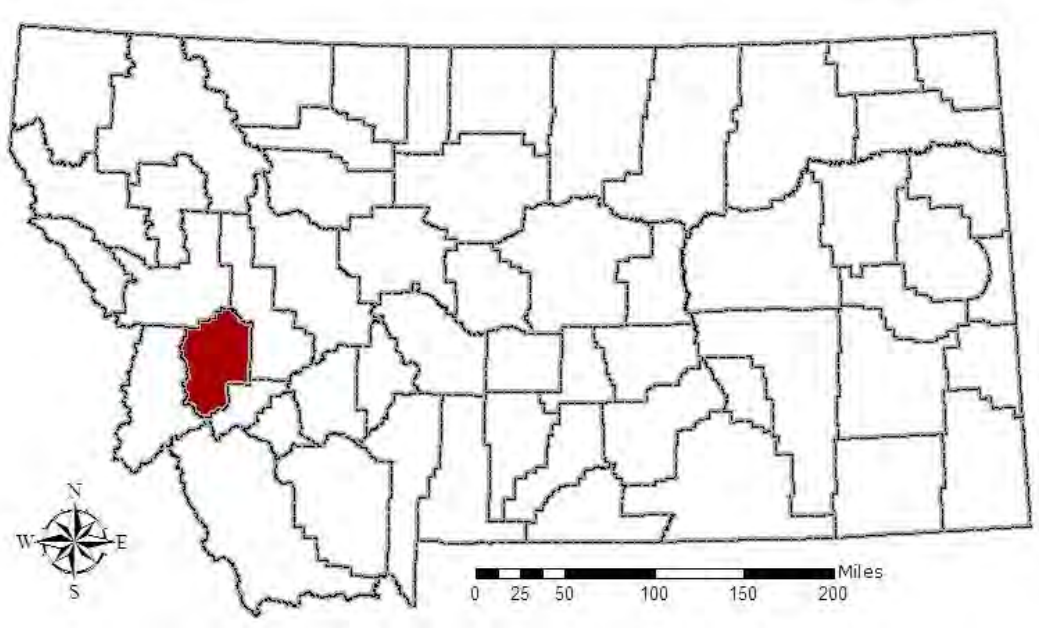
Granite County, Montana
Town of Drummond, Montana
Town of Philipsburg, Montana

Hazard Mitigation Plan

September 2013



Assistance provided by:

BIG SKY HAZARD MANAGEMENT LLC

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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 Granite County Hazard Mitigation Plan addresses fifteen major hazards with respect to risk and vulnerabilities countywide, including in the Towns of Drummond and Philipsburg. Through a collaborative planning process, the Granite County hazards were identified, researched, and profiled.

The major hazards – avalanche and landslide; communicable disease; dam failure; drought; earthquake; flood; hazardous materials release; terrorism; transportation accident; utility and communications failure; volcanic ashfall; water supply and watershed contamination; wildfire; wind, tornadoes, and severe thunderstorms; and winter storms and extended cold – 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 Granite County and the Towns of Drummond and Philipsburg are as follows:

Granite County Hazard Prioritizations

Level	Hazard
High Hazard	Wildfire Transportation Accident Winter Storms and Extended Cold Flood
Moderate Hazard	Communicable Disease Hazardous Materials Release Wind, Tornadoes, and Severe Thunderstorms Dam Failure Drought Earthquake
Low Hazard	Utility and Communications Failure Terrorism Water Supply and Watershed Contamination Volcanic Ash Avalanche and Landslide

Town of Drummond Hazard Prioritizations

Level	Hazard
High Hazard	Flood Hazardous Materials Release Wind, Tornadoes, and Severe Thunderstorms Transportation Accident Winter Storms and Extended Cold
Moderate Hazard	Communicable Disease Drought Earthquake Utility and Communications Failure
Low Hazard	Water Supply and Watershed Contamination Dam Failure Wildfire Volcanic Ash Terrorism

Town of Philipsburg Hazard Prioritizations

Level	Hazard
High Hazard	Wind, Tornadoes, and Severe Thunderstorms Wildfire Winter Storms and Extended Cold
Moderate Hazard	Communicable Disease Drought Flood Earthquake Transportation Accident Utility and Communications Failure Water Supply and Watershed Contamination
Low Hazard	Hazardous Materials Release Dam Failure Volcanic Ash Terrorism

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.*
- *Goal 2: Reduce future damages from flooding.*
- *Goal 3: Reduce potential losses from earthquakes.*
- *Goal 4: Minimize the impacts from a transportation or hazardous materials accident.*
- *Goal 5: Reduce the community risk from public health threats.*
- *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 Granite County and the Towns of Drummond and Philipsburg. Granite County Disaster and Emergency Services and the Granite 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 and town plans, regulations, and documents, will further the goals of hazard mitigation in Granite County.

The Granite 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 and towns may be eligible for federal mitigation funds. This plan serves as a guide for understanding the major hazards facing Granite County and the Towns of Drummond and Philipsburg and provides a strategy for preventing or reducing some of the impacts.

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1. INTRODUCTION

1.1 Purpose

Granite County and the Towns of Drummond and Philipsburg recognize that hazards, both natural and human-caused, threaten their communities. Rather than wait until disaster strikes, the jurisdictions 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 communities and provides a clearer vision and competitive edge for future mitigation grant funding. By integrating mitigation concepts into local thinking, the communities 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 communities' money in the long-term and contributing to the communities' sustainabilities.

The plan's intent is to assist the communities in making financial decisions for mitigation projects and clarify actions that could be taken through additional funding. Hopefully through the planning process, the communities have become more aware of their 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.

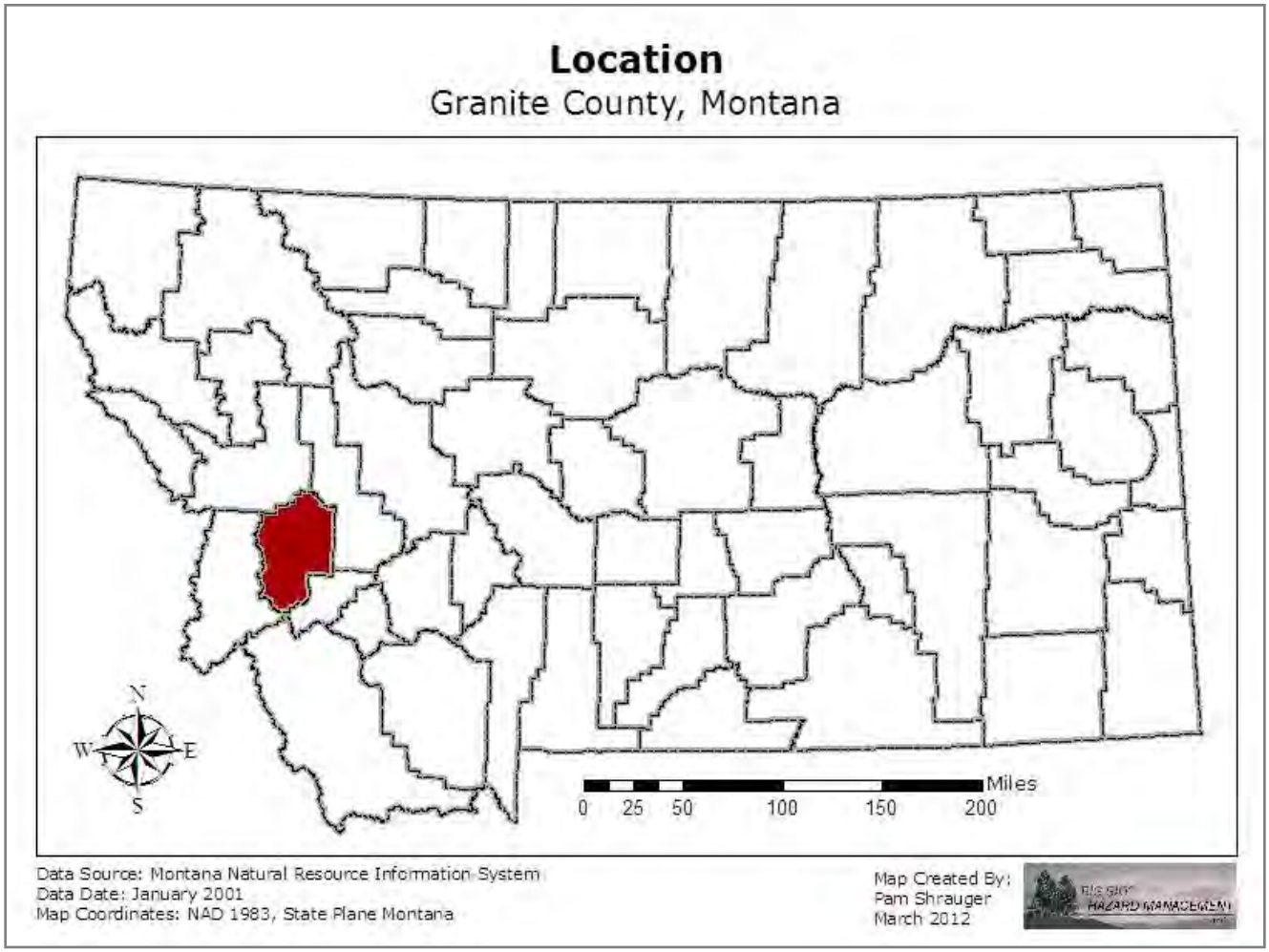
Granite County and the Towns of Drummond and Philipsburg have adopted this Hazard Mitigation Plan by resolution (see Appendix P for copies of the resolutions). These governing bodies have the authority to promote mitigation activities in their jurisdictions.

1.3 County and Jurisdictional Profile

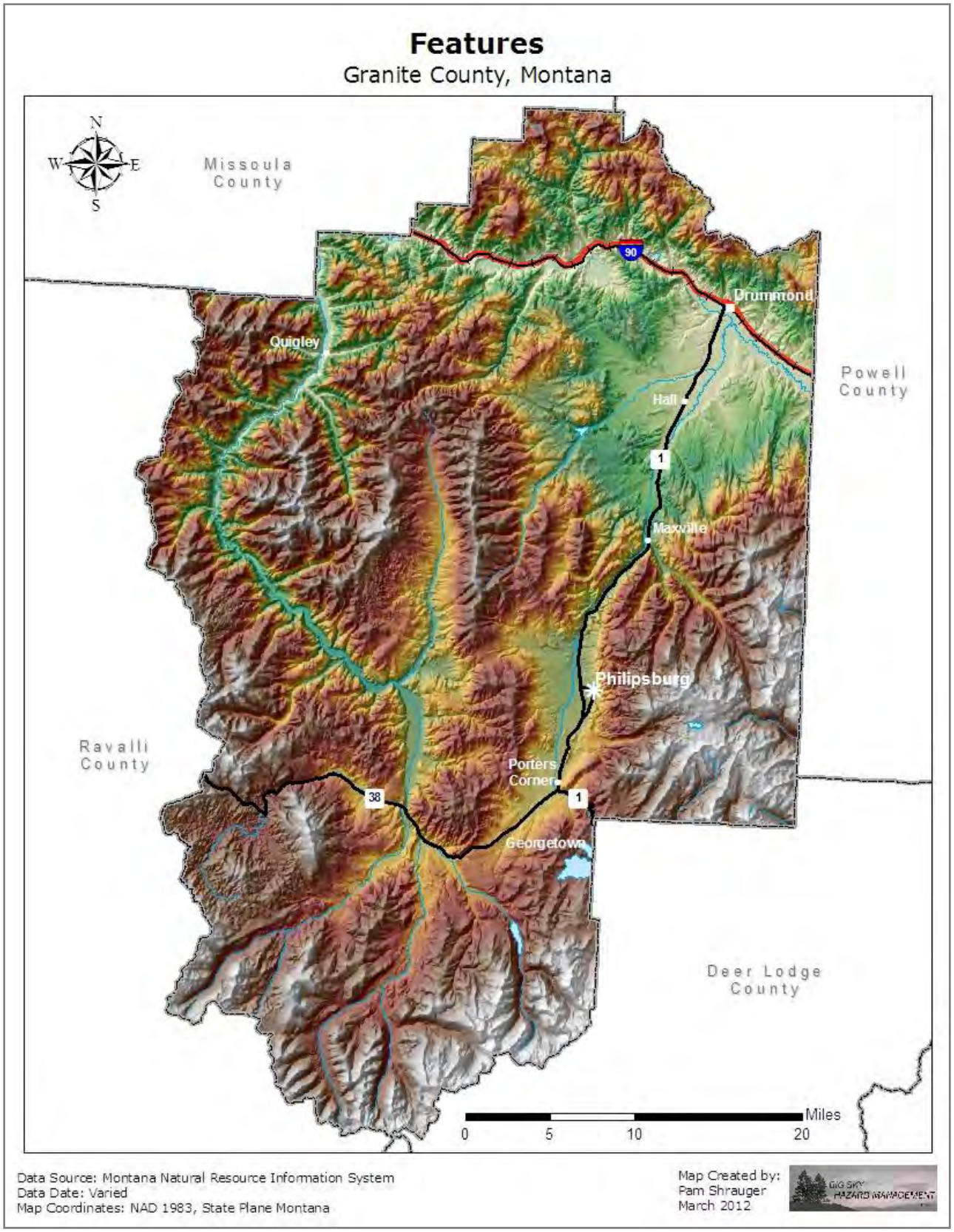
Granite County is located in western Montana, as shown in Map 1.3A, with an area of approximately 1,727 square miles. Granite County is bordered on the northwest by Missoula County, on the northeast by Powell County, on the southeast by Deer Lodge County, and on the west by Ravalli County. The Town of Philipsburg is the county seat and the only other incorporated community is the Town of Drummond.

Map 1.3B shows the general features in the county. The Pintler Scenic Route, a popular scenic bypass of Interstate 90 passes through much of Granite County. Residents enjoy the convenience of traveling to Missoula or Butte, both about an hour away from Philipsburg, while remaining within close proximity to beautiful mountains in the rural area. The area is known for its year-round recreation activities, historic mines, and ghost towns. Mountain ranges in Granite County include the Sapphire Mountains to the west, the Flint Creek Range to the east, and the Anaconda Range to the south. The Continental Divide traverses the southeastern border and elevations range from 3,950 feet to 8,450 feet above sea level across the county. Water bodies in the county include the Clark Fork River, Flint Creek, Rock Creek, East Fork Reservoir, and a portion of Georgetown Lake.

