting travel, availability of fuels, and the economics of the county. Increases in gasoline and diesel prices create hardships on consumers, especially those in the agriculture industry.

On April 21, 2005, a fiber optic line near Helena was accidentally cut, and telephone, Internet, and cell phone services were lost for a period of about two hours. Most of Anaconda – Deer Lodge County including Anaconda, Warm Springs, and Opportunity were affected. (Associated Press, 2005) Community Hospital of Anaconda had to rely on a satellite telephone provided by law enforcement for Life Flight operations.

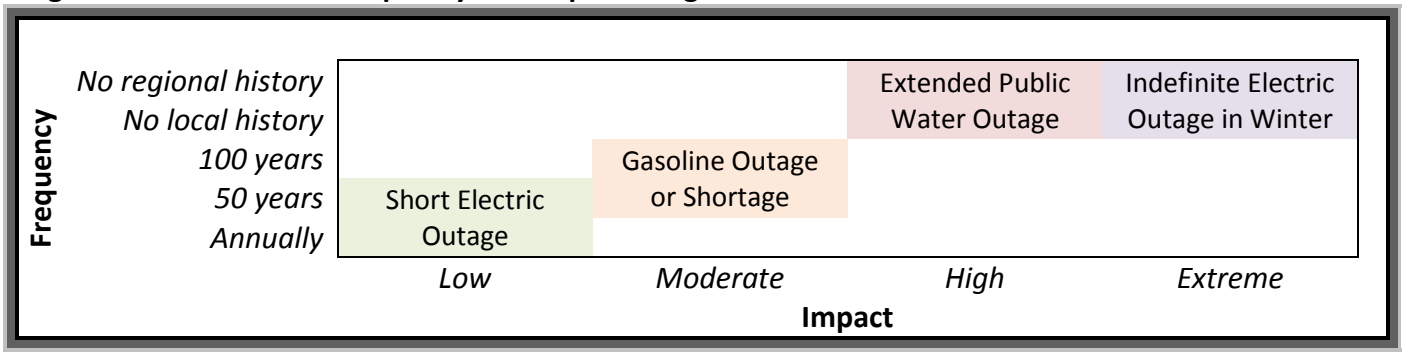
On August 21, 2013, an underground line was cut and 911 service in the county was lost for a few hours. The community of Opportunity also had a recent phone service outage, according to local residents.

4.19.3 Probability and Magnitude

With a limited history of events, the probability of utility outages can only be theorized. Generally, electric power outages are the most common and are often short-lived; electric outages do have the potential to cause significant problems. Gasoline shortages have also been problems in the past but have been limited to economic and social losses. Natural gas, propane, and water shortages are possible, but given a limited history of such, are somewhat less likely.

Possibly the most significant utility outage scenario for Anaconda – Deer Lodge County is the loss of electricity for a week or more during a particularly cold winter spell. Without generators, an extended power outage could additionally lead to the loss of running water, sewer services, and the ability to heat buildings, which in turn may lead to pipe ruptures. Any equipment such as medical equipment, computers, and cell phones requiring power to run would eventually be incapacitated. Those facilities with generators would still be able to use appliances, equipment, and heating systems, however, community water and sewer services may not be available. Such a long term outage could lead to emergency sheltering and necessitate the activation of other emergency resources.

Figure 4.19.3A Hazard Frequency and Impact Ranges



4.19.4 Vulnerabilities

Methodology

Since the extent and impacts of a significant utility outage is extremely difficult to determine, two scenarios were used to determine potential losses. The first is the loss of a public water supply for an extended period of time. The second is a long term electric outage during the winter.

Exposure

Critical Facilities and Infrastructure

Most utility outages do not directly impact structures; however, an electric outage during winter could result in frozen and burst water pipes, causing water damage within the interiors of structures. A natural gas, propane, or fuel oil shortage could produce similar results.

Electricity and gasoline disruptions could also limit the ability to provide emergency services. Some critical facilities do have back-up generators in case of an electricity outage. These facilities include the Law Enforcement Center. Others, however, may have limited functionality following an event due to a utility failure. For example, medical and special needs facilities require electricity for certain types of medical equipment to work. Emergency shelters are also of particular concern, especially during an extended cold weather period. Gas station pumps may not operate without electricity, and therefore, emergency vehicles may not have enough fuel during long term outages. Gasoline shortages could also limit the fuel available for emergency responders.

Energy providers typically rely on established infrastructure to provide services and materials. Therefore, energy failures are often related to problems with the infrastructure. Minor damages or problems may indicate a short-term outage whereas large scale damages may suggest a long-term outage. Many services rely on other utilities to operate. For example, the water supply pumps and sewer lift stations both require electricity to continue operations. One or both may go down during long-term electric outages. Propane and gasoline refills require the transportation network to be open since deliveries are done by truck. This interdependency can lead to more complex utility outage problems.

Existing Structures

Similar to critical facilities, structures across the county could be without heat during an electric, natural gas, propane, or fuel failure. During cold weather, structures without heat may be uninhabitable for a time. Generally, structures are not directly affected by utility outages, but in some cases, direct damages may result.

Population

Over the past 100 years, the population has become more and more dependent on the nation's critical infrastructure and systems. Heat, running water, sanitation, communications, grocery stores, and pharmacies all require electricity, and without these services in the long term, the population may suffer. Natural gas, propane, fuel oil, and electricity are critical for heat, especially during the cold winter months. Approximately, 4,975 people in Anaconda – Deer Lodge County rely on natural gas for heat, 918 rely on electric heat, and 479 rely on propane. Personal and commercial food supplies may spoil during extended power outages. Water is needed for cooking, cleaning, and drinking, and sewer is needed for sanitation. Each is important for the health and safety of humans. Without these services, emergency resources may be needed. Emergency supplies can often hold the populations over

temporarily but may take some time before arriving, in which case, individuals may need to rely on their own personal supplies.

Values

Utility outages often result in business disruption losses as most businesses rely on utilities for production, sanitation, or employee well being.

Future Development

Where future development occurs is not directly tied to increased utility and energy failures. Increased populations add to the challenges of managing a long-term failure but would not increase the damages necessarily.

Vulnerabilities and Impacts

Table 4.19.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities	・ Critical functional losses	・ $0 losses	Low-Moderate
Critical Infrastructure	・ Loss of electricity ・ Loss of utility gas ・ Loss of potable water ・ Loss of sanitary sewers ・ Loss of telephone service ・ Loss of internet service ・ Fuel/energy shortages	・ $0 losses	Moderate-High
Existing Structures		・ $0 losses ・ Displacement/functional losses	Low-Moderate
Population		・ Illness ・ Injuries ・ Fatalities	Moderate
Values	・ Business disruption losses ・ Service industry losses ・ Restrictions on activities	・ Agricultural losses ・ Emotional impacts ・ Cancellation of activities	Moderate
Future Structures		・ Likely to occur in hazard areas ・ Increases the total hazard exposure	Low-Moderate

* in addition to probable (100-year) impacts

4.19.5 Data Limitations

Data limitations include:

- Quantifying the type and length of failures that begin to cause significant problems.
- Limited historical occurrence and related data prevents accurately estimating potential losses.

4.2 Bioterrorism

Table 4.2A Hazard Summary

Overall Hazard Rating	Low	
Probability of High Impact Event	Low	Very limited national incidence.
Vulnerability	Moderate	The entire population of 9,298 and essentially all economic sectors are at risk.

Table 4.2B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.2.1 Description

Bioterrorism is the use of biological agents to intentionally infect the population, plants, or animals with disease. The types of diseases can range from highly contagious to ones that trigger acute illness. The target can be humans, plants, or animals, such as livestock. Depending on the terrorist's tactics, the biological agent may be introduced in a clandestine manner or as part of an explosive or publicized attack.

The Centers for Disease Control and Prevention (CDC) has established categories of bioterrorism agents based on the potential for transmission and severity. The categories follow.

Category A agents are high priority and include organisms or toxins that pose the highest risk to the public and national security because:

- They can be easily spread or transmitted from person to person.
- They result in high death rates and have the potential for major public health impact.
- They might cause public panic and social disruption.

Examples include Anthrax, Botulinum toxin, Bubonic plague, Smallpox, Tularemia, and viral hemorrhagic fevers (Marburg, Ebola, Lassa and Machupo viruses).
Source: Centers for Disease Control and Prevention, 2013a.

Category B agents are the second highest priority because:

- They are moderately easy to spread.
- They result in moderate illness rates and low death rates.
- They require specific enhancements of CDC's laboratory capacity and enhanced disease monitoring.

Examples include Buricellosis, Epsilon toxin, food safety agents (Salmonella, E. coli, etc.), Glanders, Melioidosis, Psittacosis, Q fever, Ricin toxin, Abrin toxin, Staphylococcal enterotoxin B, Typhus, viral encephalitis, and water supply agents (cholera, C. parvum, etc.).
Source: Centers for Disease Control and Prevention, 2013a.

Category C agents are the third highest priority and include emerging pathogens that could be engineered for mass spread because:

- They are easily available.
- They are easily produced and spread.
- They have potential for high morbidity and mortality rates and major health impact.

Examples include Nipah virus, Hantavirus, SARS, H1N1 Influenza, HIV/AIDS.
Source: Centers for Disease Control and Prevention, 2013a.

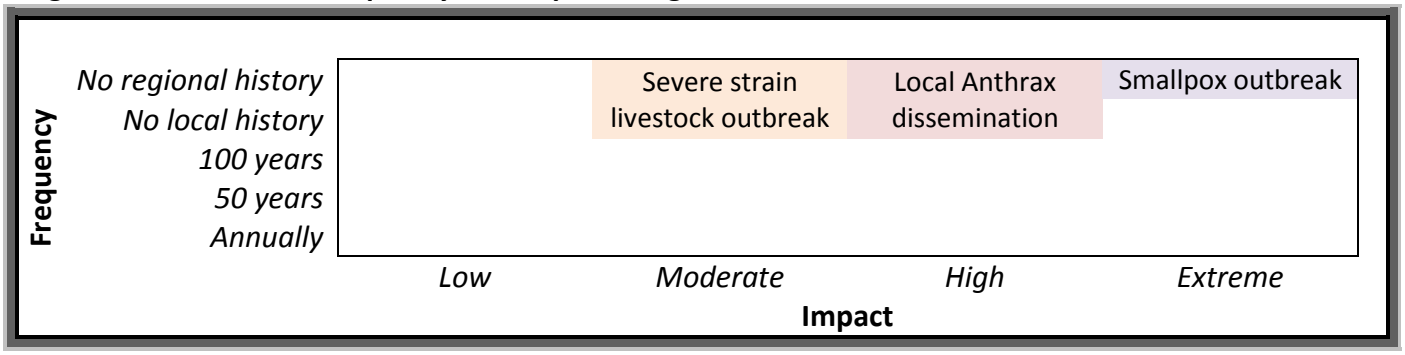
Similarly, the US Department of Agriculture maintains an Agricultural Select Agency list for plant and animal diseases that could be used in bioterrorism. Some already listed are considered overlap agents, as they can pass between humans and animals. The most significant livestock diseases include Foot-and-mouth disease virus and Rinderpest virus. Twelve additional livestock agents and seven plant agents complete the current list. (US Department of Agriculture, 2013)

4.2.2 History

Anaconda – Deer Lodge County does not have a history of bioterrorism; in fact, the nation's history of bioterrorism is quite limited as well. Some isolated attacks with Anthrax and Ricin have been noted, but none of extensive impact.

4.2.3 Probability and Magnitude

Figure 4.2.3A Hazard Frequency and Impact Ranges



4.2.4 Vulnerabilities

Methodology

Vulnerabilities were calculated based on two scenarios: an attack on cattle using a highly virulent agent and a smallpox outbreak in the Anaconda – Deer Lodge County populations.

Exposure

Critical Facilities and Infrastructure

Critical facilities are generally not threatened by bioterrorism, but, their functionality can be lost. Clean up and decontamination costs could be significant. For example, the cleanup of anthrax in several

congressional offices on Capitol Hill in September and October of 2001 cost the Environmental Protection Agency about $27 million. (US General Accounting Office, 2003)

Existing Structures

In most plausible bioterrorism scenarios, existing structures would not be impacted.

Population

The entire county population of 9,298 plus non-residents is at risk from bioterrorism. In the smallpox scenario, infection occurs after direct and prolonged contact with an infected person. Therefore, an infection rate of 25% is estimated. The mortality rate is about 30%. (Centers for Disease Control and Prevention, 2013b) Therefore, an estimated 2,325 people in Anaconda – Deer Lodge County would be infected with 697 fatalities. Since naturally occurring smallpox has been eradicated from the world through vaccinations, very little immunity and vaccination capabilities exist currently.

Values

Bioterrorism to livestock would have a profound impact on national and local economies. In the example of cattle, Anaconda – Deer Lodge County could lose 6,216 head and over $3 million in livestock sales. (US Department of Agriculture, 2007) In addition to economic losses, the emotional toll of biological attack would likely be significant.

Future Development

In most plausible bioterrorism scenarios, future development would not be impacted, but any additional residents would be at risk for disease and increase the overall exposure.

Vulnerabilities and Impacts

Table 4.2.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities		・ $100,000 losses ・ Critical functional losses ・ Clean-up costs	Low
Critical Infrastructure			Low
Existing Structures		・ $0 losses ・ Clean-up costs	Low
Population		・ 2,325 estimated cases ・ 697 estimated fatalities	High

Table 4.2.4A Hazard Vulnerabilities and Impacts (continued)

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Values		・ Agricultural losses ・ Business disruption losses ・ Service industry losses ・ Biodiversity losses ・ Emotional impacts ・ Cancellation of activities ・ Restrictions on activities	Moderate-High
Future Structures		・ Increases the total hazard exposure ・ All types of future structures are at risk	Low

* in addition to probable (100-year) impacts

4.2.5 Data Limitations

Data limitations include:

- Uncertainties related to how and when a bioterrorism attack would occur.

4.20 Volcanic Ashfall

Table 4.20A Hazard Summary

Overall Hazard Rating	Low	
Probability of High Impact Event	Low	Volcano impacts are very unlikely when compared to other hazards.
Vulnerability	Low-Moderate	Ash removal could be difficult and costly and create respiratory problems.

Table 4.20B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.20.1 Description

Anaconda – Deer Lodge County does not have any known active volcanoes, however, past eruptions have affected the county as dense volcanic ash can travel hundreds of miles. The Yellowstone Caldera within Yellowstone National Park to the southeast is an active geologic area. The last non-hydrothermal eruption in the Yellowstone Caldera was thousands of years ago. Currently, the most active region in the continental United States is the Cascade Range to the west in Washington and Oregon, about 500 miles away. This region includes the volcanoes at Mount St. Helens, Mount Rainer, and Mount Hood. Anaconda – Deer Lodge County lies within reasonable range of ashfall from these volcanoes under normal upper atmospheric wind and stability conditions. In addition to ashfall and other effects, large eruptions have been known to change weather patterns globally.

The Yellowstone Caldera, one of the world's largest active volcanic systems, has produced several giant volcanic eruptions in the past few million years, as well as many smaller eruptions and steam explosions. Although no eruptions of lava or volcanic ash have occurred for many thousands of years, future eruptions are likely. Over the next few hundred years, hazards will most likely be limited to ongoing geyser and hot-spring activity, occasional steam explosions, and moderate to large earthquakes. To better understand Yellowstone's volcano and earthquake hazards and to help protect the public, the US Geological Survey, the University of Utah, and Yellowstone National Park formed the Yellowstone Volcano Observatory, which continuously monitors activity in the region. (US Geological Survey, 2005)

If a large caldera-forming eruption were to occur at Yellowstone, its effects would be felt worldwide. Thick ash deposits would bury vast areas of the United States, and the injection of huge volumes of volcanic gases into the atmosphere could drastically affect global climate. Fortunately, the Yellowstone volcanic system shows no signs that it is headed toward such an eruption. The probability of a large caldera-forming eruption within the next few thousand years is exceedingly low. Any renewed volcanic activity at Yellowstone would most likely take the form of non-explosive lava eruptions. (US Geological Survey, 2005) An eruption of lava could cause widespread havoc in the Park, including fires and the loss of roads and facilities, but more distant areas would probably remain largely unaffected.

The Cascade Region does not have the same caldera-forming potential as Yellowstone, but has been much more active in recent years. The volcanoes in this region can drop and have dropped measurable ash over Montana. Volcanic ashfall may not sound harmful hundreds of miles away, but depending on the volume of ash that falls, it can create problems. Ash in the air can affect those with respiratory sensitivities, reduce visibilities, and clog air intakes. Its corrosive properties can damage vehicles and other machinery. When wet, the ash becomes glue-like and hard to remove. Even relatively small amounts of airborne ash can disrupt air travel.

The areas affected by volcanic eruptions are dependent on the type of eruption and the prevailing wind direction. In an actual event, models would be used to predict the areas that would receive ash and other effects from the volcano. The county is assumed to have the same risk countywide for volcanic ashfall.

4.20.2 History

On May 18, 1980, Mount St. Helens in the Cascade Range of Washington erupted, sending ash high into the atmosphere. Over the course of several days, the ash fell from the sky, primarily over eleven states, including Montana. Approximately one inch fell over Anaconda – Deer Lodge County. The Montana Governor asked public offices and businesses to close and individuals with breathing problems to stay indoors until the threat was assessed. Driving was not permitted for two days while the ash was cleaned up. No reports of structure damage were received, and the health concerns lasted for a three day period.

The Yellowstone region has produced three exceedingly large volcanic eruptions in the past 2.1 million years. In each of these cataclysmic events, enormous volumes of magma erupted at the surface and into the atmosphere as mixtures of red-hot pumice, volcanic ash (small, jagged fragments of volcanic glass and rock), and gas that spread as pyroclastic ("fire-broken") flows in all directions. Rapid withdrawal of such large volumes of magma from the subsurface then caused the ground to collapse, swallowing overlying mountains and creating broad cauldron-shaped volcanic depressions called "calderas." (US Geological Survey, 2005)

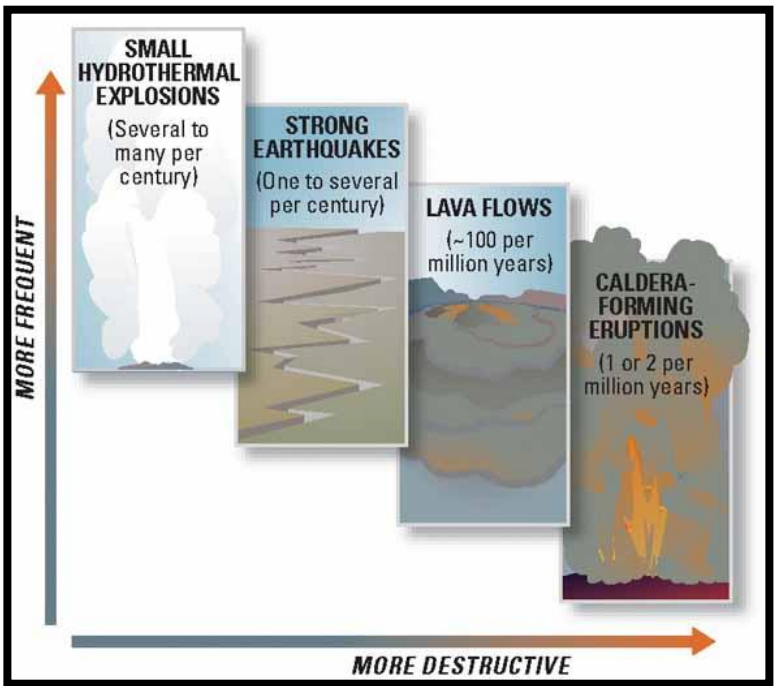
4.20.3 Probability and Magnitude

Volcanic eruptions are rare events when compared to other hazards. Scientists evaluate natural hazards by combining their knowledge of the frequency and the severity of hazardous events. In the Yellowstone region, damaging hydrothermal explosions and earthquakes can occur several times a century. Lava flows and small volcanic eruptions occur only rarely - none in the past 70,000 years. Massive caldera-forming eruptions, the most potentially devastating of Yellowstone's hazards, are extremely rare - only three have occurred in the past several million years. U.S. Geological Survey, University of Utah, and National Park Service scientists with the Yellowstone Volcano Observatory (YVO) see no evidence that another such cataclysmic eruption will occur at Yellowstone in the foreseeable future. Recurrence intervals of these events are neither regular nor predictable. (US Geological Survey,

2005) Figure 4.20.3A shows the probability of the various events that can occur in Yellowstone National Park.

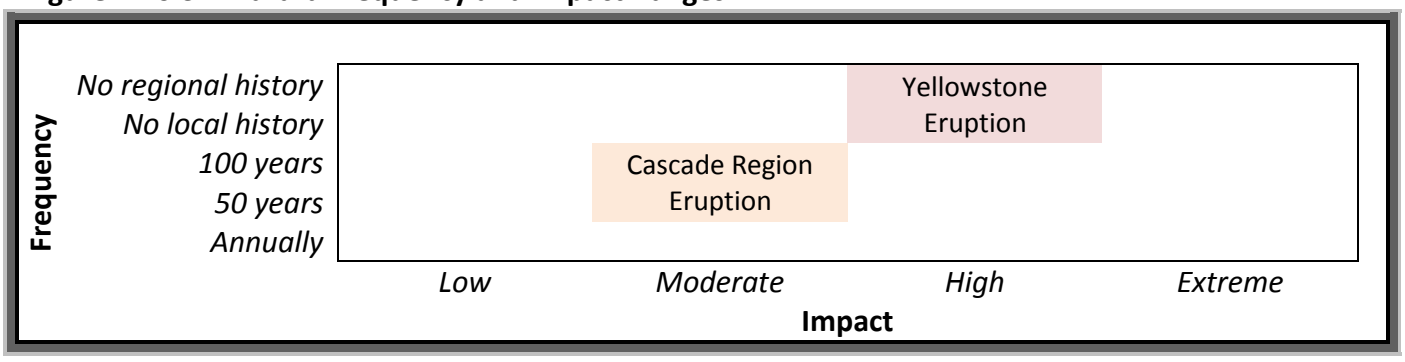
The Cascade region, being more active, has a higher probability of eruptions over the next 100 years. Based on eruptions in the Cascade region over the past 4,000 years, the probability of an eruption is about 1.25% in any given year or approximately 1-2 eruptions per 100 years within the Cascade Range. The Montana Hazard/Vulnerability Analysis from 1987 estimates the return period of substantial volcanic ash fallout in Anaconda – Deer Lodge County to generally once every 5,000-8,000 years.

Figure 4.20.3A Recurrence Intervals for Geological Events in Yellowstone National Park



Source: US Geological Survey, 2005.

Figure 4.20.3B Hazard Frequency and Impact Ranges



4.20.4 Vulnerabilities

Methodology

Given that volcanic eruptions are such infrequent events, two scenarios were used to determine potential losses. The first is an eruption that drops less than an inch of ash over Anaconda – Deer Lodge County. The second is an eruption dropping several inches of heavy ashfall.

Exposure

Critical Facilities and Infrastructure

All critical facilities are at risk from volcanic eruptions. The impact on the facilities will depend on the amount of ash that falls and the ability to remove it. Significant amounts of ash have the potential to clog air systems and shut down facilities. Given enough wet, heavy ash, the potential exists for roofs to fail. Infrastructure exposed to the ash fall, such as power systems, could be brought down by the ash as well. The removal of ash from government facilities and infrastructure could potentially create costs beyond the community's capabilities. With the reduced visibilities and volcanic ash in the air, aircraft may not be able to fly to the affected area to provide medical or emergency supplies. Therefore, all critical facilities and vulnerable populations are vulnerable to ash fall.

Existing Structures

During Mount St. Helens' 1980 eruption, the greatest costs came from the difficult task of removing volcanic ash. The greatest threat is not necessarily to people or residences but to property such as vehicles and equipment. The volcanic dust is corrosive to metals and without proper removal can certainly cause damages to property. An eruption resulting in very heavy, wet ash could threaten structures by collapsing roofs. The probability of an event of this magnitude is very low.

Population

Light ash fall does not significantly impact the population if those with respiratory sensitivities remain indoors. Ash fall conditions that exist for several days, however, could lead to significant health problems for many in Anaconda – Deer Lodge County. The degree of population impacts will greatly vary depending on the type of event.

Values

The economy, particularly the tourist economy, could be affected should an eruption occur or be imminent. Volcanic ash has also been shown to be hazardous to livestock, thus potentially impacting the livestock industry. Commerce and travel may additionally be affected. In the case of Mount St, Helens, travel in Anaconda – Deer Lodge County was restricted while crews cleaned up.

Future Development

Future development will have little to no effect on the volcano hazard. Any new development will be exposed to the volcano hazards of Anaconda – Deer Lodge County and increase the population and property values at risk.

Vulnerabilities and Impacts

Table 4.20.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities	・ Critical functional losses ・ Clean-up/debris removal costs	・ $1,000,000 losses ・ Structural losses ・ Contents losses ・ Critical data losses	Low-Moderate
Critical Infrastructure		・ $5,000,000 losses ・ Road closures ・ Loss of electricity ・ Loss of potable water ・ Loss of telephone service ・ Loss of internet service	Moderate
Existing Structures	・ Clean-up/debris removal costs	・ $1,000,000 losses ・ Structural losses ・ Contents losses ・ Displacement/functional losses	Low-Moderate
Population	・ Illness	・ Injuries ・ Fatalities	Moderate
Values	・ Agricultural losses ・ Habitat damages ・ Reduced air quality ・ Reduced water quality ・ Soil contamination ・ Restrictions on activities ・ Aesthetic value losses	・ Business disruption losses ・ Service industry losses ・ Biodiversity losses ・ Historic structure losses ・ Historic site losses ・ Historic item losses ・ Emotional impacts ・ Cancellation of activities	Moderate-High
Future Structures		・ Likely to occur in hazard areas ・ Increases the total hazard exposure	Low

* in addition to probable (100-year) impacts

4.20.5 Data Limitations

Data limitations include:

- Difficulties in predicting future volcanic activity and the associated impacts due to the low frequency of eruptions.

4.21 Wildland and Forest Fires

Note: Some information for this hazard profile was summarized from the Anaconda – Deer Lodge County Community Wildfire Protection Plan dated September 2005. The Anaconda – Deer Lodge County Community Wildfire Protection Plan remains an important stand-alone document and provides additional detail regarding the wildfire hazard and response capabilities in the county.

Table 4.21A Hazard Summary

Overall Hazard Rating	High	
Probability of High Impact Event	Moderate-High	Regular occurrence of large wildfires.
Vulnerability	Moderate-High	Structures, critical facilities, critical infrastructure, and future development are all at risk from wildfires.

Table 4.21B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
FEMA-FSA-2317	2000	Fire Suppression Assistance	None	$38,516 in federal assistance to seven counties $13,339,160 in federal assistance to state agencies
FEMA-DR-1340	2000	Individual Assistance for nearly the entire state	None	$11,579,000 federal assistance statewide

4.21.1 Description

A wildfire is an uncontrolled fire in a vegetated area. Wildfires are a natural part of the ecosystem. They have a purpose in nature, and following years of fire suppression, many areas have built up fuels that can lead to larger, more intense fires. Fuels in Anaconda – Deer Lodge County range from dense timber stands in varying terrain to native grasslands. Douglas fir, grand fir, juniper, lodgepole pine, ponderosa pine, sub-alpine fir, western larch, western red cedar, whitebark pine, sagebrush-junipers, and a variety of grasses make up many of the wildland fuels in the county. (Anaconda – Deer Lodge County, 2005) Periods of drought, disease, insect infestations, and low fire activity may all lead to an increase in hazardous fuels. These fuels burn rapidly and readily when cured. These types of fires have the potential to destroy structures and natural resources while producing heavy amounts of smoke, particularly when spread by strong winds.

Any flame source can trigger a wildfire, but they are most often triggered by lightning, debris burning, power lines, and campfires. (Anaconda – Deer Lodge County, 2005) Once ignited, ambient conditions dictate whether the fire will spread or not. Moist, cool, and calm conditions or a lack of fuels will suppress the fire, whereas, dry, warm, and windy conditions and dry fuels will contribute to fire spread. The terrain, accessibility, and capabilities of the fire agencies are also factors in the fire's growth potential.

Wildland and forest fire occurrence is weather dependent and highly variable from year to year. Fire season generally runs from March through November but wildfires can occur at any time of year. The light, flashy fuels and the heavy, fire-sustaining timber present in the region are capable of producing large, fast moving wildfires. Forest fires can travel quickly through the crowns of trees or spread along the forest floor. Grass fires are common in non-irrigated fields and open areas scattered with sage brush and native grasses due to the arid climate during almost any season but winter. Both types of wildfires are often aggravated by windy conditions. The Beaverhead – Deerlodge National Forest, Anaconda Pintler Wilderness, Lost Creek State Park, Mount Haggin Wildlife Management Area, and other state and federal lands regularly experience wildfires, and the mixed fuels and rugged terrain of those areas make firefighting especially difficult. The privately owned timber, shrub, native grass, and non-irrigated lands in the remainder of the county also present significant wildfire hazards.

Anaconda – Deer Lodge County has large areas of government owned lands. The national forest and wilderness areas are managed by the US Forest Service. In other parts of the county are tracts of land managed by the US Bureau of Land Management and state government. This scattering of government and private ownership can present unique firefighting challenges and opportunities. Map 3.4A in the Current Land Use section shows the government land ownership in the county.

Problems with wildland and forest fires occur when combined with the human environment. People and structures near wildfires can be threatened unless adequately protected through evacuation, mitigation, or suppression. Most structures are flammable, and therefore, are threatened when wildfire approaches. In addition, a significant loss of life could occur with residents who do not evacuate, firefighters, and others who are in the wildfire area. Infrastructure such as electric transmission lines, fuel tanks, and radio transmission and cell towers are not often equipped to withstand the heat from a wildfire. Timber resources, animal habitats, and waterways can all be damaged leading to negative economic and environmental impacts. The area where human development meets undeveloped, vegetative lands is called the wildland urban interface (WUI). The most extreme situation with respect to fuel conditions and values at risk occurs in rural subdivisions where numerous high-value individual homes and subdivisions are located in the wildland urban interface area in close proximity to the National Forest boundaries.

Wildland urban interface areas with extreme, very high, or high risk are shown in Table 4.21.1A. Community Wildfire Protection Plan stakeholders in 2005 additionally identified the Bear Gulch, Cherry Creek, and Pintler Meadows subdivision areas are high priorities. (Anaconda – Deer Lodge County, 2005)

Table 4.21.1A Wildland Urban Interface Risk Ratings

Location	Rating	Description
Clear Creek	Extreme 176	South of Anaconda on Highway 274; Gated area; Lower homes in grass and deciduous fuels, upper homes in dense lodgepole along Clear Creek
Perkins Gulch	Extreme 174	East of Warm Springs, accessed by Perkins Gulch Road (lower area) and Cottonwood Creek Road (upper area); Structures are located in sections 17 and 19

Table 4.21.1A Wildland Urban Interface Risk Ratings (continued)

Location	Rating	Description
Foster/Barker Creek	Extreme 172	7 miles west of Anaconda; North end of Barker Creek and south end of Foster Creek; Forest Service run Job Corps in Foster Creek accounts for most of the wood shake roofs
Warm Springs Creek	Very High 167	North of Highway 1 by Spring Hill; Of 18 residences, 3 meet landscape requirements and 3 have wood shake roofs
Yankee Flats	Very High 165	8 miles west of Anaconda; Majority of homes in lodgepole pine stands on South side of Highway 1; 13% of homes met landscape requirements
Georgetown Lake East	Very High 151	Lake frontage; Georgetown and Southern Cross; Of 156 residences, 49 meet landscape requirements and 14 have wood shake roofs
Georgetown Lake South	High 147	Dense clusters; Close to Georgetown Lake; Steep grade on roads off of Vagabond Lane in the Dude Ranch area; Of 253 residences, 41 meet landscape requirements
Silver Lake	High 141	East of Georgetown Lake along MT Highway 1; Includes Lagger Gulch and Camp Silvercloud (Girl Scout Camp) with 13 structures
Fairmont	High 137	Fairmont off I-90 or Highway 441; A few homes that do not meet landscape requirements in Gregson Creek and Whitepine Creek draws; Of 53 houses, 37 meet landscape requirements and 39 have fire resistance roofing material
Olson Gulch	High 136	6 miles west of Anaconda; Of 29 homes, 9 meet landscape standards

Source: Montana Department of State Lands, 1994.

Wildfire potential and the wildland urban interface can be mapped in a variety of ways since many factors play into wildfire risk. The Anaconda – Deer Lodge County Community Wildfire Protection Plan builds off the Healthy Forest Restoration Act (HFRA) Wildland – Urban Interface definition that considers housing density and land cover attributes by adding a four mile buffer to capture values at risk in extreme wildfire situations, road buffers for roadways that provide egress and ingress, and buffers around high voltage power lines. A total of 303,834 acres of Anaconda – Deer Lodge County are considered wildland urban interface by this definition, including 150,402 acres of private lands. Figure 5 of the Anaconda – Deer Lodge County Community Wildfire Protection Plan 2005 shows the wildland urban interface.

The heavy smoke produced by a wildfire can cause unhealthy air conditions that may affect those with respiratory problems and otherwise healthy people. Smoky conditions can also lead to poor visibility and an increased probability of highway or aircraft accidents. Besides air pollution, water pollution may also occur during and after a wildfire. Should a significant wildfire pass through the area, pollution of the watershed can occur. With vegetation removed and the ground seared from a wildfire, the area also

becomes more prone to flash floods and landslides because of the ground's reduced ability to hold water.

4.21.2 History

Anaconda – Deer Lodge County has a long history of wildfires from small to large. Some have caused damages and others have not. The extent of damages often depend on the proximity to the wildland urban interface, fire spread rates, and the effectiveness of suppression and mitigation measures. The history of wildfires can be difficult to compile because the various firefighting entities involved and a variety of recordkeeping measures over the years. The following events have been complied based on research conducted for the CWPP, a DNRC database, and other miscellaneous sources. Using a mix of databases, some dating back to 1968 and another to 1981, a total of 2,130 fires burning 173,197 acres in the greater Granite County area were calculated through 2004. (Anaconda – Deer Lodge County, 2005) The Montana Department of Natural Resources and Conservation database has 310 fires burning 2,070 acres listed from 1981-2012, primarily on private and state lands. (Montana Department of Natural Resources and Conservation, 2013) Note that many of the fires listed do not appear to have accurate acreages listed. The largest fires and costliest in Anaconda – Deer Lodge County can be found in Tables 4.21.2A and 4.21.2B.

Table 4.21.2A Largest Wildland Fires by Acreage Burned

Name	Start Date	Acres Burned
Barker Creek	August 4, 1979	3,300 acres
Dutchman	April 21, 1983	1,214 acres
Willow Glen	September 18, 1979	335 acres
Girard Gulch	August 19, 1988	140 acres
Fish Trap	April 22, 1977	110 acres

Sources: Montana Department of Natural Resources and Conservation, 2013; National Interagency Fire Center, 2013; Anaconda Standard newspaper archives.

Table 4.21.2B Costliest Wildland Fires

Name	Start Date	Cost	Acres Burned	Losses
Twin Lakes	August 10, 2003	$447,449	93 acres	
Girard Gulch	August 19, 1988	$367,633	140 acres	1 structure
Foster Creek	August 23, 1999	$157,919		

Sources: Montana Department of Natural Resources and Conservation, 2013; National Interagency Fire Center, 2013.

4.21.3 Probability and Magnitude

An analysis of the Montana Department of Natural Resources and Conservation records indicates approximately 10 fire starts per year occur in Anaconda – Deer Lodge County on state lands or that require state assistance (generally not including fires on US Forest Service lands). About 85% of the land burned in these fires was on private lands. The greater Anaconda – Deer Lodge County area, including

Forest Service lands, appears to have a frequency of 25-75 per year. (Anaconda – Deer Lodge County, 2005)

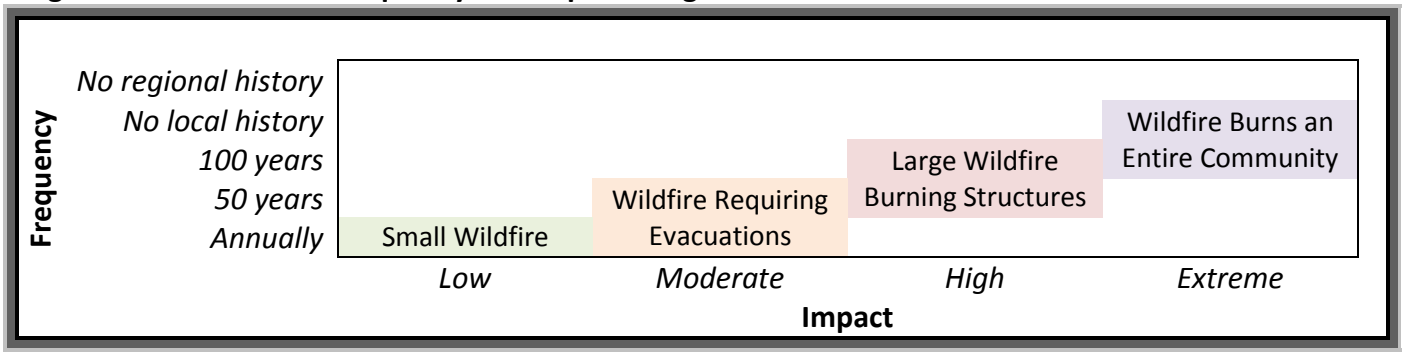
In 1994, Montana Department of State Lands determined the fire start history for the high risk areas in Anaconda – Deer Lodge County. Table 4.21.3A shows the fire start history by area.

Table 4.21.3A Wildfire History by Area from 1984-1993

Location	Frequency
Georgetown Lake East	1.2 Fires/1,000 Acres/10 Years
Yankee Flats	0.95 Fires/1,000 Acres/10 Years
Foster/Barker Creek	0.75 Fires/1,000 Acres/10 Years
Clear Creek	0.72 Fires/1,000 Acres/10 Years
Warm Springs Creek	0.72 Fires/1,000 Acres/10 Years
Georgetown Lake South	0.63 Fires/1,000 Acres/10 Years
Olson Gulch	0.62 Fires/1,000 Acres/10 Years
Perkins Gulch	0.53 Fires/1,000 Acres/10 Years
Silver Lake	0.52 Fires/1,000 Acres/10 Years
Fairmont	0.50 Fires/1,000 Acres/10 Years

Source: Montana Department of State Lands, 1994.

Figure 4.21.3B Hazard Frequency and Impact Ranges



4.21.4 Vulnerabilities

Methodology

The Anaconda – Deer Lodge County Community Wildfire Protection Plan uses a detailed matrix to determine the risk to values for a given area. This matrix takes into account fire behavior fuels modeling, ignition probability modeling, fire regime condition class modeling, and the wildland urban interface priority areas. Figure 9 in the Anaconda – Deer Lodge County Community Wildfire Protection Plan shows the associated Fire Risk / WUI Impact Model.

For population estimates, the 2010 county population of 9,298 was divided by the total number of census housing units of 5,122 for an estimate of 1.8 people per structure.

Exposure

Critical Facilities and Infrastructure

Critical facilities in close proximity to forested areas or constructed with especially flammable materials are more likely to suffer losses from a wildfire. Since a wildfire is possible in essentially all areas of Anaconda – Deer Lodge County, all critical facilities are assumed to have some risk. The Georgetown Lake Fire Stations, the Montana DNRC offices, and the Anaconda Job Corps are the critical facilities with the highest risk in the wildland urban interface. Montana State Hospital has also historically been threatened by wildfire. (Anaconda – Deer Lodge County, 2005) Other critical facilities at risk based on comparisons to the CWPP maps include all facilities and infrastructure outside the urban limits of Anaconda. Defensible space should be considered and maintained around all critical facilities in the county.

Electric and communications infrastructure, including the major regional electric transmission lines, can be found in wildland areas. This infrastructure is highly vulnerable to wildland fire without mitigation. Wooden bridges in wildland areas are also quite vulnerable.

Existing Structures

Wildfires have the greatest potential to substantially burn public lands; however, private residences become threatened when the fire enters the wildland urban interface. Anaconda – Deer Lodge County has many wildland urban interface areas that may be threatened should a wildfire encroach. The Anaconda – Deer Lodge County Community Wildfire Protection Plan estimates that 1,673 houses are in the wildland urban interface with a total value of $118,281,100. This value does not account for improvements or personal effects that may be at risk from a wildfire. In terms of acreage, approximately 6,905 acres are estimated to be very high risk, 56,054 acres are high risk, 114,269 acres are medium risk, and 79,690 acres are low risk. (Anaconda – Deer Lodge County, 2005)

A wildfire damage factor is rather difficult to determine because any actual losses will be highly dependent on the fire characteristics and its location. Not all areas will be affected by one wildfire. Losses in the area of the WUI fire, however, could have a high loss rate. Given the assumption that 10% of the structures in the wildland urban interface could be lost in a probable wildfire, the structure losses from that fire would roughly total $11.8 million dollars with 167 structures affected.

History has shown that personal property losses can be much greater than just that of residences. Outbuildings, fences, equipment, livestock, pastures, and crops are often additional losses. Suppression costs, particularly due to the efforts needed for structure protection, can easily total in the millions of dollars as events in neighboring counties have shown.

Population

Using the estimate of 167 structures affected in a major wildfire, roughly 301 people would live in the affected area (167 structures x 1.8 people/structure). In many cases, residents can be evacuated before the fire moves into their area. Some residents, however, may choose to remain in the evacuated area or a rapidly spreading fire may not allow enough time for a formal evacuation. Firefighters can also be particularly threatened during wildfires. Advances in firefighter safety and technology have improved firefighting efforts; however, the potential for loss of life and injuries still exists.

Values

Although the primary concern is to structures and the interface residents, most of the costs associated with fires, come from firefighting efforts in suppression costs. Additional losses to natural resources, water supplies, air quality, and the economy are also typically found. Wildfire's impact on the regional economy can be significant with the loss of timber, natural resources, recreational opportunities, and tourism, all of which are of particular importance in Anaconda – Deer Lodge County. The taxable value of the county's forestland is estimated at over $56 million. (Anaconda – Deer Lodge County, 2005)

Future Development

The wildland urban interface is a very popular place to live as national trends show. More and more homes are being placed in this interface, particularly in Montana, and Anaconda – Deer Lodge County is no exception. Development in the hazard areas has increased in recent years and has amplified the vulnerabilities outside the urban areas significantly. Regulating growth in these areas is a delicate balance between protecting private property rights and promoting public safety.

Many of the 2,060 parcels of private, undeveloped land coincide with wildland urban interface areas. These areas could be developed in the future. The risk to individual structures can be mitigated through landscaping and/or building placement. Should these parcels be subdivided, the subdivision would need to meet the requirements set forth in the Anaconda – Deer Lodge County Subdivision Regulations. The Georgetown Lake Zoning District also has requirements specific to wildfire mitigation.

<u>Vulnerabilities and Impacts</u>

Table 4.21.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities	・ $500,000 losses ・ Structural losses ・ Contents losses ・ Critical functional losses ・ Critical data losses	・ $1,500,000 losses	Moderate-High
Critical Infrastructure	・ $500,000 losses ・ Road closures	・ $2,000,000 losses ・ Loss of electricity	Moderate-High

Table 4.21.4A Hazard Vulnerabilities and Impacts (continued)

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Existing Structures	・ $1,180,000 losses ・ Structural losses ・ Contents losses ・ Displacement/functional losses	・ $11,800,000 losses	High
Population		・ Injuries ・ Fatalities	Moderate
Values	・ Agricultural losses ・ Reduced air quality ・ Restrictions on activities ・ Aesthetic value losses	・ Business disruption losses ・ Service industry losses ・ Habitat damages ・ Reduced water quality ・ Soil contamination ・ Historic structure losses ・ Historic site losses ・ Historic item losses ・ Emotional impacts ・ Cancellation of activities	Moderate
Future Structures	・ Likely to occur in hazard areas ・ Subdivision regulations in place to mitigate some impacts	・ 2,060 undeveloped parcels, mostly in the wildland urban interface	Moderate-High

* in addition to probable (100-year) impacts

4.21.5 Data Limitations

Data limitations include:

- Lack of a comprehensive, multi-agency, historic wildfire digital database containing information on start location, cause, area burned, suppression costs, and damages.
- Need for an updated Community Wildfire Protection Plan.
- Updated subdivision level reviews needed.

4.22 Risk Assessment Summary

The risk assessment represents an approximate history and estimated vulnerabilities to Anaconda – Deer Lodge County from the hazards identified. Table 4.22A provides a summary of federal major disaster and emergency declarations. As with any assessment involving natural or human-caused hazards, all potential events may not be represented here and an actual incident may occur in a vastly different way than described. This assessment, however, will be used, where possible, to minimize damages from these events in the future.

Every type of event is different, ranging from population to property to economic impacts. Incidents also have different probabilities and magnitudes even within hazards. For example, a light snowstorm will be different than a blizzard and a moderate flood will be different from both of those. Some hazards have estimates of dollar losses and population impacts whereas others are more qualitatively assessed based on the information available during the risk assessment process.

The hazards are prioritized using the best possible information on risks and vulnerabilities to provide guidance when selecting mitigation strategies. Generally, an evaluation of a specific mitigation activity will capture the benefits of such actions, including considering the probability of the hazard occurring and the disaster losses to be mitigated.

The following factors were considered when prioritizing the hazards:

- Probability of a "Disastrous"/High Impact Event
- Vulnerability (considers probable impacts to critical facilities, critical infrastructure, structures, the population, economic, ecologic, historic, and social values, and future development)

For more information on these determinations, see the individual hazard profiles.

Table 4.22B shows the hazard prioritizations for Anaconda – Deer Lodge County.

Table 4.22A Federal Major Disaster and Emergency Declarations Summary

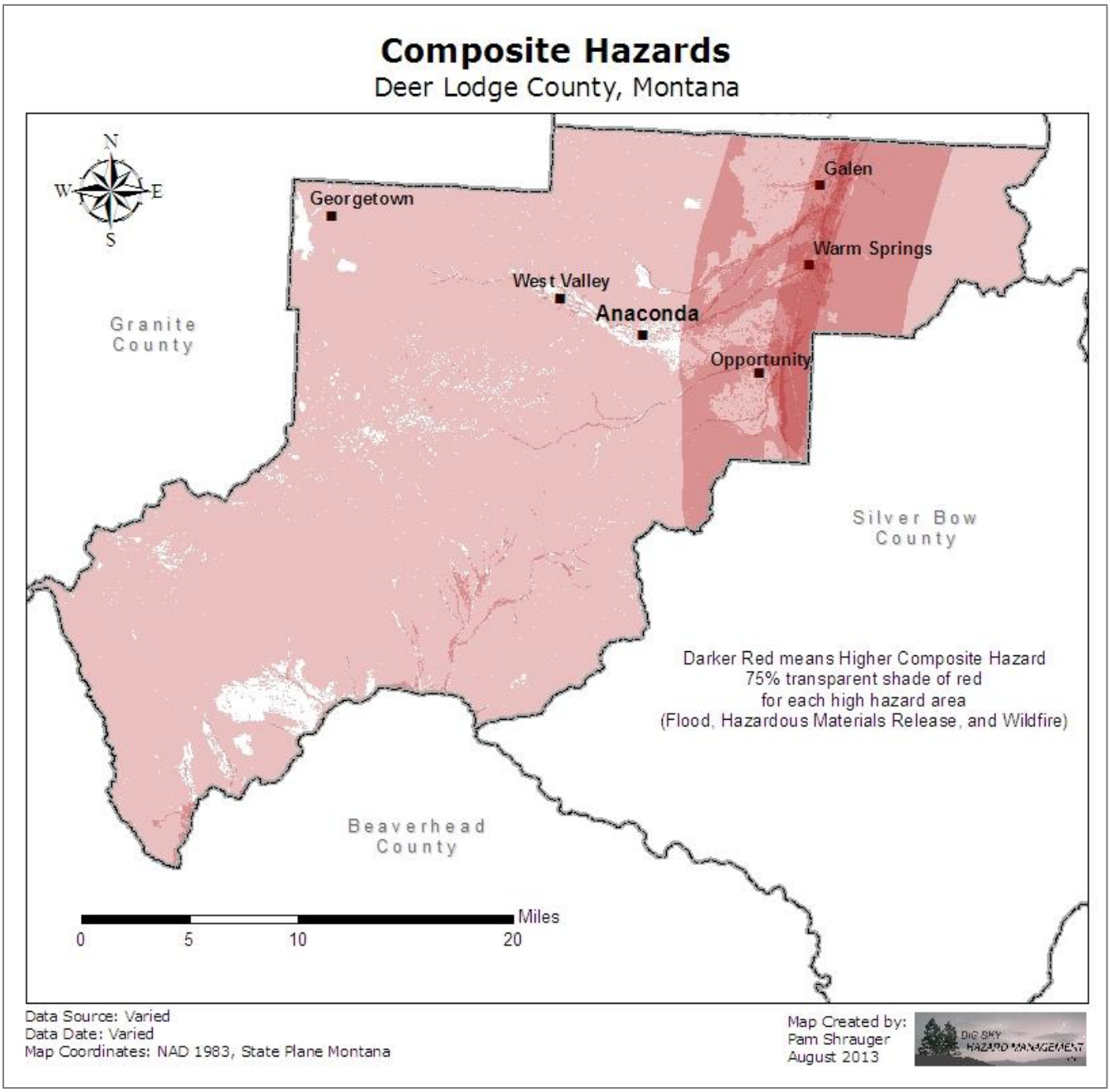
Hazard	Declaration	Year	Cause/Additional Information	Casualties	Damages/Assistance
Flood	FDAA-DR-417	1974	Public Assistance	None	Total federal assistance to the entire disaster area = $603,145
Flood	FEMA-DR-761	1986	Public Assistance	None	Total federal and state assistance to the entire disaster area = $1,996,384
Flood	FEMA-DR-1105	1996	Public Assistance	None	Total federal and state public assistance to the entire disaster area = $2,427,633
Flood	FEMA-DR-1183	1997	Public Assistance	None	Total federal and state public assistance to the entire disaster area = $7,696,015
Flood	FEMA-DR-1996	2011	Public Assistance	None	Total federal public assistance to the entire disaster area = $36,136,221
Wildfire	FEMA-FSA-2317	2000	Fire Suppression Assistance	None	$38,516 in federal assistance to 7 counties $13,339,160 in federal assistance to state agencies
Wildfire	FEMA-DR-1340	2000	Individual Assistance for nearly the entire state	None	$11,579,000 federal assistance statewide

Table 4.22B Hazard Ratings

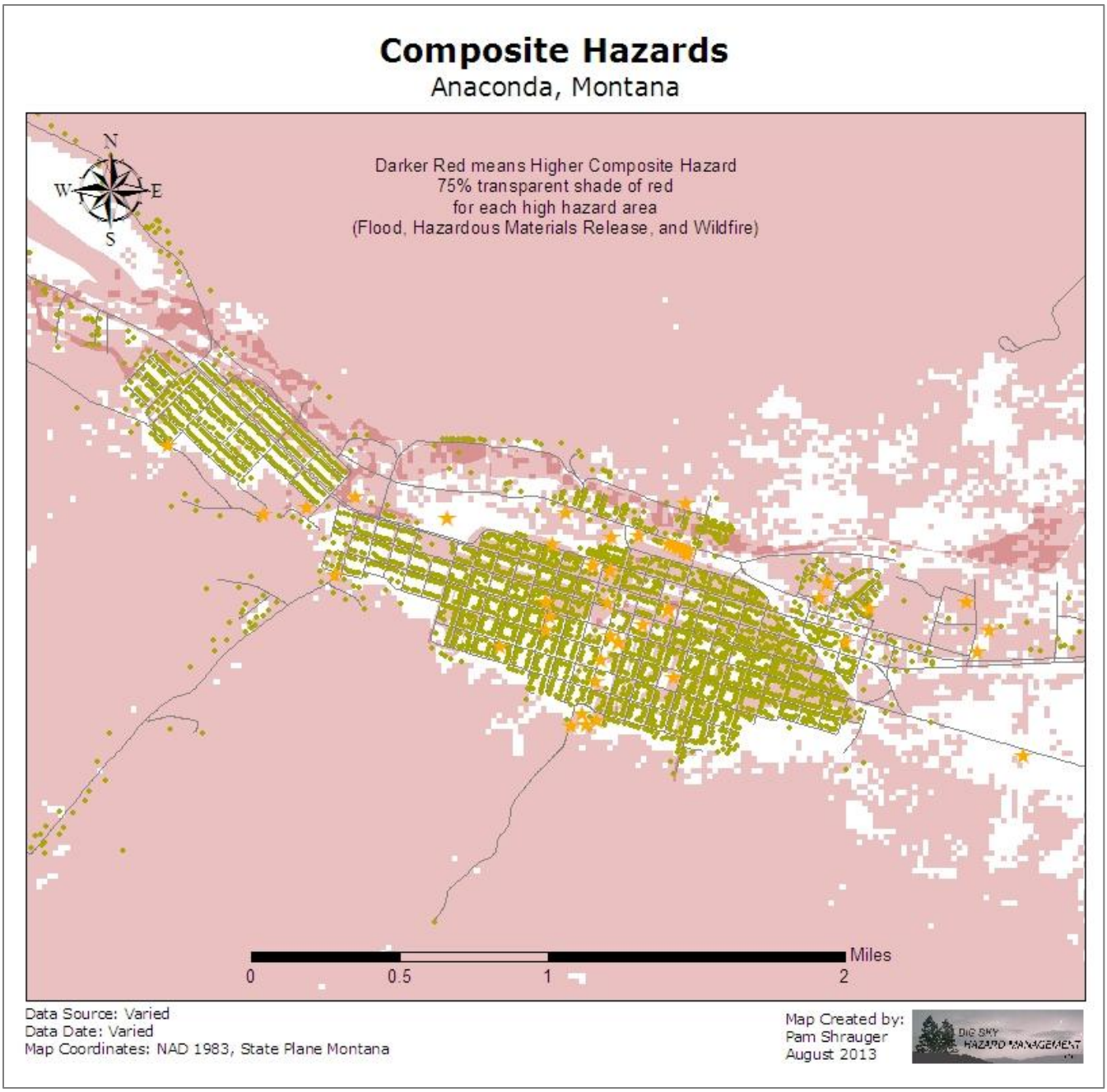
Hazard	Probability of High Impact Event	Vulnerability	Overall Hazard Rating
Flood	Moderate-High	High	High
Wildland and Forest Fires	Moderate-High	Moderate-High	High
Severe Winter Weather	Moderate-High	Moderate	High
Earthquake	Low-Moderate	High	High
Disease Outbreak	Moderate	Moderate	Moderate
Drought, Blight, and Infestation	Moderate	Moderate	Moderate
Severe Thunderstorms, Tornadoes, and Wind	Moderate	Moderate	Moderate
Hazardous Materials Release	Moderate	Low-Moderate	Moderate
Highway Transportation Accident	Moderate	Low-Moderate	Moderate
Urban Fire / Explosion	Moderate	Low-Moderate	Moderate
Cyber Attack / Failure	Low-Moderate	Moderate	Moderate
Dam Failure	Low-Moderate	Moderate	Moderate
Large Public Event	Low-Moderate	Moderate	Moderate
Utility Outage	Low-Moderate	Moderate	Moderate
Bioterrorism	Low	Moderate	Low
Radioactive Release	Low	Moderate	Low
Terrorism	Low	Moderate	Low
Volcanic Ashfall	Low	Low-Moderate	Low
Aircraft Crash	Low	Low	Low
Landside and Avalanche	Low	Low	Low
Railroad Transportation Accident	Low	Low	Low

Maps 4.22C, 4.22D, and 4.22E are composite maps showing the areas in the county at high risk from multiple hazards, where such geographic delineations exist. These maps can help identify those areas that are vulnerable to more than one hazard and could be targeted for mitigation.

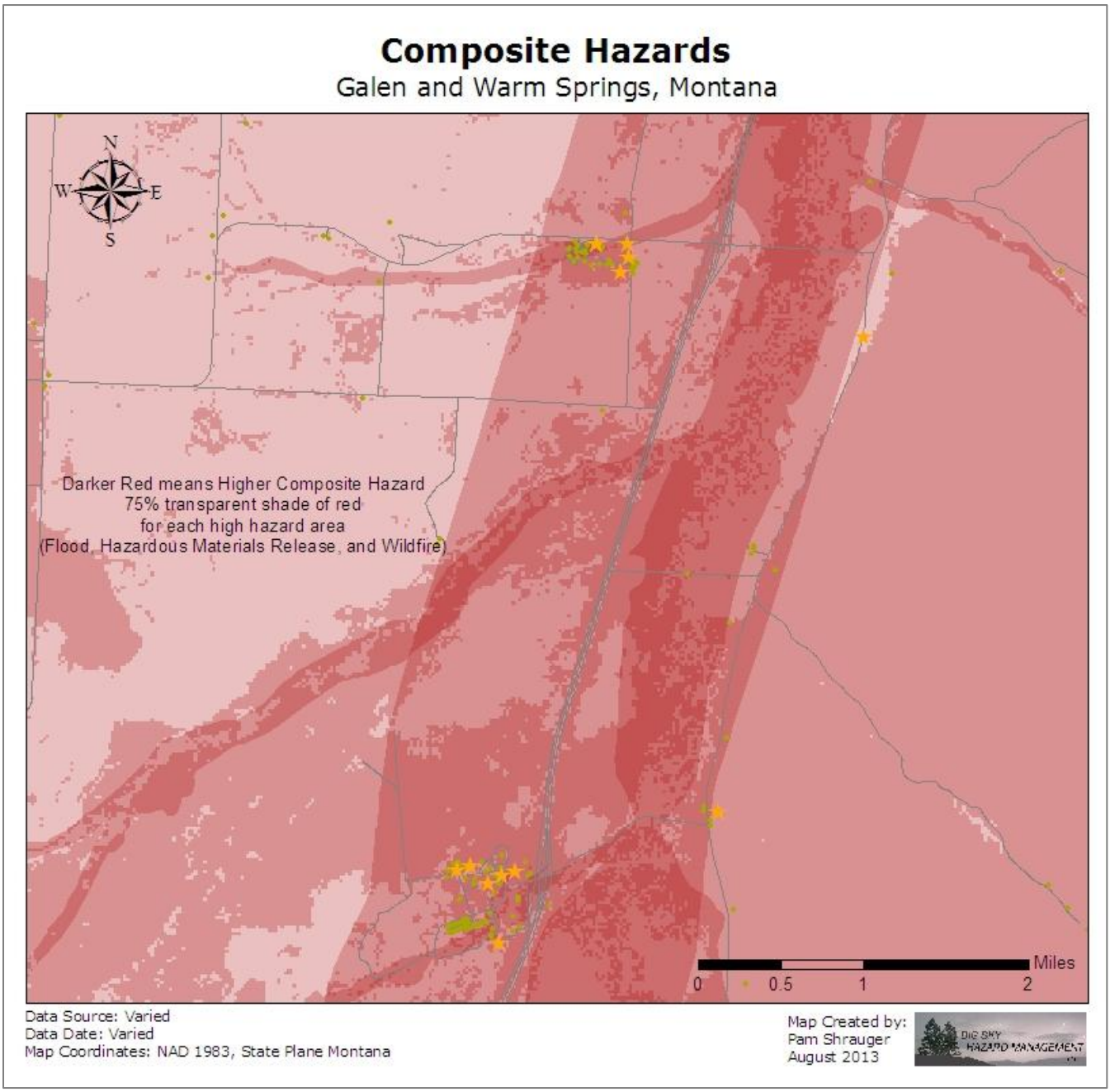
Map 4.22C


Composite Hazards
Deer Lodge County, Montana
N
W
E
S
Georgetown
Galen
Warm Springs
West Valley
Anaconda
Opportunity
Granite County
Silver Bow County
Beaverhead County
Darker Red means Higher Composite Hazard
75% transparent shade of red
for each high hazard area
(Flood, Hazardous Materials Release, and Wildfire)
Miles
0
5
10
20
Data Source: Varied
Data Date: Varied
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
August 2013
BIG SKY HAZARD MANAGEMENT

Map 4.22D


Composite Hazards
Anaconda, Montana
N
W
E
S
Darker Red means Higher Composite Hazard
75% transparent shade of red
for each high hazard area
(Flood, Hazardous Materials Release, and Wildfire)
Miles
0
0.5
1
2
Data Source: Varied
Data Date: Varied
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
August 2013
BIG SKY
HAZARD MANAGEMENT

Map 4.22E


Composite Hazards
Galen and Warm Springs, Montana
N
W
E
S
Darker Red means Higher Composite Hazard
75% transparent shade of red
for each high hazard area
(Flood, Hazardous Materials Release, and Wildfire)
Miles
0
0.5
1
2
Data Source: Varied
Data Date: Varied
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
August 2013
BIG SKY
HAZARD MANAGEMENT

4.3 Cyber Attack / Failure

Table 4.3A Hazard Summary

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Low-Moderate	Very limited national and local history.
Vulnerability	Moderate	Most of the population is dependent on critical information technology.

Table 4.3B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.3.1 Description

Cyberterrorism is the attack or hijack of the information technology infrastructure that is critical to the US economy through financial networks, government systems, mass media, or other systems. Any cyber attack that creates national unrest or instability would be considered cyberterrorism. Information technology could also fail due to solar flares or equipment failures and have similar catastrophic impacts to society.

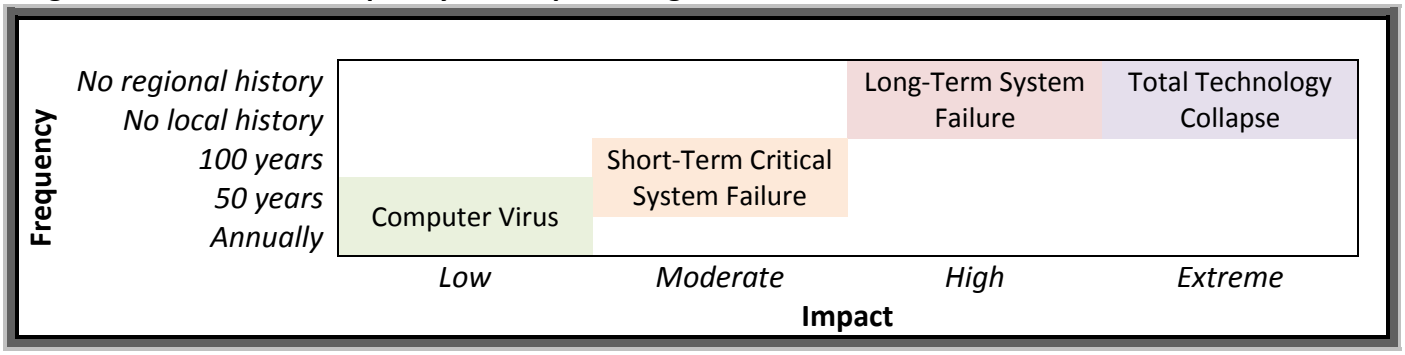
In the past 100 years, the nation has become highly dependent on information technology for communication, financial transactions, and record keeping. Vital information and systems are often backed up to prevent loss; however, a sophisticated attack could destroy this information, leading to economic instability and possibly even chaos and civil unrest. Critical infrastructure systems such as electric, water treatment, financial transactions, medical equipment, and even gas pumps rely on cyber systems now and could lose functionality in an attack or failure.

4.3.2 History

Anaconda – Deer Lodge County and most of the nation have very little experience with cyber attack or failure, as very few incidents have occurred. A computer virus is probably the most common type of cyber attack most people have experience. These viruses have not had an impact on the scale of a community-wide disaster.

4.3.3 Probability and Magnitude

Figure 4.3.3A Hazard Frequency and Impact Ranges



4.3.4 Vulnerabilities

Methodology

Since the probability of a cyber attack or failure is extremely difficult to determine, the scenario of a long-term critical infrastructure system failure is theorized here to predict losses.

Exposure

Critical Facilities and Infrastructure

Critical infrastructure often relies on complex and interdependent technology systems. Should a critical system fail either by attack or equipment or software failure, the infrastructure could lose functionality. Essentially all critical systems are at risk, including but not limited to, electricity, natural gas, water systems, wastewater systems, communications, telephone, cellular telephones, internet, financial networks, air traffic, weather radars, and military systems. Should just one of these systems fail and experience a long-term disruption, national and local consequences could result.

Existing Structures

Structures should not be directly affected by a cyber attack or failure.

Population

While most cyber system failures would not have an immediate impact on the health and safety of the population, dependencies could lead to such impacts in the long-term. The inability to heat structures in the winter or keep food supplies due to a power or fuel outage could then have an impact on people. If the ability to call for emergency services is lost, indirect fatalities could result. Rioting and unrest related to the attack or failure, such as the collapse of financial records, could also harm the population.

Values

The economy is the value most likely to suffer during a cyber attack or failure. A complete economic collapse could result. In most cases, the failure of one critical system would have economic impacts, but other sectors of the economy and other values would not be severely affected.

Future Development

Future development should not have a direct impact on losses with the exception of increasing the number of people exposed and in need of support due to the cyber attack or failure.

Vulnerabilities and Impacts

Table 4.3.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities			Low
Critical Infrastructure		・ Loss of electricity ・ Loss of utility gas ・ Loss of potable water ・ Loss of sanitary sewers ・ Loss of telephone service ・ Loss of internet service ・ Fuel/energy shortages	Moderate-High
Existing Structures			Low
Population		・ Injuries ・ Fatalities	Moderate
Values	・ Business disruption losses	・ Service industry losses ・ Emotional impacts ・ Cancellation of activities	Moderate-High
Future Structures		・ Increases the total hazard exposure	Low

* in addition to probable (100-year) impacts

4.3.5 Data Limitations

Data limitations include:

- Inability to quantify the probability and magnitude of a cyber attack or failure.

4.4 Dam Failure

Table 4.4A Hazard Summary

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Low-Moderate	The limited history indicates a low-moderate probability of a high hazard failure.
Vulnerability	Moderate	Roads, critical facilities, structures, and the population are at risk from a dam failure.

Table 4.4B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.4.1 Description

Dams, generally defined as barriers created with the purpose of retaining water, have been placed in strategic locations across the county, state, and nation for a wide variety of uses including flood control, hydroelectricity generation, irrigation, public water supplies, and recreation. Dams exist in a wide variety of shapes, sizes, and materials. They are constructed, operated, and maintained by entities such as private individuals, businesses, and government.

The structural integrity of a dam depends on its design, maintenance, and ambient conditions. Should a dam fail, the consequences can be devastating or minimal depending on the dam's characteristics and regional attributes. Although not particularly likely, seismic activity, poor maintenance, overwhelming flow conditions, and terrorist activities can all lead to the catastrophic failure of a dam. The result is the rush of water contained by the dam downstream at a rapid pace. Problems arise when a dam fails and people and/or property lie in its inundation area. Dam failure can be compared to riverine or flash flooding in the area downstream from the dam, and sometimes for long distances from the dam, depending on the amount of water retained and the drainage area. Others may be located in areas that result in little if any damages during a failure.

Most dams are classified based on the potential hazard to life and property should the dam suddenly fail. Note the hazard rating is not an indicator of the condition of the dam or its probability of failure. Definitions, as accepted by the Interagency Committee on Dam Safety, are as follows:

- Low Hazard Potential
  Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.
- Significant Hazard Potential
  Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environment damage, disruption of lifeline facilities, or impact other concerns. Significant hazard potential

classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

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

Source: Federal Emergency Management Agency, 2004.

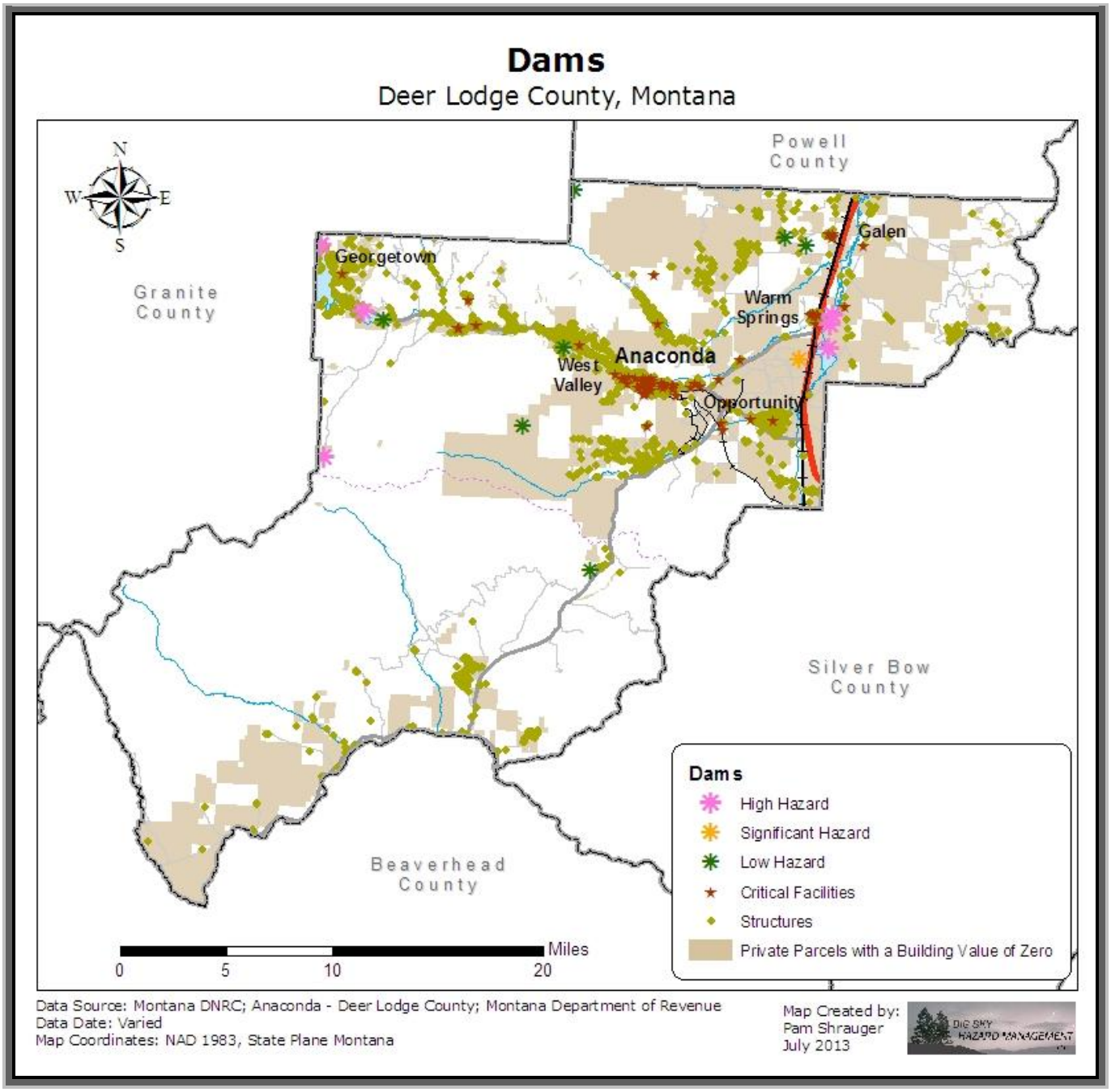
Anaconda – Deer Lodge County has five high hazard dams, one significant hazard dam, and six low hazard dams as shown in Table 4.4.1A. The locations and hazard assignment of dams in Anaconda – Deer Lodge County can be found on Map 4.4.1B. Inundation mapping for the high hazard dams exist in their Emergency Action Plans. Copies of these plans are kept by the Anaconda – Deer Lodge County Disaster and Emergency Services Coordinator.

Table 4.4.1A Dams in Anaconda – Deer Lodge County

Dam Name	River	Year Finished	Hazard	Owner
Silver Lake West	Georgetown Lake Tributary	1918	High	Butte-Silver Bow
Storm Lake	Storm Lake Creek	1898	High	Butte-Silver Bow
Warm Springs Tailing #1	Silver Bow Creek	1911	High	Atlantic Richfield Company
Warm Springs Tailing #2	Silver Bow Creek	1919	High	Atlantic Richfield Company
Warm Springs Tailing #3	Silver Bow Creek	1959	High	Atlantic Richfield Company
Opportunity Tailings Pond	Silver Bow Creek, Offstream	1962	Significant	Atlantic Richfield Company
Babcock	Lost Creek Tributary	1953	Low	Loubren, Inc.
Heapby Reservoir	Modesty Creek	1958	Low	Donald W. Beck
Hearst Lake	Grays Gulch	1898	Low	Butte-Silver Bow
Meyer's Dam	Warm Springs Creek	1902	Low	Atlantic Richfield Company
Silver Lake East	Storm Lake Creek Tributary	1918	Low	Butte-Silver Bow
Thornton Lake	Thornton Creek	1904	Low	Donald W. Beck

Source: US Army Corps of Engineers, 2005.

Map 4.4.1B



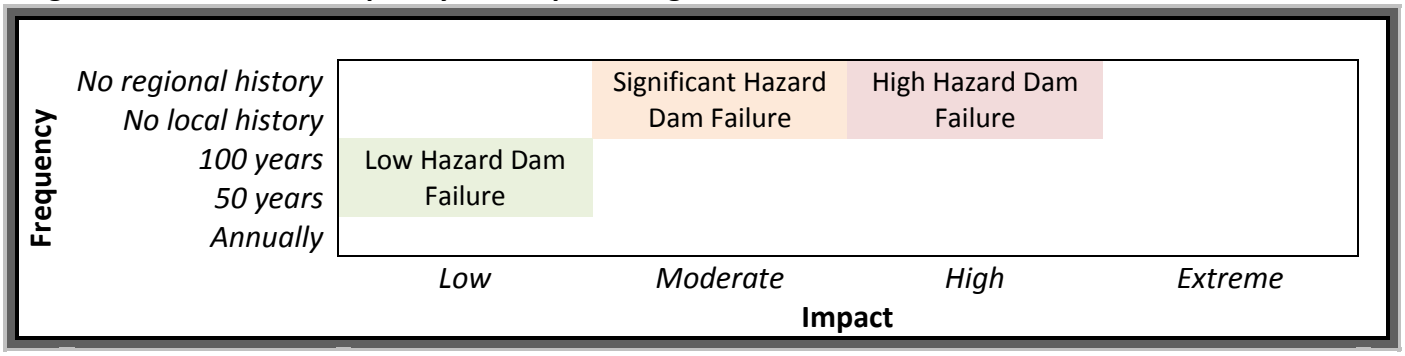
4.4.2 History

In July 1938, the "City Reservoir" broke near Warm Springs and resulted in rescues and an inundation area of twenty-two blocks wide by four blocks long. (Anaconda Leader, 1938) Although not a dam, residents recalled a water flume break in the 1970s that flooded Anaconda.

4.4.3 Probability and Magnitude

The probability of dam failure in Anaconda – Deer Lodge County is considered low. High hazard dams and tailing ponds are the most probable to cause damages, and none are known to be unstable. Conditions could certainly change, but the high hazard dams are monitored the most carefully and breaches can often be mitigated before catastrophic failure.

Figure 4.4.3A Hazard Frequency and Impact Ranges



4.4.4 Vulnerabilities

Methodology

For each dam, an estimated number of structures and bridges were calculated to be in the inundation area. These estimations were based on viewing the paper inundation maps from the Emergency Action Plans and selecting critical facilities and structures from the digital structure data that appeared to be in the general vicinity of the inundation area. Therefore, these estimates may have a large margin of error. To estimate the losses from a dam break, the average damage to the structures and critical facilities impacted was estimated to be 30% since many structures may have little damage while other may be a complete loss. A loss ratio specific to dam failure would allow for a more accurate loss estimation.

Exposure

The Silver Lake West hazard area extends from Silver Lake West Dam to Georgetown Lake. Based on the inundation maps, seven residences plus residences on Denton's Point Road could be flooded by a dam break. (Butte-Silver Bow County, 2003)

The Storm Lake Dam hazard area extends downstream from Storm Lake north along the Storm Lake Creek drainage and then northeasterly to the confluence of the Silver Lake East discharge channel. From there, the hazard area continues easterly, passing under Highway 10A into Cable Meadows where it joins Cable Creek. From Cable Meadows, the inundation area passes under the highway again and follows along the southern edge of Highway 1 easterly toward West Valley and Anaconda, passing under the highway three more times before reaching Anaconda. The Storm Lake Dam inundation areas are projected to affect Camp Silvercloud, the Spring Hill Picnic Area, and along Warm Springs Creek with a width from Stumptown Road to Highway 1. Once in Anaconda, the inundation area extends north of

Commercial Avenue. The inundation area tapers to 100-year floodplain levels by Galen Road. (Butte-Silver Bow County, 2003)

The Warm Springs Ponds Emergency Action Plan defines the hazard area as follows:

> *For the clear weather breach, the inundation/evacuation area extends 39.5 miles downstream of the Warm Springs Ponds along the Clark Fork River valley to a point approximately 2 miles downstream of Goldcreek at which point the breach discharge is equivalent to the 100-year discharge. Under the design flooding conditions, the inundation/evacuation area extends 27 miles downstream of the Warm Springs Ponds to a point approximately 1.3 upstream from Garrison at which point the discharge resulting from the breach flood is equivalent to the design flood discharge.* (Atlantic Richfield Company, 2003)

Seventeen residences in Anaconda-Deer Lodge County are in the inundation area of the Warm Springs Ponds.

Critical Facilities and Infrastructure

Table 4.4.4A shows the critical facilities and infrastructure that would potentially be affected by dam failures of the high hazard dams in Anaconda – Deer Lodge County.

Table 4.4.4A Critical Facilities and Infrastructure in Dam Inundation Areas

Dam	Critical Facilities and Infrastructure Likely Affected
Silver Lake West Dam	
Storm Lake Dam	▪ DNRC Office ▪ ADLC Well Houses ▪ Dwyer School ▪ BAP Rail Yard ▪ Anaconda Community Hospital ▪ Anaconda Fire Station ▪ ADLC Water Department ▪ Metcalf Senior Citizen Center
Warm Springs Ponds Dams	▪ Montana State Hospital

Existing Structures

Table 4.4.4B shows the estimated exposure (based on the median value of housing units) and losses (based on a 30% damage factor).

Table 4.4.4B Potential Losses from High Hazard Dam Failure

Dam	Estimated Structures in the Inundation Area	Structure Value Exposure	Estimated Potential Losses
Silver Lake West Dam	18 structures	$1,902,000	$570,780
Storm Lake Dam	219 structures	$23,148,300	$6,944,490
Warm Springs Ponds Dams	17 structures	$1,796,900	$539,070

Population

With any dam failure event, the loss of life is always possible. The warning time for a dam failure can be fairly short, but some warning may exist. The high hazard dams pose the greatest risk to lives. With some warning time, the potential for the loss of life from dam failure could be reduced. Current technology (cell phones and 911 call back systems) could be useful in notifying those in the inundation area. These notification methods are not 100%, however, so the loss of life is certainly possible, especially if the warning time is short.