Map 1.3A



Map 1.3B


Features
Granite County, Montana
N
W
E
S
Missoula County
90
Drummond
Quigley
Powell County
Hall
1
Maxville
Philipsburg
Ravalli County
Porters Corner
38
1
Georgetown
Deer Lodge County
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
GIS SKY HAZARD MANAGEMENT

1.4 Climate Overview

Table 1.4A details the climate statistics recorded by the National Weather Service (NWS) at Drummond and Philipsburg. The locations of the Philipsburg station has varied over the years but has stayed in the same general vicinity.

Table 1.4A Granite County Climate Statistics

	Drummond 1963 - 2012	Philipsburg 1903-2012
Annual Average Maximum Daily Temperature	57°F	55°F
Annual Average Minimum Daily Temperature	28°F	28°F
Annual Average Total Precipitation	13 inches	15 inches
Annual Average Total Snowfall	40 inches	53 inches
Highest Temperature Recorded	104°F July 11, 2002	98°F August 4, 1961
Lowest Temperature Recorded	-43°F December 23, 1983	-40°F February 9, 1933
Annual Average Number of Days Dropping Below Freezing	209 days	217 days
Annual Average Number of Days Staying Below Freezing	42 days	44 days
Annual Average Number of Days Reaching 90°F or Higher	21 days	6 days
Highest Annual Precipitation	22.22 inches 1975	24.80 inches 1975
Lowest Annual Precipitation	7.15 inches 1979	7.29 inches 1904
1 Day Maximum Precipitation	1.52 inches August 7, 2009	3.10 inches May 19, 1938
Highest Annual Snowfall	101.3 inches 1975	140.0 inches 1951

Source: Western Regional Climate Center, 2012.

1.5 Plan Scope and Organization

The Granite 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 Granite County and the Towns of Drummond and Philipsburg. 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 Granite County and the Towns of Drummond and Philipsburg, 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 October 2004 with an advertised public meeting. This meeting generated very little public interest and served as an orientation to the planning process for the Disaster and Emergency Services Coordinator. A list of important public officials that should be part of the planning process was generated. This group consisted of representatives from emergency management, fire services, medical and health services, public works, state and federal government, law enforcement, elected officials, administrative officials, news media, and the public. All jurisdictions, Granite County, Philipsburg, and Drummond, were included in this list of stakeholders. A preliminary list of critical facilities and vulnerable populations was also created. 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 second public meeting in April 2005 was advertised through an article and a letter to the editor from the Disaster and Emergency Services Coordinator in the Philipsburg Mail newspaper. Personal invitations were extended to the important officials identified at the first public meeting. Attendees of this meeting were introduced to the reasons for mitigation planning and the planning process. Hazards were then identified and participants were surveyed on their primary hazard concerns. Critical facilities and vulnerable populations were also reviewed and additionally identified in this workshop. All jurisdictions were represented at this meeting.

The third public meeting was held in May 2005. This meeting focused on reviewing historical hazard information and hazard mapping. An extensive discussion of each hazard's history was conducted with the knowledgeable attendees, including several long-time residents. After the hazards and mapping were reviewed, attendees brainstormed several potential mitigation goals, objectives, and projects.

Once draft sections were completed, they were distributed over e-mail for review. The full draft of the plan was posted on a website to solicit public review and comment. Final public comments on the full draft plan were solicited from December 30, 2005 – January 20, 2006.

2.2 Plan Update Process

Upon the required 5-year plan update, Granite County, in partnership with 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 and towns. The contract was managed by Anaconda – Deer Lodge County. 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 Philipsburg to educate the public on hazard mitigation planning, to discuss what changes and accomplishments have taken place in the county and towns 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. Public meetings (advertised through invitations, a press release, and newspaper ad) were held in Drummond and Philipsburg 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 jurisdictions adopted the updated plan, either before or immediately after state and FEMA conditional approval.

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 Granite County has been some residential growth. Since Granite County does not have building codes or a construction permit system, the exact number of new developments is difficult to determine, however, most of the development has occurred in the Georgetown Lake area. The recent economic slowdown has reduced this activity, but growth still continues.

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 communities. 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.
- 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 done for each jurisdiction 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 and community 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

This plan, both the initial 2005 plan and the 2013 update, included the following jurisdictions:

- Granite County
- Town of Drummond
- Town of Philipsburg

Note: The jurisdictions listed above are all of the incorporated jurisdictions in Granite County. Other communities such as Georgetown, Hall, and Maxville are not incorporated nor do they have governing bodies and are under the jurisdiction of Granite County.

Each jurisdiction participated in a variety of ways depending on the resources available in the community. Granite 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 Town of Drummond and Philipsburg participated in the plan's update by sending representatives to public meetings, providing data and information, discussing elements of the plan at their regularly scheduled public meetings, and reviewing the draft plan. Each of the jurisdictions 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 Philipsburg Mail 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 Granite 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 and town council meetings are also open, public meetings, the discussions and subsequent adoption of the plan by the governing bodies were additional opportunities for public comment. The jurisdictions advertised these meetings using their usual public notification procedures, typically by posting meeting agendas and newspaper notices.

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
East Fork Rock Creek Dam Emergency Action Plan	March 1998
Flint Creek Dam Emergency Action Plan	April 2001
Fred Burr Lake Dam Emergency Action Plan	August 2004
Georgetown Lake Zoning District and Code	2011
Granite County Community Wildfire Protection Plan	November 2005
Granite County Growth Policy	October 2004
Granite County, Town of Philipsburg, Town of Drummond Subdivision Regulations	2006
Lower Willow Creek Dam Emergency Action Plan	2005

Plan Adoption

This plan has been adopted by Granite County and the Towns of Drummond and Philipsburg. Each jurisdiction has 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 governing body at a regularly scheduled public meeting/hearing. In order for the resolution to be approved, a majority of the governing body must agree; for Granite County, this is two out of three commissioners, and in Drummond and Philipsburg, this is three out of five councilpersons. 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. Copies of the resolutions, including the date signed, are in Appendix P.

The Granite 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 Granite County and the Towns of Drummond and Philipsburg 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 Granite 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 Granite 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 and floods. 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 and floods.

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 by jurisdiction in the *risk assessment summary* and take into account the number of hazards that threaten the community.

2.4 Hazard Identification

In 2005, fifteen 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; all hazards remained and no new hazards were identified. New data sources, plans, and information for several hazards were identified and incorporated into the appropriate hazard profile.

Table 2.4A shows the hazards, jurisdictions, 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	Jurisdiction(s)	How Identified	Why Identified
Avalanche and Landslide	Granite County	▪ 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
Communicable Disease (including human and animal diseases)	Granite County Drummond Philipsburg	▪ 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
Dam Failure	Granite County Drummond Philipsburg	▪ Dam Emergency Action Plans ▪ Federal Emergency Management Agency ▪ Granite County GIS data ▪ US Army Corps of Engineers	▪ Potential for a loss of life and property from a dam failure from high hazard dams ▪ History of a near-failure of a high hazard dam
Drought	Granite County Drummond Philipsburg	▪ 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

Table 2.4A Identified Hazards (continued)

Hazard Profile	Jurisdiction(s)	How Identified	Why Identified
Earthquake	Granite County Drummond Philipsburg	▪ 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)	Granite County Drummond Philipsburg	▪ HAZUS-MH ▪ Federal Emergency Management Agency ▪ National Weather Service ▪ Granite County GIS data	▪ History of riverine, flash, and ice jam floods, including Presidential disaster declarations ▪ Identified flood hazard areas in the county and towns
Hazardous Materials Release (including fixed, mobile, and pipeline releases)	Granite County Drummond Philipsburg	▪ National Response Center ▪ Granite County 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
Terrorism	Granite County Drummond Philipsburg	▪ 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
Transportation Accident (including highway, aircraft, and railroad accidents)	Granite County Drummond Philipsburg	▪ Federal Railroad Administration ▪ Montana Highway Patrol ▪ Montana Rail Link ▪ National Transportation Safety Board	▪ Interstate 90 and MT Highway 1 traverse the county ▪ History of aircraft accidents, some with casualties ▪ Potential for commercial aircraft accident ▪ Active railroad passes through Drummond and county areas
Utility and Communications Failure	Granite County Drummond Philipsburg	▪ Local utility data	▪ Dependence of population on utility and communications services
Volcanic Ashfall	Granite County Drummond Philipsburg	▪ Cascades Volcano Observatory ▪ US Geological Survey ▪ Yellowstone Volcano Observatory	▪ History of volcanic ashfall
Water Supply and Watershed Contamination	Granite County Drummond Philipsburg	▪ Local water supply data	▪ Possibility of water contamination from mining, vandalism, and other sources

Table 2.4A Identified Hazards (continued)

Hazard Profile	Jurisdiction(s)	How Identified	Why Identified
Wildfire	Granite County Drummond Philipsburg	▪ Interagency Fire Coordination Center ▪ Montana Department of Natural Resources and Conservation ▪ Granite County 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
Wind, Tornadoes, and Severe Thunderstorms	Granite County Drummond Philipsburg	▪ Federal Emergency Management Agency ▪ National Climatic Data Center ▪ National Weather Service ▪ Storm Prediction Center	▪ History of strong winds, severe thunderstorms, and tornadoes, including damages
Winter Storms and Extended Cold (including blizzards, heavy snow, ice storms, and extreme cold)	Granite County Drummond Philipsburg	▪ 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

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 hospital. 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 Granite 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. 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
Drummond Town Hall	114 A Street Drummond
Granite County Courthouse	220 North Sansome Street Philipsburg
Granite County Public Health	202 East Front Street Drummond
Granite County Sheriff's Office / 911 / EOC / Jail	115 East Kearney Street Philipsburg
Philipsburg Town Hall	104 South Sansome Street Philipsburg

Table 3.1B Fire Stations and Emergency Medical Services

Name	Address
Drummond Ambulance	204 East Front Street Drummond
Georgetown Lake Fire Service Area Georgetown Lake Quick Response Unit	310 Lakeshore Drive PO Box 1234 Anaconda
Philipsburg Ambulance	120 East Kearney Street Philipsburg
Philipsburg Volunteer Fire Department and Ambulance	505 Hamilton Court Philipsburg
Valley Rural Fire District / Drummond Fire	434 and 450 East Front Street Drummond
Valley Rural Fire District / Maxville	100 Maxville Road Philipsburg

Table 3.1C Transportation Facilities

Name	Address
Drummond Airport	Drummond Airport Road Drummond
Drummond Town Shop / Garage	30 East Broad Street Drummond
Granite County Airport / Riddick Field	910 Airport Road Philipsburg
Granite County Memorial Hospital Heliport	310 South Sansome Street Philipsburg
Granite County Road Department	439 School Hill Road Philipsburg
Granite County Road Department	500 South Brown Street Philipsburg
Granite County Road Department – Hall Shop	104 South Broadway Avenue Hall
Montana Department of Transportation – Clinton Shop	1683 Drummond Frontage Road Clinton
Montana Department of Transportation – Drummond Shop	6283 MT Highway 1 Drummond
Montana Department of Transportation – Philipsburg Shop	3798 MT Highway 1 Philipsburg
Montana Department of Transportation Weigh Station	15060 and 15061 Interstate 90 Drummond
Philipsburg Town Shop	408 Hamilton Court Philipsburg

Table 3.1D Utility and Communications Facilities

Name	Address
Beacon 42 Repeater Site (Future Site)	46°44'48" N, 113°37'20" W (Missoula County)
Blackfoot Telephone Bearmouth Substation	1442 West Mullan Trail Clinton
Blackfoot Telephone Drummond Central Office	129 ½ East Broad Street Drummond
Blackfoot Telephone Philipsburg Central Office	205 East Broadway Street Philipsburg
Drummond Lift Station and Sewage Treatment Area	410 West Front Street Drummond
Drummond Sanitation Site	24 Sorenson Lane Drummond
Drummond Water Tower	80 South Main Street Drummond
Drummond Well House	84 South Main Street Drummond
Granite County Sheriff's Office / 911 Repeater Site	46°20'00" N, 113°47'47" W (Ravalli County)
Philipsburg Chlorination Plant	23 Power Plant Road Philipsburg
Philipsburg Sanitation Site	74 Flint Creek Way Philipsburg
Philipsburg Water Tower	37 Stewart Lake Road Philipsburg
Philipsburg Water Works	365 Granite Road Philipsburg
Qwest Fiber Optic	1440 West Mullan Trail Clinton
Ravena Repeater Site (Future Site)	46°42'15" N, 113°17'33" W Granite County
Rumsey Mountain Repeater Site	46°15'45"N, 113°14'47" W Granite County
Shakopee Heights Water and Sewer Pumphouse	88 Shakopee Drive Anaconda
Slide Rock Repeater Site	46°35'21" N, 113°33'17" W Granite County

Table 3.1E Energy and Natural Gas Facilities

Name	Address
Cenex Bulk Plant (fuel)	229 East Front Street Drummond
Cenex Bulk Plant (propane)	908 West Broadway Street Philipsburg
Cenex Bulk Plant (propane)	21 Wrecker Lane Drummond
Flint Creek Hydroelectric Project	111 Power House Road Philipsburg
Northwestern Energy – Drummond Clark Fork Electric Substation	361 South Main Street Drummond
Northwestern Energy – Drummond East Electric Substation	358 South Main Street Drummond
Northwestern Energy – Drummond Electric Substation	357 South Main Street Drummond
Northwestern Energy – Drummond Pump Substation	212 East Mullan Trail Drummond
Northwestern Energy – Philipsburg Electric Substation	412 South Montgomery Street Philipsburg
Northwestern Energy Gas Substation	92 West Mullan Trail Drummond
Northwestern Energy Gas Substation	915 Pearl Street Philipsburg
Northwestern Energy Gas Substation	27 Old Highway 10A Drummond
Northwestern Energy Gas Substation	124 West Main Street Hall
Northwestern Energy Gas Substation	5 Maxville Road Philipsburg
Philipsburg Power Plant	22 Power Plant Road Philipsburg
Philipsburg Power Plant	44 Frost Creek Road Philipsburg
Yellowstone Pipeline Gas Substation	214 East Mullan Trail Drummond