Using an estimate of 1.82 people per residence (9,298 people / 5,122 housing units), Table 4.4.4C shows the estimated population at risk. The actual population risk will be highly dependent on warning time and notification success. In the case of the Storm Lake Dam, most of those people residing in the hazard area are in the Anaconda area and would have about 5 hours to evacuate from the time the dam broke until the peak flow arrived in a storm induced event. Of greater concern would be the Camp Silvercloud area which has only about 45 minutes. The Yankee Flats area would see peak flow in about 2.5 hours. The Silver Lake West Dam breach would reach Georgetown Lake in about 1 hour, and therefore, a rapid evacuation would need to occur for those in the inundation area. Depending on the time of day and season, the population in that area could greatly vary. (Butte-Silver Bow County, 2003) The population impacts from a break at the Warm Springs Ponds would not only affect the resident and working population in that area, but the containments released from the treatment ponds would be an additional hazard.

Table 4.4.4C Estimated Population in the Dam Inundation Areas

Dam	Estimated Structures in the Inundation Area	Estimated Population at Risk	Other Estimated Populated Exposures
Silver Lake West Dam	18 structures	33 people	
Storm Lake Dam	219 structures	449 people	Camp Silvercloud Dwyer School Anaconda Community Hospital Metcalf Senior Citizen Center
Warm Springs Ponds Dams	17 structures	31 people	Montana State Hospital

Values

Most dam failures would likely have economic impacts to agriculture and the usual emotional impacts that result from disasters, especially if lives are lost. In the case of Storm Lake Dam, businesses in Anaconda could be impacted as well, resulting in additional economic losses.

Future Development

With the exception of the Georgetown Lake area, most of the development in Anaconda – Deer Lodge County is not occurring in the dam inundation areas. Those inundation areas of Silver Lake West and just downstream from Storm Lake do have an increased probability of future development based on current trends. Should development continue to occur in those areas, the structures, infrastructure, and population at risk would increase, particularly in the short warning time areas. Currently, the development permit system and subdivision regulations do not consider dam inundation areas.

Vulnerabilities and Impacts

Table 4.4.4D Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities		・ Losses in the millions ・ Structural losses ・ Contents losses ・ Critical functional losses ・ Critical data losses ・ Clean-up/debris removal costs	Moderate
Critical Infrastructure		・ Losses in the millions ・ Road closures ・ Loss of potable water	Moderate
Existing Structures		・ Up to $23+ million ・ Structural losses ・ Contents losses ・ Displacement/functional losses ・ Clean-up/debris removal costs	Moderate
Population		・ Over 450 people at risk ・ Injuries ・ Fatalities	Moderate
Values		・ Agricultural losses ・ Business disruption losses ・ Service industry losses ・ Historic structure losses ・ Historic site losses ・ Historic item losses ・ Emotional impacts ・ Aesthetic value losses ・ Cancellation of activities	Low-Moderate
Future Structures		・ Somewhat likely to occur in hazard areas ・ Many undeveloped parcels within the dam inundation areas	Moderate

* in addition to probable (100-year) impacts

4.4.5 Data Limitations

Data limitations include:

- Lack of digital dam inundation area mapping.
- Difficulties in quantifying the probability of a dam failure, including the probabilities of seismically induced breaks.
- Uncertainties regarding reservoir levels at the time of a break.
- Uncertainties regarding the warning time and capabilities that would be involved with a break.

4.5 Disease Outbreak

including human and animal diseases

Table 4.5A Hazard Summary

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Moderate	A severe strain of disease occurs approximately once every 100 years.
Vulnerability	Moderate	The entire population of 9,298 and essentially all economic sectors are at risk.

Table 4.5B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.5.1 Description

Diseases affect humans and animals continuously. Each species has its own natural immune system to ward off most diseases. The causes and significance of diseases vary. Of significance in the disaster mitigation realm are communicable diseases with the potential for high infection rates in humans or those which might necessitate the destruction of livestock. Such diseases can devastate human populations and the economy.

Diseases may infect populations rapidly with little notice. New diseases regularly emerge or mutate. Known diseases, such as influenza, can be particularly severe in any given season.

Human Disease

Human epidemics may lead to quarantines, large-scale medical needs, and mass fatalities. Typically, the elderly, young children, and those with suppressed immune systems are at greatest risk from communicable diseases. Diseases of particular concern often circulating in the United States include:

- Food-borne illnesses, such as E. coli and Salmonella
- Influenza
- Meningitis
- Pertussis/Whooping Cough
- Measles
- Norwalk Virus
- Severe Acute Respiratory Syndrome (SARS)

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

Medical advances over the past fifty years have prevented many disease outbreaks, yet the potential still remains. Much of the county is in a rural setting, and therefore, is somewhat isolated from the rapid spread of global diseases; however, frequent air travel by many citizens has made the transfer of disease

easier to rural communities. Tourists, travelers on Interstate 90, and residents returning to the area are all possible means of introducing communicable diseases to the local communities. The schools and assisted living settings are also prime situations for the rapid spread of disease.

Animal Disease

Agriculture and ranching are an important part of the Anaconda-Deer Lodge County economy. Animal diseases, particularly those that infect livestock, can distress the agricultural community. Such diseases could lead to food shortages and negative economic impacts, depending on the types of animals infected and the geographic extent of the disease.

Montana has numerous reportable and quarantineable animal diseases. Some of the more commonly known diseases include bovine spongiform encephalopathy (mad cow disease), brucellosis, foot and mouth disease, anthrax, plague, rabies, and West Nile virus. (Montana Department of Livestock, 2013) Most global livestock diseases have been confined to specific countries due to strict import regulations.

The disease outbreak hazard is somewhat uniform across the county. The urban areas may be slightly more vulnerable to the rapid spread of disease in humans; however, the more rural areas are more vulnerable to animal diseases.

4.5.2 History

Anaconda-Deer Lodge County has not experienced any significant disease outbreaks within its population in recent years. Approximately three human influenza pandemics have occurred over the past 100 years, one severely affecting the United States. Following World War I, the Spanish influenza pandemic of 1918 killed 20-40 million people worldwide, including 675,000 Americans. (Billings, 1997) In the State of Montana, the Spanish influenza caused 9.9 deaths per 1,000 people from 1918-1919. (Brainerd, 2003) Historical records from area newspapers show that the influenza outbreak was so bad in 1918 that residents were quarantined from November 30 to December 17.

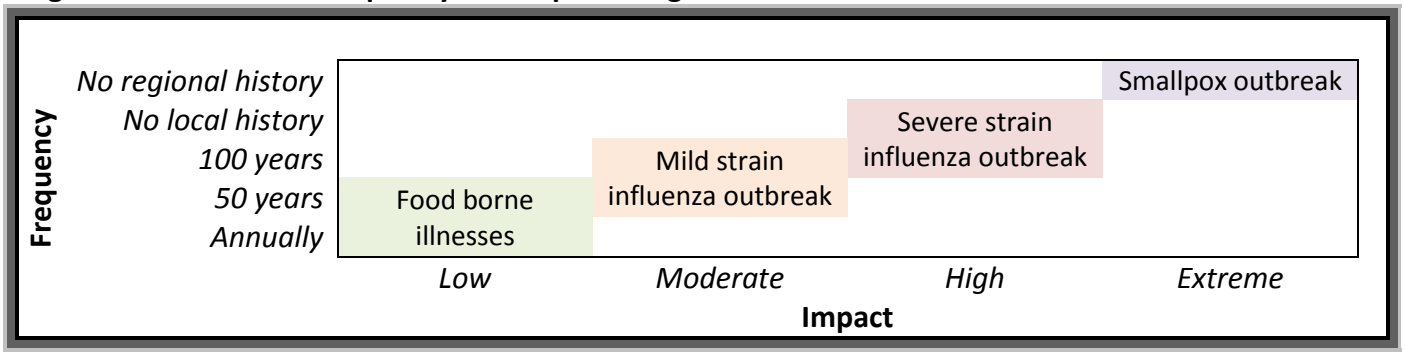
In nearby Butte, another quarantine was in place from September 15, 1934 to November 1, 1934 for children under the age of eighteen after seven cases of poliomyelitis (infant paralysis) were discovered. Residents recall a polio outbreak in Anaconda in the 1948-49 time period and claim the whole city of Anaconda was shut down after about 200 people were infected.

Recent years have not resulted in additional significant events; however, the 1979, 2003, and 2009 influenza seasons were more severe than usual. In 2013, Anaconda – Deer Lodge County had a local Pertussis outbreak, infecting at least 25 people.

4.5.3 Probability and Magnitude

The probability of an epidemic in Anaconda-Deer Lodge County is rather difficult to assess based on history and current data. Medicine has improved significantly over the past 50 years and continues to do so every day. Given the somewhat urban nature of Anaconda, the probability of rapid infection is somewhat greater than more rural parts of the county and state. Given relatively rapid worldwide airline travel, a disease originating in another part of the world could easily travel unknowingly to Anaconda-Deer Lodge County through either residents or visitors.

Figure 4.5.3A Hazard Frequency and Impact Ranges



4.5.4 Vulnerabilities

Methodology

Vulnerabilities were calculated based on estimates derived from a severe strain of influenza impacting the communities. With the exception of population losses, qualitative methodologies were the most logical way to estimate losses.

Exposure

Critical Facilities and Infrastructure

Critical facilities are not structurally threatened by diseases; however, their accessibility and functionality can be lost. Contamination of a critical facility could render the facility non-functional until decontamination occurs. For this reason, all critical facilities are assumed to be at risk from disease outbreaks. As with any human biological event, the hospitals and health service providers would most likely discover a threat and possibly become the first contaminated. The state hospitals and facilities in Warm Springs and Galen have high density housing that could contribute a rapid spread of disease in those populations.

Should an epidemic necessitate a quarantine or incapacitate a significant portion of the population, support of and physical repairs to infrastructure may be delayed, and services may be disrupted for a time due to limitations in getting affected employees to work.

Existing Structures

In most plausible communicable disease scenarios, existing structures would not be impacted.

Population

The entire county population of 9,298 plus non-residents is at risk for contracting a communicable disease. The number of infections and fatalities in the communities would depend on the transmission and mortality rates. Using a general estimate of 30% for the infection rate and a conservative mortality rate (once infected) of 2.5%, as can be the case in an influenza pandemic, approximately 2,789 residents of Anaconda-Deer Lodge County would be infected with about 70 fatal infections. (World Health Organization, 2010) Another contributing factor is the higher than average percentage of people over 65 years old in Anaconda-Deer Lodge County.

As with any disease, age and other health conditions can be a contributing factor. The ability to control the spread of disease depends on the virulence of the disease, the time lapse before the onset of symptoms, the movement of the population, and the warning time involved. Vaccinations, anti-virals, quarantines, and other protective measures may also prevent the spread and impact of the disease. Besides human diseases, animal diseases could negatively affect agriculture and limit food supplies.

Values

In addition to the obvious population impacts, human or animal diseases may have a significant impact on the Anaconda-Deer Lodge County economy, particularly tourism or agriculture. A human quarantine or highly publicized event may affect sales in the community through tourism and resident services, resulting in long term economic impacts. Animal diseases nationwide could have an overarching effect on the national economy. More directly, however, Anaconda-Deer Lodge County has 123 farms totaling about 79,335 acres. In 2007, total cash receipts from agriculture were $4,025,000 with $3,529,000 from livestock sales. At the start of 2007, Anaconda-Deer Lodge County had 6,216 head of cattle and calves, 839 sheep and lambs, and 381 horses and ponies for agriculture purposes. (US Department of Agriculture, 2007) This income and livestock could be lost in a severe animal disease outbreak.

Future Development

In most plausible disease scenarios, future development would not be impacted, but any additional residents would be at risk for disease and increase the overall exposure.

Vulnerabilities and Impacts

Table 4.5.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities		・ $100,000 losses ・ Critical functional losses ・ Clean-up costs	Low
Critical Infrastructure		・ $500,000 losses ・ Loss of electricity ・ Loss of utility gas ・ Loss of potable water ・ Loss of sanitary sewers ・ Loss of telephone service ・ Loss of internet service ・ Fuel/energy shortages	Low-Moderate
Existing Structures		・ $0 losses ・ Clean-up costs	Low
Population	・ Hundreds of cases ・ Some fatalities	・ 2,789 estimated cases ・ 70 estimated fatalities	High
Values	・ Agricultural losses ・ Emotional impacts ・ Cancellation of activities ・ Restrictions on activities	・ Business disruption losses ・ Service industry losses ・ Biodiversity losses	Moderate-High
Future Structures		・ Increases the total hazard exposure ・ All types of future structures are at risk	Low

* in addition to probable (100-year) impacts

4.5.5 Data Limitations

Data limitations include:

- Uncertainties related to how and when a disease will spread through a population
- Unknowns with the emergence of new, unstudied diseases

4.6 Drought, Blight, and Infestation

Table 4.6A Hazard Summary

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Moderate	Droughts of high magnitude occur roughly every 100 to 500 years.
Vulnerability	Moderate	Strains on the public water supplies and local agriculture economy could be significant.

Table 4.6B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

Note: The Federal Emergency Management Agency's ability to utilize the President's Disaster Fund for drought relief to state and local interests is very limited in scope; however, the US Department of Agriculture frequently declares agricultural disasters because of drought.

4.6.1 Description

A drought is an extended period of unusually dry weather. The following is an excerpt from the National Drought Mitigation Center: *"Drought is an insidious hazard of nature. Although it has scores of definitions, it originates from a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector. Drought should be considered relative to some long-term average condition of balance between precipitation and evapotranspiration (i.e., evaporation + transpiration) in a particular area, a condition often perceived as "normal". It is also related to the timing (i.e., principal season of occurrence, delays in the start of the rainy season, occurrence of rains in relation to principal crop growth stages) and the effectiveness (i.e., rainfall intensity, number of rainfall events) of the rains. Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with it in many regions of the world and can significantly aggravate its severity."* (National Drought Mitigation Center, 2011)

Droughts can range from minor to severe, short-term to long-term with a variety of determining factors such as precipitation, soil moisture, river levels, and tree moisture. A minor, short-term drought can slip by unnoticed while a long-term severe drought can impact the agricultural economy, natural resources, and even public water supplies. In Montana, drought conditions have also been associated with grasshopper infestations and blight. Drought is a unique hazard in that it does not strike suddenly, but rather, slowly impacts lives and property without a clear beginning or end, and the impacts tend to persist over long periods of time. Often the question of whether or not an extended dry spell is, in fact, a drought causes considerable debate among meteorologists, farmers, public officials, and other agriculture experts. The amount, duration, and extent of moisture deficiency necessary to establish a drought threshold vary considerably.

For the purposes of this plan, drought is a condition of climatic dryness which is severe enough to reduce soil moisture and water below the minimum necessary for sustaining plant, animal, and human life systems. In addition to severe damage to vegetation, soil in a drought area can become dry and

crumble. Often, topsoil is blown away by hot, dry winds. Streams, ponds, and wells can also dry up during a drought, thus wildlife and livestock may suffer and even die. Although agriculture production is the most obvious recipient of drought losses, this hazard can impact communities by reducing domestic water supplies and increasing the fire danger. Water problems caused by drought can range from reduced recreation opportunities to reduction in quantity and quality of municipal water supplies. Losses do not usually include direct structural damage or traumatic loss of human life.

Drought is most commonly associated with wildfire in Anaconda – Deer Lodge County. Dry conditions contribute to lower moisture content in the trees and plants that provide fuel for wildfires. An initial look at the driest years show that they do not directly coincide with severe wildfire seasons, however, the effects of drought can carry into the long term. One season of severely low precipitation may not be enough for extreme fire behavior; however, followed by several seasons of below normal precipitation, the conditions can contribute to an increased probability for significant wildfires. Drought often kills trees and plants that then become very dry fuels for wildfires years later. Short-term drought conditions can prime grasses on non-irrigated lands for grass fires and long-term drought conditions can additionally impact the heavier timber fuels for forest fires.

Counter intuitively, in mountainous areas, such as those found in Anaconda – Deer Lodge County, drought can quickly be followed by flash flooding. Dry soils are not as permeable to water, particularly if the vegetation has been killed, and therefore, heavy rains run off faster than on moist soils with green vegetation and can more easily lead to flash flooding.

Blight and grasshopper infestations have a greater probability of occurring in drought conditions. Besides the hydrologic and agricultural impacts, drought can also lead to severe dust storms and soil erosion affecting the population and non-agriculture economies. Additional concerns include the water temperatures for fish populations, wildlife health, changes in plant ecology, hydroelectric power supplies, and public water sources.

Monitoring of drought conditions occurs nationally, and various indices, such as the Palmer Index, indicate the level of drought. Mapping of the current drought status is published by the US Drought Monitor weekly at http://droughtmonitor.unl.edu/.

4.6.2 History

Paleoclimate studies show extreme periods of drought hundreds of years ago in the northern Great Plains including 200-370 A.D., 700-850 A.D., and 1000-1200 A.D. Compared to these periods over the past 2,000 years, the droughts since 1200 A.D. have been relatively wet and minor. (Laird et al, 1996) Droughts cannot be defined with certainty as extremely dry periods often alternate with wetter than normal periods.

1930s – The 1930s Dust Bowl remains the most highly publicized of past droughts in Montana. This nationwide drought produced erosion problems in the creation of dust storms throughout Montana. (Montana Disaster and Emergency Services, 2001)

1950s – Montana, especially eastern and central portions, had an extended period of reduced rainfall that impacted agricultural and local economies. (Montana Disaster and Emergency Services, 2001)

1960s - Montana saw another significant drought period beginning in 1961. By the end of June 1961, 17 counties had requested federal disaster designations due to a lack of moisture, higher than normal temperatures, and grasshopper infestation. Small grain crops died before maturing, and range grass and dryland hay crops were deteriorating rapidly. Livestock water supplies were at critical levels. In July of 1961, the State's Crop and Livestock Reporting Service called it the worst drought since the 1930s. In 1966, the entire state experienced another episode of drought. (Montana Disaster and Emergency Services, 2001)

1970s – Over 250,000 acres of Montana farmland was damaged by winds in the western and southern parts of the state over a 7-month period in 1977. Excessive tillage and inadequate crop cover during years of little moisture caused exaggerated soil damage. In June of 1977, Montana officials worked with officials from Washington, Idaho, and Oregon on the Northwest Utility Coordination Committee to lessen the potential for hydroelectricity shortages. On June 23, Governor Judge ordered a 10% electric use reduction in state and county governments. (Montana Disaster and Emergency Services, 2001)

1980s - Drought-related economic losses in Montana in 1980 were estimated to be $380 million. Drought continued to plague the state in 1985, and all 56 counties received agricultural disaster declarations. The continued lack of moisture in 1985 resulted in a wheat crop that was the smallest in 45 years. Grain farmers received more in government deficiency payments and insurance money than they did for their crops. For a typical 2,500 acre Montana farm/ranch, the operator lost more than $100,000 in equity over the course of that year. The state's agriculture industry lost nearly $3 billion in equity. The extended effects of this drought included the loss of thousands of off-farm jobs and the closing of many implement dealerships and Production Credit Associations. (Montana Disaster and Emergency Services, 2001)

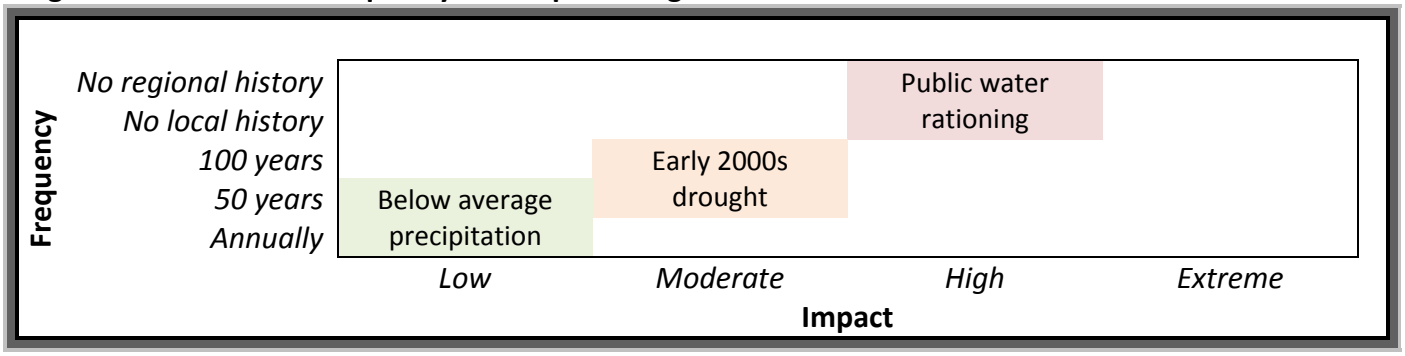
1990s – Drought emergencies were declared in a number of Montana counties with 83% of the state reported under drought conditions by mid-August 1994. Impacts included stress to stream fisheries (low water levels, high temperatures), reduced crop yields, and wildfires. (Montana Disaster and Emergency Services, 2001)

2000s – Severe drought and persistent heat caused significant losses to agriculture and related industries. The US Department of Agriculture (USDA) issued Natural Disaster Determinations for drought for the entire state of Montana for the years 2000, 2001, 2002, and 2003. This designation entitled counties to low interest loans for producers, small business administration loans, and an Internal Revenue Service provision deferring capital gains. Most protective measures were conducted at the county level. In January 2005, Anaconda – Deer Lodge County had "extreme" drought intensity. February 2005 was a particularly dry month; it was the driest February on record across the State of Montana. (Montana Disaster and Emergency Services, 2001)

4.6.3 Probability and Magnitude

The National Oceanic and Atmospheric Administration Paleoclimatology Program studies drought by analyzing records from tree rings, lake and dune sediments, archaeological remains, historical documents, and other environmental indicators to obtain a broader picture of the frequency of droughts in the United States. According to their research, "…paleoclimatic data suggest that droughts as severe as the 1950s drought have occurred in central North America several times a century over the past 300-400 years, and thus we should expect (and plan for) similar droughts in the future. The paleoclimatic record also indicates that droughts of a much greater duration than any in the 20th century have occurred in parts of North America as recently as 500 years ago." Based on this research, the 1950s drought situation could be expected approximately once every 50 years or a 20% chance every ten years. An extreme drought, worse than the 1930s "Dust Bowl," has an approximate probability of occurring once every 500 years or a 2% chance of occurring each decade. (National Oceanic and Atmospheric Administration, 2003)

Figure 4.6.3A Hazard Frequency and Impact Ranges



4.6.4 Vulnerabilities

Methodology

Vulnerabilities were calculated based on estimates derived from a severe drought that impacts public water supplies. Qualitative methodologies are the most logical way to estimate losses given the uncertainties related to and wide variety of drought impacts.

Exposure

Critical Facilities and Infrastructure

Generally, critical facilities are not affected directly by drought. Infrastructure relying on the water supply is the primary exception. If the water supply for public drinking water and sewer systems was threatened, those losses could total millions of dollars should equipment be damaged or outside water need to be shipped into the county.

Existing Structures

In most plausible drought scenarios, existing structures would not be impacted.

Population

Since drought evolves slowly over time, the population has ample time to prepare for its effects and is warned accordingly. The greatest direct threat to the population from drought is through the drinking water supply. Should a drought affect the water available for public water systems or individual wells, the availability of clean drinking water could be compromised. This situation would require emergency actions and could possibly overwhelm the local government and financial resources.

Values

The most probable losses from drought are to the economy. The agriculture industry can be severely threatened by drought due to a loss of forage, feed, and water supplies. Crops may not even reach maturity or provide minimal yields in significant droughts. Given the dependence of the local economy on agriculture, the impacts can extend to other industries. In 2007, Anaconda – Deer Lodge County had 123 farms covering 79,335 acres. The total market value of agricultural products sold in 2007 was $3,529,000 for livestock, poultry, and their products and $497,000 for crops. (US Department of Agriculture, 2007)

Natural resources, and therefore recreation and tourism, are influenced by drought. As river and stream levels drop, fish populations and other natural resources are impacted. With fishing and river recreational activities an important part of the tourism industry in Anaconda – Deer Lodge County, those aspects of the economy can be threatened during extended periods of drought.

Future Development

Future development's greatest impact on the drought hazard would possibly be to ground water resources. New water and sewer systems or significant well and septic sites could use up more of the water available, particularly during periods of drought. Fortunately, public water systems are monitored by the Montana Department of Environmental Quality, but individual wells and septic systems are not as strictly regulated. Therefore, future development could have an impact on the drought vulnerabilities.

<u>Vulnerabilities and Impacts</u>

Table 4.6.4A Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities		• $0 losses • Critical functional losses	Low
Critical Infrastructure		• $1,000,000 losses • Loss of potable water	Low-Moderate
Existing Structures		• $0 losses	Low

Table 4.6.4A Hazard Vulnerabilities and Impacts (continued)

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Population		・ Increased illness	Low
Values	・ Agricultural losses ・ Biodiversity losses ・ Habitat damages ・ Reduced water quality ・ Restrictions on activities ・ Aesthetic value losses	・ Service industry losses ・ Emotional impacts ・ Cancellation of activities	High
Future Structures		・ Increases the total hazard exposure ・ May increase the strain on public water systems and individual wells.	Low-Moderate

* in addition to probable (100-year) impacts

4.6.5 Data Limitations

Data limitations include:

- Difficulties in pinpointing the start and end of drought periods.
- Limitations in quantifying economic losses from drought.
- Lack of a publicly available database listing historical/archived US Department of Agriculture (USDA) Secretarial disaster declarations and the associated losses.

4.7 Earthquake

Table 4.7A Hazard Summary

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Low-Moderate	Local history of damaging earthquakes is relatively minor, but regional history is more extensive.
Vulnerability	High	Losses to structures and infrastructure during the 100 year event are in the millions.

Table 4.7B Federal Major Disaster and Emergency Declarations

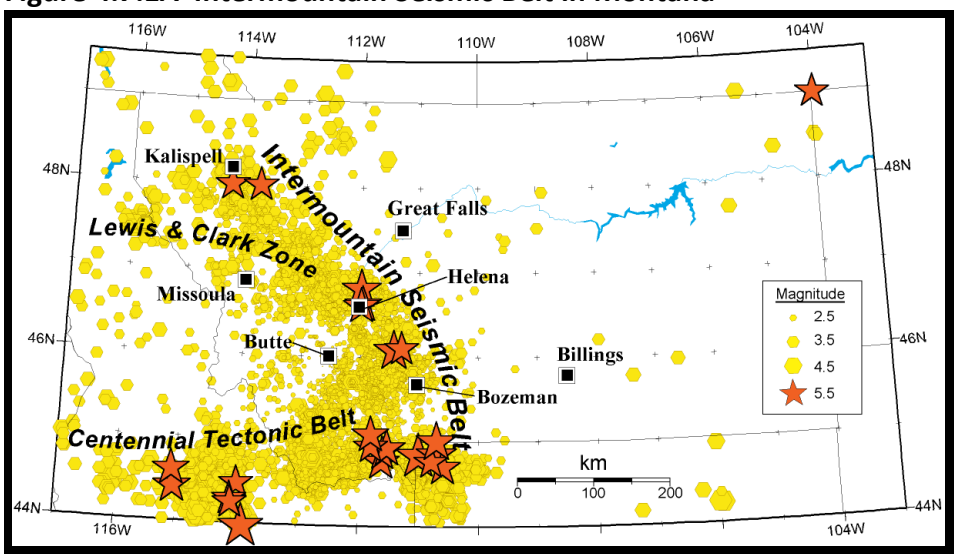
Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.7.1 Description

One of the most frightening and destructive phenomena of nature is a severe earthquake and its terrible aftereffects. An earthquake is the sudden movement of the Earth, caused by the abrupt release of strain that has accumulated over a long time. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth's surface. Huge plates slowly move over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free, thus, producing an earthquake. (US Geological Survey, 1997)

Montana is the fourth ranked state in the United States for seismicity and has many faults, primarily in the mountainous parts of the state. Yellowstone National Park, to the southeast of Anaconda – Deer Lodge County, is an active geothermal area with approximately earthquakes 2,000 each year. The Intermountain Seismic Belt, shown in Figure 4.7.1A, demonstrates the active seismic areas of the state. Anaconda – Deer Lodge County lies to the west of the most active areas and has been in close proximity to many significant earthquakes. Earthquakes can damage property and infrastructure very rapidly and significantly with little warning, severely impacting those close to the epicenter and being felt for hundreds of miles.

Figure 4.7.1A Intermountain Seismic Belt in Montana



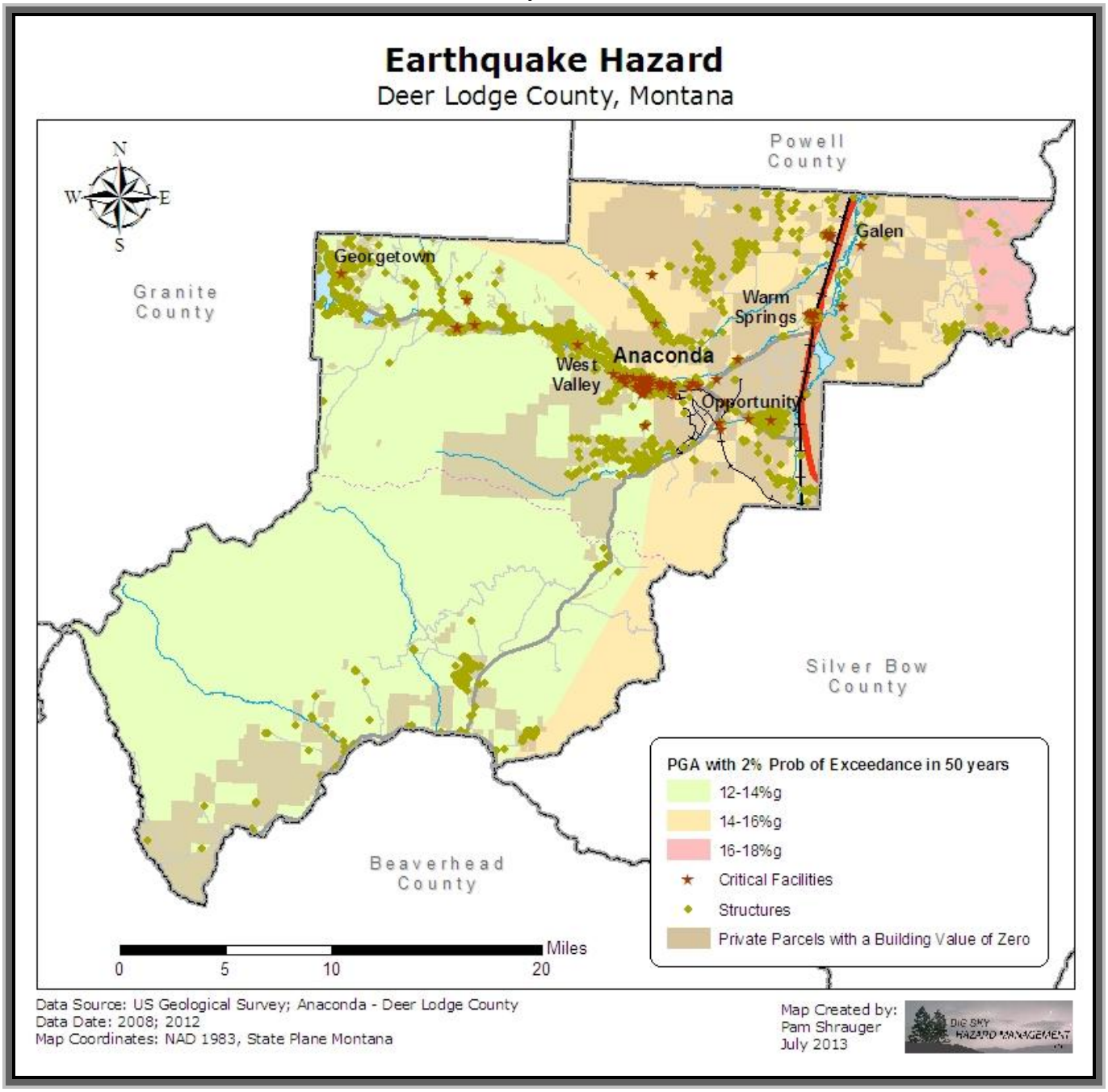
Source: Montana Bureau of Mines and Geology, 2011.

Geologists primarily measure earthquake severity in two ways: by magnitude and by intensity. Magnitude is based on the area of the fault plane and the amount of slip. The intensity is based on how strong the shock is felt and the degree of damage at a given location. The most commonly used scales are the Richter magnitude scale, moment magnitude scale, and modified Mercalli intensity scale. (National Earthquake Hazards Reduction Program, 2011)

Anaconda – Deer Lodge County does not have any documented active surface faults, but history has shown that significant earthquakes (up to magnitude 6.5) may occur anywhere throughout the Intermountain Seismic Belt, even in areas where young faults are not recognized. Examples of damaging earthquakes for which no known surface fault was recognized include the 1925 Clarkston earthquake (magnitude 6.6) and the 1935 Helena earthquakes (magnitude 6.3-5.9).

Research through the US Geological Survey's National Seismic Hazard Mapping Project has resulted in peak ground acceleration (PGA) maps related to the probability of seismic shaking. The map for Anaconda – Deer Lodge County, Map 4.7.1B, shows the strength of seismic shaking that has a 2% probability of being exceeded in a 50 year period. The strength of the shaking is measured as a percentage of the acceleration of gravity (%g). Generally, a PGA of 20%g would result in major damage and a PGA of 10%g would result in slight damage. As Map 4.7.1B shows, the earthquake hazard in Anaconda – Deer Lodge County is greater to the northeast and less to the southwest, although the entire county is at risk.

Map 4.7.1B


Earthquake Hazard
Deer Lodge County, Montana
N
W
E
S
Powell County
Granite County
Silver Bow County
Beaverhead County
Georgetown
Galen
Warm Springs
West Valley
Anaconda
Opportunity
PGA with 2% Prob of Exceedance in 50 years
12-14%g
14-16%g
16-18%g
Critical Facilities
Structures
Private Parcels with a Building Value of Zero
Miles
0
5
10
20
Data Source: US Geological Survey; Anaconda - Deer Lodge County
Data Date: 2008; 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
July 2013
DIG SKY HAZARD MANAGEMENT

4.7.2 History

Since 1900, seven earthquakes of magnitude 5.5 or greater have occurred within 100 miles of Anaconda – Deer Lodge County. Table 4.7.2A shows the list of these earthquakes.

Table 4.7.2A Earthquakes Magnitude 5.5 or greater within 100 miles

Date	Name/Location	Location	Magnitude
June 27, 1925	Clarkston Valley Earthquake	8 miles north of Three Forks	Richter magnitude 6.6
February 15, 1929	Lombard Earthquake	20 miles north of Manhattan	Richter magnitude 5.6
October 12-31, 1935	Helena Earthquakes	15 miles north of Helena	Richter magnitude 6.3 (highest of 3)
November 23, 1947	Virginia City Earthquake	25 miles west-northwest of West Yellowstone	Richter magnitude 6.3
July 25, 2005	Dillon Earthquake	10 miles north of Dillon	Richter magnitude 5.6

Sources: Stickney et al, 2000; US Geological Survey, 2011; University of Utah, 2011.

The Clarkston earthquake in 1925 was felt in six distinct shocks in Anaconda. The first shock "shook buildings and caused occupants to flee in panic to streets." Damage was confined to small and fragile items. (Associated Press, 1925) The 1929 Lombard earthquake was felt in Anaconda but the only damages were to dishes rattled off shelves. (Associated Press, 1935) The October 19, 1935 earthquake in Helena was felt in Anaconda and residents fled into the streets, but no damages were reported. (Associated Press, 1935) The Virginia City earthquake in 1947 was also felt in Anaconda - Deer Lodge County but no damages were reported.

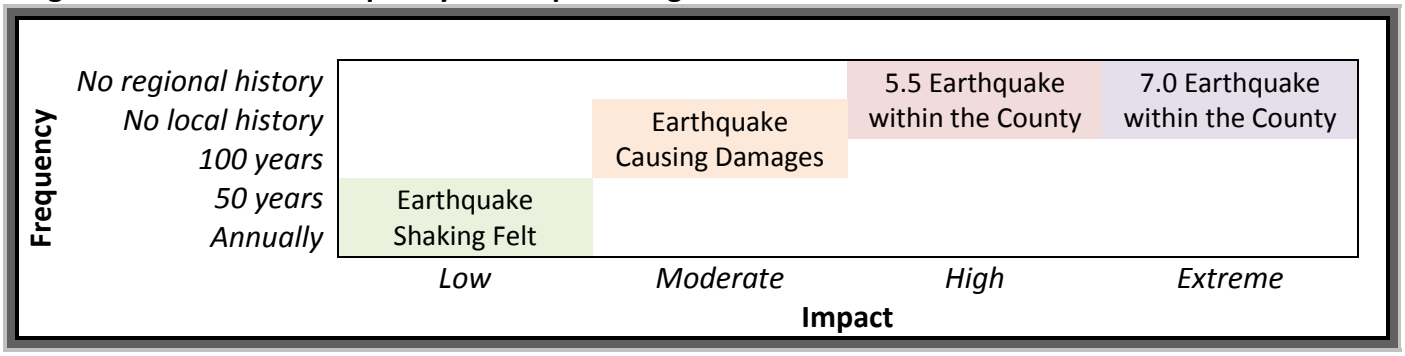
The Hebgen Lake earthquake on August 18, 1959, the most significant earthquake to have occurred in Montana over the past 100 years, was located just over 100 miles from Anaconda. This magnitude 7.5 earthquake occurred to the southeast of Anaconda - Deer Lodge County near Yellowstone National Park. This surface rupturing earthquake changed the geology of the Hebgen Lake area and triggered a major landslide (80 million tons of rock). The result was the creation of a new lake, Earthquake Lake, on the Madison River, and State Highway 287 was buried. Twenty-eight people were killed and roadway and timber damages totaled over $11 million. The quake was felt in 8 states and 3 Canadian provinces. (US Geological Survey, 2013) Residents of Anaconda felt the early morning earthquake and fled to the streets. Some chimneys in the area were loosened and foundations were cracked. Major damages were not reported in Anaconda, however. (Anaconda Leader, 1959)

Also greater than 100 miles away, the magnitude 7.3 Borah Peak earthquake near Challis, ID on October 28, 1983 was felt in Anaconda and a wall in the courthouse cracked. In addition, minor landslides on Mt. Haggin were triggered. (Anaconda Leader, 1983)

4.7.3 Probability and Magnitude

Earthquakes when large and damaging are infrequent events. Anaconda – Deer Lodge County experiences many small earthquakes every month, but they are undetectable except by instrumentation. Anaconda – Deer Lodge County lies within the Northern Rocky Mountain seismic source zone which is estimated to have a recurrence rate of 36.6 years for a magnitude 5 or greater earthquake, 420 years for a magnitude 6 or greater earthquake, and 4,821 years for a magnitude 7 or greater earthquake. (Montana Disaster and Emergency Services, 2004) The areas to the east and south of Anaconda – Deer Lodge County have much more frequent earthquake intervals.

Figure 4.7.3A Hazard Frequency and Impact Ranges



4.7.4 Vulnerabilities

Methodology

General losses from earthquakes can be estimated using HAZUS-MH, a loss estimation model developed by the Federal Emergency Management Agency. This model uses national datasets and hazard information to estimate the earthquake losses from a particular event at the census tract or county level. Although the default data and methods provided with the HAZUS-MH MR2 model contain many generalizations that could lead to inaccuracies, the model provides a ballpark estimate of what earthquake losses may occur and the magnitude of such. A structural engineer can make specific determinations on individual structures. Two simulations were run through the model, the 100-year probabilistic hazard with a 5.5 moment magnitude and the 500-year probabilistic hazard with a 7.0 moment magnitude. Differences from the previous plan version are likely due to improvements in the model's databases.