Table 3.1F Banking/Finance Facilities

Name	Address
Granite Mountain Bank, Drummond	27 A Street Drummond
Granite Mountain Bank, Philipsburg	139 East Broadway Street Philipsburg

Table 3.1G State and Federal Government Facilities

Name	Address
Beaverhead Deerlodge National Forest, Pintler Ranger District	88 Business Loop Philipsburg
Lolo National Forest, Rock Creek Ranger Station	2814 Rock Creek Road Clinton
US Post Office – Drummond	60 East Broad Street Drummond
US Post Office – Hall	101 East Main Street Hall
US Post Office – Philipsburg	234 East Broadway Street Philipsburg
USDA Service Center and DNRC Offices	105 South Holland Street Philipsburg

Table 3.1H Vulnerable Populations – Medical/Senior Facilities

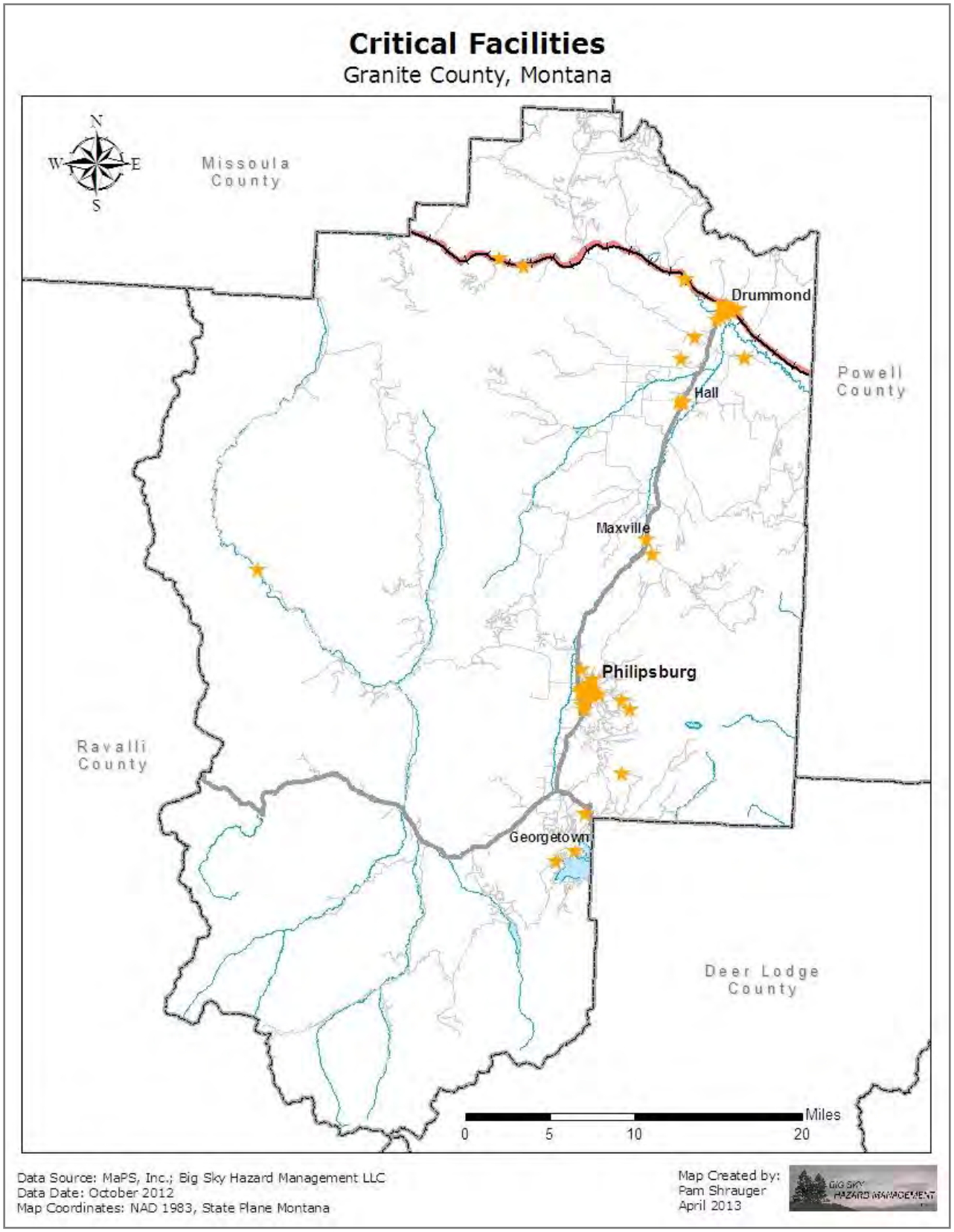
Name	Address
Drummond Community Hall / Senior Citizens Center	54 East Broad Street Drummond
Drummond Multi-Purpose Center / American Legion	112 A Street Drummond
Granite County Medical Center	310 South Sansome Street Philipsburg
Margo Bowers Community Health Center	26 East Broad Street Drummond
Philipsburg Senior Citizens Center	103 East Broadway Street Philipsburg

Table 3.1J Vulnerable Populations – Schools

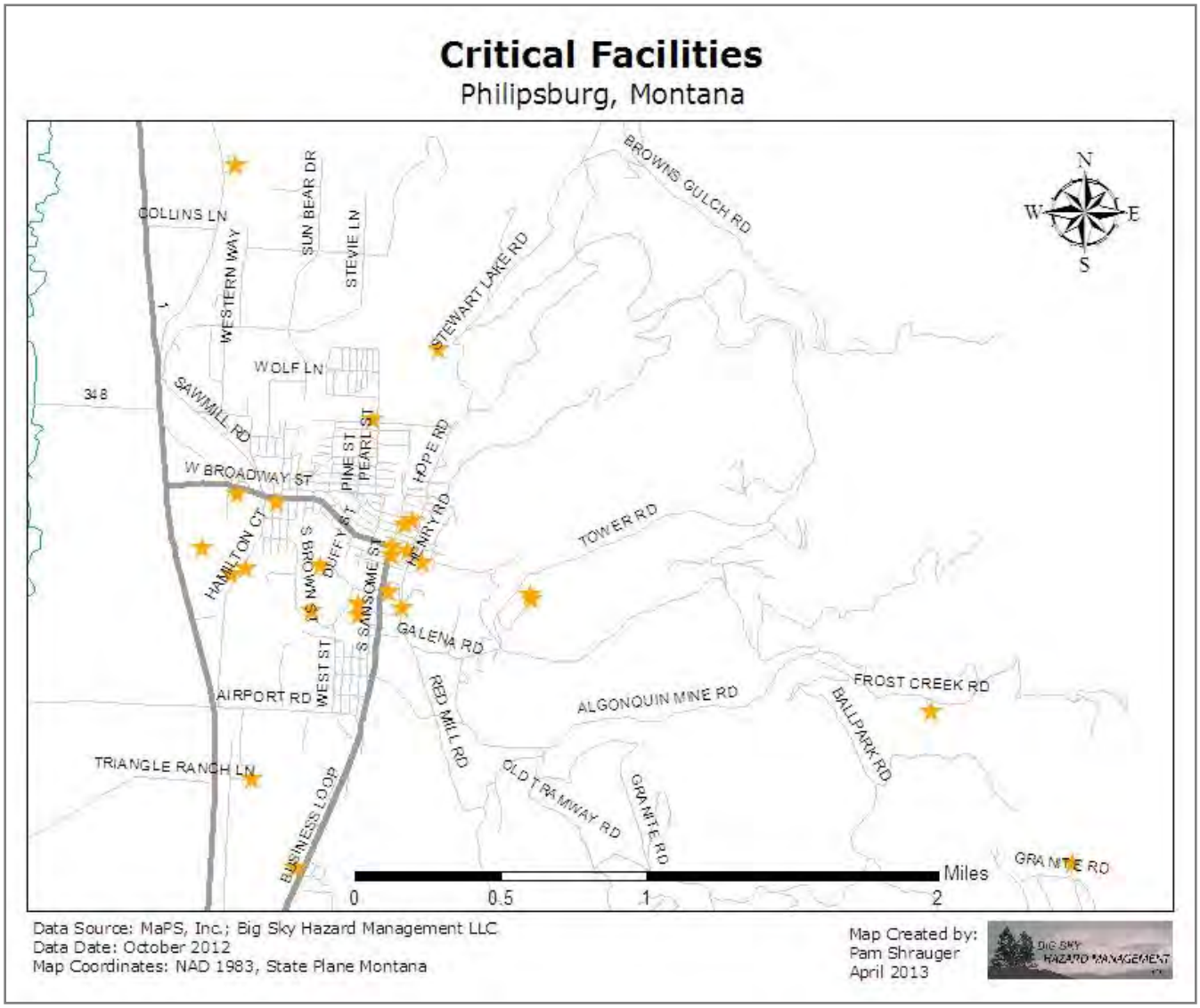
Name	Address
Drummond School *2012-2013 Enrollment = 172*	108 West Edwards Drummond
Drummond School – Library and Vocational Education Building	127 First Street Drummond
Granite County High School *2012-2013 Enrollment = 94*	507 Schnepel Street Philipsburg
Hall Elementary School *2012-2013 Enrollment = 26*	109 West Main Street Hall
Philipsburg Elementary School *2012-2013 Enrollment = 83*	407 Schnepel Street Philipsburg

Source: Montana Office of Public Instruction, 2012.

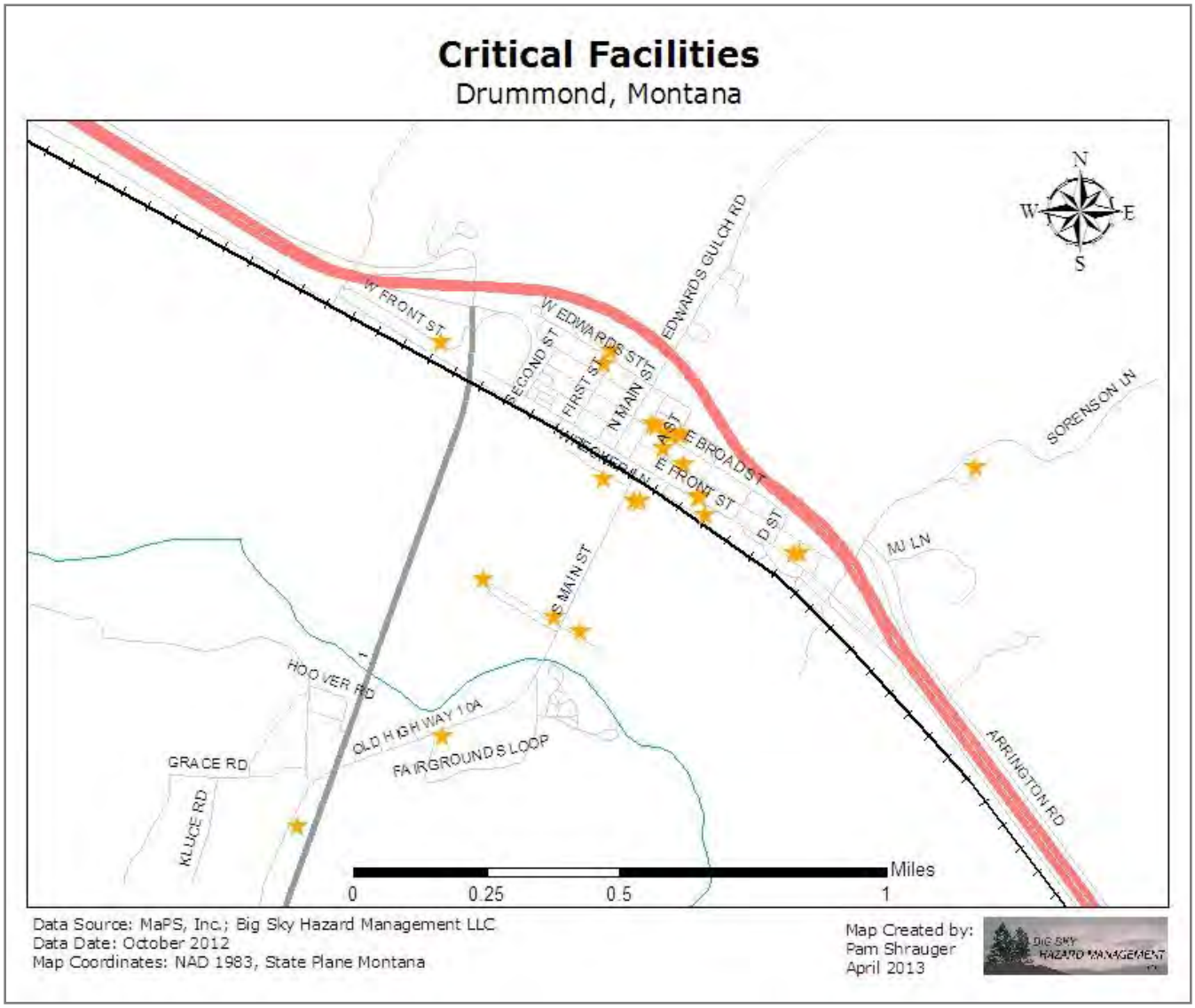
Map 3.1K


Critical Facilities
Granite County, Montana
N
W
E
S
Missoula County
Drummond
Powell County
Hall
Maxville
Philipsburg
Ravalli County
Georgetown
Deer Lodge County
Miles
0
5
10
20
Data Source: MaPS, Inc.; Big Sky Hazard Management LLC
Data Date: October 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
April 2013

Map 3.1L


Critical Facilities
Philipsburg, Montana
COLLINS LN
WESTERN WAY
SUN BEAR DR
STEVIE LN
BROWNS GULCH RD
STEWART LAKE RD
WOLF LN
SAWMILL RD
348
1
W BROADWAY ST
PINE ST
PEARL ST
HOPE RD
HENRY RD
TOWER RD
HAMILTON CT
S MAIN ST
DUFFY ST
S SANSOME ST
GALENA RD
AIRPORT RD
WEST ST
RED MILL RD
ALGONQUIN MINE RD
FROST CREEK RD
BALLPARK RD
TRIANGLE RANCH LN
BUSINESS LOOP
OLD TRAMWAY RD
GRANITE RD
GRANITE RD
N
W
E
S
0
0.5
1
2
Miles
Data Source: MaPS, Inc.; Big Sky Hazard Management LLC
Data Date: October 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
April 2013
BIG SKY HAZARD MANAGEMENT

Map 3.1M


Critical Facilities
Drummond, Montana
N
W
E
S
W FRONT ST
W EDWARDS ST
EDWARDS GULCH RD
SECOND ST
FIRST ST
N MAIN
E BROAD ST
E FRONT ST
D ST
SORENSON LN
MU LN
S MAIN ST
HOOVER RD
OLD HIGHWAY 10A
FAIRGROUNDS LOOP
GRACE RD
KLUCE RD
ARRINGTON RD
Miles
0
0.25
0.5
1
Data Source: MaPS, Inc.; Big Sky Hazard Management LLC
Data Date: October 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
April 2013
BIG SKY HAZARD MANAGEMENT

Critical Infrastructure

Electricity

Electricity runs lights, computers, medical equipment, water pumps, heating system fans, refrigerators, freezers, televisions, and many other types of equipment. Most residents of Granite County receive their electricity from NorthWestern Energy, except the Lower Rock Creek area that is serviced by the Missoula Electric Cooperative. 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 Granite County. Five major regional electric transmission lines cross through Granite County, one through the extreme northeast corner of the county, three close to Interstate 90, and one dipping south of Interstate 90 to near Maxville.

Energy / Heating Fuel

During the cold winter months, the heating of homes and businesses is a necessity. The primary heating fuel used in Philipsburg and Drummond is natural gas, provided by Northwestern Energy. In unincorporated areas of Granite County, propane is more common. Overall, a variety of fuels are used as shown in Table 3.1N. Most systems ultimately require electricity to run their thermostats and blowers.

Table 3.1N US Census Housing Data on House Heating Fuel

	Granite County (TOTAL)	Town of Philipsburg	Town of Drummond	Unincorporated Granite County
Utility Gas	583	259	196	128
Bottled, Tank, or LP Gas	380	12	6	362
Electricity	150	82	25	43
Fuel Oil, Kerosene, etc.	30	4	0	26
Coal or Coke	0	0	0	0
Wood	380	86	15	279
Solar Energy	0	0	0	0
Other Fuel	11	11	0	0
No Fuel Used	3	3	0	0

Source: US Census Bureau, 2013.

Natural gas in portions of Granite County is provided by NorthWestern Energy through underground pipeline infrastructure. The HAZUS-MH MR2 replacement value for the natural gas system is estimated at $20,866,000. Buildings heated with propane and fuel oil typically have a nearby tank that is refilled regularly by a local vendor.

The Yellowstone Pipeline, a major pipeline transporting refined petroleum products from Billings, Montana to Spokane, Washington crosses the northern half of the county close to Interstate 90.

Telephone and Cellular Services

Local telephone services in the county are provided by Blackfoot Telephone Cooperative. Similar to electric infrastructure, telephone can be run through overhead or underground lines. Much of the telephone infrastructure in Granite County lies within the road right-of-ways. Several cell towers exist within the county to provide cellular telephone service, but some areas lack reliable coverage. Given the recent dependence of individuals on cell phones, this infrastructure is considered especially important due to the number of people, both residents and visitors, who depend on it. Internet phone service is another option available to many residents.

Water and Wastewater

Philipsburg is served by a public water and wastewater system. The Philipsburg water supply comes from Fred Burr Lake and Silver Springs. This chlorinated system has over 500 users served by two storage tanks that can hold 200,000 gallons each. The wastewater system is a gravity flow sewer system with cell facultative lagoons. Drummond also has a wastewater system. Larger 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 $52,164,000 and for wastewater systems is estimated at $31,298,000.

Transportation

The transportation infrastructure within Granite County includes the road, rail, and air networks. The primary road transportation routes in Granite County are Interstate 90 and Montana Highways 1 and 38. The major roadways are mostly paved. Generally, county roads and some in Philipsburg and Drummond are gravel. According to the Granite County Growth Policy, the county maintains 540 miles of county roads, Philipsburg maintains 16 miles of streets and alleys, and Drummond maintains 4 miles of streets and alleys. The HAZUS-MH MR2 replacement value for the highway system is estimated at $560,145,000.

Montana Rail Link operates a main railroad line in an east-west direction through the county, near Interstate 90, including stations at Drummond and Bearmouth. The railroad transports goods and raw materials along this line. A spur line no longer in service extends from Drummond to Philipsburg. The HAZUS-MH MR2 replacement value for the railway system is estimated at $76,198,000.

Granite County has two small airports serving private, charter, and/or government aircraft, Riddick Field (U05) one mile south of Philipsburg and Drummond Airport (M26) southwest of Drummond. Granite County Medical Center (MT67) has a heliport. The HAZUS-MH MR2 replacement value for the airport system is estimated at $108,495,000. The closest commercial service airport is in Missoula (MSO).

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.

Table 3.2A Population Statistics

Location	Type	2010 Population	Change Since 2000 Census (people)	Change Since 2000 Census
Granite County (total)	County	3,079	+249	+8.8%
Philipsburg	Incorporated Town	820	-94	-10.3%
Drummond	Incorporated Town	309	-9	-2.8%
Unincorporated County Areas	Unincorporated	1,950	+352	+22.0%

Source: 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 Granite County. Much of the data was derived from FEMA's HAZUS-MH loss-estimation modeling software, version 2.0.

Table 3.2B Number of Buildings by Type

Building Type (HAZUS code)	Number
Single Family Dwelling (RES1)	1,464
Mobile Home (RES2)	425
Duplex (RES3A)	1
3-4 Units (RES3B)	2
Institutional Dormitory (RES5)	1
Personal and Repair Services (COM3)	1
Entertainment and Recreation (COM8)	4

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

Table 3.2C Number of Buildings by Structural Classification Type

Description (HAZUS code)	Number
Wood, Light Frame ≤ 5,000 sq. ft. (W1)	1,437
Steel Moment Frame, Low-Rise (S1L)	1
Concrete Shear Walls, Low-Rise (C2L)	1
Reinforced Masonry Bearing Walls with Wood or Metal Deck Diaphragms, Low-Rise (RM1L)	31
Reinforced Masonry Bearing Walls with Precast Concrete Diaphragms, Low-Rise (RM2L)	3
Unreinforced Masonry Bearing Walls, Low-Rise (URML)	1
Mobile Homes (MH)	425

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

Table 3.2D Housing Census Data

	Granite County (TOTAL)	Town of Drummond	Town of Philipsburg	Unincorporated Granite County
Number of Housing Units	2,751	286	619	1,846
Median Value of Specified Owner-Occupied Housing Units	$170,800	$99,800	$152,400	$187,970
Number of Mobile Homes	466	35	71	360

Source: US Census Bureau, 2013.

Table 3.2E Structure Ages Based on US Census Data

	Granite County (TOTAL)	Town of Drummond	Town of Philipsburg	Unincorporated Granite County
2005 or later	113	0	20	93
2000 to 2004	202	8	24	170
1990 to 1999	312	9	76	227
1980 to 1989	270	16	26	228
1970 to 1979	390	27	55	308
1960 to 1969	293	44	45	204
1950 to 1959	298	42	76	180
1940 to 1949	126	48	20	58
1939 or earlier	747	92	277	378

Source: US Census Bureau, 2013.

The total value of residential structures in Granite County can be estimated as shown in Table 3.2F. Census values were estimated by multiplying the number of housing units by the median unit value. 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 Granite County has 2,160 parcels listed with a building value greater than zero. Note that this figure includes non-residential buildings. Table 3.2F contains the sum of the building values listed in the CAMA data. In comparison, the Federal Emergency Management Agency's HAZUS-MH loss estimation software gives the residential building stock in Granite County a replacement value of over $196 million for 1,893 residences. Table 3.2G lists the non-residential building stock replacement values by structure type. Map 3.2H shows the locations of structures provided by the Granite County GIS contractor integrated with values based on the closest CAMA parcel with a building value greater than $0. Maps 3.2J, 3.2K, 3.2L, 3.2M show the types of structures by location.

Table 3.2F Estimated Value of Residential Structures

Jurisdiction	Census Estimated Residential Value	CAMA Estimated Building Value*	HAZUS-MH Residential Building Replacement Value
Granite County, total	$469,870,800	$250,338,184	$196,179,000
Town of Drummond	$28,542,800	$10,025,740	not applicable
Town of Philipsburg	$94,335,600	$39,830,373	not applicable
Granite County, unincorporated	$346,992,400	$200,482,071	not applicable

* includes non-residential buildings

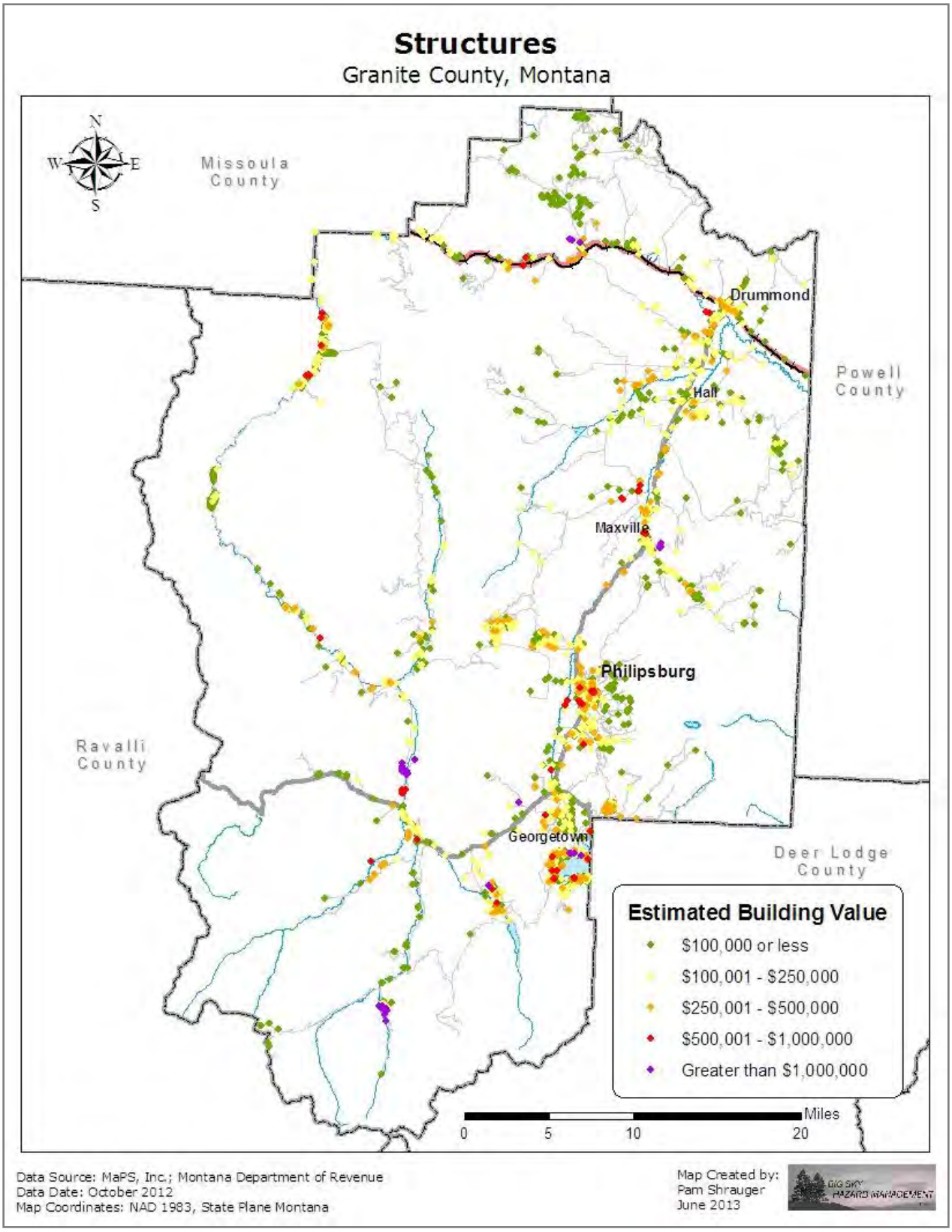
Sources: US Census Bureau, 2013; Montana Department of Revenue, 2013; Federal Emergency Management Agency HAZUS-MH MR2 database.