Exposure

Critical Facilities and Infrastructure

Since the probability and likely strength of an earthquake varies across the county, the threat to critical facilities can be assessed based on their geographic locations. Structural assessments of the individual facilities would further determine the seismic stability of that structure. Based on geography, however, the critical facilities and vulnerable populations in and around Galen and Warm Springs can be

considered the most vulnerable. The critical facilities in Anaconda, West Valley, and Opportunity are the next most vulnerable, followed by those in the Georgetown Lake area. The differences in risk, however, are quite subtle and all critical facilities are at risk from earthquakes in Anaconda – Deer Lodge County. Perhaps more important is that unreinforced masonry construction is particularly vulnerable to seismic shaking. Therefore, any critical facilities with, or within close proximity to, unreinforced masonry can be considered at greatest risk. Based on the results of the HAZUS-MH runs, Table 4.7.4A shows the functionality of critical facilities included in the inventory.

Table 4.7.4A Critical Facility Functionality Following an Earthquake

Critical Facility Type	100-Year Event Functionality	500-Year Event Functionality
Hospitals	91% on Day 1	46-54% on Day 1
Law Enforcement	95% on Day 1	81% on Day 1
Schools	95% on Day 1	80-84% on Day 1

Source: Federal Emergency Management Agency, HAZUS-MH MR2.

The HAZUS-MH MR2 database contains over 64 miles of highway, 52 bridges, and 1,150 miles of pipeline valued at over $457 million. Infrastructure, as quantified in the default HAZUS-MH database, suffers slight damages during the 100-year and 500-year earthquakes as shown in Table 4.7.4B.

Table 4.7.4B HAZUS-MH Estimated Infrastructure Losses

Infrastructure System	100-Year Economic Losses	100-Year Damages	500-Year Economic Losses	500-Year Damages
Highway	$30,000		$40,000	
Airport	$190,000		$520,000	
Potable Water	$40,000	2 breaks 9 leaks	$220,000	12 breaks 48 leaks
Waste Water	$30,000	2 breaks 7 leaks	$170,000	9 breaks 38 leaks
Natural Gas	$30,000	2 breaks 8 leaks	$180,000	10 breaks 41 leaks
Communications	$0		$10,000	
TOTAL	*$320,000*		*$1,140,000*	

Source: Federal Emergency Management Agency, HAZUS-MH MR2.

Existing Structures

Table 4.7.4C HAZUS-MH Estimated Structure Losses

Damage Extent	100-Year Damages	500-Year Damages
Complete	0 structures	2 structures
Extensive	3 structures	34 structures
Moderate	47 structures	218 structures
Slight	210 structures	640 structures
Capital Stock and Income Losses*	$2,690,000	$15,430,000

Source: Federal Emergency Management Agency, HAZUS-MH MR2.
* Losses from capital stock (structural, non-structural, contents, and inventory) and income (relocation, capital related, wages, and rental income)

Population

The population would have little or mostly likely no warning prior to an earthquake. Most casualties in a large earthquake in Anaconda – Deer Lodge County would be anticipated with building collapse, roadway failures, falling objects, and landslides. The HAZUS-MH model estimates one minor injury in the 100 year event. In the 500 year event, up to 1 serious injury and 5 minor injuries are estimated. The number of actual casualties will be dependent on a variety of factors including proximity to the epicenter, time of day, and magnitude, among others.

Values

The impacts of a strong earthquake in Anaconda – Deer Lodge County could be far reaching. Economically, physical and functional damages to businesses, particularly downtown businesses in unreinforced masonry structures, could be substantial. Industries such as construction, however, may see a recovery related boom following an earthquake. Since many historic structures were not built to earthquake resistant standards, the losses to those historical values could be significant. Social losses could include fear of aftershocks, emotional impacts from casualties, and cancellation of activities.

Future Development

Any future development in Anaconda – Deer Lodge County is at risk for earthquake damages. Fortunately, construction standards for seismic stability have improved over the past 100 years. Anaconda – Deer Lodge County does enforce the state building code, and therefore, future development is more likely to withstand a strong earthquake.

Vulnerabilities and Impacts

Table 4.7.4D Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities	▪ Losses in the thousands ▪ Critical functional losses ▪ Clean-up/debris removal costs	▪ Losses in the millions ▪ Structural losses ▪ Contents losses ▪ Critical data losses	High
Critical Infrastructure	▪ $320,000 losses ▪ Physical losses ▪ Road closures ▪ Loss of potable water ▪ Loss of sanitary sewers ▪ Loss of utility gas	▪ $1,140,000 losses ▪ Loss of electricity ▪ Loss of telephone service ▪ Loss of internet service ▪ Fuel/energy shortages	Moderate
Existing Structures	▪ $2,690,000 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses Clean-up/debris removal costs	▪ $15,430,000 losses	High
Population	1 Injury	▪ 6 Injuries	Moderate
Values		▪ Business disruption losses ▪ Service industry losses ▪ Historic item losses ▪ Historic structure losses ▪ Emotional impacts ▪ Aesthetic value losses	Moderate
Future Structures	▪ Likely to occur in hazard areas	▪ Future structures likely to be constructed to seismic standards	Low

* in addition to probable (100-year) impacts

4.7.5 Data Limitations

Data limitations include:

- Estimating the probability and possible damages associated with this low frequency, high impact hazard.
- Lack of improved digital data for use in the HAZUS module.
- Lack of individual facility assessments by a structural engineer.

4.8 Flood

including riverine, flash, and ice jam floods

Table 4.8A Hazard Summary

Overall Hazard Rating	High	
Probability of High Impact Event	Moderate-High	History of frequent, damaging flood events.
Vulnerability	High	Critical facilities, infrastructure, and structures are all at significant risk.

Table 4.8B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
FDAA-DR-417	1974	Public Assistance	None	Total federal assistance to the entire disaster area = $603,145
FEMA-DR-761	1986	Public Assistance	None	Total federal and state assistance to the entire disaster area = $1,996,384
FEMA-DR-1105	1996	Public Assistance	None	Total federal and state public assistance to the entire disaster area = $2,427,633
FEMA-DR-1183	1997	Public Assistance	None	Total federal and state public assistance to the entire disaster area = $7,696,015
FEMA-DR-1996	2011	Public Assistance	None	Total federal public assistance to the entire disaster area = $36,136,221

4.8.1 Description

A flood is a natural event for rivers and streams and occurs when a normally dry area is inundated with water. Excess water from snowmelt and rainfall accumulates and overflows onto the banks and adjacent floodplains. Floodplains are lowlands, adjacent to rivers and streams, which are subject to recurring floods. Flash floods, usually resulting from heavy rains or rapid snowmelt, can flood areas not typically subject to flooding, including urban areas. Extreme cold temperatures can cause streams and rivers to freeze, causing ice jams and creating flood conditions.

Hundreds of significant floods occur in the United States each year and kill an average of about 100 people annually. Flooding is one of the most deadly hazards nationwide and in Montana. Most injuries and deaths occur when people are swept away by flood currents, and most property damage results from inundation by sediment-laden water. Fast-moving water can wash buildings off their foundations and sweep vehicles downstream. Pipelines, bridges, and other infrastructure can be damaged when high water combines with flood debris. Basement flooding can cause extensive damage.

Riverine Flood

Riverine flooding originates from a body of water, typically a river, creek, or stream, as water levels rise onto normally dry land. Flooding on the rivers generally occurs during the spring and early summer when snow rapidly melts in the higher elevations. Smaller streams are more susceptible to flooding in the summer with peak flows resulting from thunderstorms.

Flooding in Anaconda – Deer Lodge County normally occurs during periods of excessive rainfall or snowmelt. Anaconda – Deer Lodge County has many creeks and streams including Warm Springs Creek and Silver Bow Creek that serve as the headwaters for the Clark Fork River. The Big Hole River forms part of the southern county line.

Anaconda sits on an alluvial fan and generally floods from gulches on the southern end of the city, namely the Sheep, Glover, Fifer, and three smaller gulches. Typically, the Sheep Gulch floods onto Oak Street, Glover Gulch onto Poplar Street, and Fifer Gulch onto Evergreen Street. The smaller gulches flood onto Birch, Larch, and Spruce Streets. The flooding from these gulches generally results in shallow street, basement, and first floor flooding of downtown Anaconda. Railroad fill on the north and east end of Anaconda acts as a dam and does not allow the runoff to drain into Warm Springs Creek. Larger floods affect the areas of Washoe Park, Deer Park, homes in the Cedar and Park Street areas, and a few homes immediately west of Meyers Dam. (Federal Emergency Management Agency, 1985)

Warm Springs Creek near Anaconda has a flood stage of 4.4 feet. At that level, flooding affects low-lying areas of Washoe Park and homes in the West Valley area have water running across their property. At 4.8 feet, water flows across the Cedar Street Bridge and North Cedar Street becomes inaccessible. (National Weather Service, 2013)

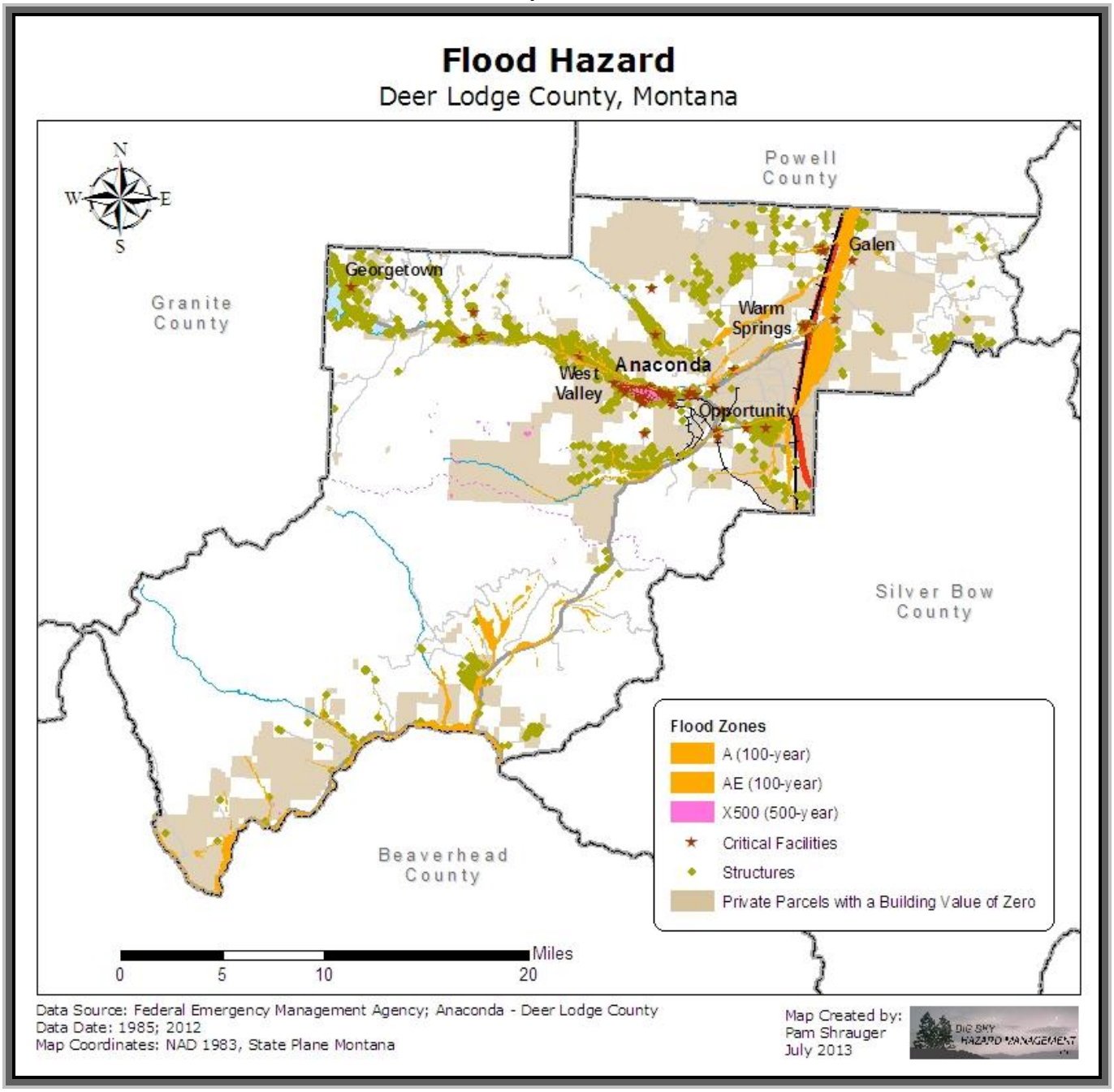
Identification and Mapping

The riverine hazard areas may be mapped as part of the National Flood Insurance Program (NFIP). Under this program, an area is broken into zones to depict the level of flood hazard. Most commonly, the areas within the 100-year floodplain are considered the greatest risk. The 100-year floodplain has a 1% chance of exceedance in any given year. Over a 30-year period, a flood of this magnitude or greater has a 26% chance of occurring, compared to a 9% chance of fire for buildings in high-risk flood areas. (Federal Emergency Management Agency, 2009) Locations outside the 100-year floodplain may also experience flood conditions during greater magnitude floods, localized events, or along unmapped creeks, streams, and ditches. The 500-year floodplain includes the 100-year floodplain plus the areas that would be flooded during a larger, 500-year event.

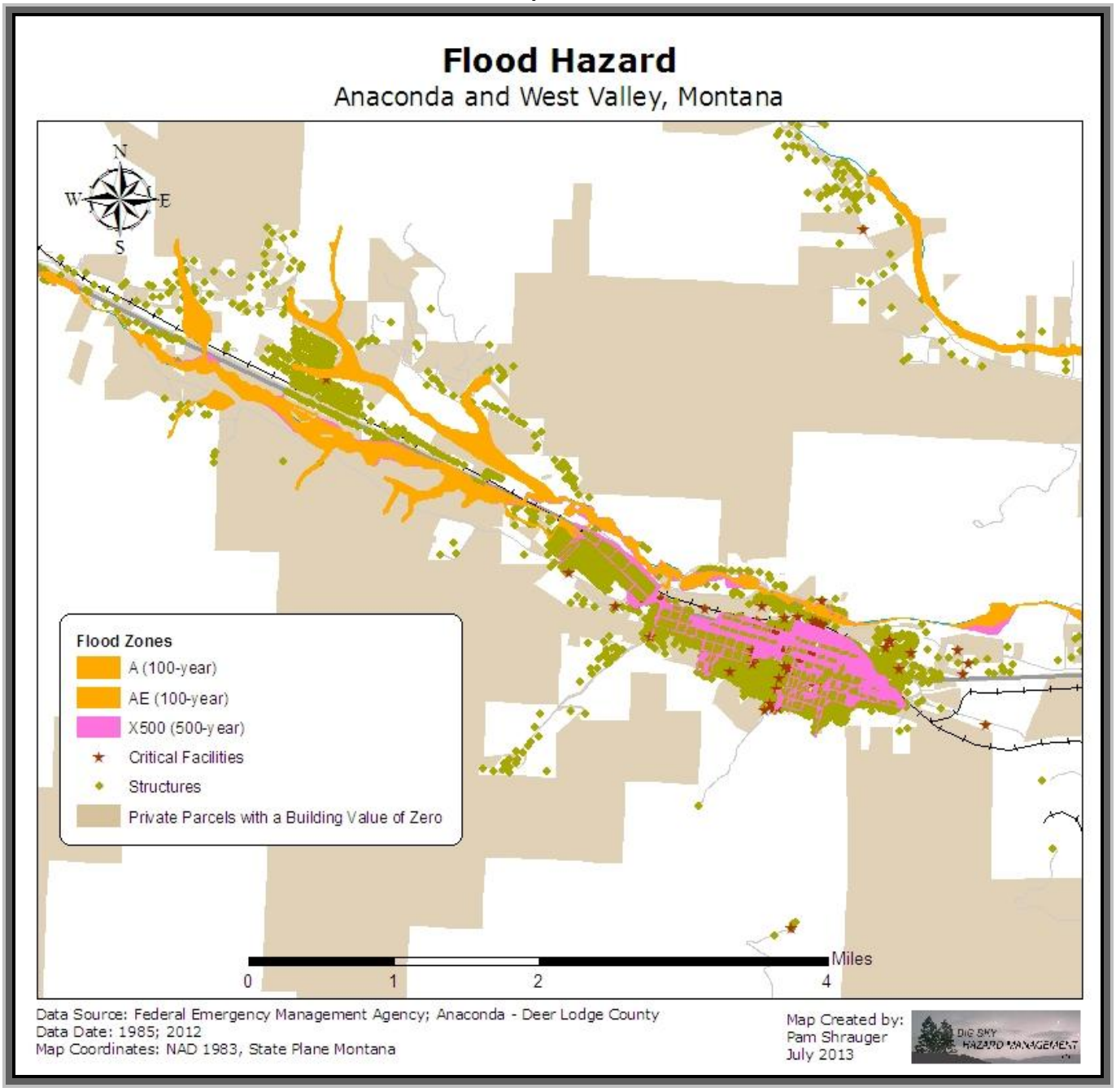
The Flood Insurance Rate Maps (FIRMs) depicting flood-prone areas and the associated Flood Insurance Studies for Anaconda – Deer Lodge County have effective date of December 18, 1985.

The primary waterways in Anaconda – Deer Lodge County are the Big Hole River, Warm Springs Creek, and Silver Bow Creek. Stretches of the 100-year and 500-year floodplains have been mapped for these areas and other creeks. The official mapping exists in paper format. Very basic digital mapping, termed Q3 data, showing the Special Flood Hazard Areas for Anaconda – Deer Lodge County is available and adequate for our general analysis purposes. Map 4.8.1A shows the designated 100-year and 500-year floodplains in Anaconda – Deer Lodge County. Development in the 100-year floodplain must meet floodplain construction requirements adopted by Anaconda – Deer Lodge County, and most borrowers must purchase flood insurance.

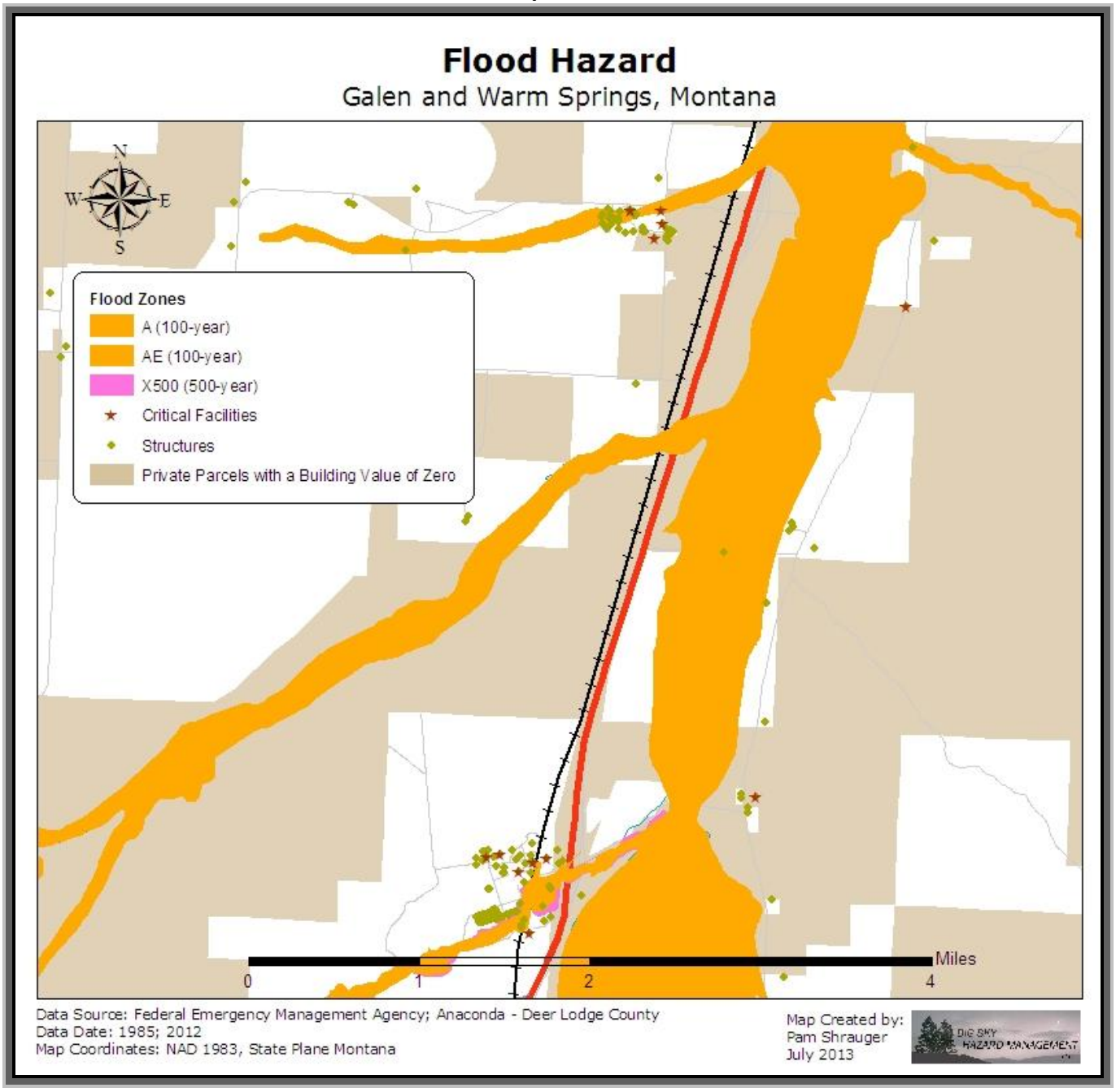
Map 4.8.1A


Flood Hazard
Deer Lodge County, Montana
N
W
E
S
Powell County
Granite County
Silver Bow County
Beaverhead County
Georgetown
Galen
Warm Springs
Anaconda
West Valley
Opportunity
Flood Zones
A (100-year)
AE (100-year)
X500 (500-year)
Critical Facilities
Structures
Private Parcels with a Building Value of Zero
Miles
0
5
10
20
Data Source: Federal Emergency Management Agency; Anaconda - Deer Lodge County
Data Date: 1985; 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
July 2013
BIG SKY HAZARD MANAGEMENT

Map 4.8.1B


Flood Hazard
Anaconda and West Valley, Montana
N
W
E
S
Flood Zones
A (100-year)
AE (100-year)
X500 (500-year)
Critical Facilities
Structures
Private Parcels with a Building Value of Zero
0
1
2
4
Miles
Data Source: Federal Emergency Management Agency; Anaconda - Deer Lodge County
Data Date: 1985; 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
July 2013
BIG SKY
HAZARD MANAGEMENT

Map 4.8.1C


Flood Hazard
Galen and Warm Springs, Montana
N
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Flood Zones
A (100-year)
AE (100-year)
X500 (500-year)
Critical Facilities
Structures
Private Parcels with a Building Value of Zero
0
1
2
4
Miles
Data Source: Federal Emergency Management Agency; Anaconda - Deer Lodge County
Data Date: 1985; 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
July 2013
BIG SKY HAZARD MANAGEMENT

Floodplain Management

Flood is different from most other hazards in that riverine flood problems are managed through a national insurance system called the National Flood Insurance Program (NFIP) under the Federal Emergency Management Agency (FEMA). FEMA conducts a Flood Insurance Study (FIS) of a region to identify the community's risk levels. The FIS includes statistical data for river flow, rainfall, topographic surveys, as well as hydrologic and hydraulic analyses. After examining the FIS data, FEMA creates Flood Insurance Rate Maps (FIRMs) delineating the different areas of flood risk. Land areas that are at high risk for flooding are called Special Flood Hazard Areas (SFHAs), or floodplains. These maps are certainly not all inclusive and other flood prone areas may exist. Montana is currently undergoing a map modernization process.

The floodplain in Anaconda – Deer Lodge is managed through floodplain ordinances in compliance with the National Flood Insurance Program (NFIP). A designated floodplain administrator issues and reviews permits for development in the floodplain. Development is currently not restricted in the 500-year floodplain.

Flood Insurance

Residents of Anaconda – Deer Lodge County have the opportunity to purchase flood insurance through the National Flood Insurance Program (NFIP). As of May 31, 2013, 12 policies covering over $1.59 million in property were in force in Anaconda – Deer Lodge County. (Federal Emergency Management Agency, 2013a) Anaconda – Deer Lodge County does not have any repetitive loss properties through the National Flood Insurance Program. (Montana Disaster and Emergency Services, 2013) A repetitive loss property is defined as “any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978.” (Federal Emergency Management Agency, 2007)

Flash Flood

Flash floods can occur anywhere when a large volume of water falls or melts over a short time period, usually from slow moving thunderstorms or rapid snowmelt. The mountainous terrain in Anaconda – Deer Lodge County is a contributing factor in flash flood and rapid snowmelt problems. Because of the localized nature of flash floods, clear definitions of hazard areas do not exist. These types of floods often occur rapidly with significant impacts. Rapidly moving water, only a few inches deep, can lift people off their feet, and only a depth of a foot or two, is needed to sweep cars away. Most flood deaths result from flash floods. Many areas of Anaconda – Deer Lodge County contain mountainous and hilly terrain, and therefore, are more prone to flash flooding. Recent wildfire burn areas and downstream areas are also more prone to flash floods.

Ice Jam Flood

An ice jam is a stationary accumulation of ice that restricts flow. Ice jams can cause considerable increases in upstream water levels, while at the same time, downstream water levels may drop. Types

of ice jams include freezeup jams, breakup jams, or combinations of both. When an ice jam releases, the effects downstream can be similar to that of a flash flood or dam failure.

4.8.2 History

Anaconda - Deer Lodge County has a long history of flooding. The historical record doesn't begin to fully outline the flood events until the mid 1970s. Previous events have been noted, dating all the way back to 1890, but the detailed loss estimates for these events are limited. The historical record has been compiled from the 1985 Flood Insurance Study, the National Climatic Data Center Storm Events database, river gauge data, and newspaper accounts.

Sheep Gulch, July 1, 1890 - Newspaper reports recount a flash flood near Sheep Gulch that resulted in road washouts on July 1, 1890.

Warm Springs Creek, 1948 – The Flood Insurance Study notes a damaging discharge on Warm Springs Creek in 1948.

Warm Springs Creek, 1958 – The Flood Insurance Study notes a damaging discharge on Warm Springs Creek in 1958.

Warm Springs Creek, 1965 – The Flood Insurance Study notes a damaging discharge on Warm Springs Creek in 1965.

Warm Springs Creek, 1967 – The Flood Insurance Study notes a damaging discharge on Warm Springs Creek in 1967.

Anaconda Area Flooding, January 1974 - In January 1974, a rapid snowmelt and rain event resulted in significant Anaconda urban and a damaging discharge on Warm Springs Creek. Mill Creek was noted at full capacity. Stores were sandbagged throughout the Anaconda downtown area and the President declared the area a disaster.

Warm Springs Creek, June 17, 1984 - Residents recalled that on June 17, 1984, three bridges were washed out when Warm Springs Creek flooded.

Countywide Flooding, February 1986 - Rapid snowmelt resulted in damages in several parts of the county. In Galen, a road near the state hospital was washed out and the wastewater treatment plant was inoperable. Meyers and Morrel Junction county roads were both washed out. Flooding problems were noted in the residential areas of West Valley on Rumsey, Warren, and Powell Streets, in Opportunity, and in Crackerville. Two homes were flooded with six inches to a foot on the first floor. A water boil order was in effect for West Valley, Lost Creek, and Opportunity due to contamination concerns. Anaconda - Deer Lodge County was declared a federal disaster area by the President on March 15, 1986. Recent mitigation work has upgraded culverts in the West Valley area.

Warm Springs Creek, June 1995 - Warm Springs Creek flooded as noted by local residents, but not to the significance in the two years that followed.

Countywide Flooding, February 6-9, 1996 – Rapid snowmelt led to the loss of headgates, bridges, ditches, canals, and fences. Debris was washed into agricultural fields. East Side Road was severely damaged. On February 23, 1996, the President declared a federal disaster, including Anaconda - Deer Lodge County (FEMA-1105-DR-MT). Anaconda-Deer Lodge County received from the federal government $9,767 for emergency protective measures and $15,759 for road, culvert, and ditch repairs. The total losses far exceeded those figures.

Countywide Flooding, May and June 1997 - The winter of 1996-1997 left a significant snow pack in the mountains and valleys of Anaconda - Deer Lodge County. On March 18, 1997, the county issued a pre-event disaster declaration (Resolution #472) in anticipation of flooding problems. Then during May and June, flooding caused severe damage to roads and bridges. In particular, thunderstorm rains on June 14, 1997, caused flooding of low lying areas, washed out several culverts, and closed Hauser Avenue in Anaconda. The county declared a disaster on June 17, 1997 (Resolution #490), and on July 25, 1997, the President declared a disaster in Anaconda - Deer Lodge County (FEMA-1183-DR-MT).

Anaconda Area Flash Flooding, July 19, 2002 - On July 19, 2002, a strong thunderstorm dumped heavy rain which flooded an area just west of Anaconda. Based on National Weather Service records, reports were received from the media and law enforcement of flash flooding causing water two feet deep to flood several buildings around the 1880s Ranch on North Cable Road. Mud and tree branches and stumps were reported flowing through the ranch, with water flooding North Cable Road. Five buildings were flooded with six to eight inches of mud. Part of a garage foundation was washed away when water came down the hill at roughly nine inches deep and about twice the width of the structure.

Warm Springs Creek, June 2003 - According to a local meteorologist, Warm Springs Creek flooded Washoe Park and parts of the area were evacuated during June 2003. Warm Springs Creek reached a stage of 4.17 feet on May 31, 2003.

Fifer Creek, May 31, 2009 – Basement flooding was reported in two homes on Hemlock Street in Anaconda during a period of increased snow melt. (National Climatic Data Center, 2013)

Warm Springs Creek, June 24, 2011 – Warm Springs Creek reached a stage of 4.85 feet. Washoe Park and the Cedar Street Bridge were flooded. Homes and the Cedar Street Bridge were sandbagged. Water flooded the foundations of four homes. (National Climatic Data Center, 2013) Anaconda – Deer Lodge County was included in the federal disaster declaration for public assistance.

4.8.3 Probability and Magnitude

Flooding probabilities are shown through the mapping of the floodplain. The 100-year floodplain has a 1% probability of being exceeded in any given year. The 500-year floodplain has a 0.2% probability of being exceeded in any given year. Flooding has been noted 15 times since 1890 in Anaconda-Deer Lodge County. Some level of flooding should be expected every decade. The Flood Insurance Study

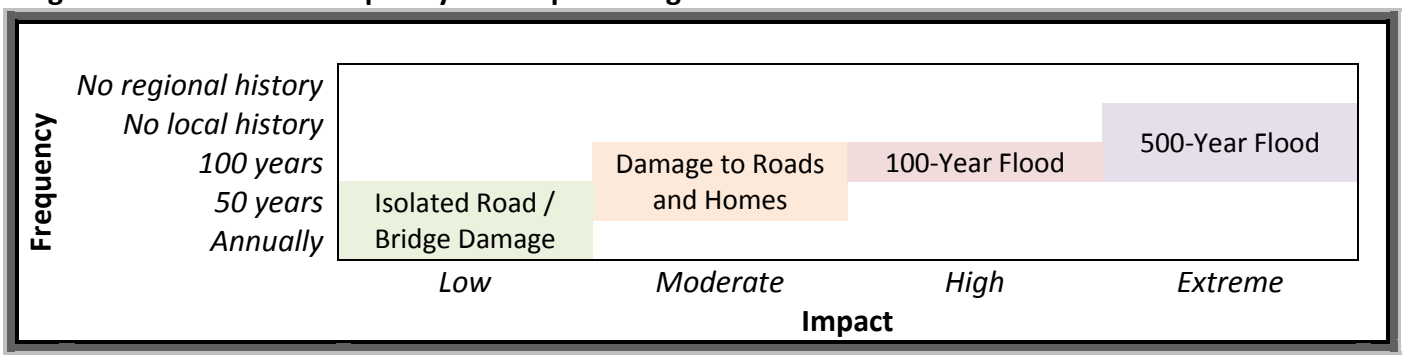
outlined the peak discharges for Warm Springs Creek shown in Table 4.8.3A for the various recurrence intervals.

Table 4.8.3A Warm Springs Creek Peak Discharges

	Peak Discharges by Recurrence Interval			
Flooding Source and Location	**10-year**	**50-year**	**100-year**	**500-year**
Upstream of confluence with Clark Fork	870 cfs	1,250 cfs	1,430 cfs	1,865 cfs
Upstream of North Cable Road	785 cfs	1,130 cfs	1,295 cfs	1,680 cfs
Downstream of Warm Springs Creek Road	270 cfs	390 cfs	445 cfs	575 cfs

Source: Federal Emergency Management Agency, 1985.

Figure 4.8.3B Hazard Frequency and Impact Ranges



4.8.4 Vulnerabilities

Methodology

The approximate floodplain boundaries (Q3 data) were compared to the GIS structure data for Anaconda – Deer Lodge County. Comparisons were done both for the 100-year flood hazard areas countywide and the identified 500-year flood hazard areas for Anaconda. This analysis is similar to the one used in the previous plan version, except the structure data for the county is now much more precise. Many critical facilities are no longer estimated to be in the floodplain (but are still in close proximity). However, since neither database is exact, this analysis should be used for planning purposes only and not for floodplain determinations.

HAZUS-MH MR2, FEMA's loss estimation software can be used to estimate flood losses. Preliminary runs through the model show that comparison with the Q3 floodplain data is a much more accurate methodology.

For population estimates, the 2010 county population of 9,298 was divided by the total number of structures in the Anaconda – Deer Lodge County GIS database of 6,060 for a rough estimate of 1.5 people per structure.

Exposure

Critical Facilities and Infrastructure

Comparing the locations of critical facilities and infrastructure to the 100-year and 500-year flood hazard areas, the following facilities are estimated to have the greatest risk. These results should only be used for planning purposes and are not actual flood zone determinations. The FEMA Flood Insurance Study notes that part of Anaconda, Warm Springs, the State Hospital, the Fish & Game fish hatchery, and the game farm at Warm Springs all lie in the floodplain. The study also notes that eight bridges north of Anaconda and four in Warm Springs restrict flow and cause flooding. (Federal Emergency Management Agency, 1985)

100-year event, countywide:

- A.W.A.R.E., Inc., Galen
- Wastewater Treatment Plant, Galen

500-year event, Anaconda area:

- Anaconda Fire Station
- Dwyer School
- Head Start
- Law Enforcement Center
- Lincoln School
- Public Health Department

Additionally, since many of downtown Anaconda's roadways become streams from the runoff of various gulches and higher terrain to the south, during the 500-year event, many additional critical facilities would likely lose access and/or functionality.

Comparing US Census TIGER road data with the Q3 floodplain data, approximately 98 miles of roads coincide with the 100-year floodplain and an additional 28 miles coincide with the 500-year floodplain. Since roadbeds may be elevated above 100- and 500-year flood levels, this assessment doesn't specify if the roadway is in the floodplain, but does give an estimate of the exposure.

The critical scour potential bridge structures in Anaconda – Deer Lodge County are at:

- Silver Bow Creek, 4 miles South of Opportunity (state owned)
- Mill Creek, 1 mile west of Opportunity (county owned)
- Warm Springs Creek, Sycamore Street, Anaconda (county owned)

  Source: Montana Disaster and Emergency Services, 2010

The vulnerabilities to flash flooding are harder to quantify without specific hazard data. In Montana, however, flash flooding has been known to be most problematic to public infrastructure such as roads. As history shows, floods frequently wash out roadways in Anaconda – Deer Lodge County. Specific critical facilities have not been identified as more susceptible to flash flooding.

Existing Structures

The type of property damage caused by flood events depends on the depth and velocity of the floodwaters. Flooding can wash away supporting fill, infiltrate basements, damage contents, and in worst cases, wash structures off their foundations. Most flood damage is caused by water saturating materials susceptible to loss such as wood, insulation, wallboard, fabric, furnishings, floor coverings, and appliances.

FEMA's Benefit-Cost Analysis Module determines damage percentages for various building types. Table 4.8.4A shows the estimated percentages of building and contents losses from flooding at depths of one foot, three feet, and six feet.

Table 4.8.4A Flood Building and Contents Loss Estimation Percentages

	Flood Depth		
Structure Type	**1 foot**	**3 feet**	**6 feet**
One Story No Basement	14% Building Damage 21% Contents Damage	27% Building Damage 40.5% Contents Damage	40% Building Damage 60% Contents Damage
Two Story No Basement	9% Building Damage 13.5% Contents Damage	18% Building Damage 27% Contents Damage	24% Building Damage 36% Contents Damage
One or Two Story with Basement	15% Building Damage 22.5% Contents Damage	23% Building Damage 34.5% Contents Damage	38% Building Damage 57% Contents Damage
Manufactured Unit	44% Building Damage 66% Contents Damage	73% Building Damage 90% Contents Damage	81% Building Damage 90% Contents Damage

Source: Federal Emergency Management Agency, 2001.

The structure database provided by the Anaconda – Deer Lodge County GIS contractor was compared to the digital flood hazard areas. Table 4.8.4B shows the estimated number of structures within the hazard areas and their associated building values. Potential losses were estimated by using a damage factor of 30%.

Table 4.8.4B Estimated Flood Exposure

Flood Hazard Area	**Estimated Number of Structures in the Flood Hazard Area**	**Estimated Total Building Value**	**Estimated Losses**
100 year (countywide)	186 structures	$20,643,691	$6,193,107
500 year (Anaconda area)*	1,089 structures	$92,493,647	$27,748,094

* Does not include the 100 year hazard area. Structures in those areas would likely sustain major damage in a 500 year event.

As of May 31, 2013, Anaconda – Deer Lodge County has 12 policies with a total of $1,590,600 of insurance in-force. Since 1978, $4,094 have been paid out in National Flood Insurance Program loss payments in Anaconda – Deer Lodge County. (Federal Emergency Management Agency, 2013a)

Population

Due to the terrain and hazard areas in Anaconda – Deer Lodge County, the population is considered to be at moderate risk for riverine and flash flooding. Some warning does exist, particularly with riverine flooding, but rapidly occurring events may leave the population unprepared and in a dangerous situation. The impacts from flash flooding could be even greater in areas downstream of wildfire burn areas. Flash flooding often occurs without warning. The population estimated in the 100-year floodplain is about 279 people. Approximately 1,634 people additionally live in the 500 year flood hazard area of Anaconda. The population in flash flood areas is unknown as flash flood can occur almost anywhere.

Values

Economic values can be negatively affected by floods. Agriculture losses may occur due to reduced profits, damaged crops, livestock drownings, and delays in planting. Physical losses to businesses and historic properties may also occur. Damages to the road transportation network may slow commerce. Flooding often benefits ecologic values in the riparian areas, but socially, emotional impacts related to losses can be significant.

Future Development

Anaconda – Deer Lodge County adheres to National Flood Insurance Program (NFIP) requirements for new and improved developments in the mapped floodplain, as governed by Anaconda-Deer Lodge County Ordinance 106. These requirements do not prohibit development in the floodplain; rather, they require the development to meet certain standards. As a participant in this program, specific development considerations must be made and a permit issued before development can occur in the 100-year floodplain. Culverts and bridges on natural watercourses must be designed by a professional engineer and pass the 100-year flood without damage to the bridge or culvert and without diverting floodwaters. Those culverts and bridges not on a natural watercourse must pass runoff from a 10-year, 6 hour storm event. The Georgetown Lake Development District requires runoff and erosion control measures for large developments and includes enhanced wetland, stream, and lakeshore protections. The Big Hole Ordinance adopted by communities along the Big Hole River in 2005 prohibits development within 500 feet of the high water mark. (Anaconda Leader, 2005)

Future development of lands within the floodplain is possible. About 314 private, undeveloped parcels of land coincide with the 100-year floodplain; however, these parcels may also contain possible building sites outside the 100-year floodplain boundaries. In the 500 year flood hazard area of Anaconda, 160 private, undeveloped parcels of land coincide with the hazard area; these areas are not regulated specifically for flood like the 100 year areas are.

Vulnerabilities and Impacts

Table 4.8.4C Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities	▪ $250,000 losses ▪ Structural losses ▪ Contents losses ▪ Critical functional losses ▪ Critical data losses ▪ Clean-up/debris removal costs	▪ $1,000,000 losses	Moderate-High
Critical Infrastructure	▪ $1,000,000 losses ▪ Road closures ▪ Loss of sewer	▪ $5,000,000 losses	Moderate-High
Existing Structures	▪ $6,000,000 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses Clean-up/debris removal costs	▪ $34,000,000 losses	Moderate-High
Population		▪ Injuries ▪ Fatalities	Moderate
Values	▪ Agricultural losses ▪ Aesthetic value losses	▪ Business disruption losses ▪ Service industry losses ▪ Reduced water quality ▪ Historic structure losses ▪ Historic site losses ▪ Historic item losses ▪ Emotional impacts ▪ Cancellation of activities ▪ Restrictions on activities	Moderate
Future Structures	▪ Somewhat likely to occur in hazard areas ▪ 314 undeveloped parcels in the 100-year floodplain	▪ 160 additional undeveloped parcels in the 500-year floodplain	Moderate

* in addition to probable (100-year) impacts

4.8.5 Data Limitations

Data limitations include:

- Quantifying all of the losses that occur during major floods, especially when some are covered by insurance and government assistance and others are not.
- Outdated floodplain mapping with many unmapped flood prone areas.

4.9 Hazardous Materials Release

including fixed and mobile releases

Table 4.9A Hazard Summary

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Moderate	Significant potential exists due to interstate and railroad, but only a limited history of releases.
Vulnerability	Low-Moderate	Damages to critical facilities and the population possible, but most of the population is outside of the highest risk areas.

Table 4.9B Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.9.1 Description

A hazardous material release is the contamination of the environment (i.e. air, water, soil) by any material that because of its quantity, concentration, physical characteristics, or chemical characteristics threatens human, animal, or plant health, the environment, or property. An accidental or intentional release of materials could produce a health hazard to those in the area, downwind, and/or downstream with immediate, prolonged, and/or delayed effects. The spread of the material may additionally be defined by weather conditions and topography of the area. A hazardous material release can come from a fixed facility, via its transportation, or intentionally in the case of terrorism.

Fixed facilities housing hazardous substances in Anaconda – Deer Lodge County include the usual facilities within communities such as water and sewer treatment plants, medical facilities, gas stations, bulk plants, and supply stores containing substances such as fuel, farm and weed chemicals, propane, fuel oil, paint, and small amounts of chlorine and low level nuclear wastes. Table 4.9.1A lists the identified facilities housing hazardous materials in Anaconda – Deer Lodge County.

Table 4.9.1A Hazardous Materials Facilities

Name	Address	Source of Information	Notes
Ace Hardware	1310 East Commercial	LEPC	Hardware Store & Paint Products
Albertson's/CVS	1300 East Park Avenue	DES EOP	Hardware Store & Paint Products
Anaconda Foundry	Sixth & Jefferson	DES EOP	Acetylene Storage
Anaconda Job Corps Center	1407 Foster Creek Road	LEPC	Paint Products, Diesel
Anaconda-Deer Lodge County Shop	800 South Main	DES EOP	Acetylene Storage

Table 4.9.1A Hazardous Materials Facilities (continued)

Name	Address	Source of Information	Notes
Anaconda-Deer Lodge Water Department	50 North Main Street	LEPC	Chlorine
Anaconda-Deer Lodge Weed Department	800 South Main Street	LEPC	Herbicide chemicals
A.W.A.R.E. Inc.	200 North Polk Avenue	DES	Recycling Plant
BSW, Inc.	113 East Park	DES	Paint Products
Cook's Collision	416 East Park	DES EOP	Paint Products
Dee's Motors	1200 East Commercial	DES EOP	Paint Products
Exxon East	301 MT Highway 1	Internet	Fuel & Oil Products
Exxon West	819 West Park Avenue	Internet	Fuel & Oil Products
Fairmont Hot Springs	East of Anaconda	DES EOP	Chlorine Gas Storage
Hardware Hank	216 West Park	DES EOP	Hardware Store & Paint Products
Montana State Hospital	Warm Springs	DES EOP	Chlorine Gas Storage/Propane/Gas
Northwestern Energy Generating Station	241 Willow Glen Road	LEPC	Mixed types of fuel, oil, propane, and acids
Safeway	Park & Larch	DES EOP	Hardware Store
Sinclair	701 East Park Avenue	DES	Fuel & Oil Products
Thriftway Super Stop	1420 East Park Avenue	DES EOP	Propane Storage & Gasoline
Thriftway West	2005 West Park Avenue	DES	Fuel & Oil Products
Town Pump East	6940 MT Highway 1	DES EOP	Propane Storage & Gasoline
Town Pump West	819 West Park Avenue	DES EOP	Propane Storage & Gasoline
Washoe Park Swimming Pool		DES EOP	Chlorine Gas Storage

Note: None are required to report as part of SARA Title III

A hazardous material release may also occur due to a transportation accident. The most likely locations for a transportation-related hazardous material release are along the interstate and the railroad. Interstate 90 crosses eastern Anaconda – Deer Lodge County in a north-south direction. This Interstate is widely used by vehicles transporting hazardous materials. Montana Highway 1 and the other state roads may be used for the local transportation of hazardous materials but are not generally used for larger scale transportation of such goods. For the most part, the primary railroad parallels Interstate 90. The railroad is owned and operated by Burlington Northern Santa Fe. Hazardous materials and wastes are continually present on these corridors. A short line railroad also transports goods between Butte and Anaconda, but most materials are not hazardous.

A hazardous material release can occur anywhere; however, buffer zones around the primary hazardous materials transportation routes show the areas that would most likely be affected by a transportation-related hazardous material incident. Table 4.9.1B shows the evacuation radii for a few common hazardous materials. This list is generalized for planning purposes and is certainly not all-inclusive.

Emergency responders should rely on other sources for more detailed information. Over 18,000 materials are covered under the US Department of Transportation regulations.

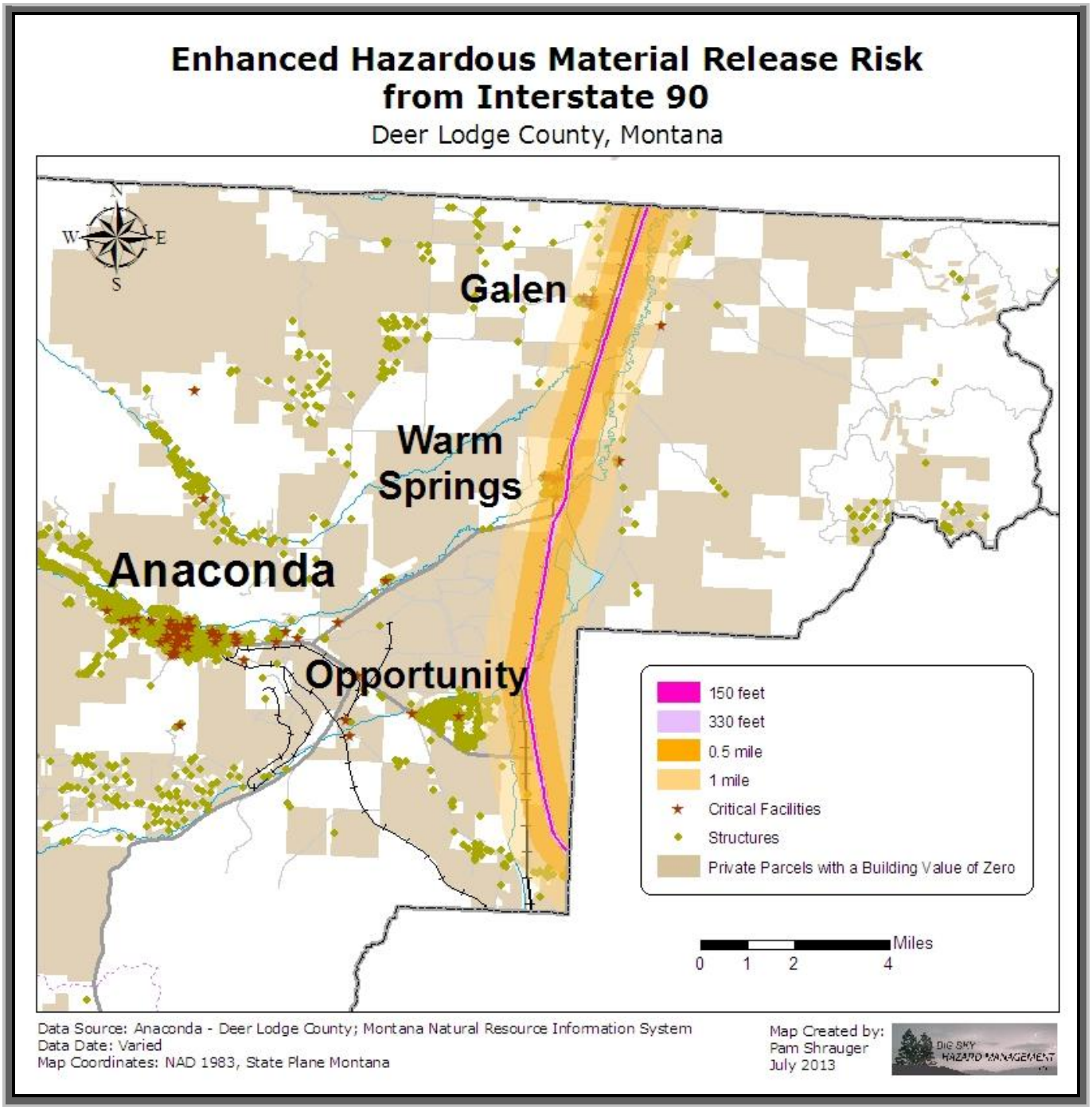
Table 4.9.1B Evacuation Radii for Hazardous Material Releases

Material	Potential Hazard	Initial Isolation	Evacuation
Diesel Fuel/Gasoline	Highly Flammable	150 feet	Up to ½ mile
Ammonium Nitrate Fertilizers	Oxidizer	150 feet	Up to ½ mile
Propane	Extremely Flammable	330 feet	Up to 1 mile
Anhydrous Ammonia	Toxic by Inhalation	500 feet	Up to 1.4 miles
Chlorine	Toxic by Inhalation	2,000 feet	Up to 5 miles

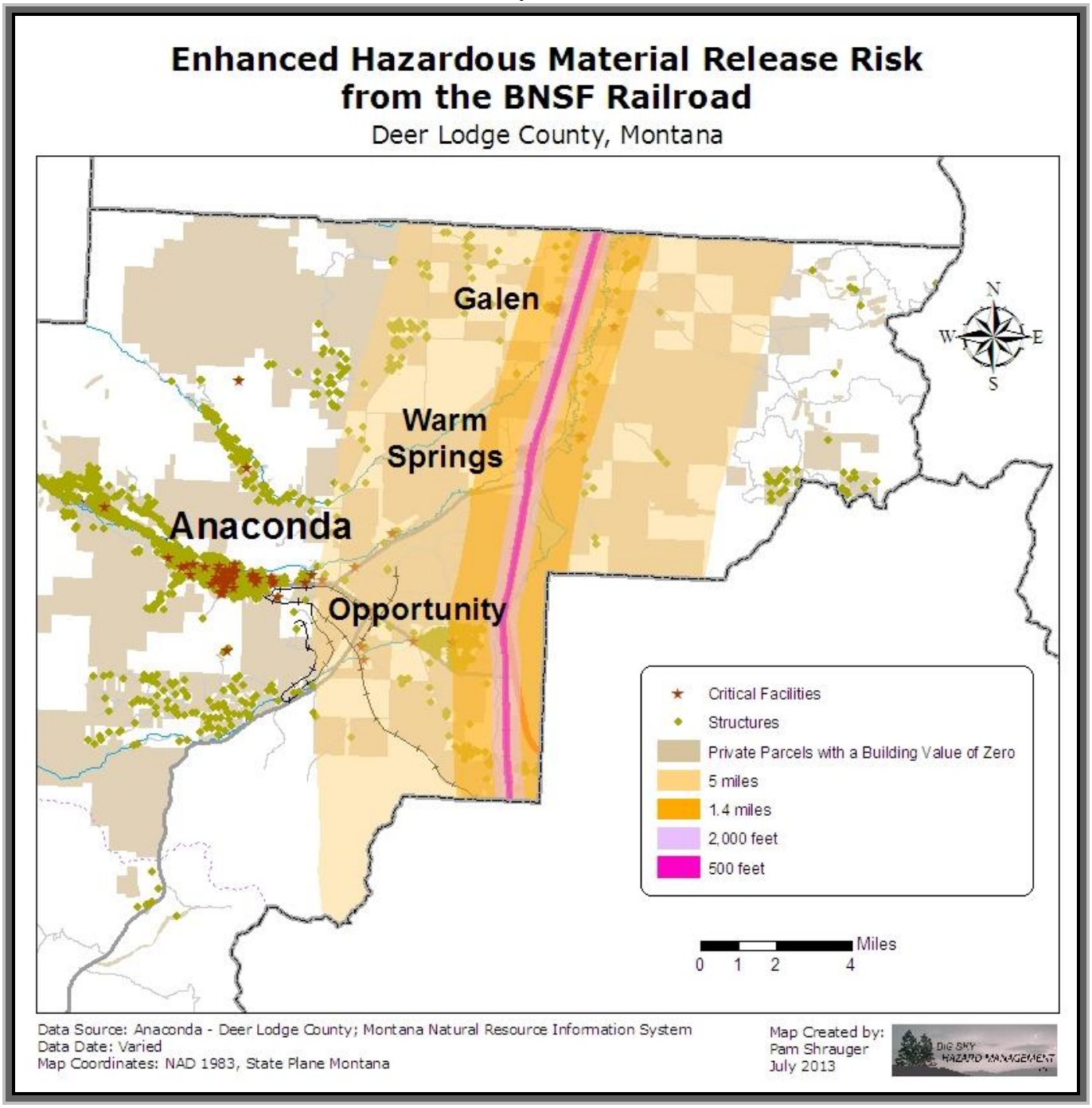
Source: US Department of Transportation, 2008.

The buffers around the interstate and BNSF railroad shown in Maps 4.9.1C and 4.9.1D, respectively, represent those areas with an enhanced risk from a hazardous materials release based on their proximity to regular hazardous materials transportation routes and infrastructure. Along the interstate, buffer zones of 150 feet, 330 feet, ½ mile, and 1 mile were established based on the initial isolation and evacuation radii for diesel fuel/gasoline and propane releases, as shown in Table 4.9.1B. For the railroad, the buffers were 500 feet and 1.4 miles for anhydrous ammonia and 2,000 feet and 5 miles for chlorine. Note that the actual evacuation zones are highly dependent on factors such as wind speed, wind direction, material released, and quantity released. Like most other hazards, in an actual event, the entire risk area likely won't be affected, but a small section surrounding the spill location may.

Map 4.9.1C


Enhanced Hazardous Material Release Risk
from Interstate 90
Deer Lodge County, Montana
N
W
E
S
Galen
Warm
Springs
Anaconda
Opportunity
150 feet
330 feet
0.5 mile
1 mile
Critical Facilities
Structures
Private Parcels with a Building Value of Zero
Miles
0 1 2 4
Data Source: Anaconda - Deer Lodge County; Montana Natural Resource Information System
Data Date: Varied
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
July 2013
DIG SKY
HAZARD MANAGEMENT

Map 4.9.1D


Enhanced Hazardous Material Release Risk
from the BNSF Railroad
Deer Lodge County, Montana
Galen
Warm
Springs
Anaconda
Opportunity
N
W
E
S
Critical Facilities
Structures
Private Parcels with a Building Value of Zero
5 miles
1.4 miles
2,000 feet
500 feet
Miles
0 1 2 4
Data Source: Anaconda - Deer Lodge County; Montana Natural Resource Information System
Data Date: Varied
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
July 2013
DIG SKY
HAZARD MANAGEMENT

4.9.2 History

Historically, incidents have been small enough to prevent a large evacuation and long-term impacts however, hazardous materials incidents do occur in Anaconda – Deer Lodge County. The incidents logged with the National Response Center and those identified by area residents are shown in Table 4.9.2A. Note this database likely does not contain all incidents.

Table 4.9.2A Hazardous Material Releases from 1990-2010

Date	Location	Material	Cause/Impacts
04/20/1992	Warm Springs	Natural Gas	A utility worker was overcome by natural gas when repairing the line during union protests.
06/1997	Washoe Theater	Carbon Monoxide	Carbon monoxide leak led to the evacuation of 450 people, treatment of 157, and 56 sent to the hospital.
08/27/2004	Anaconda Job Corps Center	Carbon Monoxide	30 male students were treated for carbon monoxide poisoning when a heating system exhaust pipe leaked into a dormitory.
05/21/2013	409 East 8th Street Anaconda	Motor Oil, 20 gallons	Release from four 5-gallon buckets that was then reportedly illegally cleaned up.

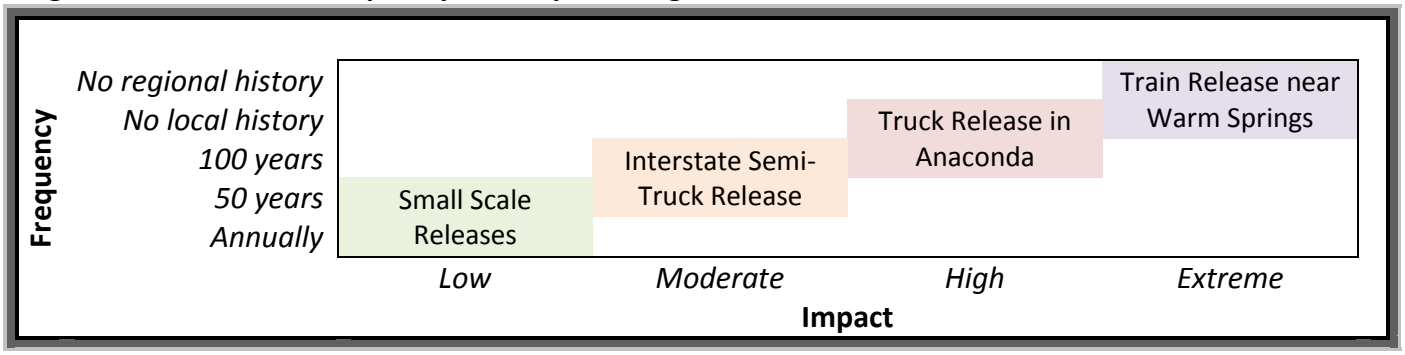
Sources: National Response Center, 2013; The Missoulian, 2004.

4.9.3 Probability and Magnitude

The probability of a hazardous materials release can only be realistically assessed qualitatively. The history of events in Anaconda – Deer Lodge County is 4 recorded events over the past 23 years, none of which have resulted in a disaster declaration. The exposure, however, is high in the areas around Interstate 90 and the BNSF railroad. The probability of a significant release is considered greater along the railroad since the US Department of Transportation regulates hazardous materials on commercial vehicles, has specific regulations regarding mixed loads and amounts, and provides enforcement, whereas, the railroad system does not have as extensive control measures.

In neighboring Butte – Silver Bow County, a survey from November 1996 of the hazardous materials placards on Interstate 90 showed 56.4 commercial vehicles per hour used the Interstate with 6.8 of those vehicles carrying hazardous materials. Similar figures could be assumed for neighboring Anaconda – Deer Lodge County.

Figure 4.9.3A Hazard Frequency and Impact Ranges



4.9.4 Vulnerabilities

Methodology

To assess the vulnerabilities to hazardous material releases, GIS data for critical facilities, structures, and undeveloped parcels were compared to the enhanced risk areas depicted by the buffer zones around the interstate and railroad. Of course, the entire county is at some risk for a hazardous material release, but the areas identified are at the greatest risk given their proximity to places where hazardous materials can typically be found. For population estimates, the 2010 county population of 9,298 was divided by the total number of structures in the Anaconda – Deer Lodge County GIS database of 6,060 for a rough estimate of 1.5 people per structure.

Exposure

Critical Facilities and Infrastructure

Based on the estimated buffer zones, the highest risk critical facilities can be identified. Should a hazardous material release affect one of the critical facilities, the level of emergency services available could be reduced. A release near a special needs facility may present unique evacuation challenges. Structural and contents losses may only be seen if an explosion and/or fire are present. Table 4.9.4A shows the critical facility exposure to the various hazardous material risk areas.

Table 4.9.4A Hazardous Material Incident Exposure to Critical Facilities

Within Buffer Zone	Exposure	Specific Facilities
150 feet of Interstate 90	None	
330 feet of Interstate 90	None	

Table 4.9.4A Hazardous Material Incident Exposure to Critical Facilities (continued)

Within Buffer Zone	Exposure	Specific Facilities
½ mile of Interstate 90	9 critical facilities	CCCS Start Program CCCS WATCh Program Montana State Hospital NWE Electric Substation, Warm Springs NWE Gas Substation, Galen NWE Gas Substation, Warm Springs RYO Correctional Facility Warm Springs Post Office Wastewater Treatment Plant, Galen
1 mile of Interstate 90	10 critical facilities	Critical facilities listed above, plus: A.W.A.R.E., Inc.
500 feet of the Railroad	4 critical facilities	Montana State Hospital NWE Electric Substation, Warm Springs NWE Gas Substation, Warm Springs Warm Springs Post Office
2,000 feet of the Railroad	8 critical facilities	Critical facilities listed above, plus: CCCS Start Program CCCS WATCh Program NWE Gas Substation, Galen RYO Correctional Facility
1.4 miles of the Railroad	14 critical facilities	
5 miles of the Railroad	21 critical facilities	

Existing Structures

Comparing the structure database provided by the Anaconda – Deer Lodge County GIS contractor to the buffer zones, Table 4.9.4B shows the estimated number of structures within the enhanced hazard areas. Fortunately, unless an explosion is present with the release, structures are typically not damaged in a hazardous materials release. Structure losses in an explosion would likely total in the millions of dollars.

Table 4.9.4B Structure Vulnerabilities to Hazardous Material Releases

Within Buffer Zone	Estimated Number of Structures
150 feet of Interstate 90	1 structure
330 feet of Interstate 90	3 structures
½ mile of Interstate 90	104 structures
1 mile of Interstate 90	218 structures
500 feet of the Railroad	23 structures
2,000 feet of the Railroad	113 structures
1.4 miles of the Railroad	402 structures
5 miles of the Railroad	705 structures

Population

Table 4.9.4C shows the estimated population within each of the buffer zones. These estimates are based on 1.5 people per structure. Greater population concentrations may be found in communities, special needs facilities, and businesses. Generally, an incident will affect only a subset of the total population at risk. In a hazardous material release, those in the immediate isolation area would have little to no warning, whereas, the population further away in the dispersion path may have some time to evacuate, depending on the weather conditions, material released, and public notification.

Table 4.9.4C Population Vulnerabilities to Hazardous Material Releases

Within Buffer Zone	Estimated Number of Structures	Estimated Population
150 feet of Interstate 90	1 structure	2 people
330 feet of Interstate 90	3 structures	5 people
½ mile of Interstate 90	104 structures	156 people
1 mile of Interstate 90	218 structures	327 people
500 feet of the Railroad	23 structures	35 people
2,000 feet of the Railroad	113 structures	170 people
1.4 miles of the Railroad	402 structures	603 people
5 miles of the Railroad	705 structures	1,058 people

Many factors will determine the true hazard area in a transportation related hazardous material release. The worst case scenario would be a release along the railroad near Warm Springs. Given this scenario, the hospital population of about 200 patients and support staff would be threatened and faced with a challenging evacuation.

Values

Temporary business closures and associated business disruption losses may occur with a hazardous material release and losses may be more extensive to include physical losses when explosions are present. Often, the most significant losses occur to ecologic values when such releases occur. Releases that impact a body of water can be especially difficult to manage. Social values such as cancelled activities and emotional impacts related to significant population losses or associated illness are also possible.

Future Development

Much of the future development currently occurring is off of the interstate and BNSF rail network in the county. The potential, however, does exist for development of agricultural lands bordering the interstate and railroad. The Superfund site is also in the vicinity of the interstate and railroad and likely tempers growth in the area as well. Table 4.9.4D provides the number of private, undeveloped parcels within each of the enhanced risk areas.

Table 4.9.4D Undeveloped Parcel Vulnerabilities to Hazardous Material Releases

Within Buffer Zone	Estimated Number of Parcels
150 feet of Interstate 90	31 parcels
330 feet of Interstate 90	44 parcels
½ mile of Interstate 90	119 parcels
1 mile of Interstate 90	169 parcels
500 feet of the Railroad	68 parcels
2,000 feet of the Railroad	118 parcels
1.4 miles of the Railroad	229 parcels
5 miles of the Railroad	464 parcels

Vulnerabilities and Impacts

Table 4.9.4E Hazard Vulnerabilities and Impacts

Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Critical Facilities	• Critical functional losses	• $100,000 losses • Structural losses • Contents losses • Critical data losses • Clean-up/debris removal costs	Low-Moderate
Critical Infrastructure	• Road closures	• $500,000 losses • Loss of electricity • Loss of utility gas • Loss of potable water	Low-Moderate
Existing Structures	• Displacement/functional losses	• $500,000 losses • Structural losses • Contents losses • Clean-up/debris removal costs	Low-Moderate
Population	• Illness • Injuries • Fatalities		Moderate-High
Values	• Agricultural losses • Habitat damages • Reduced air quality • Reduced water quality • Soil contamination	• Biodiversity losses • Historic structure losses • Historic site losses • Historic item losses • Emotional impacts • Aesthetic value losses • Cancellation of activities • Restrictions on activities	Moderate
Future Structures		• Possibly to occur in hazard areas • Over 450 parcels available for development in enhanced risk areas • Increases the total hazard exposure	Low

* in addition to probable (100-year) impacts

4.9.5 Data Limitations

Data limitations include:

- Estimating what substances and the quantity that may be released in any given location.
- Lack of a study with the numbers and types of hazardous materials being hauled on the interstate, railroad, and highways in the county.

5. MITIGATION STRATEGY

Hazard mitigation, as defined by the Disaster Mitigation Act of 2000, is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Studies on hazard mitigation show that for each dollar spent on mitigation, society saves an average of four dollars in avoided future losses. (Multihazard Mitigation Council, 2005) Mitigation can take many different forms from construction projects to public education.

The development of a mitigation strategy allows Anaconda – Deer Lodge County to create a vision for preventing future disasters, establish mitigation goals, prioritize projects, and evaluate the success of such projects. The mitigation strategy is based on the results of the risk assessment and recommendations by stakeholders and the public. The goals are broad, visionary, forward-looking statements that outline in general terms what the county would like to accomplish. Goals are usually not measurable or fully attainable but rather ideals to which the county should strive for as it develops and implements mitigation projects.

Rather than wait until a disaster occurs, Anaconda – Deer Lodge County has developed this strategy to move in a more proactive direction for disaster prevention. All losses cannot be entirely mitigated, however, some actions can be taken, as funding and opportunities arise, that may reduce the impacts of disasters, thus, saving lives and property.

Initially, the mitigation strategies were developed in 2005 based on the results of the risk assessment and recommendations by knowledgeable community members through the Local Emergency Planning Committee and public meetings and existing studies and plans. In 2013, those mitigation goals, objectives, and project ideas were reviewed by the public, refined in a public meeting during which suggestions from the attendees were incorporated, and also took into account recommendations from existing policies, plans, and studies. Wildfire projects were incorporated from the Anaconda – Deer Lodge County Community Wildfire Protection Plan.

The overarching mission of this mitigation strategy is to:

Reduce or prevent losses from disasters.

Many of the mitigation actions were carried over from the 2005 plan and new ones were developed based on direct input from stakeholders; the projects were then prioritized. Some projects that were completed or considered no longer effective were removed. Those goals, objectives, and projects that remain are considered to be valid and effective mitigation strategies. More information on the specific changes to the mitigation strategy since 2005 can be found in Appendix J.

5.1 Goals, Objectives, and Proposed Projects

The mitigation goals, objectives, and proposed projects for Anaconda – Deer Lodge County follow. Each of the projects specifies the type of project, its priority, the responsible agencies and partners, resources needed, and the goal timeframe.

For clarification and prioritization purposes, each project is categorized by type. The types of projects include:

- Supportive: Usually supportive projects are important components of all types of mitigation activities. For example, a coordinator or staff position is often critical to applying for and implementing mitigation grants.
- Educational/Informational: These projects typically do not mitigate a hazard directly, however, by educating the public or others, those individuals may then take their own mitigation actions. These types of projects may also be used by governing bodies and other authorities to make decisions or develop new policies or projects.
- Policy/Regulatory: Policies and regulations created, updated, or enforced by government entities can have powerful hazard mitigation impacts. Their benefits can often be difficult to measure. Conservation easements are an example of a land use change mechanism enforced by regulatory authorities.
- Property Protection: These projects often directly reduce future property losses through physical changes. Such changes can reduce or eliminate the threat to property.
- Infrastructure Protection: These projects often physically reduce losses to critical infrastructure. Hardening or improvements to infrastructure can reduce the likelihood of losses to important lifeline systems from the various hazards.
- Population Protection: Generally, population protection measures reduce the loss of life and injury by physically changing a threat to people or by prompting a person to take immediate action. For example, warning systems may alert people to imminent hazards.

Additional information on the priorities and goal timeframes can be found in the sections that follow.

GOAL 1: PREVENT COMMUNITY LOSSES FROM WILDFIRES AND STRUCTURE FIRES.

Objective 1.1: Minimize the risk to structures in the wildland urban interface.

Project 1.1.1: FireSafe Program

- Create an Anaconda – Deer Lodge County FireSafe Council and Program.
- Promote mitigation practices in the wildland urban interface.
- Coordinate wildfire preparedness planning and activities.
- Build partnerships with community leaders and businesses, such as insurance providers, for wildfire prevention and mitigation.

Project Type: Supportive
Responsible Agencies and Partners: Fire Departments
Resources Needed: Staff time and expertise
Potential Funding Sources: None needed
Goal Timeframe: Near Term: Initiated within 0-3 years; Post Disaster: when residents are most interested
Priority: High

Project 1.1.2: WUI Assessments

- Using firefighters or fire professionals, assess the wildfire risk to individual homes and properties.
- Encourage property owners to reduce fuels, create defensible space, and other mitigation measures based on the results of the assessments.

Project Type: Educational/Informational
Responsible Agencies and Partners: Fire Departments
Resources Needed: Staff time and expertise
Potential Funding Sources: Montana DNRC, US Forest Service Title III funds, US Bureau of Land Management
Goal Timeframe: Near Term: Initiated within 0-3 years
Priority: High

Project 1.1.3: Fuel Reductions

- Pursue wildland urban interface fuel reduction projects in high-risk areas, including near structures, road right-of-ways, utility right-of ways, and along federal and state lands.
- Develop a financial incentive program for private landowners to conduct fuel reduction activities on their properties.
- Work with federal and state agencies to coordinate fuel reduction priorities and projects.

Project Type: Property Protection
Responsible Agencies and Partners: Fire Departments; US Forest Service; US Bureau of Land Management; Montana DNRC
Resources Needed: Staff time and expertise; Funding for fuel reduction projects (about $100-$200 per acre)
Potential Funding Sources: Hazardous Fuels Assistance Programs through the US Forest Service and US Bureau of Land Management; Montana DNRC Western States Wildland Urban Interface grant
Goal Timeframe: Near Term: Initiated within 0-3 years
Priority: High

Project 1.1.4: Uniform Fire Code

- Adopt the Uniform Fire Code for wildland urban interface areas.

Project Type: Policy/Regulatory
Responsible Agencies and Partners: County Commission; Planning Department; Fire Departments
Resources Needed: Staff time and expertise
Potential Funding Sources: None needed
Goal Timeframe: Near Term: Initiated within 0-3 years
Priority: High

Objective 1.2: Improve wildland firefighting capabilities.

Project 1.2.1: Dry Hydrants

- Develop dry hydrant supplies within the wildland urban interface to supply substantial amounts of water within a reasonable distance for wildland firefighting efforts.

Project Type: Property Protection
Responsible Agencies and Partners: Fire Departments
Resources Needed: Staff time and expertise; Funding for projects
Potential Funding Sources: Homeowners' Association Fees; Special Tax Districts
Goal Timeframe: Near Term: Initiated within 0-3 years
Priority: High

Project 1.2.2: Ingress/Egress Road Improvements

- Improve critical ingress/egress roadways in the wildland urban interface with activities such as road widening and the addition of turnarounds, particularly in high risk subdivisions.
- Where feasible, construct a second access road into a subdivision.

Project Type: Population Protection
Responsible Agencies and Partners: Fire Departments; Maintenance Department; US Forest Service; US Bureau of Land Management; Montana DNRC; Homeowners Associations
Resources Needed: Staff time and expertise; Funding for projects
Potential Funding Sources: US Forest Service; US Bureau of Land Management; Montana DNRC Western States Wildland Urban Interface grant; Homeowners' Association Fees; Special Tax Districts
Goal Timeframe: Mid Term: Initiated within 3-6 years
Priority: Medium

Objective 1.3: Reduce the possibility of large urban structure fires.

Project 1.3.1: City Hydrants

- Upgrade the fire hydrants in the east end of Anaconda.
- Integrate this need into the Anaconda – Deer Lodge County Capital Improvements Plan.

Project Type: Property Protection
Responsible Agencies and Partners: Anaconda Fire Department, Water Department
Resources Needed: Staff time and expertise; Funding for upgrades
Potential Funding Sources: County Budget; Special Tax District
Goal Timeframe: Long Term: Initiated within 7-10 years
Priority: Low

Project 1.3.2: Sprinklers

- Promote sprinkler installations in older commercial structures.

Project Type: Property Protection
Responsible Agencies and Partners: Anaconda Fire Department; Planning Department / Historic Preservation
Resources Needed: Staff time and expertise
Potential Funding Sources: Property owners; Historic preservation grants
Goal Timeframe: Mid Term: Initiated within 3-6 years
Priority: Medium

GOAL 2: REDUCE POTENTIAL LOSSES FROM EARTHQUAKES.

Objective 2.1: Prevent earthquake damages to critical facilities, infrastructure, and facilities housing vulnerable populations.

Project 2.1.1: Critical Facility Seismic Retrofits

- Conduct earthquake risk assessments at each critical facility.
- Perform simple mitigation activities such as filming windows and securing equipment and furniture that could fall during an earthquake, especially at schools like the Dwyer School and Anaconda High School that have large glass panes.
- Conduct earthquake drills in schools.
- Structurally retrofit important government facilities, as needed.

Project Type: Property Protection
Responsible Agencies and Partners: Disaster and Emergency Services; Department Directors and Facility Managers; School Facility Managers; Private Facility Managers
Resources Needed: Staff time and expertise; Funding for supplies
Potential Funding Sources: Federal Emergency Management Agency mitigation grants
Goal Timeframe: Near Term: Initiated within 0-3 years
Priority: High

Project 2.1.2: Infrastructure Seismic Improvements

- Prioritize and make improvements to bring vulnerable infrastructure up to seismic code.
- Inspect key bridges for seismic stability and make improvements during upgrades.
- Anchor or stabilize electric transformers and generators for seismic motion during maintenance and new installations.
- Install expansion joints in underground utilities during new or replacement construction.

Project Type: Infrastructure Protection
Responsible Agencies and Partners: Disaster and Emergency Services; Maintenance Department; Water Department; Private Utility Companies
Resources Needed: Staff time and expertise; Funding for improvements
Potential Funding Sources: Federal Emergency Management Agency mitigation grants; County Budget for staff and equipment time and supplies
Goal Timeframe: Near Term: Initiated within 0-3 years; Post Disaster: when making repairs
Priority: High

Objective 2.2: Prevent residential and commercial losses from earthquakes.

Project 2.2.1: Earthquake Retrofit Education

- Educate home and business owners on simple earthquake retrofits.
- Survey commercial structures for earthquake stability and recommend retrofits.

Project Type: Educational/Informational
Responsible Agencies and Partners: Disaster and Emergency Services; Business Groups
Resources Needed: Staff time and expertise; Funding for engineers/specialists to conduct surveys
Potential Funding Sources: Federal Emergency Management Agency mitigation grants; Small Business Administration Pre-Disaster Mitigation loans
Goal Timeframe: Near Term: Initiated within 0-3 years
Priority: High

GOAL 3: REDUCE FUTURE DAMAGES FROM FLOODING.

Objective 3.1: Prevent flood losses to county infrastructure and critical facilities.

Project 3.1.1: Bridge, Culvert, and Road Improvements

- Upgrade bridges, culverts, storm drains, and roads to allow sufficient passage of floodwaters.
  - Relocate and upgrade culverts on Morrel Road from the Old Opportunity landfill to Gas City Road (approximately 4 miles of roadway).
  - Upgrade the bridge in Galen.
  - Upgrade and maintain storm drains from Fourth Street to the smelter.
- Install culverts and storm drains in areas prone to washouts or drainage problems.
  - Install culverts and raise roadbed on North Fork Road off the Big Hole Highway from Bacon's Home Ranch to the county line.
  - Install storm drains in areas where they are lacking in the west end of Anaconda.
- Stabilize roadsides that are prone to mudslides and/or landslides.

Project Type: Infrastructure Protection
Responsible Agencies and Partners: Maintenance Department; Disaster and Emergency Services
Resources Needed: Staff time and expertise; Funding for projects (amount highly variable depending on the project)
Potential Funding Sources: Federal Emergency Management Agency mitigation grants; County Budget
Goal Timeframe: Near Term: Initiated within 0-3 years; Post-Disaster: During bridge, culvert, and/or road repairs
Priority: High

Project 3.1.2: Critical Facility Flood Mitigation

- Identify flood mitigation opportunities for critical facilities in the floodplain.
- Prevent flood contamination of well houses serving the Anaconda public water system.

Project Type: Infrastructure Protection
Responsible Agencies and Partners: Water Department; Disaster and Emergency Services; Department Directors and Facility Managers; Private Facility Managers
Resources Needed: Staff time and expertise; Funding for projects (amount highly variable depending on the project)
Potential Funding Sources: Federal Emergency Management Agency mitigation grants; County Budget
Goal Timeframe: Near Term: Initiated within 0-3 years; Post-Disaster: During facility repairs
Priority: High

Project 3.1.3: Water Body and Drain Maintenance

- Remove debris from water bodies, old bridges, and storm drains, as needed, to protect public safety.

Project Type: Infrastructure Protection
Responsible Agencies and Partners: Maintenance Department
Resources Needed: Staff time and expertise
Potential Funding Sources: County Budget for staff and equipment time
Goal Timeframe: Mid Term: Initiated within 3-6 years
Priority: Medium

Project 3.1.4: Dam Security

- Investigate and implement security measures for the area dams.