Table 3.2G HAZUS-MH Estimated Non-Residential Building Stock Replacement Value

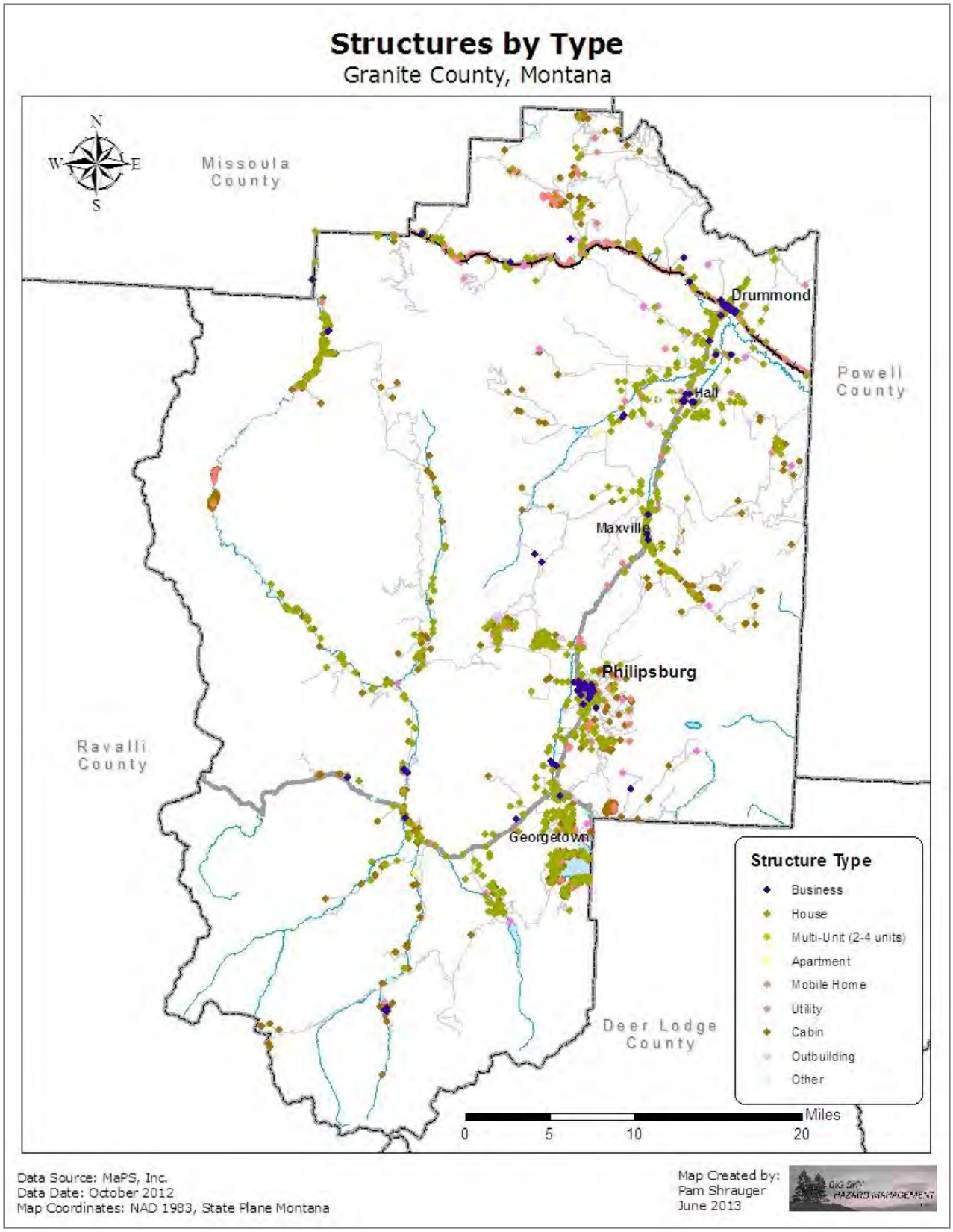
Type	Replacement Value
Commercial	$9,582,000
Industrial	$1,031,000
Agriculture	$1,086,000
Religion	$302,000
Government	$85,000
Education	$400,000
TOTAL	*$12,486,000*

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

Map 3.2H


Structures
Granite County, Montana
N
W
E
S
Missoula County
Drummond
Powell County
Hall
Maxville
Philipsburg
Ravalli County
Georgetown
Deer Lodge County
Estimated Building Value
$100,000 or less
$100,001 - $250,000
$250,001 - $500,000
$500,001 - $1,000,000
Greater than $1,000,000
Miles
0
5
10
20
Data Source: MaPS, Inc.; Montana Department of Revenue
Data Date: October 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
June 2013
BIG SKY HAZARD MANAGEMENT

Map 3.2J


Structures by Type
Granite County, Montana
N
W
E
S
Missoula County
Drummond
Powell County
Hall
Maxville
Philipsburg
Ravalli County
Georgetown
Deer Lodge County
Structure Type
Business
House
Multi-Unit (2-4 units)
Apartment
Mobile Home
Utility
Cabin
Outbuilding
Other
Miles
0
5
10
20
Data Source: MaPS, Inc.
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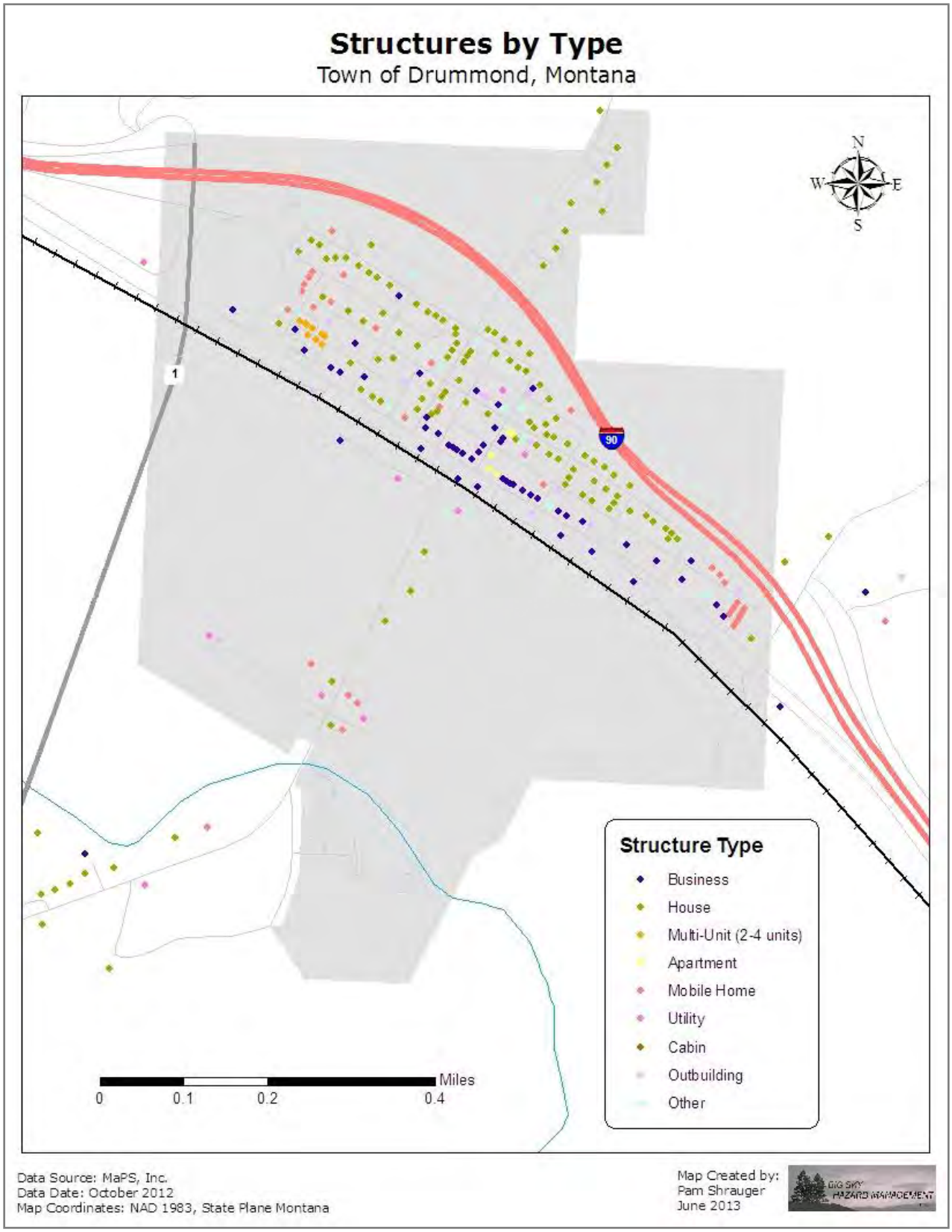
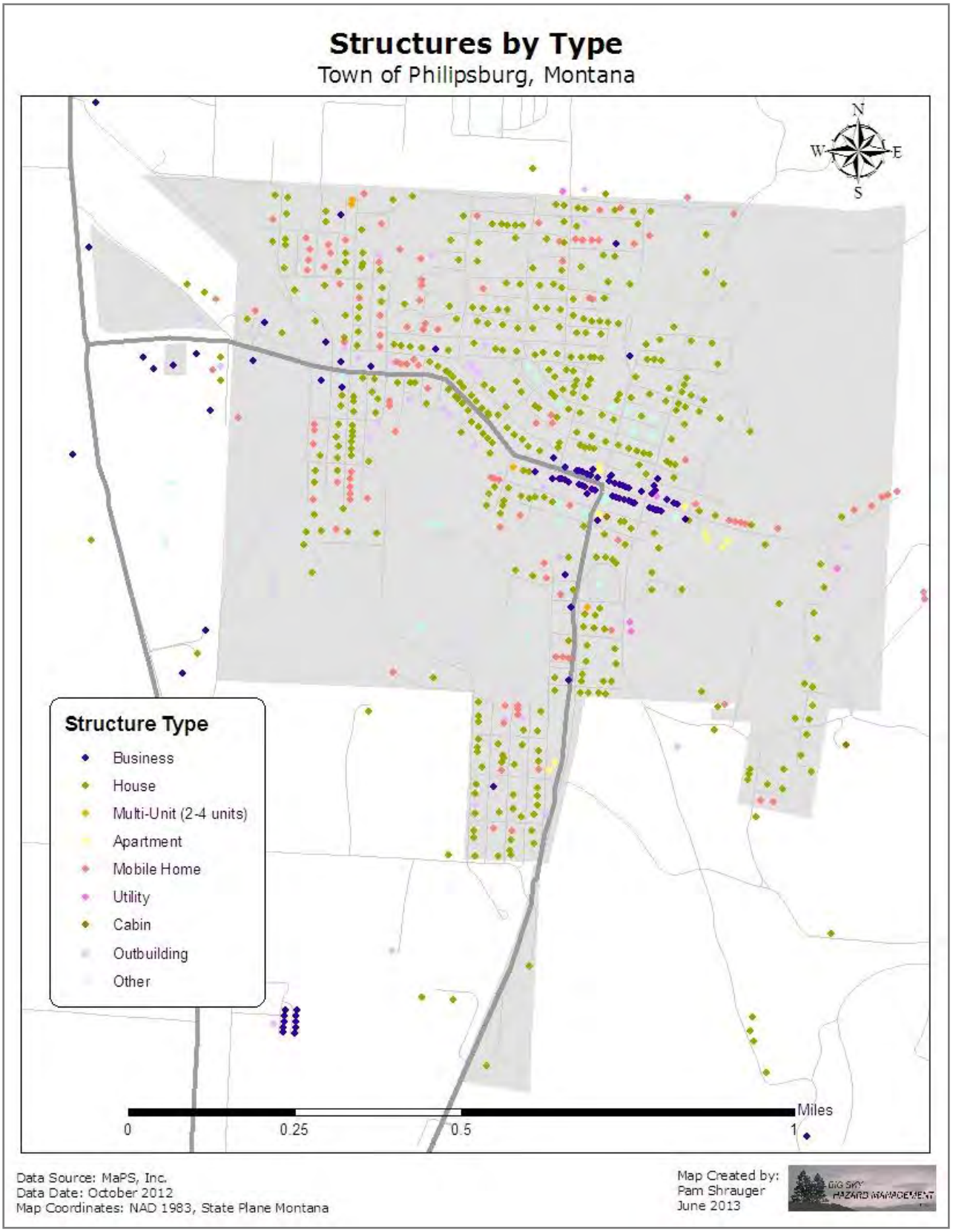
Map Created by:
Pam Shrauger
June 2013
GIS SKY HAZARD MANAGEMENT

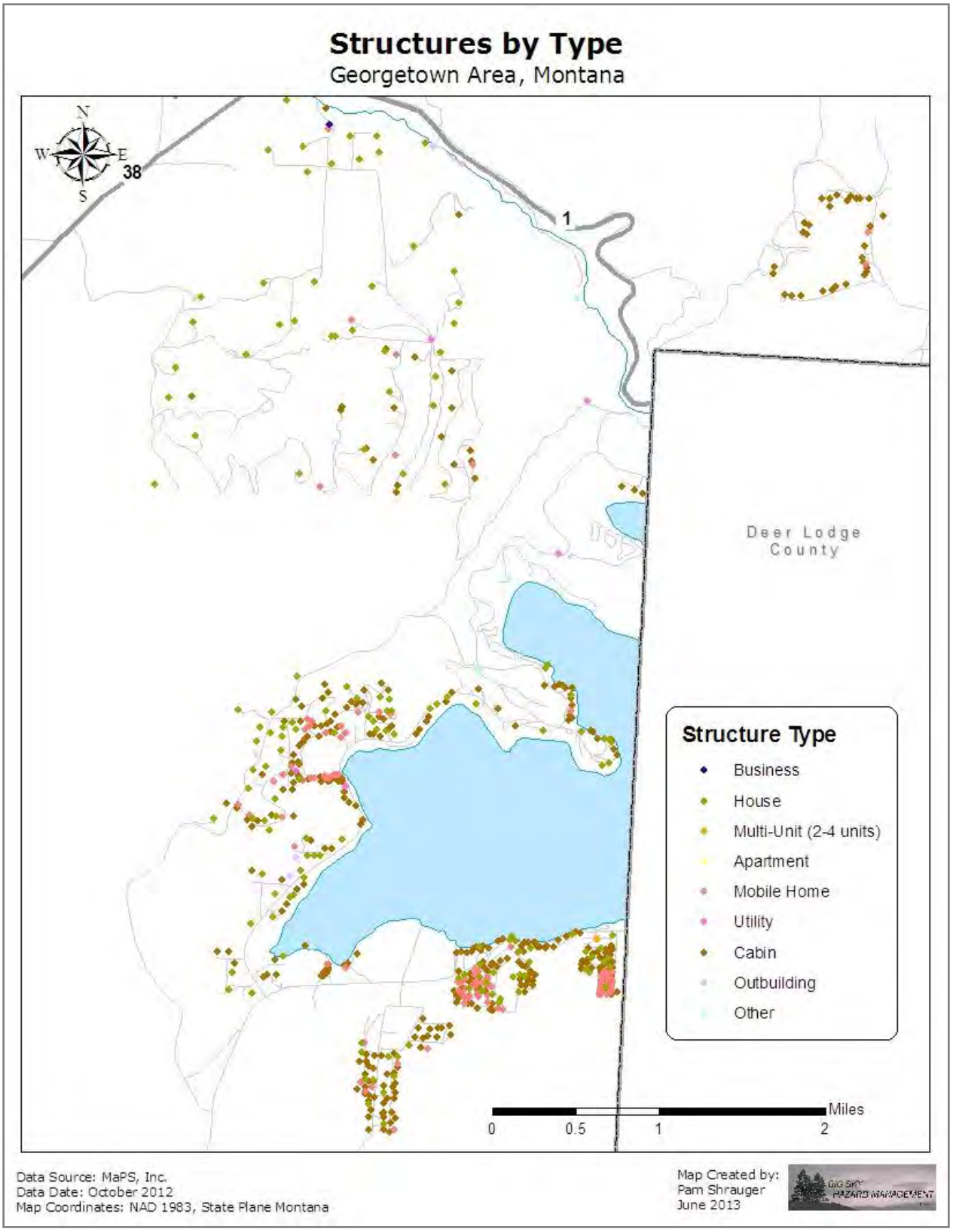
Map 3.2K


Structures by Type
Town of Drummond, Montana
N
W
E
S
1
90
Structure Type
Business
House
Multi-Unit (2-4 units)
Apartment
Mobile Home
Utility
Cabin
Outbuilding
Other
Miles
0
0.1
0.2
0.4
Data Source: MaPS, Inc.
Data Date: October 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
June 2013
BIG SKY HAZARD MANAGEMENT