Project Type: Infrastructure Protection
Responsible Agencies and Partners: Dam owners and operators
Resources Needed: Staff time and expertise; Funding for security devices
Potential Funding Sources: Dam operating budgets
Goal Timeframe: Mid Term: Initiated within 3-6 years
Priority: Medium

Objective 3.2: Reduce losses to private property from flooding.

Project 3.2.1: Flood Insurance Education

- Educate property owners and tenants on the availability and importance of flood insurance.

Project Type: Educational/Informational
Responsible Agencies and Partners: County Commission; Floodplain Administrator; Disaster and Emergency Services
Resources Needed: Staff time and expertise
Potential Funding Sources: None needed
Goal Timeframe: Near Term: Initiated within 0-3 years; Post Disaster: when property owners and tenants are most interested
Priority: High

Project 3.2.2: Floodplain Ordinances

- Continue compliance with the National Flood Insurance Program and local flood ordinances.
- Consider more restrictive floodplain development regulations, such as freeboard.
- Consider joining the Community Rating System volunteer incentive program.

Project Type: Policy/Regulatory
Responsible Agencies and Partners: County Commission; Floodplain Administrator; Planning Department
Resources Needed: Staff time and expertise
Potential Funding Sources: None needed
Goal Timeframe: Near Term: Initiated within 0-3 years
Priority: High

Project 3.2.3: Backflow Prevention

- Install backflow prevention systems to prevent waste water from backing into structures.

Project Type: Property Protection
Responsible Agencies and Partners: Maintenance Department; Disaster and Emergency Services
Resources Needed: Staff time and expertise; Funding for design and installation
Potential Funding Sources: Federal Emergency Management Agency mitigation grants; County Budget
Goal Timeframe: Near Term: Initiated within 0-3 years; Post-Disaster: During sewer repairs
Priority: High

GOAL 4: MINIMIZE COMMUNITY EXPOSURE TO HAZARDOUS MATERIALS RELEASES.

Objective 4.1: Reduce the risk to Montana State Hospital and other critical facilities in Warm Springs from hazardous materials releases.

Project 4.1.1: Montana State Hospital Emergency Exit

- Continue to investigate options for an emergency exit from Montana State Hospital.
- If an appropriate solution is found, implement the construction of the exit.

Project Type: Population Protection
Responsible Agencies and Partners: Montana State Hospital
Resources Needed: Staff time and expertise; Funding for construction
Potential Funding Sources: Montana State Hospital Budget; Anaconda Job Corps
Goal Timeframe: Long Term: Initiated within 7-10 years
Priority: Low

Objective 4.2: Harden hazardous material critical infrastructure.

Project 4.2.1: Natural Gas Line Protection

- Protect the exposed natural gas lines near Warm Springs.

Project Type: Population Protection
Responsible Agencies and Partners: Northwestern Energy; County Commission
Resources Needed: Staff time and expertise; Funding for construction
Potential Funding Sources: Northwestern Energy
Goal Timeframe: Long Term: Initiated within 7-10 years
Priority: Low

GOAL 5: REDUCE COMMUNITY RISK FROM COMMUNICABLE DISEASE.

Objective 5.1: Slow the spread of communicable disease.

Project 5.1.1: Communicable Disease Prevention Program

- Create a public education campaign, especially during seasons when emerging health risks are high.
- Increase immunization efforts and education.

Project Type: Population Protection
Responsible Agencies and Partners: Public Health; Anaconda Community Hospital
Resources Needed: Staff time and expertise; Funding for education supplies
Potential Funding Sources: Montana Department of Public Health and Human Services; County Budget
Goal Timeframe: Mid Term: Initiated within 3-6 years
Priority: Medium

GOAL 6: OPTIMIZE THE USE OF ALL-HAZARD MITIGATION MEASURES.

Objective 6.1: Maintain continuity of government services in a disaster.

Project 6.1.1: Generators

- Install generators at critical facilities and vulnerable population locations.
- Complete installation of generators at water and waste water treatment facilities.

Project Type: Population Protection
Responsible Agencies and Partners: Water Department; Maintenance Department; Disaster and Emergency Services Coordinator; Department Heads and Facility Managers; Private Facility Managers
Resources Needed: Staff time and expertise; Funding for generators (about $5,000 - $15,000 per site)
Potential Funding Sources: Unknown
Goal Timeframe: Ongoing: Already initiated and continuing; Post Disaster: when funding may be available
Priority: Medium

Project 6.1.2: Emergency Operations Center

- Designate a location for the Anaconda – Deer Lodge County Emergency Operations Center.
- Prepare the designated location for extended emergency operations.

Project Type: Supportive
Responsible Agencies and Partners: Disaster and Emergency Services Coordinator; County Commission
Resources Needed: Staff time and expertise
Potential Funding Sources: None needed
Goal Timeframe: Mid Term: Initiated within 3-6 years
Priority: Medium

Project 6.1.3: Sheltering Plan

- Develop functional annexes to the Anaconda – Deer Lodge County Emergency Operations Plan, specifically sheltering in a power outage.

Project Type: Population Protection
Responsible Agencies and Partners: Disaster and Emergency Services Coordinator
Resources Needed: Staff time and expertise
Potential Funding Sources: None needed
Goal Timeframe: Near Term: Initiated within 0-3 years; Post Disaster: when updates may be needed
Priority: High

Objective 6.2: Develop resources than can be used to further study and prepare for all hazards.

Project 6.2.1: HAZUS-MH GIS Data

- Develop GIS data that can be used with FEMA's HAZUS loss estimated models.

Project Type: Educational/Informational
Responsible Agencies and Partners: GIS Coordinator; Disaster and Emergency Services
Resources Needed: Staff time and expertise; Funding for education and data development
Potential Funding Sources: Federal Emergency Management Agency mitigation grants
Goal Timeframe: Long Term: Initiated within 7-10 years
Priority: Low

Project 6.2.2: Storm Ready Community

- Become a National Weather Service Storm Ready Community through evaluation of and improvements to public weather warning capabilities.

Project Type: Population Protection
Responsible Agencies and Partners: Disaster and Emergency Services Coordinator; National Weather Service Warning Coordination Meteorologist
Resources Needed: Staff time and expertise
Potential Funding Sources: None needed
Goal Timeframe: Mid Term: Initiated within 3-6 years
Priority: Medium

Project 6.2.3: Hazard Mitigation Training

- Train department heads and engineers in hazard mitigation.

Project Type: Educational/Informational
Responsible Agencies and Partners: All County Departments; Water Department; Maintenance Department; Disaster and Emergency Services; Montana Disaster and Emergency Services
Resources Needed: Staff time and expertise
Potential Funding Sources: None needed
Goal Timeframe: Near Term: Initiated within 0-3 years; Post-Disaster: when mitigation grant and training opportunities are most available
Priority: High

Project 6.2.4: NOAA Weather Radios

- Place NOAA Weather Radios in all critical facilities and schools.

Project Type: Population Protection
Responsible Agencies and Partners: Disaster and Emergency Services Coordinator; National Weather Service Warning Coordination Meteorologist
Resources Needed: Staff time and expertise; Funding for radios
Potential Funding Sources: Facility budgets; Private donations
Goal Timeframe: Ongoing: Already initiated and continuing
Priority: High

Objective 6.3: Mitigate the impact of hazards on future development through land use and building regulations.

Project 6.3.1: Growth Policy and Subdivision Regulations

- Update the growth policy to encourage growth in low hazard areas and continue to allow for the consideration of high hazard areas during subdivision reviews.
- Continue to make improvements to the subdivision regulations for disaster resistance, specifically with regard to wildland and forest fires.
- Ensure the new state requirements for wildfire considerations in growth policies are met.

Project Type: Policy/Regulatory
Responsible Agencies and Partners: County Commission; Planning Department; Fire Departments; County Attorney
Resources Needed: Staff time and expertise
Potential Funding Sources: None needed
Goal Timeframe: Near Term: Initiated within 0-3 years
Priority: High

Project 6.3.2: Capital Improvements Plans

- Update the county's Capital Improvements Plan to include relevant hazard mitigation projects and hazard considerations during improvements.

Project Type: Policy/Regulatory
Responsible Agencies and Partners: County Commission; Planning Department
Resources Needed: Staff time and expertise
Potential Funding Sources: None needed
Goal Timeframe: Near Term: Initiated within 0-3 years
Priority: High

Project 6.3.3: Conservation Easements

- Protect values along the rivers and streams and in wildland urban interface areas through conservation easements.
- If necessary, consider a local bond to generate funds.

Project Type: Policy/Regulatory
Responsible Agencies and Partners: County Commission; Floodplain Administrator; Planning Department; Private Conservation Groups
Resources Needed: Staff time and expertise; Funding for easement purchases (amount depends on the market and size of purchase)
Potential Funding Sources: Local Bonds; County Budget; Private Conservation Organizations
Goal Timeframe: Mid Term: Initiated within 3-6 years; Post-Disaster: when landowners are most interested
Priority: Medium

5.2 Project Prioritization

Each of the proposed projects has value and is important enough to be included in the strategy; however, time and financial constraints and competition with other community priorities do not permit all of the proposed actions to be implemented immediately. By prioritizing the actions, the most critical, cost effective projects can be achieved in the short term. The prioritization of the projects serves as a guide for choosing and funding projects, however, depending on the funding sources, some actions may be best achieved outside the priorities established here.

To ensure that community goals and other factors are taken into account when prioritizing projects, a prioritization model that uses the following factors has been developed: cost, staff time, feasibility, population benefit, property benefit, values benefit, maintenance, and hazard rating. *Cost* considers the direct expenses associated with the project such as material and contractor expenses. *Staff time* evaluates the amount of time needed by a local government employee to complete or coordinate the project. *Feasibility* assesses the political, social, and/or environmental ramifications of the project and the likelihood such a project would proceed through permitting, public review processes, and/or private business implementation. The feasibility factor is essentially a summarization of FEMA's Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) evaluation criteria as shown in Table 5.2A. *Population benefit* considers the possible prevention of deaths and injuries through the project's implementation. *Property benefit* estimates the reduction of property losses, including structures and infrastructure, from the hazard being mitigated. *Values benefit* considers the economic, ecologic, historic, and social benefits of the project. *Maintenance* rates the amount of work required to keep the mitigation measure effective and useful. The *hazard rating* is based on the results of the risk assessment and is a measure of the history, probability, magnitude, and vulnerabilities of the hazard.

Table 5.2A FEMA's STAPLEE Criteria

Criteria	Considerations
Social	Community Acceptance Effects on Segment of Population
Technical	Technical Feasibility Long-Term Solution Secondary Impacts
Administrative	Staffing Funding Allocated Maintenance/Operations
Political	Political Support Local Champion or Proponent Public Support
Legal	State Authority Local Authority Subjectivity to Legal Challenges

Table 5.2A FEMA's STAPLEE Criteria (continued)

Criteria	Considerations
Economic	Benefit of Action Cost of Action Contribution to Economic Goals Outside Funding Requirement
Environmental	Effects on Land/Water Bodies Effects on Endangered Species Effects on Hazardous Material and Waste Sites Consistency with Community Environmental Goals Consistency with Federal Laws

Source: Federal Emergency Management Agency, 2003.

Each factor was ranked qualitatively for each of the projects. The methods used to assign a category and the associated score can be generally defined as shown in Table 5.2B. The highest possible score is 30 for projects in which all factors are applicable. Some factors have a greater range than others, thus indicating a higher weighting. These weightings allow for appropriate prioritization of the project. More specifically, 11 of 30 points account for benefits (population benefit, property benefit, and values benefit), 11 of 30 points account for direct and indirect costs (cost, staff time, and maintenance), 5 of 30 points account for the hazard rating (incorporates hazard probability and impacts; see Section 4.22), and 3 of 30 points account for project feasibility.

The projects were prioritized by comparing the scores of projects of similar type. This method allows for more even prioritization of a variety of projects. In order for a project to receive a "high" priority, it also needed to mitigate a "high" rated hazard. When evaluating projects for grant applications, established cost-benefit analyses requiring detailed project-specific data should be used.

Note that all projects listed in the strategy have value and are worthy of inclusion in this plan. A low priority does not mean the project is not important, rather, compared to the other projects, its score using the described methodology was lower. Even low priority projects are encouraged immediately should funding, resources, and opportunities allow.

Table 5.2B Prioritization Criteria

Factor	Threshold	Rating	Score
Cost *Range: 1-5*	Little to no direct expenses	Low	5
	Less than $5,000	Low-Moderate	4
	$5,000-$25,000	Moderate	3
	$25,001-$100,000	Moderate-High	2
	Greater than $100,000	High	1
Staff Time *Range: 1-3*	Less than 10 hours of staff time	Low	3
	10-40 hours of staff time	Moderate	2
	Greater than 40 hours of staff time	High	1
Feasibility *Range: 1-3*	Positive support for the project	High	3
	Neutral support for the project	Moderate	2
	Negative support for the project	Low	1
Population Benefit *Range: 1-4*	Potential to reduce more than 20 casualties	Very High	4
	Potential to reduce 6-20 casualties	High	3
	Potential to reduce 1-5 casualties	Moderate	2
	No potential to reduce casualties	Low	1
Property Benefit *Range: 1-4*	Potential to reduce losses to more than 20 buildings or severe damages to infrastructure	Very High	4
	Potential to reduce losses to 6-20 buildings or substantial damages to infrastructure	High	3
	Potential to reduce losses to 1-5 buildings or slight damages to infrastructure	Moderate	2
	No potential to reduce property losses	Low	1
Values Benefit *Range: 1-3*	Provides significant benefits to economic, ecologic, historic, or social values	High	3
	Provides some benefits to economic, ecologic, historic, or social values	Moderate	2
	No or very little benefit to economic, ecologic, historic, or social values	Low	1
Maintenance *Range: 1-3*	Requires very little or no maintenance	Low	3
	Requires less than 10 hours per year	Moderate	2
	Requires more than 10 hours per year	High	1
Hazard Rating *Range: 1-5*	see Section 4.22	High	5
	see Section 4.22	Moderate	3
	see Section 4.22	Low	1

Table 5.2C Hazards and Development Mitigated by Each Proposed Project

	Aircraft Crash	Bioterrorism	Cyber Attack / Failure	Dam Failure	Disease Outbreak	Drought, Blight, and Infestation	Earthquake	Flood	Hazardous Materials Release	Highway Transportation Accident	Landslide and Avalanche	Large Public Event	Radioactive Release	Railroad Transportation Accident	Severe Thunderstorms, Tornadoes, and Wind	Severe Winter Weather	Terrorism	Urban Fire / Explosion	Utility Outage	Volcanic Ashfall	Wildland and Forest Fires	Existing Development	Future Development
Project 1.1.1: FireSafe Program																					X		
Project 1.1.2: WUI Assessments																					X	X	
Project 1.1.3: Fuel Reductions																					X	X	
Project 1.1.4: Uniform Fire Code																		X			X		X
Project 1.2.1: Dry Hydrants																		X			X	X	X
Project 1.2.2: Ingress/Egress Road Improvements																					X	X	X
Project 1.3.1: City Hydrants																		X				X	X
Project 1.3.2: Sprinklers																		X				X	
Project 2.1.1: Critical Facility Seismic Retrofits							X															X	
Project 2.1.2: Infrastructure Seismic Improvements							X															X	
Project 2.2.1: Earthquake Retrofit Education							X															X	
Project 3.1.1: Bridge, Culvert, and Road Improvements				X				X	X	X												X	
Project 3.1.2: Critical Facility Flood Mitigation								X														X	
Project 3.1.3: Water Body and Drain Maintenance				X				X															
Project 3.1.4: Dam Security				X													X					X	
Project 3.2.1: Flood Insurance Education								X														X	
Project 3.2.2: Floodplain Ordinances								X															X
Project 3.2.3: Backflow Prevention				X				X											X			X	
Project 4.1.1: Montana State Hospital Emergency Exit				X				X	X					X									
Project 4.2.1: Natural Gas Line Protection									X								X	X	X			X	
Project 5.1.1: Communicable Disease Prevention Program		X		X																			
Project 6.1.1: Generators							X								X	X	X		X				
Project 6.1.2: Emergency Operations Center	X	X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X		

Table 5.2C Hazards and Development Mitigated by Each Proposed Project (continued)

	Aircraft Crash	Bioterrorism	Cyber Attack / Failure	Dam Failure	Disease Outbreak	Drought, Blight, and Infestation	Earthquake	Flood	Hazardous Materials Release	Highway Transportation Accident	Landslide and Avalanche	Large Public Event	Radioactive Release	Railroad Transportation Accident	Severe Thunderstorms, Tornadoes, and Wind	Severe Winter Weather	Terrorism	Urban Fire / Explosion	Utility Outage	Volcanic Ashfall	Wildland and Forest Fires	Existing Development	Future Development
Project 6.1.3: Sheltering Plan				X			X	X	X				X		X	X	X	X	X		X		
Project 6.2.1: HAZUS-MH GIS Data							X	X							X								
Project 6.2.2: Storm Ready Community			X	X				X	X		X		X		X	X				X	X		
Project 6.2.3: Hazard Mitigation Training				X			X	X			X				X	X			X		X		
Project 6.2.4: NOAA Weather Radios			X	X				X	X		X		X		X	X				X	X		
Project 6.3.1: Growth Policy and Subdivision Regulations				X				X	X		X							X			X		X
Project 6.3.2: Capital Improvements Plans			X	X			X	X				X				X	X	X	X			X	
Project 6.3.3: Conservation Easements				X				X	X		X										X		X

Table 5.2D Mitigation Prioritization Scores

	Cost	Staff Time	Feasibility	Population Benefit	Property Benefit	Values Benefit	Maintenance	Hazard Rating	TOTAL SCORE
Supportive									
Project 1.1.1: FireSafe Program	5	1	2	2	3	2	1	5	21
Project 6.1.2: Emergency Operations Center	3	1	2	3	1	2	2	5	19
Educational/Informational									
Project 1.1.2: WUI Assessments	3	1	3	2	3	2	2	5	21
Project 2.2.1: Earthquake Retrofit Education	5	1	2	3	2	2	1	5	21
Project 3.2.1: Flood Insurance Education	5	2	2	1	3	2	1	5	21
Project 6.2.1: HAZUS-MH GIS Data	3	2	3	1	1	2	2	5	19
Project 6.2.3: Hazard Mitigation Training	4	1	3	2	3	2	2	5	22
Policy/Regulatory									
Project 1.1.4: Uniform Fire Code	5	2	2	2	4	2	1	5	23
Project 3.2.2: Floodplain Ordinances	5	1	2	2	4	2	1	5	22
Project 6.3.1: Growth Policies and Subdivision Regulations	5	1	2	2	4	2	1	5	22
Project 6.3.2: Capital Improvements Plans	5	1	3	2	2	2	2	5	22
Project 6.3.3: Conservation Easements	1	2	2	2	3	3	3	5	21
Property Protection									
Project 1.1.3: Fuel Reductions	3	2	2	2	4	2	1	5	21
Project 1.2.1: Dry Hydrants	3	2	2	2	3	2	2	5	21
Project 1.3.1: City Hydrants	2	1	2	2	2	2	2	3	16
Project 1.3.2: Sprinklers	3	2	2	3	2	2	3	3	20
Project 2.1.1: Critical Facility Seismic Retrofits	4	2	3	2	1	2	3	5	22
Project 3.2.3: Backflow Prevention	2	2	2	1	3	3	3	5	21
Infrastructure Protection									
Project 2.1.2: Infrastructure Seismic Improvements	2	2	2	2	3	2	3	5	21
Project 3.1.1: Bridge, Culvert, and Road Improvements	2	2	2	2	3	2	3	5	21
Project 3.1.2: Critical Facility Flood Mitigation	3	2	2	2	3	3	3	5	23
Project 3.1.3: Water Body and Drain Maintenance	4	1	3	2	2	2	1	5	20
Project 3.1.4: Dam Security	3	2	2	4	3	2	3	3	22

Table 5.2D Mitigation Prioritization Scores (continued)

	Cost	Staff Time	Feasibility	Population Benefit	Property Benefit	Values Benefit	Maintenance	Hazard Rating	TOTAL SCORE
Population Protection									
Project 1.2.2: Ingress/Egress Road Improvements	2	2	3	3	1	2	2	5	20
Project 4.1.1: Montana State Hospital Emergency Exit	3	2	2	4	1	2	2	3	19
Project 4.2.1: Natural Gas Line Protection	2	2	2	2	2	2	3	3	18
Project 5.1.1: Communicable Disease Prevention Program	5	2	2	4	1	2	2	3	21
Project 6.1.1: Generators	3	2	2	3	1	2	2	5	20
Project 6.1.3: Sheltering Plan	5	2	3	3	1	1	2	5	22
Project 6.2.2: Storm Ready Community	5	1	3	2	1	2	2	5	21
Project 6.2.4: NOAA Weather Radios	4	2	3	4	1	2	3	5	24

5.3 Project Implementation

A critical component of any mitigation program is the implementation of the mitigation projects. Maintenance of this Hazard Mitigation Plan is the responsibility of Anaconda – Deer Lodge County Disaster and Emergency Services (DES) in coordination with other appropriate agencies. Once a mitigation project is identified, however, DES generally steps back from the leadership role and assumes the role of team participant. The lead role in project development should then shift to the department or agency responsible for the project management.

The proposed and prioritized projects are shown in Table 5.3A with the associated goal timeframes for the actions. The timeframes are defined as follows and are generally based on the nature of the project and its priority:

- Near Term: Initiated within 0-3 years
- Mid Term: Initiated within 3-6 years
- Long Term: Initiated within 7-10 years
- Ongoing: Already initiated and continuing
- Post Disaster: May best be initiated during the recovery process

Some projects may be best achieved outside of the goal timeframes depending on the funding and staff resources available. Others may not be feasible in the goal timeframe due to financial, staff, or political limitations. This prioritized list, however, allows the county to focus on the types of projects with the greatest benefits.

Table 5.3A Implementation Scheme for Mitigation Projects

Proposed Action	Priority	Goal Timeframe
Supportive		
Project 1.1.1: FireSafe Program	High	Near Term Post Disaster
Project 6.1.2: Emergency Operations Center	Medium	Mid Term
Educational/Informational		
Project 6.2.3: Hazard Mitigation Training	High	Near Term Post Disaster
Project 1.1.2: WUI Assessments	High	Near Term
Project 2.2.1: Earthquake Retrofit Education	High	Near Term
Project 3.2.1: Flood Insurance Education	High	Near Term Post Disaster
Project 6.2.1: HAZUS-MH GIS Data	Low	Long Term
Policy/Regulatory		
Project 1.1.4: Uniform Fire Code	High	Near Term
Project 3.2.2: Floodplain Ordinances	High	Near Term
Project 6.3.1: Growth Policies and Subdivision Regulations	High	Near Term
Project 6.3.2: Capital Improvements Plans	High	Near Term
Project 6.3.3: Conservation Easements	Medium	Mid Term Post Disaster

Table 5.3A Implementation Scheme for Mitigation Projects (continued)

Proposed Action	Priority	Goal Timeframe
Property Protection		
Project 2.1.1: Critical Facility Seismic Retrofits	High	Near Term
Project 1.1.3: Fuel Reductions	High	Near Term
Project 1.2.1: Dry Hydrants	High	Near Term
Project 3.2.3: Backflow Prevention	High	Near Term Post Disaster
Project 1.3.2: Sprinklers	Medium	Mid Term
Project 1.3.1: City Hydrants	Low	Long Term
Infrastructure Protection		
Project 3.1.2: Critical Facility Flood Mitigation	High	Near Term Post Disaster
Project 2.1.2: Infrastructure Seismic Improvements	High	Near Term Post Disaster
Project 3.1.1: Bridge, Culvert, and Road Improvements	High	Near Term Post Disaster
Project 3.1.4: Dam Security	Medium	Mid Term
Project 3.1.3: Water Body and Drain Maintenance	Medium	Mid Term Post Disaster
Population Protection		
Project 6.2.4: NOAA Weather Radios	High	Ongoing
Project 6.1.3: Sheltering Plan	High	Near Term Post Disaster
Project 5.1.1: Communicable Disease Prevention Program	Medium	Mid Term
Project 6.2.2: Storm Ready Community	Medium	Mid Term
Project 1.2.2: Ingress/Egress Road Improvements	Medium	Mid Term
Project 6.1.1: Generators	Medium	Ongoing Post Disaster
Project 4.1.1: Montana State Hospital Emergency Exit	Low	Long Term
Project 4.2.1: Natural Gas Line Protection	Low	Long Term

5.4 Funding Sources

Funding for mitigation projects exists from a multitude of sources. Some sources may be specifically designed for disaster mitigation activities, while others may have another overarching purpose that certain mitigation activities may qualify for. Most mitigation funding sources are recurring through legislation or government support. Some, however, may be from an isolated instance of financial support. Whenever possible, creative financing is encouraged. Often, additional funding sources are found through working with other agencies and businesses to identify common or complementary goals and objectives. Table 5.4A shows the programs that may be available to Anaconda – Deer Lodge County. The traditional mitigation programs that are especially relevant for the county are shown in bold. Note that many of the grant programs have a cash or in-kind match requirement.

This list of potential funding sources is certainly not all inclusive. Many opportunities for mitigation funding exist both in the public and private sectors such as businesses, foundations, and philanthropic organizations. A local resource available to Anaconda – Deer Lodge County that could be particularly useful for labor associated with mitigation projects is the Anaconda Job Corps.

Table 5.4A Mitigation Funding Sources

Name	Description	Managing Agencies
AmeriCorps	Provides funding for volunteers to serve communities, including disaster prevention.	▪ Corporation for National & Community Service
Assistance to Firefighters Grants	Provides funding for fire prevention and safety activities and firefighting equipment.	▪ US Department of Homeland Security
Clean Water Act Section 319 Grants	Provides grants for a wide variety of activities related to non-point source pollution runoff mitigation.	▪ US Environmental Protection Agency
Community Development Block Grant (CDBG)	Provides funding for sustainable community development, including disaster mitigation projects.	▪ US Housing and Urban Development
Conservation District “HB 223” Grants	Provides funding for projects sponsored by conservation districts	▪ Montana Department of Natural Resources and Conservation
Economic Development Administration (EDA) Grants and Investments	Invests and provides grants for community construction projects, including mitigation activities.	▪ US Economic Development Administration

Table 5.4A Mitigation Funding Sources (continued)

Name	Description	Managing Agencies
Education Mini-Grants	Provides grants to conservation districts for projects that focus on water and other natural resources	▪ Montana Department of Natural Resources and Conservation
Emergency Watershed Protection	Provides funding and technical assistance for emergency measures such as floodplain easements in impaired watersheds.	▪ US Natural Resources Conservation Service
Environmental Quality Incentives Program	Provides funding and technical assistance to farmers and ranchers to promote agricultural production and environmental quality as compatible goals.	▪ US Natural Resources Conservation Service
Flood Mitigation Assistance Program (FMA)	Provides pre-disaster flood mitigation funding (with priority for repetitive flood loss properties under the National Flood Insurance Program).	▪ Montana Department of Natural Resources and Conservation ▪ FEMA – Region VIII
Hazard Mitigation Grant Program (HMGP)	Provides post-disaster mitigation funding statewide.	▪ Montana Disaster & Emergency Services ▪ FEMA – Region VIII
Hazardous Fuels Mitigation Program	Provides funding for the reduction of hazardous wildfire fuels.	▪ US Bureau of Land Management
Hazardous Materials Planning and Training Grants	Provides funding for planning and training for hazardous materials releases.	▪ Montana Disaster & Emergency Services
Homeland Security Grants	Through multiple grants, provides funding for homeland security activities. Some projects can be considered mitigation.	▪ Montana Disaster & Emergency Services ▪ US Department of Justice ▪ US Department of Homeland Security
Housing and Urban Development (HUD) Grants	Provides a number of grants related to safe housing initiatives.	▪ US Housing and Urban Development
Individual Assistance (IA)	Following a disaster, funds can mitigate hazards when repairing individual and family homes.	▪ Montana Disaster & Emergency Services ▪ FEMA – Region VIII

Table 5.4A Mitigation Funding Sources (continued)

Name	Description	Managing Agencies
Jumpstart Grants	Provides grants for forest stewardship and fuel reduction projects.	▪ Montana Department of Natural Resources and Conservation
Law Enforcement Support Office 1033 Program	Provides surplus military property to local law enforcement agencies.	▪ Montana Public Safety Service Bureau
Map Modernization Program	Provides funding to establish or update floodplain mapping.	▪ Montana Department of Natural Resources and Conservation ▪ FEMA – Region VIII
National Wildlife Wetland Refuge System	Provides funding for the acquisition of lands into the federal wildlife refuge system.	▪ US Fish and Wildlife Service
North American Wetland Conservation Fund	Provides funding for wetland conservation projects.	▪ US Fish and Wildlife Service
NRCS Conservation Programs	Provides funding through a number of programs for the conservation of natural resources.	▪ US Natural Resources Conservation Service
Partners for Fish and Wildlife	Provides financial and technical assistance to landowners for wetland restoration projects in "Focus Areas" of the state.	▪ US Fish and Wildlife Service
PPL Montana Community Fund	Provides grants to Montana organizations in the areas of education, environment, and economic development.	▪ PPL Montana
Pre-Disaster Mitigation (PDM) Grants	Provides grants through a competitive process for specific mitigation projects, including planning.	▪ Montana Disaster & Emergency Services ▪ FEMA – Region VIII
Public Assistance (PA)	Following a disaster, funds can be used to mitigate hazards when repairing damages to public structures or infrastructure.	▪ Montana Disaster & Emergency Services ▪ FEMA – Region VIII
Reclamation and Development Grants Program	Provides funding from the interest income of the Resource Indemnity Trust Fund to local governments for dam safety and other water related projects.	▪ Montana Department of Natural Resources and Conservation

Table 5.4A Mitigation Funding Sources (continued)

Name	Description	Managing Agencies
Renewable Resource Development Grant	Provides funding to protect, conserve, or develop renewable resources, including water.	▪ Montana Department of Natural Resources and Conservation
Repetitive Flood Claims (RFC) Grant	Provides funding to reduce flood damages to insured properties that have had one or more claims to the NFIP.	▪ Montana Department of Natural Resources and Conservation ▪ FEMA – Region VIII
Rural Development Grants	Provides grants and loans for infrastructure and public safety development and enhancement in rural areas.	▪ US Department of Agriculture, Rural Development
Rural Fire Assistance (RFA) Grant	Funds fire mitigation activities in rural communities.	▪ National Interagency Fire Center
SBA Pre-Disaster Mitigation Loan Program	Provides low-interest loans to small businesses for mitigation projects.	▪ US Small Business Administration (SBA)
Severe Repetitive Loss (SRL) Grant	Provides funding to reduce flood damages to residential insured properties that have had at least four claims to the NFIP.	▪ Montana Department of Natural Resources and Conservation ▪ FEMA – Region VIII
Small Flood Control Projects	Authority of USACE to construct small flood control projects.	▪ US Army Corps of Engineers (USACE)
Streambank & Shoreline Protection	Authority of USACE to construct streambank stabilization projects.	▪ US Army Corps of Engineers (USACE)
Volunteer Fire Assistance (VFA) Grants	Provides funding for wildfire prevention and suppression projects.	▪ Montana Department of Natural Resources and Conservation
Watershed Planning Assistance	Provides funding for watershed planning activities through conservation districts.	▪ Montana Department of Natural Resources and Conservation
Western States Wildland Urban Interface Grant	Provides funding for pre-disaster wildfire mitigation.	▪ Montana Department of Natural Resources and Conservation
Wetland Program Development Grants (WPDGs)	Provides funding for studies related to water pollution prevention.	▪ US Environmental Protection Agency
Woody Biomass Utilization and Fuels for Schools and Beyond Programs	Facilitates and promotes the beneficial use of woody biomass created by forest management treatments.	▪ Montana Department of Natural Resources and Conservation

5.5 Existing Planning Mechanisms and Capabilities

Implementing mitigation projects requires cooperation and coordination between a variety of agencies, organizations, and the public. Most mitigation projects are time consuming and may require the attention of local officials with many other priorities. Incorporating mitigation ideas and information into existing planning mechanisms and programs is one way to use existing resources to achieve mitigation objectives.

Recent economic slowdowns may have tempered growth in the county but this slowdown also provides the opportunity to look at existing policies and regulations so that future development may be better protected as economic conditions improve.

Anaconda – Deer Lodge County has a relatively small tax base that limits the number of resources and amount of time that can be devoted to mitigation, or even planning and emergency management for that matter. Therefore, the county may require additional assistance and support in order to perform the most basic mitigation activities such as grant applications or community outreach. Anaconda – Deer Lodge County has one part-time coordinator, assisted by a part-time deputy, to manage Disaster and Emergency Services activities for the county. Anaconda – Deer Lodge County participates in the National Flood Insurance Program (NFIP) and has a designated floodplain administrator, however, floodplain administration is only one of many responsibilities for this individual. In general, the county has only a few planning mechanisms through which mitigation concepts can be integrated. Table 5.5A lists the existing local plans and development mechanisms.

Table 5.5A Existing Local Plans and Development Mechanisms

Plan Name	Date
Anaconda – Deer Lodge County Growth Policy	2010
Anaconda – Deer Lodge County Subdivision Regulations	January 1994
Anaconda – Deer Lodge County Development Permit System	December 1992
Anaconda – Deer Lodge County Capital Improvements Plan	
Anaconda – Deer Lodge County Community Wildfire Protection Plan	September 2005

A variety of legislation enables the implementation of mitigation activities including, but not limited to:

- Robert T. Stafford Disaster Relief and Emergency Assistance Act
- Presidential Executive Order 12898, Environmental Justice
- Presidential Executive Order 11988, Floodplain Management
- Presidential Executive Order 11990, Protection of Wetlands
- Montana Code Annotated, Title 10, Chapter 3, Disaster and Emergency Services
- Montana Code Annotated, Title 76, Chapter 5, Flood Plain and Floodway Management
- Montana Code Annotated, Title 50, Chapter 60, Building Construction Standards
- Montana Code Annotated, Title 76, Chapter 2, Planning and Zoning
- Anaconda – Deer Lodge County Floodplain Ordinance
- Anaconda – Deer Lodge County Subdivision Regulations
- Anaconda – Deer Lodge County Development Permit System

As the county develops new plans and existing plans are updated, the new plans and updates will utilize the hazard information and actions identified in this mitigation plan for consideration and inclusion. Given that limited planning mechanisms exist in the county, the information in this mitigation plan will be valuable for future planning efforts. Most of the integration of mitigation into existing plans will be done by the Planning Departments and/or Board as the plans are updated or created, however, for more comprehensive integration, local officials and other departments will also need to consider mitigation when making decisions and updating codes, regulations, policies, and plans. Table 5.5B shows examples of how mitigation can be incorporated into existing and future planning documents. Note that some proposed mechanisms may not be feasible at this time or any time in the near future due to the staff, technical expertise, political, and financial resources needed to implement the program.

Table 5.5B Incorporation into Existing and Future Plans

Existing or Anticipated Plan	Mitigation Strategies
Capital Improvement Plan	▪ When updated, consider and include projects related to hazard mitigation, such as transportation and public utility infrastructure and building improvements, in the capital improvements schedule.
Community Wildfire Protection Plan	▪ When updated, continue to emphasize mitigation activities in the strategy portion of the plan.
Development Permit System	▪ Continue to enforce the state building code. This activity will reduce the risks to future development from hazards such as earthquakes, tornadoes, strong winds, heavy snow, terrorism, urban fire, and volcanic ashfall.
Economic Development Strategy	▪ When developed or updated, include elements of the risk assessment and mitigation strategy into the strategy, considering sustainability and disaster resistance a top priority since disasters often lead to economic problems.
Emergency Operations Plan	▪ Integrate the operational, response, training, and preparedness needs that are not directly tied to mitigation into the county's emergency operation plan.
Growth Policy	▪ When updated, include elements of the risk assessment and mitigation strategy into the growth policy, considering sustainability and disaster resistance a top priority.
Subdivision Regulations	▪ When updated, incorporate elements of the risk assessment and mitigation strategy into the subdivision regulations, considering sustainability and disaster resistance a top priority.
Zoning / Ordinances	▪ Adopt ordinances that create disaster resistance such as fire reduction ordinances, flood ordinances, and open space zoning in hazard areas.

6. PLAN MAINTENANCE

An important aspect of any useable plan is the maintenance and upkeep of the document. The Anaconda – Deer Lodge County (ADLC) Commission is ultimately responsible for ensuring this plan is kept up to date. To facilitate and ensure the plan will remain viable for jurisdictions for many years, the plan maintenance responsibilities are delegated to the Anaconda – Deer Lodge County Disaster and Emergency Services (DES) Coordinator and the Local Emergency Planning Committee (LEPC). The LEPC meets regularly and is responsible for coordinating emergency planning issues for the county. Given the broad representation of agencies and jurisdictions, this committee is a good fit, has many members that participated in the plan development, and eliminates the need for an additional committee. All Local Emergency Planning Committee meetings are open to the public.

From the time when the 2005 plan was originally developed to the 2013 update, very little direct review of the plan occurred. Projects were implemented and mitigation progressed, but formal changes to the plan and specific review meetings were not conducted. Therefore, in 2013, changes were made to the plan maintenance to reflect a more realistic approach to plan maintenance.

6.1 Plan Monitoring

The plan will be monitored by the ADLC DES Coordinator and the ADLC LEPC, and mitigation progress will be discussed through agency/department reports at each LEPC meeting, usually monthly. The status of projects will be reported on and new projects will be initiated during this time.

The ADLC DES Coordinator and the ADLC LEPC will review the goals, objectives, and projects, as needed, such as when a mitigation grant application opportunity exists, to determine if the actions for which funding exist are proceeding as planned and if new projects should be initiated. The DES Coordinator and LEPC will review any new risk information and modify the plan as indicated by the emergence of new vulnerabilities. Review of ongoing projects will be conducted to determine their status, their practicality, and which actions should be revised. If needed, site visits will be conducted and/or relevant state or federal program specialists will be invited to speak to the LEPC and local officials regarding mitigation opportunities. Reporting requirements for federal mitigation grants and such are the responsibility of the agency applying for and receiving the grant, unless other arrangements have been made. Also, land use, comprehensive, and strategic plans will be monitored as related to the Hazard Mitigation Plan, and similarly, the Planning Department will be encouraged to participate in all plan review and updates.

Available resources working on mitigation activities will be evaluated periodically by the ADLC DES Coordinator and ADLC LEPC to determine if a mitigation or project subcommittee or additional resources are needed to apply for and implement a particular project. Additional resources will be requested, as applicable.

6.2 Plan Evaluation

The evaluation of the plan will be conducted by the ADLC DES Coordinator and the ADLC LEPC, possibly with assistance from contractors, as needed and at a minimum of once every five years, at LEPC and other public meetings. At these meetings, the methods of implementing and maintaining the plan will be evaluated for successes and improvements. Changes to the implementation schedule or plan maintenance will be made as needed to ensure hazard mitigation activities continue. The evaluation will consider the following:

- changes in land development,
- if the nature or magnitude of risks has changed,
- if the goals and objectives address current and expected conditions,
- the effectiveness of the programs,
- if outcomes have occurred as expected,
- if other agencies and partners have participated as originally planned,
- if current resources are adequate for implementing the plan,
- if other programs exist that may affect mitigation priorities.

New stakeholders and interested parties will be identified and invited to participate in the implementation process. The ADLC DES Coordinator and the ADLC LEPC maintain a contact list of mitigation stakeholders. Should a hazard event have occurred in which a mitigation project was a factor, either positive or negative, a summary report, including avoided losses, will be written and included in Appendix K.