Map 3.2L


Structures by Type
Town of Philipsburg, Montana
N
W
E
S
Structure Type
Business
House
Multi-Unit (2-4 units)
Apartment
Mobile Home
Utility
Cabin
Outbuilding
Other
0
0.25
0.5
1
Miles
Data Source: MaPS, Inc.
Data Date: October 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
June 2013

Map 3.2M


Structures by Type
Georgetown Area, Montana
N
W
E
S
38
1
Deer Lodge County
Structure Type
Business
House
Multi-Unit (2-4 units)
Apartment
Mobile Home
Utility
Cabin
Outbuilding
Other
0
0.5
1
2
Miles
Data Source: MaPS, Inc.
Data Date: October 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
June 2013
GIS SKY HAZARD MANAGEMENT

3.3 Economic, Ecologic, Historic, and Social Values

Granite County has an abundance of natural resources and scenic beauty. Home to spectacular mountain ranges, rivers, creeks, streams, valleys, lakes, and rangelands, the county remains rural and its economy diverse. For many years, the Granite County economy was driven by the mining industry and stabilized by the agricultural and logging economies. Today, tourism, agriculture, social services, healthcare, timber, mining, and home-based businesses are all present.

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

- Median household income (2007-2011): $38,179
- Persons below poverty (2007-2011): 11.6%
- Total number of companies/firms (2007): 425

Source: US Census Bureau, 2013.

Based on data from the US Census of Agriculture in 2007, Granite County had:

- Number of farms: 166 farms
- Acres in farmland: 302,973 acres
- Total market value of agricultural products sold: $13,081,000
- Market value of livestock, poultry, and their products sold: $12,121,000
- Number of cattle and calves: 20,894
- Number of horses and ponies: 862
- Number of sheep and lambs: 430
- Market value of crops sold: $960,000
- Primary crops (based on number of acres): Forage/Hay, Wheat, and Barley

Source: US Department of Agriculture, 2007.

The ecologic, historic, and social values of Granite 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 Granite County include Beaverhead-Deerlodge National Forest, Lolo National Forest, Anaconda Pintler Wilderness, rivers, creeks, lakes, and wildlife. Granite County does not have any generally known listed endangered species; however, the Grizzly Bear, Canada Lynx, and Bull Trout are listed threatened species in the county. Proposed and candidate species include the Whitebark Pine and Wolverine. (US Fish and Wildlife Service, 2013)

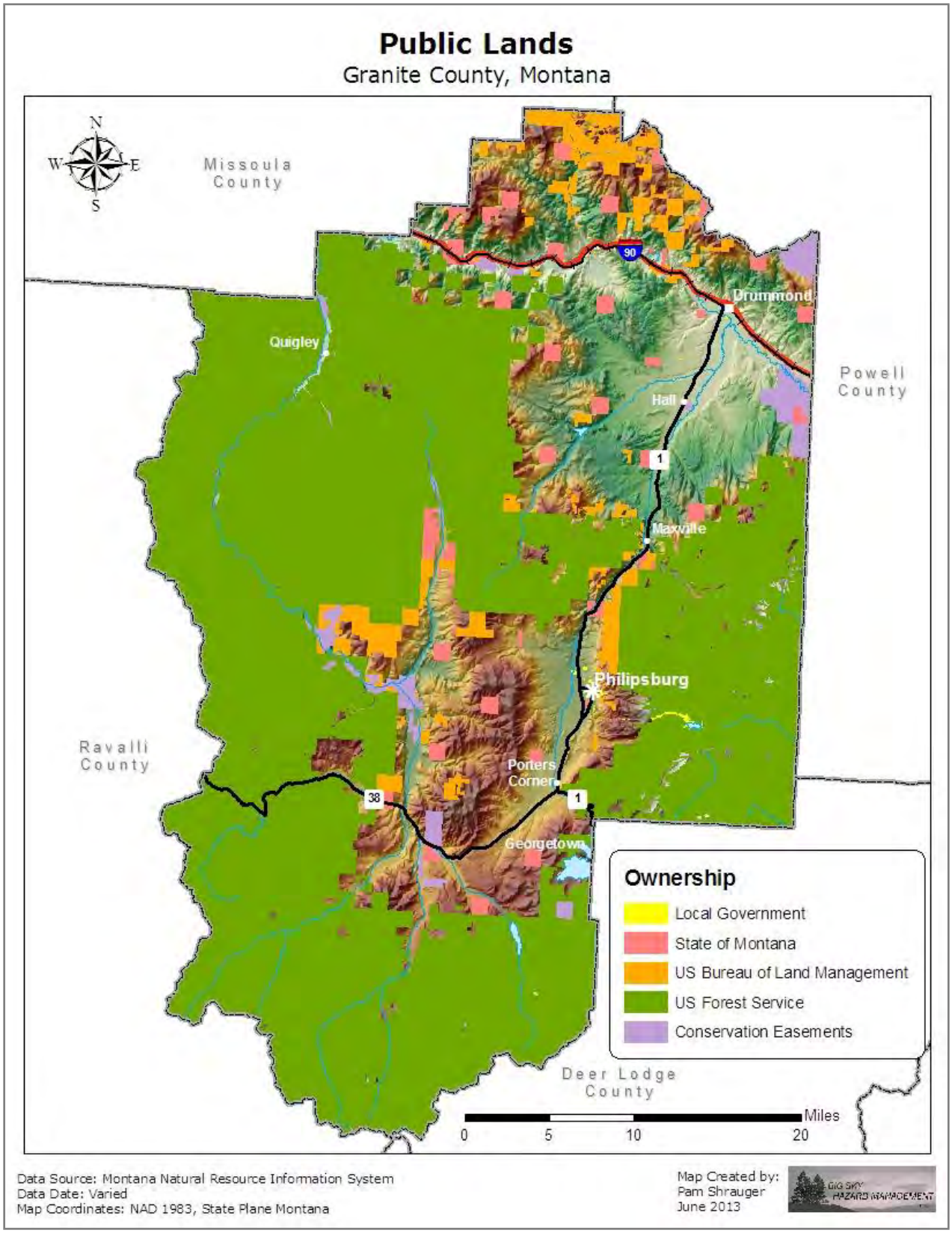
Historic values capture a piece of history and maintain a point in time. Historic values can include sites, buildings, documents, and other pieces that preserve times past and have value to people. Granite County has 11 resources listed in the National Register of Historic Places. (National Park Service, 2013)

Social values often cannot be quantified but are an important aspect of quality of life and interpersonal relationships. Examples of social values in Granite 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.

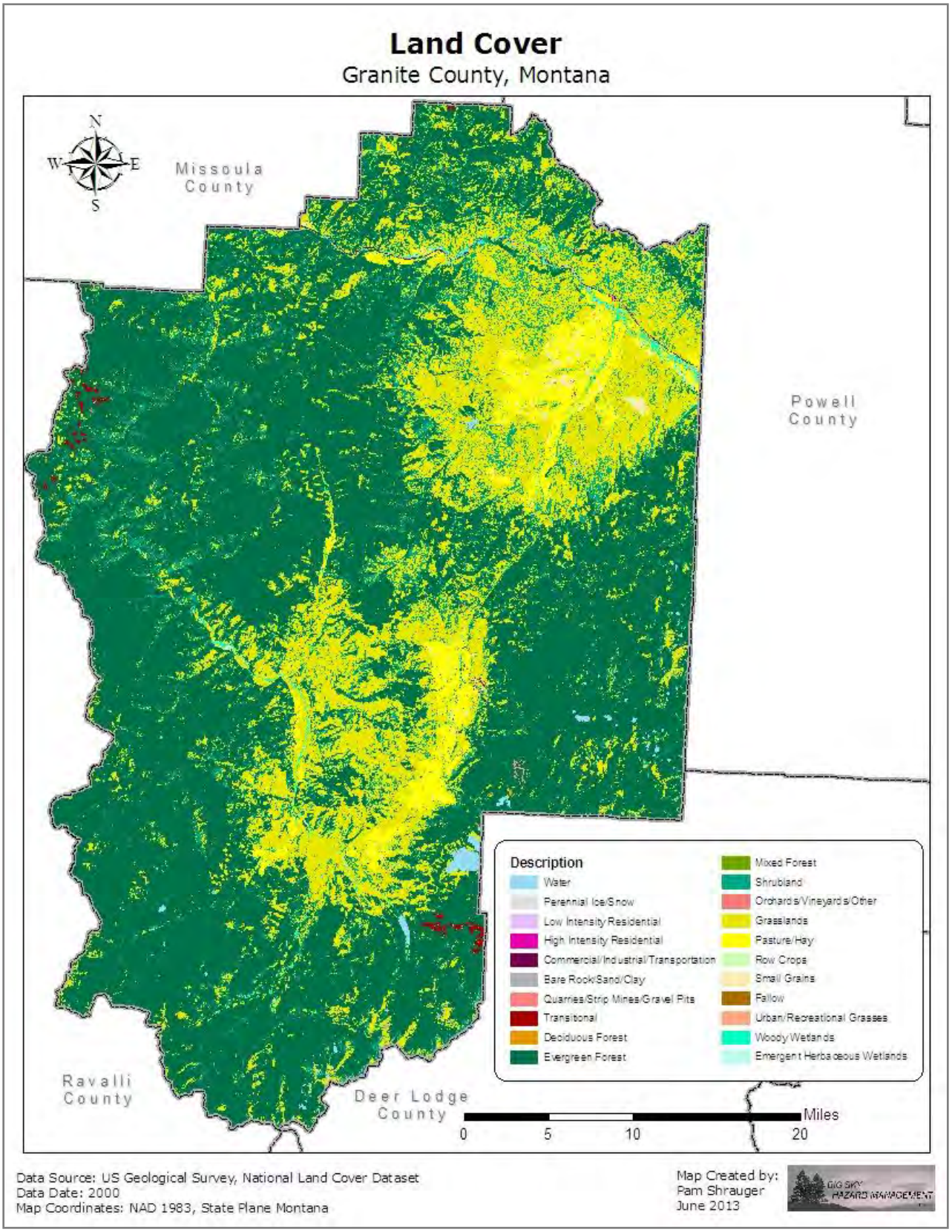
3.4 Current Land Use

Granite County has varied land use but is primarily rural with most of the land use devoted to forest uses, agriculture, residential, undeveloped areas, and government ownership. The Town of Philipsburg is the most developed area. Small communities, such as the Town of Drummond, Georgetown Lake, and Hall, and individual homes and farms are interspersed. Conservation easements have been used in Granite County as a tool for voluntary land conservation and preservation of natural resources, productive agricultural lands, and wildlife habitat. 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.

Map 3.4A


Public Lands
Granite County, Montana
N
W
E
S
Missoula County
Powell County
Ravalli County
Deer Lodge County
Quigley
Drummond
Hall
Maxville
Philipsburg
Porters Corner
Georgetown
90
1
38
Ownership
Local Government
State of Montana
US Bureau of Land Management
US Forest Service
Conservation Easements
0
5
10
20
Miles
Data Source: Montana Natural Resource Information System
Data Date: Varied
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
June 2013
GIS SKY HAZARD MANAGEMENT

Map 3.4B


Land Cover
Granite County, Montana
N
W
E
S
Missoula County
Powell County
Ravalli County
Deer Lodge County
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
0
5
10
20
Miles
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
BIG SKY HAZARD MANAGEMENT

3.5 Recent Development

Population growth has occurred within Granite County in recent years, although a population decline was seen in the Towns of Philipsburg and Drummond. Most of the growth and development over the past ten years has been in the Georgetown Lake area. Residents have expressed concerns with this development in wildfire hazard areas. The Granite County Planner estimates about 328 lots have been created through subdivision in the county since 2005. (Granite County, 2013)

Besides the residential development in the Georgetown Lake area, notable developments in recent years include:

- The Flint Creek Hydroelectric Project, constructed in 2012. Some residents expressed additional dam failure and flood concerns from this project.
- Philipsburg wastewater treatment improvements, 2009. Some residents expressed flood concerns with this facility.

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 the jurisdictions to guide future development.

Granite County Growth Policy Plan, October 2004, with amendments

The Granite County Growth Policy (including sections for Drummond and Philipsburg), as required by state law, does not provide regulatory authority but rather outlines the future of growth in the jurisdictions. 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 Granite County Growth Policy was developed and is maintained through active citizen participation in surveys and public meetings. Surveys showed "strong support for the county adopting policies, even regulations to ensure that new growth is orderly and to protect productive agricultural land. However, many citizens in the public meetings expressed concern that private property rights be protected." According to this plan, the County Planning Board encourages "the formation of localized planning and zoning districts, rather than pursuing county-wide land use regulations." The survey also shows that 60% of residents agreed that new growth should not develop adjacent to rivers, streams, or lakes.

The "Issues, Opportunities and Concerns" section of the Growth Policy Plan identifies opportunities to create wildfire mitigation requirements for new subdivisions and to keep commercial and industrial sites out of the floodplain and high fire risk areas. Further supporting hazard mitigation, the Growth Policy Plan contains the following goals and policies:

Goal: Protect the rivers and streams, flood areas, riparian areas, and wetlands in the county.

Policies:

- Prohibit development in areas deemed to be flood hazard areas.
- For new development, including subdivisions approved under Granite County Subdivision Regulations, all non-agricultural structures should be set back 300 horizontal feet from the high water marks of streams and irrigation canals and ditches. Variances may be granted in certain topography.

Goal: Ensure the effectiveness of fire fighting in all of Granite County, minimize damage to property and risk of death and injury, and provide maximum safety for fire fighters, EMS, and law enforcement personnel through sound design of new development.

Goal: Minimize exposure within wildland/urban interface and other high fire hazard areas.

Policies: The Granite County Subdivision Regulations will provide special requirements to ensure effective fire fighting, reduce fire damage, and safety in all new subdivisions proposed in high fire hazard areas. Proposed ideas include:

- Minimum standards for roads, bridges, culverts, and turnarounds.
- Minimum standards for water supplies.
- Encouragement of development in low fire hazard areas
- Distribution of information to new homeowners on defensible space, electric wiring, chimneys, fireplaces, etc.
- Adoption of the Granite County Fire Protection Plan and Capital Improvements Plan
- Recruitment of volunteer firefighters
- Exploration of a fire district in the Lower Rock Creek area.

Noted in the Lower Rock Creek amendment dated November 2010: "Granite County should not allow future subdivision of land in the floodplain, and should consider the appropriateness of additional set-back guidelines and/or regulations, or at a minimum "buffer zones" to indicate areas were new development should be discouraged. Granite County should restudy the floodplain boundaries since the last data we have is 1988 which is old and not workable." "Granite County should examine the feasibility of creating a building permit program."

Noted in the Drummond proposed amendment: "Seek to have drainage conveyance and infrastructure maintenance improvements completed. Specifically as they relate to sections of town which historically flood."

Granite County, Town of Philipsburg, Town of Drummond Subdivision Regulations, 2006

One set of subdivision regulations is used throughout Granite County, including the Towns of Drummond and Philipsburg. To support state law, twelve "purposes" are promoted, one of which is: "The avoidance of danger or injury by reason of natural hazard or the lack of water, drainage, access, transportation or other public services."

The governing body can require subdividers to mitigate "potentially significant adverse impacts." During the review process of both major and minor subdivisions, the planning board must consider "relevant evidence relating to the public health, safety, and welfare."

Lands unsuitable for subdivision include potential hazard areas from "flooding, snow avalanches, rock falls, land slides, steep slopes in excess of 25 percent slope, high potential for wildfire, subsidence, high water table, polluted or non-potable water supply, high voltage lines, high pressure gas lines, aircraft or vehicular traffic hazards or congestion, or severe toxic or hazardous waste exposure… or other features which may be detrimental to the health, safety, or general welfare of existing or future residents."

Specific to flooding, land in the floodway cannot be subdivided; however, land in the flood fringe may be according to state and federal floodplain regulations. Drainage systems must be designed by a licensed engineer and certified to accommodate a 25-year storm event.

Specific to wind and heavy snow hazards, utilities must be placed underground, wherever practical.

Specific to wildfires, the regulations require two entrance/exit roads and bridges that conform to the Granite County Bridge Standards. Structures are prohibited on slopes greater than 25% and on specific topographical features ("fire chimneys"). The minimum lot sizes based on slope and fuels and specific water supply requirements are established.

In areas considered to be high fire hazard areas, the subdivision must meet additional requirements, such as:

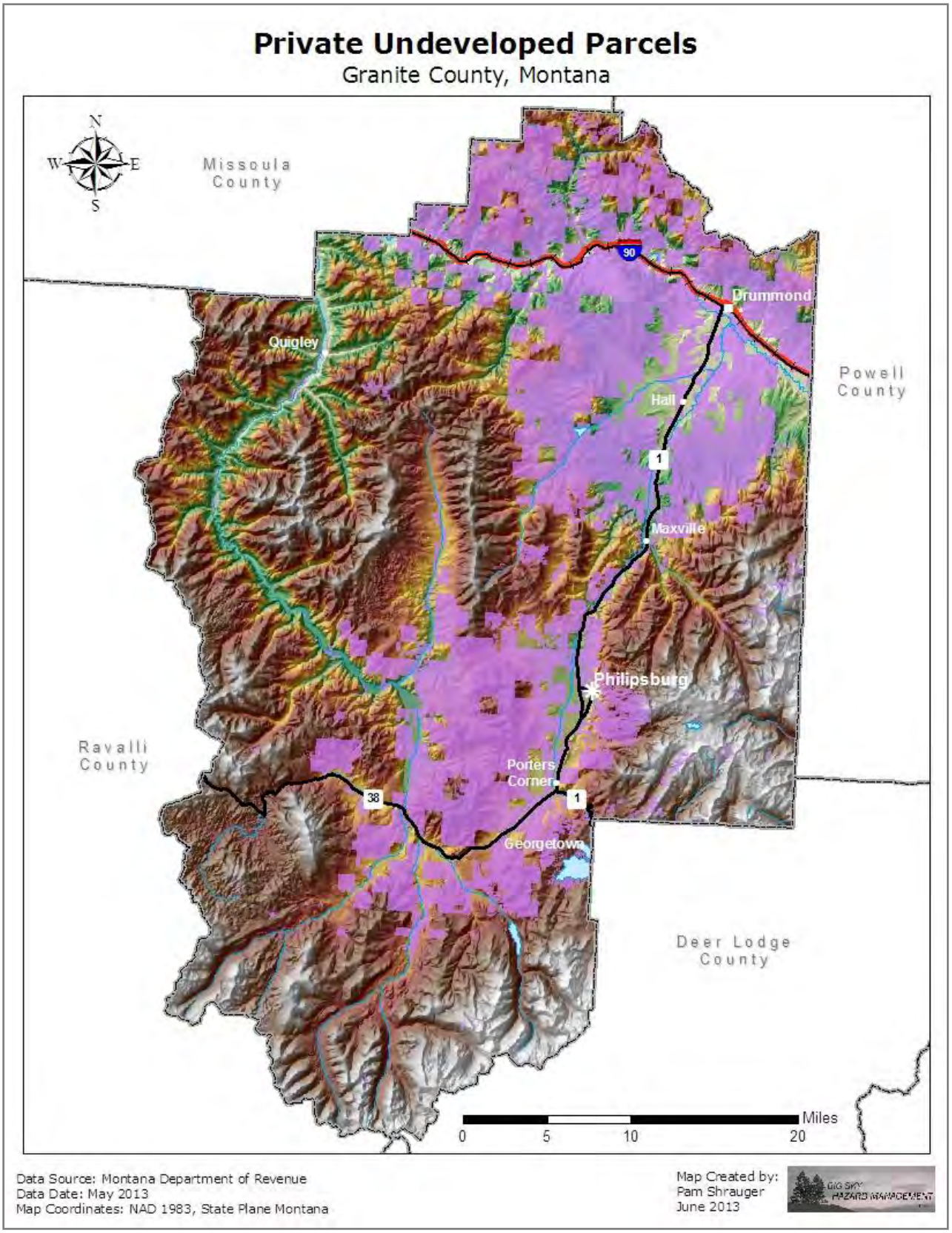
- Road right of way shall be cleared of slash.
- Open space, park land and recreation areas (including green belts, riding or hiking trails) should be located, where appropriate, to separate residences and other buildings from densely forested areas.
- Densities in areas of steep slopes or dense forest growth shall be reduced through minimum lot standards.
- Development and enforcement of a Fire Prevention and Control Plan.

Georgetown Lake Zoning District and Code, 2011

The Georgetown Lake Zoning Code generally dictates the type of development that can occur in a particular geographic location and establishes building design standards. The Georgetown Lake Fire Service Area Fire Protection Standards adopted in January 2007 provide additional standards for the area, specific to fire protection.

In general, development has slowed since 2006; however, growth in Granite County is expected to continue as overall economic conditions improve. Map 3.6A shows the private undeveloped land parcels in Granite 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 3,467 parcels of private undeveloped lands exist in Granite County. A possible future development noted in a public meeting was the addition of a fertilizer plant in Drummond.

Map 3.6A


Private Undeveloped Parcels
Granite County, Montana
N
W
E
S
Missoula County
90
Drummond
Quigley
Powell County
Hall
1
Maxville
Philipsburg
Ravalli County
Porters Corner
38
1
Georgetown
Deer Lodge County
Miles
0
5
10
20
Data Source: Montana Department of Revenue
Data Date: May 2013
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
June 2013
BIG SKY HAZARD MANAGEMENT

4. RISK ASSESSMENT / HAZARD PROFILES

4.1 Avalanche and Landslide

Table 4.1A Hazard Summary for Granite County

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 4.1B Hazard Summary for the Town of Drummond

Overall Hazard Rating	Not Applicable
Probability of High Impact Event	
Vulnerability	

Table 4.1C Hazard Summary for the Town of Philipsburg

Overall Hazard Rating	Not Applicable
Probability of High Impact Event	
Vulnerability	

Table 4.1D Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.1.1 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.

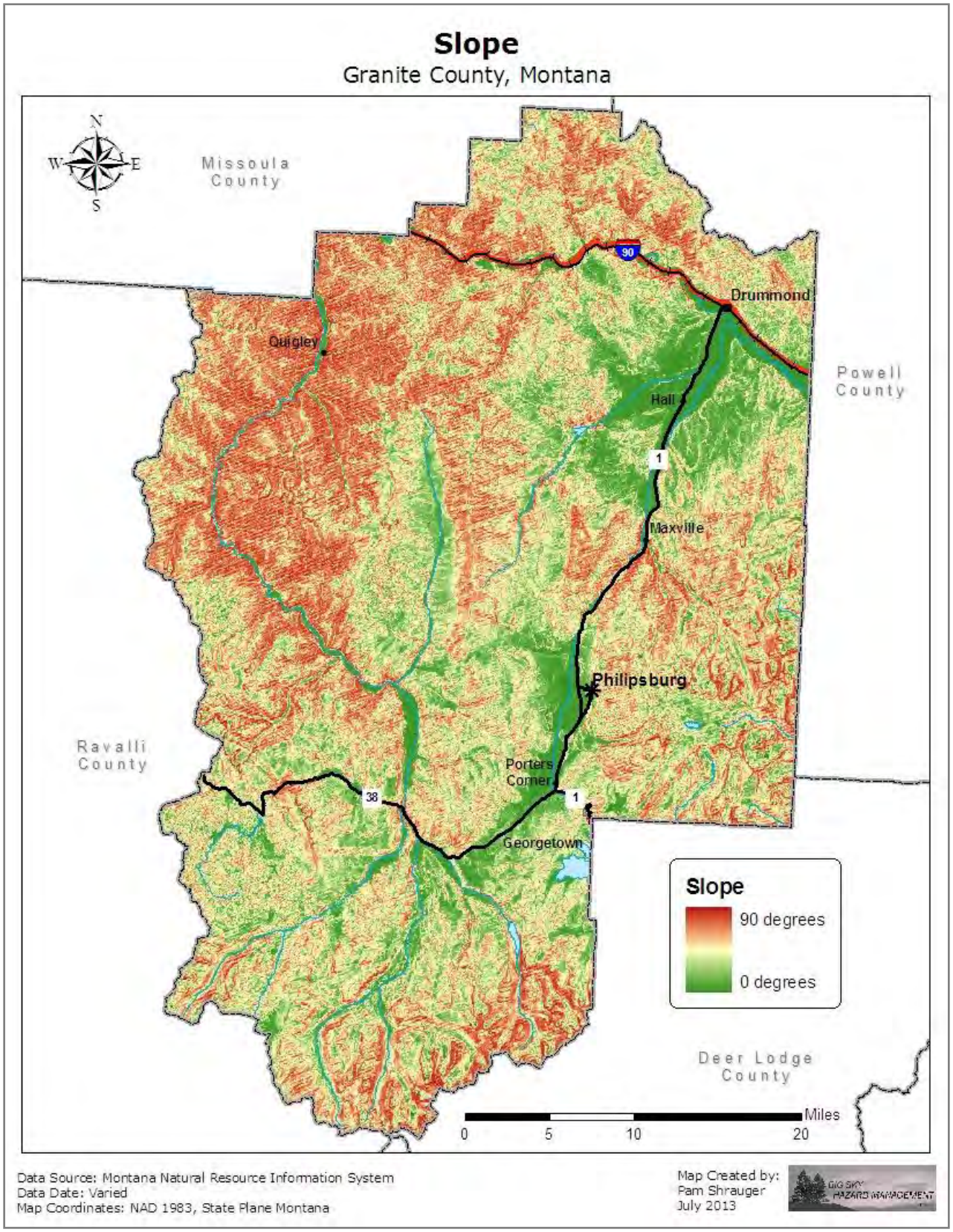
According to the Montana Disaster and Emergency Services website, "If it is assumed that an accumulation of snow is possible anywhere in Montana, then we can evaluate the potential for hazard solely on the basis of terrain characteristics. The most important factor by far is terrain steepness. Wet snow 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 4.1.1A shows the slope in Granite County.