6.3 Plan Updates

As disasters occur, projects are completed, and hazard information is improved, the Anaconda – Deer Lodge County Hazard Mitigation Plan will need to be updated. To remain an active and approved plan, an updated plan must be submitted to Montana Disaster and Emergency Services (DES) and the Federal Emergency Management Agency (FEMA) every five years. The next formal submission is required in 2018. To provide enough time for a full update before this plan expires, the following schedule is recommended:

- Pre-Disaster Mitigation Planning Grant Application Preparations: late 2016
- Pre-Disaster Mitigation Planning Grant Application: early 2017
- Contracting for Professional or Technical Services (if needed): 2017
- Plan Reviews and Modifications: January – August 2018
- Montana DES and FEMA Reviews: September - October 2018
- Final Revisions and Adoption: November 2018
- Final Plan Approval: December 2018

To facilitate the update process, annual updates to the plan are recommended. Table 6.3A shows the schedule of plan updates.

Table 6.3A Schedule of Plan Updates

Plan Section	Post-Disaster	Annually	Every 5 Years
Introduction			X
Planning Process and Methodologies	X	X	X
Critical Facilities and Infrastructure			X
Population and Structures			X
Economic, Ecologic, Historic, and Social Values			X
Current Land Use			X
Recent Development		X	X
Future Development			X
Hazard Profiles	X		X
Risk Assessment Summary			X
Mitigation Strategy	X	X	X
Plan Maintenance			X
Appendices	X	X	X

6.4 Public Involvement

Anaconda – Deer Lodge County is dedicated to involving the public directly in the review and updates of the Hazard Mitigation Plan. A copy of the Hazard Mitigation Plan will be available for review at the Anaconda – Deer Lodge County Disaster and Emergency Services' Office and the Anaconda – Deer Lodge County Commissioners' Office. The public is also invited to attend all Local Emergency Planning Committee meetings to provide input and feedback. In an effort to solicit involvement, appropriate public notices will be distributed prior to public meetings for plan updates, encouraging the public to attend and provide comment. Written comments may also be submitted at any time to the Anaconda – Deer Lodge County Local Emergency Planning Committee at:

ADLC Local Emergency Planning Committee
c/o ADLC Disaster and Emergency Services
Anaconda – Deer Lodge County Courthouse
800 Main Street
Anaconda, MT 59711

Received comments will be reviewed and integrated where applicable during the five-year plan updates, or sooner if necessary.

Appendix A. INVITED STAKEHOLDERS

Table A1. Invited Stakeholders

Name	Organization	Participation
Lynette Williams	ADLC 911	Meeting
Neal Warner	ADLC Commission	Meeting
Elaine Lux-Burt	ADLC Commission	
Mark Sweeney	ADLC Commission	
Robert Pierce	ADLC Commission	
Rose Nyman	ADLC Commission	Meeting
Rebecca Guay	ADLC Chief Executive	
Connie Ternes Daniels	ADLC Chief Executive ADLC Planning Department	Meeting
Joey Blodnick	ADLC Clerk and Recorder	Data
Karen Courtney	ADLC Code Enforcement	
Gary Wenger	ADLC Communications Board	Meeting
Gerald Thomas	ADLC Coroner Anaconda Job Corps Center	Meeting
Charles Thorpe	ADLC Disaster and Emergency Services	Meeting
Marty Mavrinac	ADLC Disaster and Emergency Services Anaconda Pintler Search and Rescue	Meeting
Ot Lemm	ADLC Disaster and Emergency Services	Meeting
Bill Converse	ADLC Disaster and Emergency Services	Meeting Data
Steve Jorgensen	ADLC Fire/EMS Department	
Victor Zenahlik	ADLC Fire/EMS Department	Meeting
Jay Slocum	ADLC GIS	Data
Tim Barkell	ADLC Law Enforcement	
Bill Sather	ADLC Law Enforcement	Meeting
Linda Best	ADLC Public Health	Meeting
Heidi Nielsen	ADLC Public Health	Meeting Data
Lynn Orr	ADLC Public Health	Meeting
Larry Sturm	ADLC Road Department	Meeting
Michael O'Rourke	ADLC Schools	
Trisha Davies	American Red Cross	
Robert Mazzolini	Anaconda Amateur Radio Club	Meeting
	Anaconda Chamber of Commerce	
	Anaconda Local Development Corporation	
Cookie Johnson	Anaconda School District	Meeting
Janet Krivacek	Beaverhead Deerlodge National Forest, Butte Ranger District	
Charlene Bucha Gentry	Beaverhead Deerlodge National Forest, Pintler Ranger District	
Russ Riebe	Beaverhead Deerlodge National Forest, Wise River Ranger District	
	Big Hole River Foundation	
Jen Downing	Big Hole Watershed Committee	

Table A1. Invited Stakeholders (continued)

Name	Organization	Participation
Pam Shrauger	Big Sky Hazard Management LLC	Consultant Meeting
	Bonneville Power Administration	
Steve McNeece	Community Hospital of Anaconda	
Audrey Aspholm	Community Hospital of Anaconda	Meeting
Bart Bonney	Georgetown Lake Volunteer Fire Department	Meeting
Jeff Brock	Georgetown Lake Volunteer Fire Department	Meeting
	Lost Creek/Antelope Gulch Volunteer Fire Department	
Joe Griffin	Montana Department of Environmental Quality	
Jonathan Clark	Montana Department of Natural Resources and Conservation	Meeting
Mike Meyer	Montana Department of Natural Resources and Conservation	
Kent Atwood	Montana Disaster and Emergency Services	Data
Martha Jo Smith	Montana Disaster and Emergency Services	
John Glueckert	Montana State Hospital	
David Gregory	Montana State Hospital	Data
Barbara Andreozzi	Montana State University Extension	Meeting
Marty Whitmore	National Weather Service, Missoula	
	Northwestern Energy	
	Opportunity Volunteer Fire Department	
	Race Track Valley Fire District	
Chad Lanes	Tri-County Sanitarian	Meeting
Terina Goicoechea	US Bureau of Land Management	Meeting Data
Craig Engelhard	US Natural Resources Conservation Service	
	Vigilante Electric Cooperative	
	West Valley Volunteer Fire Department	

Appendix B. PUBLIC INFORMATION

Anaconda Leader, April 23, 2004

County developing plan to mitigate hazards

The Anaconda-Deer Lodge Local Emergency Planning Committee (LEPC) is trying to make the community safer.

The county has received a grant from the Federal Emergency Management Agency (FEMA), now part of the Department of Homeland Security, and Montana Disaster and Emergency Services to create a hazard mitigation plan.

The plan will address major hazards such as earthquakes, wildfires, and flooding and list possible measures that could be taken to make the community more disaster resistant. Mitigation can take many different forms from construction projects to public education. This plan will also allow the county to be eligible for future federal and state mitigation grants.

"Public involvement is an extremely important part of this plan," said Larry Akers, State Mitigation Officer with Montana Disaster and Emergency Services. "I would encourage anyone with ideas or an interest in helping make Deer Lodge County less vulnerable to disasters to attend the public meetings. This plan will guide how the community deals with disaster prevention in the future."

An LEPC meeting is scheduled for 9:30AM on Wednesday, May 5th at the Anaconda Local Development Corp. After regular LEPC business, the focus will be on hazard analysis and mitigation goal development. For more information or to provide suggestions, contact Pam Pedersen at 406-581-4512.

Sent to the Anaconda Leader, October 7, 2004

Deer Lodge County Holding Hazard Mitigation Planning Meeting

The Anaconda-Deer Lodge Local Emergency Planning Committee (LEPC) is trying to prevent disasters before they happen and is asking for the public's help in doing so. To date, the planning committee has identified the greatest hazards that threaten the community including flooding, wildland fires, winter storms, wind, drought, earthquakes, hazardous materials spills, tornadoes, severe thunderstorms, avalanches, landslides, urban structure fires, aircraft accidents, volcanic ash fall, communicable disease, civil unrest, and terrorism. The county has received a grant from the Federal Emergency Management Agency (FEMA), now part of the Department of Homeland Security, and Montana Disaster and Emergency Services to develop the Hazard Mitigation Plan.

"Public involvement is an extremely important part of this plan," said Larry Akers, State Mitigation Officer with Montana Disaster and Emergency Services. "I would encourage anyone with ideas or an interest in helping make Deer Lodge County less vulnerable to disasters to attend the public meetings. This plan will guide how the community deals with disaster prevention in the future."

An LEPC meeting is scheduled for 9:00AM on Tuesday, October 12th at the Anaconda Local Development Corporation. After regular LEPC business, the focus will be on reviewing hazard maps and identifying critical facilities. For more information or to provide suggestions, please contact Pam Pedersen at 406-581-4512.

Anaconda Leader, November 12, 2004

Disaster prevention meeting planned

The Anaconda-Deer Lodge Local Emergency Planning Committee is writing a plan to address potential for losses from disasters.

To date, the committee has identified the greatest hazards to be flooding, wildland fires, winter storms, wind, drought earthquakes, hazardous materials spills, tornadoes, severe thunderstorms, avalanches, landslides, urban structure fires, aircraft accidents, volcanic ash fall, communicable disease, civil unrest and terrorism.

ADLC has received a grant from the Federal Emergency Management Agency, now part of the Department of Homeland Security, and Montana Disaster and Emergency Services to develop the hazard mitigation plan.

A public LEPC meeting is scheduled for 9 a.m. on Thursday, Nov. 18, at the Anaconda Local Development Corp., 118 East Seventh. A presentation on the results of the hazard and vulnerability assessment will be given. Those who attend are encouraged to provide suggestions on how losses can be prevented. For more information or to provide suggestions, contact Pam Pederson at 406-581-4512.

Anaconda Leader, November 17, 2004

Anaconda-Deer Lodge County Local Emergency Planning Committee will meet at 9 a.m. at the Local Development Corporation. On the agenda, presentation by Pam Pederson, Big Sky Hazard Management, update on Four-County Committee (Deer Lodge, Silver Bow, Granite and Beaverhead), discussion on grant process and water grant.

Anaconda Leader, April 20, 2005

Disaster prevention meeting scheduled

The Anaconda-Deer Lodge Local Emergency Planning Committee (LEPC) has analyzed the major hazards that threaten the community and is asking for the public's help in identifying strategies to mitigate those hazards.

"The goals and strategies in this plan are only as good as the community support they receive," says Buzz Peterson, Anaconda-Deer Lodge Disaster and Emergency Services coordinator.

"We hope to develop a plan that will make Deer Lodge County a safer place to live and work in the long term."

A public meeting will be for Monday at 9 a.m. at the Anaconda Local Development Corp., 118 East 7th St. A presentation will be given on the draft hazard analysis results. Attendees will then brainstorm recommendations that will help prevent future disaster losses.

This Pre-Disaster Mitigation Plan is being written through a grant received from the Department of Homeland Security and Montana Disaster and Emergency Services. The plan, once approved, will allow Anaconda-Deer Lodge to apply for future federal and state mitigation grants.

Anaconda Leader, May 25, 2005

Final meeting scheduled on pre-disaster mitigation plan

The Anaconda-Deer Lodge Local Emergency Planning Committee (LEPC) invites the public to review and comment on its "Pre-Disaster Mitigation Plan."

This plan identifies and analyzes the major hazards that threaten the community and prioritizes strategies to prevent future disaster losses.

A public meeting is scheduled for Thursday at 10 a.m. at the Anaconda Local Development Corporation, 118 E. Seventh St. A copy of the draft plan can be found at the Hearst Free Library or on the Internet at: www.bigskyhazards.com.

Comments can be submitted to Big Sky Hazard Management LLC at 406-581-4512 or pam@bigskyhazards.com. The deadline for comments is June 2.

This Pre-Disaster Mitigation Plan is being written through a grant from the Department of Homeland Security and Montana Disaster and Emergency Services.

The plan, once approved by the commission, will allow Anaconda-Deer Lodge County to apply for future federal and state mitigation grants.

Sent to the Anaconda Leader, January 30, 2012

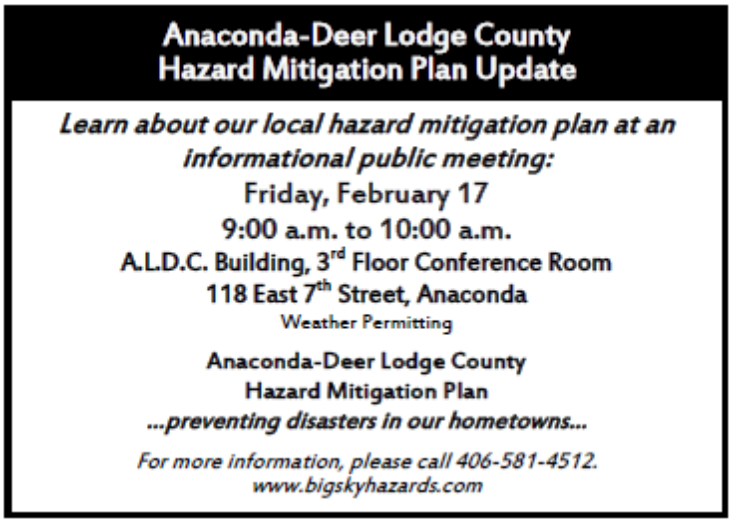
Planning to Prevent Disasters

Ever wonder what types of disasters are possible here? Are we doing all we can to mitigate future disaster losses? Residents of Anaconda-Deer Lodge County now have the opportunity to explore possible disaster scenarios and take part in minimizing the impacts, before the disaster occurs. The countywide Hazard Mitigation Plan does just that. This plan, originally developed in 2005 and now being updated, identifies the major hazards threatening the communities and the values at risk. Based on the plan's risk assessment, long term, sustainable projects ranging from education programs to infrastructure retrofits to land use regulations are identified as possible solutions to reduce future losses. Once the plan is adopted and approved, the jurisdictions may be eligible for future grant funds and additional assistance before and following a disaster.

"We can't do this without the help of the residents," says Pam Shrauger of Big Sky Hazard Management LLC, an emergency management planning firm based in Bozeman hired to coordinate the plan's update. "We want a plan that is locally driven and useful, not something to stick on a shelf. Surely, residents have good ideas regarding what can be done to reduce future disaster losses in ways that are responsible and manageable."

A meeting, designed to involve the public in the plan update process, is scheduled for Friday, February 17th from 9:00 a.m. to 10:00 a.m. in the A.L.D.C. Building, 3rd Floor Conference Room located at 118 East 7th Street, Anaconda, weather permitting. If you cannot attend the meeting, but would still like to be involved, please contact Pam Shrauger at 406-581-4512.

Copies of the original plan developed in 2005 can be found online at: http://www.bigskyhazards.com/draftplans.asp. Comments and updates related to the original plan are encouraged.



Sent to the Anaconda Leader, August 15, 2013

Countywide Mitigation Plan Update Nearly Complete

Floods, earthquakes, hail storms, wildfires, and winter storms - just to name a few; these are all hazards profiled in the updated Anaconda – Deer Lodge County Hazard Mitigation Plan. The concept of this plan is to identify potential hazards and mitigate losses, before the disasters occur.

"National studies have shown that for every dollar spent on mitigation, four dollars in future disaster losses are saved. So, it's not just about doing the right thing, it's also financially important," advises Pam Shrauger, the consultant working on the plan.

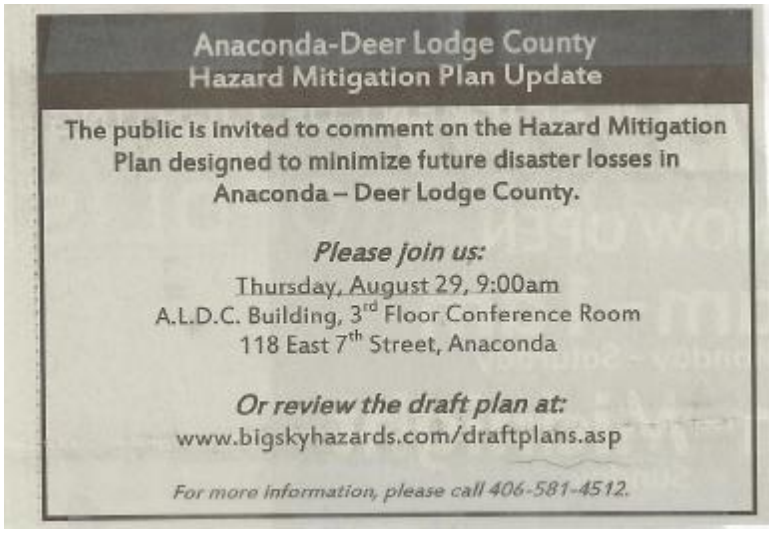
The updated plan, originally developed in 2005, identifies twenty-one major hazards and details each, including information on historical occurrence, probability, and impacts to critical facilities and the population. Mitigation strategies for Anaconda – Deer Lodge County address some of the potential losses. Examples include reducing wildfire fuels around structures, upgrading bridges and culverts for floodwaters, retrofitting public buildings for earthquakes, and continuing to improve growth regulations to encourage smart development in hazardous areas. An approved mitigation plan is a federal requirement for hazard mitigation funding both before and immediately following a disaster.

Draft sections of the plan can be read and downloaded from the internet at: http://www.bigskyhazards.com/draftplans.asp. Comments are due by September 5, 2013 and can be submitted to Big Sky Hazard Management, 4855 South Third Avenue, Bozeman, MT 59715 or by calling 406-581-4512.

The public is also invited to get more information or provide comments at the free, public meeting scheduled for Thursday, August 29th from 9:00 a.m. to 10:00 a.m. in the A.L.D.C. Building, 3rd Floor Conference Room located at 118 East 7th Street, Anaconda.

"We encourage the public to be involved every step of the way," says Shrauger. "These are your communities being protected, and anyone with an interest has a spot at the table."

Anaconda Leader, August 23, 2013



Anaconda-Deer Lodge County
Hazard Mitigation Plan Update

The public is invited to comment on the Hazard Mitigation Plan designed to minimize future disaster losses in Anaconda – Deer Lodge County.

Please join us:

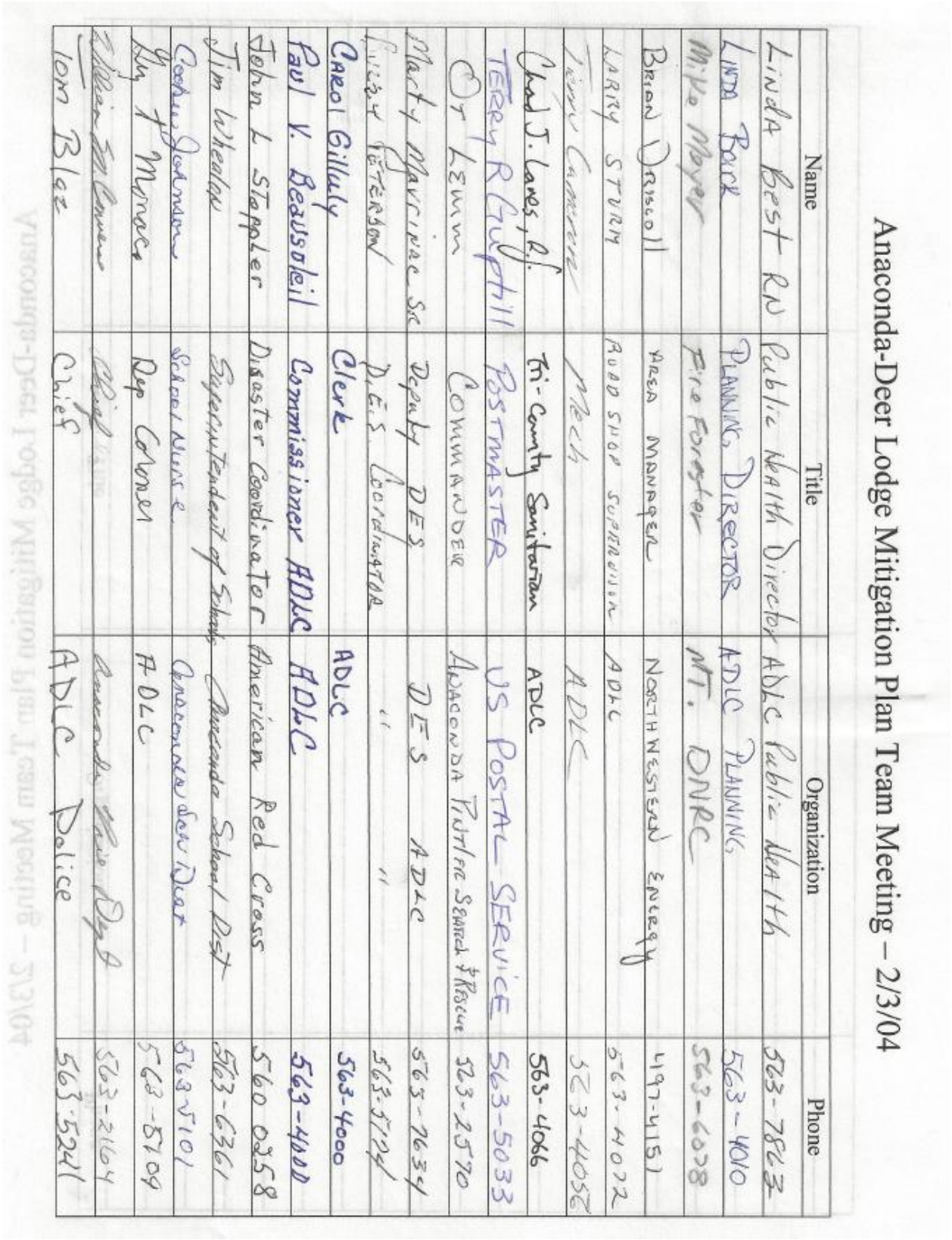
Thursday, August 29, 9:00am
A.L.D.C. Building, 3rd Floor Conference Room
118 East 7th Street, Anaconda

Or review the draft plan at:

www.bigskyhazards.com/draftplans.asp

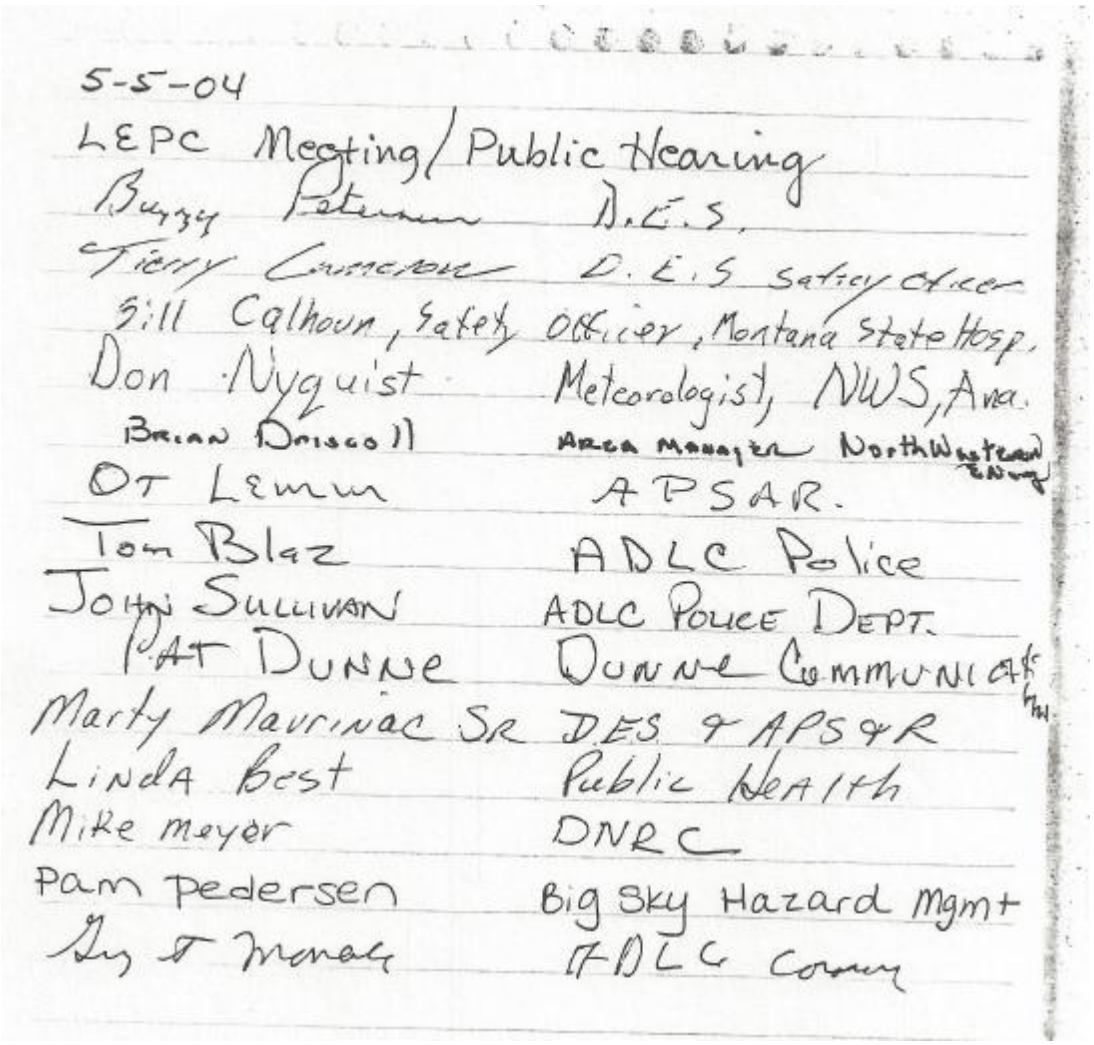
For more information, please call 406-581-4512.

Appendix C. MEETING ATTENDANCE RECORDS



Anaconda-Deer Lodge Mitigation Plan Team Meeting – 2/3/04

Name	Title	Organization	Phone
Linda Best RN	Public Health Director	ADLC Public Health	563-7822
Linda Bark	Planning Director	ADLC Planning	563-4010
Mike Mayer	Fire Forester	MT. DNRC	563-6078
Brian Driscoll	Area Manager	Northwestern Energy	497-4151
Larry Sturm	Road Shop Supervisor	ADLC	563-4072
Terry Cameron	Mech	ADLC	563-4056
Chad J. Lanes, R.S.	Tri-County Sanitarian	ADLC	563-4066
Terry R Guptill	Postmaster	US Postal Service	563-5033
Ott Lemm	Commander	Anaconda Mutual Search & Rescue	563-2570
Marty Mavrinac Sr.	Deputy DES	DES ADLC	563-2634
Lucian Peterson	D.E.S. Coordinator	" "	563-5724
Carol Gillaly	Clerk	ADLC	563-4000
Paul V. Beausoleil	Commissioner ADLC	ADLC	563-4000
John L Stapler	Disaster Coordinator	American Red Cross	560 0258
Jim Wheatley	Superintendent of Schools	Anaconda School Dist	563-6361
Cochise Johnson	School Nurse	Anaconda Deer Lodge	563-5101
Guy F Munroe	Dep Coroner	ADLC	563-5709
William M Connors	Chief	Anaconda Police Dept	563-2164
Tom Blaz	Chief	ADLC Police	563-5241



5-5-04
LEPC Meeting/Public Hearing
Buzzy Peterson D.E.S.
Terry Cosmore D.E.S safety officer
Bill Calhoun, Safety Officer, Montana State Hosp.
Don Nyquist Meteorologist, NWS, Ana.
Brian Driscoll Area Manager Northwestern Energy
OT Lemm APSAR.
Tom Blaz ADLC Police
John Sullivan ADLC Police Dept.
Pat Dunne Dunne Communications
Marty Maurinac SR DES & APS&R
Linda Best Public Health
Mike Meyer DNRC
Pam Pedersen Big Sky Hazard Mgmt
Guy T Manag ADLC Comm

Anaconda-Deer Lodge Mitigation Plan Meeting – 10/12/04

Name	Title	Organization	Phone
Buzzy Johnson	D.E.S. Coordinator	Ana-Deer Lodge Co	563-5184
William M. Conners	Anaconda Fire Chief	Ana, Fire Dept.	563-3164
Paul A Collmansperger	MAINTENANCE DIRECTOR	COMMUNITY HOSPITAL	563-8547
Tammy Mailand	ADLC Ambulance Supervisor	Ana, Ambulance	563-6144
Mike Meyer	Fire Forester	MT. DNRC	563-6078
Guy A Monaco	Coroner. office	DCL	563-5909
Terry Cameron	Safety	ADLC	563-4052
Marty Mavrinac SR	Deputy DES	A DLC	563-7634
OT Lemm	VC	Anaconda Pintler Search & Rescue	563.2570
Pam Pedersen	contractor	Big Sky Hazard Mgmt	581-4512

Anaconda-Deer Lodge Mitigation Plan Meeting – 11/18/04

Name	Organization	E-mail
Pam Pedersen	Big Sky Hazard management	pam@bigskyhazards.com
Brian Driscoll	North Western Energy 497-4151	
Ot Lemm	Anaconda Pintlar Search & Rescue	SEENOT @ IN-TCH, Com
William M. Converse	Anaconda Fire Dept.	anacondafire@rfwave.net 563-2164
Bryyy [illegible]	D.E.S. L.E.P.C Chairman	[illegible]@rfwave.net
Jim Orr	Anaconda Community Hospital	martinsmavrinac@bmi.net.
Marty Mavrinac	S&R – DES	
Bill Calhoun	Montana State Hospital	Bcalhoun@state.mt.us 693-7002
Tim Leppky	A.L.D.C. Water Dept	563-7111
Carl Eccleston	Anaconda Water Dept.	563-7111
Terry Vaughn	Dept. Natural Resources & Conservation	tvaughn@state.mt.us 563-6078
Linda Best	ADLC Public Health Department	adlcph@rfwave.net 563-7863
Larry Thomas	ADLC Road Dept Supervisor	1-406-563-4056 OR 4074
JEFF BLOCK	GTLVFD	GTLVFD@AOL.COM

Anaconda-Deer Lodge Mitigation Plan Meeting – 04/25/05

Name	Organization	E-mail
Tommy Moreland	ADLC Ambulance	
Marty Mavrinac	S&R & DES	martinjmavrinac@bmi.net
Tom DeTonancour	~~TDetonancour~~ Ana. Police	TDetonancour@deerlodgemt.us
John Sullivan	Anaconda Police	JSullivan@co.deerlodge.mt.us
Terry Vaughn	DNRC	tvaughn@mt.gov
William M. Converse	Anaconda Fire	anacondafire@rfwave.net
David A Collinsworth	Anaconda Community Hospital	D.Collinsworth@CHEA.NET
Linda Best	ADLC Public Health Dept.	adlcph@rfwave.net
Buzzy Lehman	L.E.P.C Chairman - DES	desadca@rfwave.net
pam Pedersen	Big Sky Hazard Mgmt LLC	pam@bigskyhazards.com
Trisha J Davis	Red Cross	MTSONGDOGS@MSN.COM

Anaconda-Deer Lodge Mitigation Plan Meeting – 05/26/05

Name	Organization	E-mail
"C" Lemm	Anaconda Pintler Search + Rescue	seenot@in-tch.com
OT LEMM	ANACONDA PINTLER S&R.	✓ ✓
Trisha Davies	Pioneer Dist Red Cross	MT-SONGDOGS@MSN.COM
TERRY VAUGHN	DNRC	tVAughN@MT.gov
Marty Mavrinac	Deputy DES + S&R	martinjmavrinac@bmi.net
DAVID A COLLINSWORTH	COMMUNITY HOSPITAL	D COLLINSWORTH @ CHOA. NET
WILLIAM M. CONVERSE	ANACONDA FIRE DEPT.	anacondaFire@rfwave.net.
PAT DUNNE	DUNNE COMMUNICATIONS INC	pkdunne@rfwave.net.
LARRY HEAPHY	ANACONDA J&B CORPS	lheaphy@fs.fed.us
Buzzy Reed	Anaconda J E.E. Ana-Deer Lodge	
Tom DeTonancourt	Anaconda P.D.	TDetonancourt@co.deerlodge.mt.us
John Sullivan	" "	JSullivan " " " "
David Gregory	Montana State Hospital	DGregory@MT.GOV

PDM IN KIND MATCH

PDM Meeting

Anaconda Local Development Corperation 117 East 7th St.

2/17/2012

Time: 0900

Pam Strauger Big Sky Hazaard Management LLC

	Name & Affiliation	E-mail and phone number	Federally Funded	Miles Traveled
1	Name: William M. Connors Organization: ADLC / DES	DESANA@RFWAVE.NET	Yes (No)	
2	Name: Charles Thorpe Organization: DES / ANACONDA		Yes (No)	
3	Name: M J Mavrinac Sr Organization: ADLC / SHR / DES		Yes (No)	
4	Name: DT Lemm Organization: ADLC - DES SAFETY OFFICER -		Yes No	
5	Name: Audrey J. Aspholm Organization: Community Hospital of Anaconda	aaspholm@chofa.net	Yes No	
6	Name: Jonathan Clark Organization: MT ANG	jclark2@mt.gov	Yes (No)	
7	Name: Barb Andreozzi Organization: MSU Extension	bandreozzi@montana.edu	(Yes) & (No)	
8	Name: TERINA MULLEN Organization: USDI - BLM	tmmullen@blm.gov 406-533-7665	(Yes) No	
9	Name: Heidi Nielsen Organization: ADLC Public Health	adlcph2@rfwave.net 563-7863	(Yes) & (No)	
10	Name: Rose M. Nyman Organization: ADLC Commission	rose.nyman1@gmail.com 563-3288	Yes No	
11	Name: LARRY STUNK Organization: ADLC ROAD	ROAD@ANACONDA.DEERLODGE.MT.GOV 563-4072	Yes (No)	
12	Name: Chad J. Lanes Organization: Tri-County Environmental Health	clanes@anaconda.deerlodge.mt.gov 563-4066	Yes (No)	
13	Name: BART BONNEY Organization: GTLVFD	jbingspect@msn.com 560-0695	Yes (No)	42
14	Name: JEFF BROCK Organization: GTLVFD CHIEF	Jeffbrock123@GMAIL 406 691 0150	Yes (No)	42
15	Name: GARY WINEGAR Organization: COMM BOARD	G1-WINGS@MSN.COM	Yes (No)	
16	Name: Neal Warner Organization: ADLC Commissioner	commissionerwarner@gmail.com	Yes (No)	
17	Name: COOKIE JOHNSON Organization: ANACONDA SOIL DIST	COOKIE@SCD10.ORG	(Yes) No	
18	Name: GERALD THOMAS Organization: ADLC CORONER - USFS/AJCC	CORONER ANACONDA DEERLODGE QMT.GOV	Yes (No)	

FC 205

PDM IN KIND MATCH

Meeting/Training: _____ **FY**_____

Location:_____

Date: _____ **Start Time:**_____ **End Time:**_____

Instructor/Facilitator: _____

	Name & Affiliation	E-mail and phone number	Federally Funded	Miles Traveled
1	Name: Steve Jorgenson	anacondafire@rfwave.net	Yes	
	Organization: Fire/EMS Chief	563-2164	(No)	
2	Name: BILL SATHER	BSATHER@ANACONDADEERLODGE.MT.GOV	Yes	
	Organization: ANACONDA POLICE ASST. CHIEF	563-5242	(No)	
3	Name: VICTOR ZENAHLIK	SMOKEJUMPERFD@YAHOO.COM	Yes	
	Organization: FIRE/EMS CAPTAIN	563-2164	No	
4	Name:		Yes	
	Organization:		No	
5	Name:		Yes	
	Organization:		No	
6	Name:		Yes	
	Organization:		No	
7	Name:		Yes	
	Organization:		No	
8	Name:		Yes	
	Organization:		No	
9	Name:		Yes	
	Organization:		No	
10	Name:		Yes	
	Organization:		No	
11	Name:		Yes	
	Organization:		No	
12	Name:		Yes	
	Organization:		No	
13	Name:		Yes	
	Organization:		No	
14	Name:		Yes	
	Organization:		No	
15	Name:		Yes	
	Organization:		No	
16	Name:		Yes	
	Organization:		No	
17	Name:		Yes	
	Organization:		No	
18	Name:		Yes	
	Organization:		No	

SIGN IN LIST

Meeting/training	LEPC/ PDM		
Location:	ALDC	**Date:**	8/29/2013
Time of meeting/training	900		
Staff Person	William M. Converse Pam Shrauger		

Name & Affiliation	E-mail and phone number	Federally Funded (Yes or No)			
Name: William M. Converse Organization: ADLC/DES		NO			
Name: Lynette Williams Organization: 911	lwilliams@anacondadeerlodge.mt.gov 563-5241	NO			
Name: Robert MAZZOLINI Organization: AARC	REDBIRAZZOMTN99@NETSCAPE.NET	NO			
Name: GARY WERNER Organization: COMM BOARD		NO			
Name: Audrey Aspholm Organization: CHA / Public	aaspholm@chofa.net	NO			
Name: Pam Shrauger Organization: Big Sky Hazards	pam@bigskyhazards.com	Yes			
Name: Connie Terre Daniels Organization: ADLC	ctdaniels@anacondadeerlodge.mt.gov.	NO			
Name: LINDA Best Organization: Public Health Preparedness	adelphi@rfwave.net	Yes			
Name: Barbara Andreozzi Organization: MSU-DLC Extension	barbara.andreozzi@montana.edu	V3			
Name: LYNN ORR Organization: Public Health	adelph3@rfwave.net	YES			
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Rev. 6/1/09

Appendix D. MEETING NOTES

Anaconda-Deer Lodge County (ADLC) Hazard Mitigation Plan Public Meeting Notes
February 17, 2012, 9:00-10:15 a.m. in Anaconda, Montana

Attendees:

Barb Andreozzi	Montana State University Extension
Audrey Aspholm	Community Hospital of Anaconda
Bart Bonney	Georgetown Lake Volunteer Fire Department
Jeff Brock	Georgetown Lake Volunteer Fire Department
Jonathan Clark	Montana Department of Natural Resources and Conservation
William Converse	ADLC Disaster and Emergency Services
David Gregory	Montana State Hospital
Cookie Johnson	Anaconda School District
Steve Jorgensen	Anaconda Fire/EMS Department
Chad Lanes	Tri-County Environmental Health
Ot Lemm	ADLC Disaster and Emergency Services
Marty Mavrinac Sr.	ADLC Disaster and Emergency Services Anaconda Pintler Search and Rescue
Terina Mullen	US Bureau of Land Management
Heidi Nielsen	ADLC Public Health
Rose Nyman	ADLC Commission
Bill Sather	Anaconda Police Department
Pam Shrauger	Big Sky Hazard Management LLC
Larry Sturm	ADLC Road Department
Gerald Thomas	ADLC Coroner US Forest Service, Anaconda Job Corps
Charles Thorpe	ADLC Disaster and Emergency Services
Neal Warner	ADLC Commission
Gary Wenger	ADLC Communications Board
Victor Zenahlik	Anaconda Fire/EMS Department

Note: Appears that not everyone made it on the sign-in sheet, so please send pam@bigskyhazards.com an email if you notice an attendee is missing.

Handout Contents:

Hazard Mitigation Information Sheet

What is mitigation?
Hazard mitigation prevents a potentially hazardous event from developing into a disaster or reduces the losses incurred when a disaster does occur. Mitigation focuses on *long-term, sustainable measures* that reduce or eliminate the risk to the community. Examples of mitigation include land use regulations, floodplain ordinances, seismic retrofits, living snow fences, culvert upgrades, and wildfire fuel reductions. Note that mitigation is different in many respects from the other phases of emergency management: preparedness, response, and

recovery. Mitigation is not about getting the community ready to respond to a disaster that has occurred or is imminent, rather taking steps to reduce the impacts well before the threat.

Why mitigate?
Mitigation is an investment. Studies have shown that for every dollar spent on mitigation activities, four dollars are saved in disaster losses, plus countless lives have probably been saved. For example, the Federal Emergency Management Agency (FEMA) estimates that the rigorous building standards adopted by 20,000 communities across the country are saving the nation more than $1.1 billion per year in prevented flood damages.

Why plan for mitigation?
Disasters cause significant damages, threaten lives, and disrupt the way of life and economy. By conducting a complete, all-hazard risk assessment, we can objectively analyze what potential losses could be incurred in the future and develop a strategy for reducing such losses. Often, financial assistance for mitigation in the form of federal grants is available following a disaster, but if the community is too busy focusing on the disaster recovery, valuable mitigation opportunities can be lost. By planning, we set up our communities with effective ways to use mitigation funding following a disaster, plus each year, disaster or not, competitive grant funding is available nationally for mitigation projects. Growth and development also provide important mitigation opportunities. By taking the steps necessary to mitigate losses to future development, such as subdivision regulations, building code adoption, zoning, etc., our communities can be better prepared for future growth by protecting citizens before they live in harm's way. Considering mitigation before construction begins can save taxpayers' money since mitigation often costs more after construction is completed than during the planning phase.

Anaconda-Deer Lodge County Hazard Mitigation Plan Information Sheet

WHAT: Hazard Mitigation Plans (also known as Pre-Disaster Mitigation Plans) generally have five major elements:

1. Planning Process Documentation
2. Assets and Community Inventory
3. Risk Assessment
4. Mitigation Strategy
5. Implementation/Plan Maintenance

The basic definition of hazard mitigation is "any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards." Mitigation can take many different forms from construction projects to public education. Examples from other communities include creating or strengthening regulations in hazard areas, reducing fuels around homes in the wildland urban interface, putting fences around drinking water supplies, enlarging culverts, elevating or purchasing property in the floodplain, and educating the public on insurance. Of course, every community is different, but the basic idea is to make your community safer and more disaster resistant.

WHY: By taking action before disaster strikes, the impact to your community during a hazard event can be minimized. More specifically, this plan (to be approved by MT DES and FEMA) is a requirement under the Disaster Mitigation Act of 2000 in order for communities to receive Hazard Mitigation Grant Program and Pre-Disaster Mitigation funds and other types of disaster assistance. More importantly, though, this plan outlines and clarifies the hazards that face the communities and what actions can be taken to minimize their effects.

WHEN: A series of two public meetings will be held to facilitate the plan's update, originally developed in 2005. The first meeting focuses on educating attendees on the definition and purpose of mitigation planning and

reviewing the hazards and mitigation strategies. The second meeting solicits comments on the draft plan and educates attendees on moving the plan forward. A complete plan is expected in September 2012. All meetings are free and open to the public. Comments are welcome and encouraged at any time in this process.

WHERE: The entire jurisdiction of Anaconda-Deer Lodge County is covered by this plan. The county is required to be involved in the planning process and adopt the finished plan.

HOW: An emergency management consultant, Big Sky Hazard Management LLC, will update the plan; however, public and local government participation is required. The public meetings will encourage participation, and residents and officials will be used to generate ideas and review specific sections of the plan. Newspaper notices will promote citizen involvement and comment on the draft plan. The Big Sky Hazard Management website (www.bigskyhazards.com) will post elements of the plan and the final plan as they are developed.

Anaconda-Deer Lodge County Hazard Assessment 2005

In the existing plan developed in 2005, each hazard has its own profile consisting of a hazard description, history, probability, mapping, associated hazards and other factors, vulnerabilities to critical facilities, potential losses, potential population impacts, impact of future development, and data limitations. This information was used to rank the hazards and develop mitigation strategies.

Overall hazard ratings (high, moderate, low) were determined based on:

- Probability of Major Disaster
- Property Impact
- Population Impact
- Economic Impact
- Future Development Impact

<u>High Hazards</u>:

- Wildfire
- Earthquake
- Flooding – Riverine and Flash

<u>Moderate Hazards</u>:

- Communicable Disease and Bioterrorism
- Winter Storms and Extended Cold
- Hazardous Materials
- Wind, Tornadoes, and Severe Thunderstorms
- Drought
- Flooding – Dam Failure

<u>Low Hazards</u>:

- Terrorism and Civil Disorders
- Structure Fires
- Aviation
- Volcanic Ash
- Avalanche
- Landslide and Soil/Ground Failure

Anaconda-Deer Lodge County Mitigation Strategy 2005

Goal 1: Prevent community losses from wildfires and structure fires.

Objective 1.1: Minimize the risk to structures in the wildland/urban interface.

- Encourage homeowners to reduce fuels around structures and create a fire defensible space.
- Adopt the Uniform Fire Code for the wildland/urban interface areas.
- Revise subdivision regulations with a better focus on defensible space/maintenance requirements in the wildland/urban interface.

Objective 1.2: Improve wildland firefighting capabilities.

- Develop dry hydrant water supplies in wildland/urban interface areas.

Objective 1.3: Reduce the possibility of large urban structure fires.

- Upgrade hydrants in the east end of Anaconda.
- Promote sprinkler installations in older commercial structures.

Goal 2: Reduce potential losses from earthquakes.

Objective 2.1: Prevent earthquake damages to critical facilities, infrastructure, and facilities housing vulnerable populations.

- Tie down/secure objects in schools that could fall during an earthquake.
- Seismically stabilize large glass panes in Dwyer Primary School and Anaconda High School.
- Conduct earthquake drills in the schools.
- Retrofit critical government facilities for earthquakes.
- Inspect key bridges for seismic stability.

Objective 2.2: Prevent residential and commercial losses from earthquakes.

- Educate home and business owners on simple earthquake retrofits.
- Survey commercial structures for earthquake stability and recommend retrofits.

Goal 3: Reduce future damages from flooding.

Objective 3.1: Prevent flood losses to Anaconda-Deer Lodge infrastructure.

- Relocate and upgrade culverts on Morrel Road from the Old Opportunity landfill to Gas City Road (approximately 4 miles of roadway).
- Install culverts and raise roadbed on North Fork Road off the Big Hole Highway from Bacon's Home Ranch to the county line.
- Replace bridge in Galen.
- Upgrade and maintain storm drains from Fourth Street to the smelter.
- Install storm drains in areas where they are lacking in the west end of Anaconda.
- Mitigate damages to critical facilities in the 100-year floodplain.
- Prevent flood contamination of well houses serving the Anaconda public water system.
- Install backflow prevention systems from the Anaconda waste water facility.

Objective 3.2: Reduce losses to private property from flooding.
- Educate the public on flood insurance.
- Clear debris from around old bridges
- Implement security measures at the dams.

Goal 4: Reduce potential losses from winter storms and extended cold.

Objective 4.1: Protect vulnerable populations from utility outages during winter storms and extended cold periods.
- Install generators at elder care facilities.
- Develop a sheltering plan specifically for utility outages.

Goal 5: Minimize community exposure to hazardous material releases.

Objective 5.1: Reduce the risk to the Montana State Hospital from hazardous material releases.
- Establish a back emergency exit from Montana State Hospital.

Objective 5.2: Harden hazardous material infrastructure.
- Protect the exposed natural gas lines near Warm Springs.

Goal 6: Reduce community risk from communicable disease.

Objective 6.1: Slow the spread of communicable disease.
- Create a public education communicable disease prevention program.

Goal 7: Optimize the use of all-hazard mitigation measures.

Objective 7.1: Maintain continuity of government services in a disaster.
- Install generators to maintain water services and waste water treatment.
- Designate a location for the Anaconda-Deer Lodge Emergency Operations Center.

Objective 7.2: Develop resources that can be used to further study and prepare for all hazards.
- Develop GIS data that can be used with FEMA's HAZUS loss estimated models.
- Become a National Weather Service Storm Ready County.
- Train Anaconda-Deer Lodge County Department Heads and engineers in hazard mitigation.

Objective 7.3: Utilize low cost all-hazard warning systems.
- Put NOAA Weather Radios in critical facilities and schools.

Discussion Items:

1. Are we missing any important participants or organizations that should be represented when updating this mitigation plan?
   - More representation from the Big Hole area
   - A.W.A.R.E. (were invited)
   - Montana Department of Corrections (were invited)

2. Should the title of the plan continue to be "Deer Lodge County Hazard Mitigation Plan"? If not, what would be more appropriate?
   - Change to "Anaconda-Deer Lodge County Hazard Mitigation Plan"

3. Hazards included in the 2005 plan were:
   - Avalanche
   - Aviation
   - Communicable Disease and Bioterrorism
   - Drought
   - Earthquake
   - Flooding – Dam Failure
   - Flooding – Riverine and Flash
   - Hazardous Materials
   - Landslide and Ground/Soil Failure
   - Structure Fires
   - Terrorism and Civil Disorder
   - Utility and Communications Outage
   - Volcano
   - Wildfire
   - Wind, Tornadoes, and Severe Thunderstorms
   - Winter Storms and Extended Cold

   Should we make any changes?
   - Should mirror Emergency Operations Plan. Will get list from Bill Converse.

4. Are there any new studies, data, or information that may be valuable when re-analyzing the hazards?
   - The Superfund site and 911 have updated GIS mapping.
   - ARCO has mapped the storm drains.
   - All street trees have been mapped. Many tree hazards exist.
   - The Fire Sciences Lab may have mountain pine beetle maps.
   - The Road Department is starting a bridge inventory. Approximately 50% of the bridges in the county are deficient.
   - New septic permits are being put into GIS and old ones are being entered.

5. Has growth/development occurred since 2005 in a location or way that makes it more vulnerable to any of the identified hazards? Do you have development concerns?
   - Georgetown Lake has seen development in wildfire hazard areas.
   - Hillside homes have gone up around Anaconda and are vulnerable to wildfire.

6. As you read through the mitigation strategies listed in the 2005 plan (see attached handout), please make note of the following:
   a. Progress made or projects completed since 2005 related to any of the listed strategies.
      - Objective 1.1: The mountain pine beetle problem has resulted in a lot of logging.
      - Objective 2.1: Montana State Hospital considered earthquake resistance when doing recent renovations.
      - Objective 5.1: Research has been done on a back exit for the Montana State Hospital, but no obvious solutions exist. Consider using the Anaconda Job Corps for the construction, if a solution is found.
      - Objective 7.1: Generators just need switching and installation to complete project.
   b. Updates or changes needed to the strategies.
      - Objective 1.1: Expand the wildfire mitigation strategies.
   c. New ideas, goals, or objectives for the updated plan.
      - Objective 1.1: Add a Wildland Urban Interface assessment program for Georgetown Lake. This is currently being done on the Granite County side with USFS Title III money.

- Objective 1.1: Add information on the wildland fire residential grant program, FireSafe Montana.
- Objective 6.1: Add immunization efforts to the communicable disease strategies.

7. Has the existing mitigation plan been integrated into other planning mechanisms, land use regulations, or documents? If so, how? If not, what would make it more useful?
   - The local match is the greatest limitation with mitigation grants and implementing mitigation projects.
   - A short, realistic priority list for the commission would help with implementation.

8. Have you attended any mitigation specific meetings or plan updates since 2005? If so, was the general public involved?
   - None mentioned.

9. Do we need to make any changes to the critical facilities and vulnerable populations list (see attached handout)?
   - Warm Springs Fire Station can be removed.
   - Add Ace Hardware to the Hazardous Materials facilities.
   - The Search and Rescue building is on Smelter Road.
   - Communications facilities are GPS mapped. Will need to get that data.
   - Thriftway East will be doubling in size soon.
   - Montana State Hospital at Warm Springs has 201 beds.

Additional items may be sent to Pam Shrauger, Big Sky Hazard Management LLC, 406-581-4512 or pam@bigskyhazards.com. The next public meeting will be held in August or September. Look for additional participation opportunities through email. Note: Your time spent on activities related to this plan may be used as local grant match. Please send pam@bigskyhazards.com and/or desana@rfwave.net an email regarding the amount of time you spent working on the plan review/update.

Anaconda – Deer Lodge County Hazard Mitigation Plan Meeting Notes
August 29, 2013, 9:00-11:00 a.m. in Anaconda, Montana

Attendees:

- Barbara Andreozzi — Montana State University Extension
- Audrey Aspholm — Community Hospital of Anaconda
- Linda Best — ADLC Public Health
- William Converse — ADLC Disaster and Emergency Services
- Robert Mazzolini — Anaconda Amateur Radio Club
- Lynn Orr — ADLC Public Health
- Pam Shrauger — Big Sky Hazard Management LLC, Consultant
- Connie Ternes Daniels — ADLC Chief Executive
- Gary Wenger — ADLC Communications Board
- Lynette Williams — ADLC 911

Discussion Items:

Plan Review:
The draft plan is available online at http://www.bigskyhazards.com/draftplans.asp and sections can be read, downloaded, or printed. The comments deadline is September 5, 2013. Comments can be sent to: Pam Shrauger, pam@bigskyhazards.com, 406-581-4512, 4855 S. 3rd Avenue, Bozeman, MT 59715.

Plan Highlights:
A hazard mitigation plan is a federal requirement, through the Federal Emergency Management Agency. Without an adopted and approved plan, the county is not eligible to receive certain types of federal disaster mitigation assistance following a disaster. As additional incentive, with an adopted and approved plan, the county is eligible to apply for federal mitigation funds.

The Anaconda – Deer Lodge County Hazard Mitigation Plan consists of five major components:

1. Planning Process
2. Assets and Community Inventory
3. Risk Assessment
4. Mitigation Strategy
5. Plan Implementation/Maintenance

Risk Assessment Overview Comments/Discussion Items:

- Add the Pertussis outbreak of this past year to the history section of the Disease Outbreak hazard profile.
- Ensure that the correct name, Community Hospital of Anaconda, is used through the plan.
- Increase the Cyber Attack / Failure hazard to a probability of low-moderate and the overall hazard rating to moderate.
- Update the number of people served by the local electric infrastructure.
- Add the recent 911 outage to history section of the Utility Outage hazard profile.
- Add the recent Opportunity phone service outage to the history section of the Utility Outage hazard profile.
- Add the 2007 wind storm to the history section of the Severe Thunderstorm, Tornadoes, and Wind hazard profile.

Mitigation Strategy Overview Comments/Discussion Items:

- The importance of the mitigation strategy was discussed. Having a strategy in place demonstrates community initiative which may be especially important when money is tight, funding decisions are being made, and post-disaster.
- NOAA Weather Radios have been placed in all schools and some critical facilities.

Next Steps:

Following the public comment period, any comments received will be incorporated into the plan where applicable. The county commission and DES office will receive a mailing with a hard copy of the final plan and a CD containing electronic versions of the plan and other useful tools and information. The final plan will be sent to Montana Disaster and Emergency Services and then the Federal Emergency Management Agency for review and approval. During this time frame, the county will be asked to adopt the plan by resolution (a sample resolution will be included on the CD). The county is encouraged to apply for grants and to implement or continue many of the activities listed in the plan. Annually, the LEPC should create a record of any disasters or mitigation activities occurring over the past year. Every five years, the plan needs to be updated and resubmitted for approval.

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Appendix F. ACRONYMS

AD – Anno Domini
ADLC – Anaconda – Deer Lodge County
AIDS – Acquired Immunodeficiency Syndrome
ARCO – Atlantic Richfield Company
AWARE – Anaconda Work and Residential Enterprises
BFE – Base Flood Elevation
BLM – Bureau of Land Management
BNSF – Burlington Northern Santa Fe
CAMA – Computer Assisted Mass Appraisal
CCCS – Community, Counseling, and Correctional Services
CDBG – Community Development Block Grant
CDC – Centers for Disease Control and Prevention
CFR – Code of Federal Regulations
CFS – Cubic Feet Per Second
DEQ – Department of Environmental Quality
DES – Disaster and Emergency Services
DHS – Department of Homeland Security
DMA – Disaster Mitigation Act
DNRC – Department of Natural Resources and Conservation
DOT – Department of Transportation
DPHHS – Department of Public Health and Human Services
EDA – Economic Development Administration
EO – Executive Order
EOC – Emergency Operations Center
EMS – Emergency Medical Services
EPA – Environmental Protection Agency
EPCRA – Emergency Planning Community Right-to-Know Act
FBI – Federal Bureau of Investigation
FEMA – Federal Emergency Management Agency
FIRM – Flood Insurance Rate Map
FIS – Flood Insurance Study
FMA – Flood Mitigation Assistance
FWS – Fish & Wildlife Service
FY – Fiscal Year
GIS – Geographic Information System
HAZUS-MH – Hazards United States Multi-Hazard
HFRA – Healthy Forest Restoration Act
HIV – Human Immunodeficiency Virus
HMGP – Hazard Mitigation Grant Program
HUD – Housing and Urban Development
HVAC – Heating, Ventilating, and Air Conditioning

IA – Individual Assistance
KY – Thousand Years
LANDFIRE – Landscape Fire and Resource Management Planning Tools Project
LEPC – Local Emergency Planning Committee
LP – Liquefied Petroleum
MCA – Montana Code Annotated
MDT – Montana Department of Transportation
MR – Model Release
MRL – Montana Rail Link
MT - Montana
NCDC – National Climatic Data Center
NIFC – National Interagency Fire Center
NFIP – National Flood Insurance Program
NFP – National Fire Plan
NID – National Inventory of Dams
NOAA – National Oceanic and Atmospheric Administration
NRCS – Natural Resources Conservation Service
NRMRCD – Northern Rocky Mountain Resource Conservation and Development
NTSB – National Transportation Safety Board
NWS – National Weather Service
OHWM – Ordinary High Water Mark
OPEC – Organization of Petroleum Exporting Countries
PA – Public Assistance
PCB – Polychlorinated Biphenyls
PDM – Pre-Disaster Mitigation
PGA – Peak Ground Acceleration
RAWS – Remote Automated Weather Stations
RFA – Rural Fire Assistance
RFC – Repetitive Flood Claims
RYO – Reintegrating Youthful Offenders
SARA – Superfund Amendment and Reauthorization Act
SARS – Severe Acute Respiratory Syndrome
SBA – Small Business Administration
SFHA – Special Flood Hazard Area
SHELDUS – Spatial Hazard Events and Losses Database for the United States
SRL – Severe Repetitive Loss
STAPLEE – Social, Technical, Administrative, Political, Legal, Economic, Environmental
START – Sanction, Treatment, Assessment, Revocation, and Transition
US – United States
USACE – United States Army Corps of Engineers
USDA – United States Department of Agriculture
USGS – United States Geological Survey
USFA – United States Fire Administration
USFS – United States Forest Service

VFA – Volunteer Fire Assistance
WATCh – Warm Springs Addiction Treatment and Change
WMD – Weapons of Mass Destruction
WPDG – Wetland Program Development Grant
WUI – Wildland Urban Interface
YVO – Yellowstone Volcano Observatory

Appendix G. PLAN COMMUNICATIONS

Table G1. Plan Communication Tracking

Name/Organization	Date	Type	Reason(s)
Bill Converse ADLC DES	05/23/2011	Email	Proposal acceptance
Bill Converse ADLC DES	01/23/2012	Phone	Initial public meeting
Bill Converse ADLC DES	01/24/2012	Phone	Initial public meeting
Anaconda Leader	01/25/2012	Email	Newspaper advertising
All Stakeholders	01/30/2012	Email Mail	Invitation to the public meeting
Anaconda Leader	01/30/2012	Email	Press release and display ad
Barbara Andreozzi MSU Extension	01/30/2012	Email	FEMA ReadyCommunity pilot project
All Stakeholders	02/13/2012	Email	Public meeting reminder and discussion items
Meeting Attendees	02/17/2012	Meeting	Initial public meeting
Bill Converse ADLC DES	02/21/2012	Email	Meeting sign-in sheets
Bill Converse ADLC DES	02/23/2012	Email	Emergency Operations Plan information
All Stakeholders	02/24/2012	Email	Meeting notes
Terina Mullen	02/27/2012	Email	Plan feedback
Bill Converse ADLC DES	03/02/2012	Email	Plan changes
Bill Converse ADLC DES	03/15/2012	Email	Plan changes
Bill Converse ADLC DES	03/30/2012	Email	Plan update put on hold due to contractor emergency
Kent Atwood MT DES	04/06/2012	Email	Project extension
Bill Converse ADLC DES	05/22/2012	Email	Status update
Bill Converse ADLC DES	07/24/2012	Email	Status update
Kent Atwood MT DES	07/24/2012	Email	Project extension
Bill Converse ADLC DES	08/02/2012	Email	Contract extension
Bill Converse ADLC DES	08/09/2012	Email	Contract extension

Table G1. Plan Communication Tracking (continued)

Name/Organization	Date	Type	Reason(s)
Bill Converse ADLC DES	09/12/2012	Email	Contract extension
Bill Converse ADLC DES	10/03/2012	Email	Contract extension
Bill Converse ADLC DES	10/16/2012	Email	Contract extension
Paula Arneson ADLC Planning Dept.	10/22/2012	Email	GIS data
Jay Slocum ADLC GIS Contractor	10/22/2012	Email Phone	GIS data
Joey Blodnick ADLC Clerk & Recorder	10/23/2012	Email	Facility data
Bill Converse ADLC DES	10/24/2012	Email	Critical facility updates
Bill Converse ADLC DES	10/31/2012	Email	Critical facility updates
Bill Converse ADLC DES	01/03/2013	Email	Critical facility updates
Bill Converse ADLC DES	02/19/2013	Email	Status update
All Stakeholders	02/26/2013	Email	Critical facilities
Bill Converse ADLC DES	02/27/2013	Email	Critical facility updates
David Gregory Montana State Hospital	02/27/2013	Email	Critical facility updates
Rose Nyman County Commission	02/27/2013	Email	Plan review
Heidi Nielsen ADLC Public Health	02/28/2013	Email	Critical facility updates
Bill Converse ADLC DES	05/10/2013	Email	Status update
Kent Atwood MT DES	06/27/2013	Email	Grant extension
Kent Atwood MT DES	07/31/2013	Email	Repetitive loss properties
Marty Mavrenic ADLC DES	08/12/2013	Phone	Public meeting
Paula Arneson ADLC Planning Dept.	08/13/2013	Email	Community wildfire protection plan
Terina Goicoechea BLM	08/14/2013	Email	Community wildfire protection plan

Table G1. Plan Communication Tracking (continued)

Name/Organization	Date	Type	Reason(s)
Michael Dannenberg BLM	08/14/2013	Email	Community wildfire protection plan
Bill Converse ADLC	08/15/2013	Email	Public information review
All Stakeholders	08/16/2013	Email Mail	Invitation to the final public meetings and plan review opportunity
Anaconda Leader	08/16/2013	Email	Press release and display ad
All Stakeholders	08/28/2013	Email	Meeting reminder
All Stakeholders	09/13/2013	Email	Meeting notes

Appendix H. PLAN CHANGES

Table H1. 2013 Plan Changes

2005 Section	Changes	2013 Section
All	Improved the page numbering system for easier updating.	All
1	Moved the Adoption Documentation to an annex for easier referencing and reading.	P
1	Added the 2013 adoption documents.	P
2	Broke the Introduction Section into specific subsections for easier reading and the addition of relevant information. Extraneous information was removed.	1
2	Updated mapping and added a "features" map.	1.3
2	Updated climate data.	1.4
2	Moved some information from the Introduction to the Assets and Community Inventory section.	3
2	Hazard information was moved from the Introduction section to the relevant hazard profiles.	4
3	Added information regarding the 2012-2013 planning process, including additional descriptions of the process, planning team, community changes, plan changes, public participation, incorporation of existing information, and plan adoption.	2.2
4	Moved the Vulnerability Assessment Methodology section into the Planning Process and Methodologies section.	2.3
4	Added information regarding the methodologies used in the hazard profiles.	2.3
4	Moved the Hazard Identification section into the Planning Process and Methodologies section.	2.4
4	The Assets and Community Inventory sub-section was put into its own section.	3
4	Updated the Critical Facilities list through internet research, GIS searches, and stakeholder input.	3.1
4	Updated the Critical Facilities GIS and mapping.	3.1
4	Removed the extraneous sections on possible shelters (too many possibilities and potential for change) and non-critical government facilities	3.1
4	Added information regarding Critical Infrastructure.	3.1
4	Updated census data and removed extraneous population distribution data.	3.2
4	Incorporated HAZUS building information.	3.2
4	Added a section on Economic, Ecologic, Historic, and Social Values	3.3
4	Added a section on Recent Development	3.5
4	Updated the Future Development section	3.6
4	Added mapping and analysis using private, undeveloped parcels.	3.6
4	Incorporated the Mapping and Associated Hazards and Other Factors sections into the Description section of the hazard profiles.	4
4	Added magnitude considerations to the hazard profiles.	4

Table H1. 2011 Plan Changes (continued)

2005 Section	Changes	2011 Section
4	Incorporated new studies and data into the hazard profiles.	4
4	Updated mapping in the hazard profiles.	4
4	Added a hazard summary in the hazard profiles.	4
4	Added a summary table of federal major disaster and emergency declarations to each hazard profile.	4
4	Updated the hazard history in each hazard profile.	4
4	Added a Hazard Frequency and Impact Ranges table to each hazard profile.	4
4	Added a Methodology subsection to the Vulnerabilities in each hazard profile.	4
4	Evaluated potential losses using GIS structure points rather than parcel data, when appropriate.	4
4	Added a Hazard Vulnerabilities and Impacts summary table to each hazard profile.	4
4	Added critical infrastructure and values subsections to the vulnerabilities in each hazard profile.	4
4	Changed the aviation hazard to aircraft crash.	4.1
4	Made bioterrorism its own hazard profile.	4.2
4	Added a cyber attack / failure hazard profile.	4.3
4	Changed communicable disease to disease outbreak.	4.5
4	Added blight and infestation to drought.	4.6
4	Conducted a new HAZUS run for earthquake.	4.7
4	Used buffer zones more in line with the Emergency Transportation Guidelines for the hazardous materials release vulnerabilities.	4.9
4	Added a highway transportation accident hazard profile.	4.10
4	Merged the landslide and ground/soil failure and avalanche hazard profiles.	4.11
4	Added a large public event hazard profile.	4.12
4	Added a radioactive release hazard profile.	4.13
4	Added a railroad transportation accident hazard profile.	4.14
4	Changed winter storms and extended cold to severe winter weather.	4.16
4	Changed structure fires to urban fire / explosion.	4.18
4	Changed wildfire to wildland and forest fires.	4.18
4	Used the hazard areas identified in the Community Wildfire Protection Plan rather than crown fire potential to assess the wildfire vulnerabilities.	4.21
4	Added a Federal Major Disaster and Emergency Declarations Summary table to the Risk Assessment Summary section.	4.22
4	Added Composite Hazards mapping.	4.22
5	Described the mitigation strategy development process in more detail.	5
5	Updated the Mitigation Goals, Objectives, and Proposed Actions, as needed. See Appendix J for additional details.	5.1
5	Categorized each project by type.	5.1
5	Numbered each project and provided details on the responsible agencies and	5.1

	partners, resources needed, potential funding sources, and goal timeframes specific to each project.	
5	Added information on FEMA's STAPLEE Criteria.	5.2
5	Added a table on the Hazards and Development Mitigated by Each Proposed Project.	5.2
5	Added a Funding Sources section.	5.4
5	Moved the Enabling Legislation and Existing Programs sections to the Existing Planning Mechanisms and Capabilities section.	5.5
6	Added details to the Plan Maintenance section specific to monitoring, evaluation, and updates.	6
6	Modified how the plan is maintained based on what worked and what didn't during the past seven years.	6
A	Added 2012-2013 public information documents.	B
B	Added 2012-2013 meeting attendance records.	C
C	Updated the references used.	E
D	Updated the acronyms used.	F
E	Updated the FEMA Crosswalk Reference Document.	M
F	Added the 2013 state and FEMA approval letters	N
Appendices	Added an Invited Stakeholders appendix that also outlines individual participation.	A
Appendices	Added a Meeting Notes appendix.	D
Appendices	Added a Plan Communications appendix.	G
Appendices	Added a Plan Changes appendix.	H
Appendices	Added a Past Mitigation Strategies appendix.	J
Appendices	Added a Completed Mitigation Activities appendix.	K
Appendices	Added a Grant Program Information appendix.	L

Appendix J. PAST MITIGATION STRATEGIES

Table J1. Changes to the 2005 Mitigation Strategy

2005 Goal/Objective/Action	Status	Reason
GOALS		
Prevent community losses from wildfires and structure fires.	No change	Remains an important goal.
Reduce potential losses from earthquakes.	No change	Remains an important goal.
Reduce future damages from flooding.	No change	Remains an important goal.
Reduce potential losses from winter storms and extended cold.	Removed	All associated objectives or actions either completed or merged into other strategies.
Minimize community exposure to hazardous material releases.	No change	Remains an important goal.
Reduce community risk from communicable disease.	No change	Remains an important goal.
Optimize the use of all-hazard mitigation measures.	No change	Remains an important goal.
OBJECTIVES		
Minimize the risk to structures in the wildland/urban interface.	No change	Remains an important objective.
Improve wildland firefighting capabilities.	No change	Remains an important objective.
Reduce the possibility of large urban structure fires.	No change	Remains an important objective.
Prevent earthquake damages to critical facilities, infrastructure, and facilities housing vulnerable populations.	No change	Remains an important objective.
Prevent residential and commercial losses from earthquakes.	No change	Remains an important objective.
Prevent flood losses to Anaconda-Deer Lodge infrastructure.	Modified	Slight changes made and remains an important objective.
Reduce losses to private property from flooding.	No change	Remains an important objective.
Protect vulnerable populations from utility outages during winter storms and extended cold periods.	Removed	All associated actions either completed or merged into other strategies.
Reduce the risk to the Montana State Hospital from hazardous material releases.	Modified	Location expanded and remains an important objective.

Table J1. Changes to the 2005 Mitigation Strategy (continued)

2005 Goal/Objective/Action	Status	Reason
Harden hazardous material infrastructure.	Modified	Added the word "critical" and remains an important objective.
Slow the spread of communicable disease.	No change	Remains an important objective.
Maintain continuity of government services in a disaster.	No change	Remains an important objective.
Develop resources that can be used to further study and prepare for all hazards.	No change	Remains an important objective.
Utilize low cost all-hazard warning systems.	Removed	All associated actions either completed or merged into other strategies.
ACTIONS		
Encourage homeowners to reduce fuels around structures and create a fire defensible space.	Modified	Some work completed, but still ongoing. Expanded to include other related activities.
Adopt the Uniform Fire Code for the wildland/urban interface areas.	No change	Not completed but still needed.
Revise subdivision regulations with a better focus on defensible space/maintenance requirements in the wildland/urban interface.	No change	Not completed but still needed.
Develop dry hydrant water supplies in wildland/urban interface areas.	Modified	Not completed but still needed. Description expanded.
Upgrade hydrants in the east end of Anaconda.	No change	Not completed but still needed.
Promote sprinkler installations in older commercial structures.	No change	Not completed but still needed.
Tie down/secure objects in schools that could fall during an earthquake.	Modified	Not completed but still needed. Added more description.
Seismically stabilize large glass panes in Dwyer Primary School and Anaconda High School.	No change	Not completed but still needed.
Conduct earthquake drills in the schools.	No change	Not completed but still needed.
Retrofit critical government facilities for earthquakes.	No change	Not completed but still needed.
Inspect key bridges for seismic stability	No change	Not completed but still needed.
Educate home and business owners on simple earthquake retrofits.	No change	Not completed but still needed.
Relocate and upgrade culverts on Morrel Road from the Old Opportunity landfill to Gas City Road (approximately 4 miles of roadway).	No change	Not completed but still needed.

Table J1. Changes to the 2005 Mitigation Strategy (continued)

2005 Goal/Objective/Action	Status	Reason
Install culverts and raise roadbed on North Fork Road off the Big Hole Highway from Bacon's Home Ranch to the county line.	No change	Not completed but still needed.
Replace bridge in Galen.	No change	Not completed but still needed.
Upgrade and maintain storm drains from Fourth Street to the smelter.	No change	Not completed but still needed.
Install storm drains in areas where they are lacking in the west end of Anaconda.	No change	Not completed but still needed.
Mitigate damages to critical facilities in the 100-year floodplain.	No change	Not completed but still needed.
Prevent flood contamination of well houses serving the Anaconda public water system.	No change	Not completed but still needed.
Install backflow prevention systems from the Anaconda waste water facility.	Modified	Not completed but still needed. Added a better description.
Educate the public on flood insurance.	Modified	Not completed but still needed. Improved the description.
Clear debris from around old bridges.	Modified	Not completed but still needed. Added other related possibilities.
Implement security measures at the dams.	Modified	Not completed but still needed. Added investigating options.
Install generators at elder care facilities.	Modified	Not completed but still needed. Expanded to all critical facilities.
Develop a sheltering plan specifically for utility outages.	No change	Not completed but still needed.
Establish a back emergency exit from Montana State Hospital.	Modified	Some investigational work completed, but still ongoing. Description improved.
Protect the exposed natural gas lines near Warm Springs.	No change	Not completed but still needed.
Create a public education communicable disease prevention program.	Modified	Not completed but still needed. Details and other ideas added.
Install generators to maintain water services and waste water treatment.	Modified	Some investigational work completed, but still ongoing. Updated to reflect work completed.
Designate a location for the Anaconda-Deer Lodge Emergency Operations Center.	No change	Not completed but still needed.

Table J1. Changes to the 2005 Mitigation Strategy (continued)

2005 Goal/Objective/Action	Status	Reason
Develop GIS data that can be used with FEMA's HAZUS loss estimated models.	No change	Not completed but still needed.
Become a National Weather Service Storm Ready County.	No change	Not completed but still needed.
Train Anaconda-Deer Lodge County Department Heads and engineers in hazard mitigation.	No change	Not completed but still needed.
Put NOAA Weather Radios in critical facilities and schools.	Modified	Some work completed, but still ongoing.

Additions to the 2005 mitigation strategy in 2013 include:

Objective 6.3: Mitigate the impact of hazards on future development through land use and building regulations.

Project 1.1.1: FireSafe Program

- Create an Anaconda – Deer Lodge County FireSafe Council and Program.
- Promote mitigation practices in the wildland urban interface.
- Coordinate wildfire preparedness planning and activities.
- Build partnerships with community leaders and businesses, such as insurance providers, for wildfire prevention and mitigation.

Project 1.1.2: WUI Assessments

- Using firefighters or fire professionals, assess the wildfire risk to individual homes and properties.

Project 1.1.3: Fuel Reductions

- Pursue wildland urban interface fuel reduction projects in high-risk areas, including near structures, road right-of-ways, utility right-of ways, and along federal and state lands.
- Develop a financial incentive program for private landowners to conduct fuel reduction activities on their properties.
- Work with federal and state agencies to coordinate fuel reduction priorities and projects.

Project 1.2.2: Ingress/Egress Road Improvements

- Improve critical ingress/egress roadways in the wildland urban interface with activities such as road widening and the addition of turnarounds, particularly in high risk subdivisions.
- Where feasible, construct a second access road into a subdivision.

Project 2.1.2: Infrastructure Seismic Improvements

- Prioritize and make improvements to bring vulnerable infrastructure up to seismic code.
- Anchor or stabilize electric transformers and generators for seismic motion during maintenance and new installations.
- Install expansion joints in underground utilities during new or replacement construction.

Project 3.1.1: Bridge, Culvert, and Road Improvements

- Upgrade bridges, culverts, storm drains, and roads to allow sufficient passage of floodwaters.
- Install culverts and storm drains in areas prone to washouts or drainage problems.
- Stabilize roadsides that are prone to mudslides and/or landslides.

Project 3.2.2: Floodplain Ordinances

- Continue compliance with the National Flood Insurance Program and local flood ordinances.
- Consider more restrictive floodplain development regulations, such as freeboard.
- Consider joining the Community Rating System volunteer incentive program.

Project 6.3.1: Growth Policy and Subdivision Regulations

- Update the growth policy to encourage growth in low hazard areas and continue to allow for the consideration of high hazard areas during subdivision reviews.
- Continue to make improvements to the subdivision regulations for disaster resistance, specifically with regard to wildland and forest fires.
- Ensure the new state requirements for wildfire considerations in growth policies are met.

Project 6.3.2: Capital Improvements Plans

- Update the county's Capital Improvements Plan to include relevant hazard mitigation projects and hazard considerations during improvements.

Project 6.3.3: Conservation Easements

- Protect values along the rivers and streams and in wildland urban interface areas through conservation easements.
- If necessary, consider a local bond to generate funds.

Appendix K. COMPLETED MITIGATION ACTIVITIES

June 2005 through August 2013

Mitigation Activities

Linked to 2005 Goal #1: Prevent community losses from wildfires and structures fires.

- A countywide Community Wildfire Protection Plan was completed in September 2005.
- Logging is ongoing due to the mountain pine beetle problem.

Linked to 2005 Goal #2: Reduce potential losses from earthquakes.

- Montana State Hospital considered earthquake resistance when doing recent renovations.

Linked to 2005 Goal #3: Reduce future damages from flooding.

- ARCO has mapped the storm drains in the county.

Linked to 2005 Goal #5: Minimize community exposure to hazardous material releases.

- Research has been done on a back exit for the Montana State Hospital, but no obvious solutions exist.

Linked to 2005 Goal #7: Optimize the use of all-hazard mitigation measures.

- GIS data has improved significantly since 2005 and was used in this plan update.
- All street trees have been mapped and many tree hazards have been identified.
- The ADLC Maintenance Department has started a bridge inventory and identifying bridges that are deficient.
- New septic permits are being entered into GIS.
- Generators have been purchased for several critical facilities.
- NOAA Weather Radios have been placed in all schools and some critical facilities.

Plan Integration Opportunities

- The mitigation plan has been used when developing mitigation grant applications.

Grant Funding

- Anaconda – Deer Lodge County received a Pre-Disaster Mitigation grant in 2010 for the five-year update of the Hazard Mitigation Plan.

Appendix L. GRANT PROGRAM INFORMATION

Appendix M. LOCAL MITIGATION PLAN REVIEW TOOL

Appendix N. STATE AND FEMA APPROVAL LETTERS

Appendix P. ADOPTION DOCUMENTATION

Resolution No. 05-18
A RESOLUTION TO ADOPT THE HAZARD MITIGATION PLAN
Anaconda-Deer Lodge County

WHEREAS, all citizens and property within Deer Lodge County are at risk from a wide range of hazards such as, but not limited to, avalanche, aviation accidents, communicable disease, bioterrorism, drought, earthquake, dam failure, flooding, hazardous materials, landslide, ground failure, structure fires, terrorism, civil disorder, utility and communications outages, volcano, wildfires, wind, tornadoes, severe thunderstorms, winter storms, and extended cold.

WHEREAS, Anaconda-Deer Lodge County, pursuant to Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, enacted by Section 104 of the Disaster Mitigation Act of 2000 (P.L. 106-390) and the Interim Final Rule published in the Federal Register on February 26, 2002 at 44 CFR Part 201, is required to have an approved Hazard Mitigation Plan in order to receive future federal disaster mitigation funds.

WHEREAS, a Hazard Mitigation Plan, will guide Anaconda-Deer Lodge County in making decisions for pre-disaster and post-disaster mitigation projects.

NOW, THEREFORE, BE IT RESOLVED that the Board of Commissioner of Anaconda-Deer Lodge County, Montana, hereby adopts the Hazard Mitigation Plan dated June 2005.

PASSED AND ADOPTED by the Board of Commissioners of Anaconda-Deer Lodge County, Montana this 12th day of July 2005.

Wayne C. Ternes, Chairman
Anaconda-Deer Lodge County Commission

ATTEST:

Heather J. Edwards
Clerk of the Commission