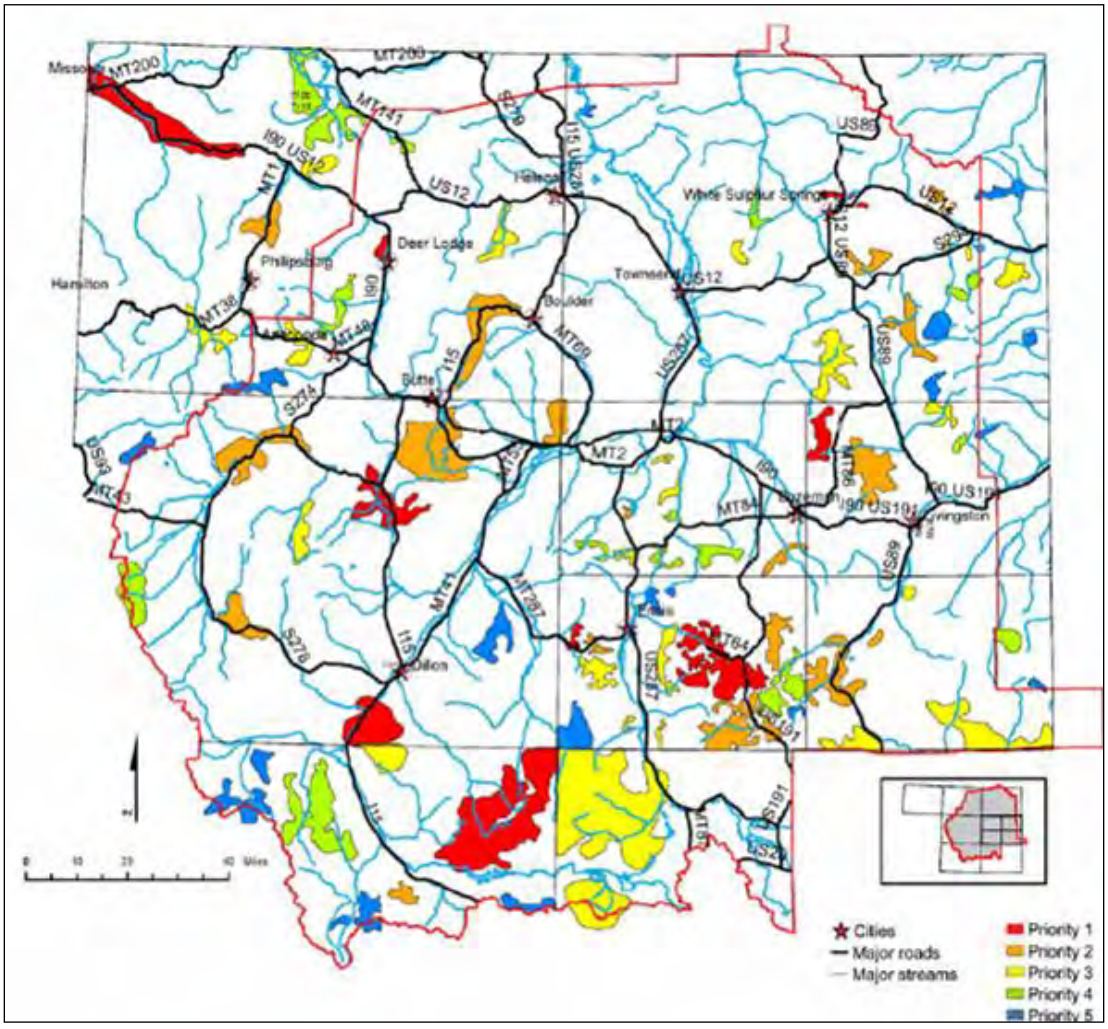
In the case of landslides, some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. Gravity is the force driving landslide movement. Factors that allow the force of gravity to overcome the resistance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

Map 4.1.1A


Slope
Granite County, Montana
N
W
E
S
Missoula County
90
Drummond
Quigley
Powell County
Hall
1
Maxville
Philipsburg
Ravalli County
Porters Corner
38
1
Georgetown
Slope
90 degrees
0 degrees
Deer Lodge County
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
July 2013
BIG SKY HAZARD MANAGEMENT

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. Granite County, in the northwestern section just outside of District 2 in Figure 4.1.1B, has Priority 1, 2, and 3 areas.

Figure 4.1.1B
Montana Department of Transportation, District 2 Landslide Priority Areas



Source: Montana Department of Transportation, 2002.

4.1.2 History

Granite County has a history of both avalanches and landslides. Table 4.1.2A outlines the impacts of avalanches since 1998. Note that avalanches are a normal occurrence in Granite County and typically do not cause any damages. The only concerns here are when people or property lie in the path.

Table 4.1.2A Granite County Avalanches Impacting the Population 1998-2012

Date and Location	Result
January 3, 1998 Southeast of Hamilton at Granite/Ravalli border near Shadow Lake	One snowmobiler killed and two others buried
December 26, 2000 Closed area of Discovery Basin Ski Area near Georgetown Lake	Three teenagers injured
December 21, 2001 13 miles east of Philipsburg near Thompson Lake in Flint Creek Range	One 21 year old male killed when separated from party
January 1, 2012 East of Red Lion in the Flint Creek Range	One snowmobiler killed

Source: Avalanche.org, 2013.

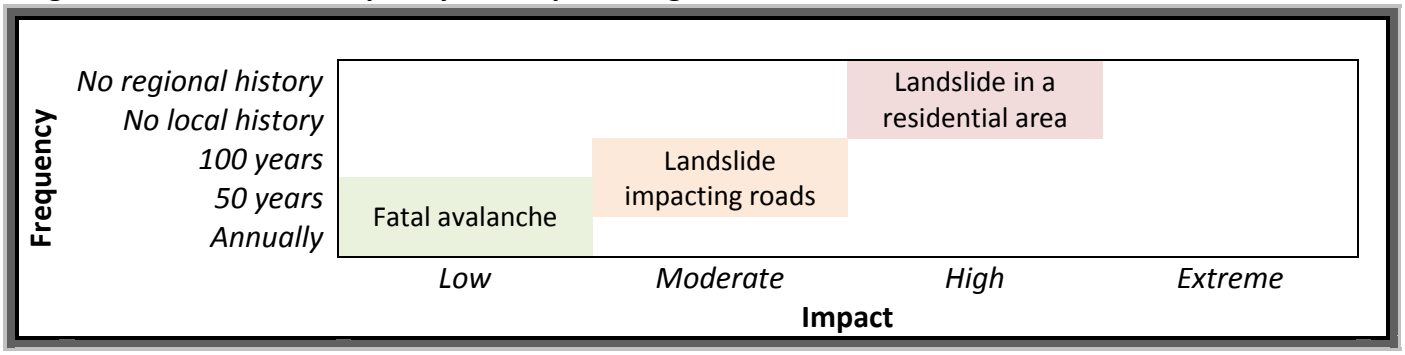
Although specific dates and damages are not known, significant landslides have occurred in Granite County. Montana Department of Transportation studied the Flint Creek Landslide Complex between mileposts 27.8 and 28.5 on Highway 1 near Georgetown Lake and the Deer Lodge County line. This area was closed for two days following a slide in this area in the early 2000s. Despite the numerous relatively minor incidents in Granite County from avalanches and landslides, none have warranted state or federal disaster declarations.

4.1.3 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, on average, one person is killed by avalanche in Granite County every 5 years (3 fatalities/15 years). The history of significant incidents noted in Table 4.1.2A most fatal incidents have occurred over the Christmas and New Year holiday season.

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 4.1.3A Hazard Frequency and Impact Ranges



4.1.4 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. Since the primary avalanche and landslide hazard areas are outside the Towns of Drummond and Philipsburg, the analysis applies only to unincorporated area of Granite County.

Exposure

Critical Facilities and Infrastructure

Critical facilities in Granite 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 $563,910 (3 homes x $187,970 median value of homes in unincorporated Granite County).

Population

Based on records from the past 15 years, one person is killed by avalanches in Granite County every five years. This figure shows that the greatest losses from avalanches are to human life. 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 Granite 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

While most are within public land areas, some undeveloped parcels of land in unincorporated parts of Granite 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 subdivision review process considers snow and rock slide hazards. Therefore, the development potential in these areas is limited by these regulations. Without a building permit system or code, however, structures that are not subject to the subdivision regulations and are outside the Georgetown Lake Zoning District could be placed in hazardous areas. 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 4.1.4A Hazard Vulnerabilities and Impacts

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Granite County	Critical Facilities		▪ $100,000 losses ▪ Structural losses ▪ Contents losses ▪ Critical functional losses ▪ Critical data losses ▪ Clean-up/debris removal costs	Low
Granite County	Critical Infrastructure	▪ $200,000 losses ▪ Road closures	▪ Loss of electricity ▪ Loss of telephone service	Low-Moderate
Granite County	Existing Structures		▪ $563,910 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses ▪ Clean-up/debris removal costs	Low-Moderate
Granite County	Population	▪ Injuries ▪ Fatalities		Moderate
Granite County	Values		▪ Service industry losses ▪ Cancellation of activities ▪ Restrictions on activities ▪ Aesthetic value losses	Low-Moderate
Granite County	Future Structures		▪ Unlikely to occur in hazard areas ▪ Up to 10 residential structures estimated	Low-Moderate

* in addition to probable (100-year) impacts

4.1.5 Data Limitations

Data limitations include:

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

4.2 Communicable Disease

including human and animal diseases

Table 4.2A Hazard Summary for Granite County

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 3,079 and essentially all economic sectors are at risk.

Table 4.2B Hazard Summary for the Town of Drummond

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 309 and essentially all economic sectors are at risk.

Table 4.2C Hazard Summary for the Town of Philipsburg

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 820 and essentially all economic sectors are at risk.

Table 4.2D Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.2.1 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.

Disease transmission may occur naturally or intentionally, as in the case of bioterrorism, and 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. Terrorism experts also theorize the possibility of attacks using biological agents.

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. The following biologic agents are considered the highest bioterrorism threats (Category A) due to their ease of dissemination or person-to-person transmission, high mortality rate with potential for major public health impacts, potential for public panic and social disruption, and the necessity for special public health preparedness:

- Anthrax
- Botulism
- Plague
- Smallpox
- Tularemia
- Viral Hemorrhagic Fevers

Source: Centers for Disease Control and Prevention, 2013.

In addition to global disease and bioterrorism concerns, naturally occurring diseases can threaten communities. Natural illnesses of particular concern, among others, 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, hospital, and assisted living settings are also prime situations for the rapid spread of disease.

Animal Disease

Granite County has a broad agricultural and ranching economic base. 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 communicable disease hazard is somewhat uniform across the county. The developed 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.

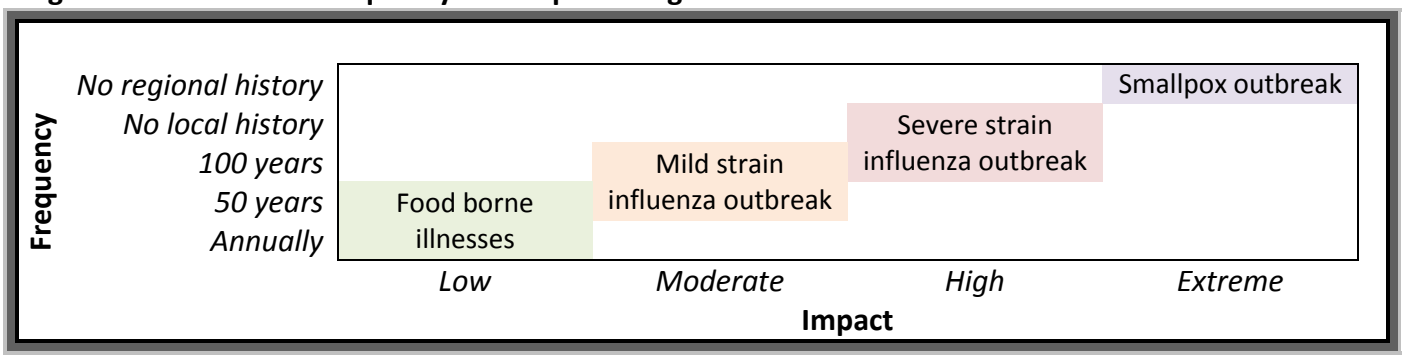
4.2.2 History

Granite 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) The local impacts of the 2009 H1N1 influenza pandemic were not especially significant. Residents recall a whooping cough quarantine in the county about 80 years ago.

4.2.3 Probability and Magnitude

The probability of an epidemic in Granite 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 relatively rapid worldwide airline travel, a disease originating in another part of the world could easily travel unknowingly to Granite County through either residents or visitors.

Figure 4.2.3A Hazard Frequency and Impact Ranges



4.2.4 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 communicable disease, however, their accessibility and functionality can be lost. Contamination of a critical facility could render the facility non-functional until decontamination or the threat has passed. For this reason, all critical facilities are assumed to be at risk from communicable disease. As with any human biological event, the hospitals and health service providers would most likely discover a threat and possibly become the first contaminated. 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)

Should an epidemic necessitate 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 3,079 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 924 residents of Granite County would be infected with about 23 fatal infections. (World Health Organization, 2010)

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 Granite 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, Granite County has 166 farms totaling about 302,973 acres. In 2007, total cash receipts from agriculture were $13,081,000 with $12,121,000 from livestock sales. At the start of 2007, Granite County had 20,894 head of cattle and calves, 862 horses and ponies, and 430 sheep and lambs. (US Department of Agriculture, 2007) This income and livestock could be lost in a severe animal disease outbreak.

Future Development

In most plausible communicable 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 4.2.4A Hazard Vulnerabilities and Impacts

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
All	Critical Facilities		▪ $100,000 losses ▪ Critical functional losses ▪ Clean-up costs	Low
All	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
All	Existing Structures		▪ $0 losses ▪ Clean-up costs	Low
All	Population	▪ Hundreds of cases ▪ Some fatalities	▪ 924 estimated cases ▪ 23 estimated fatalities	High
All	Values	▪ Agricultural losses ▪ Emotional impacts ▪ Cancellation of activities ▪ Restrictions on activities	▪ Business disruption losses ▪ Service industry losses ▪ Biodiversity losses	Moderate-High
All	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 disease will spread through a population
- Unknowns with the emergence of new, unstudied diseases

4.3 Dam Failure

Table 4.3A Hazard Summary for Granite County

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-High	County roads, critical facilities, structures, and the population are at risk from a dam failure.

Table 4.3B Hazard Summary for the Town of Drummond

Overall Hazard Rating	Low	
Probability of High Impact Event	Low-Moderate	The limited history indicates a low-moderate probability of a high hazard failure.
Vulnerability	Low-Moderate	Critical facilities, mostly electric, are at risk.

Table 4.3C Hazard Summary for the Town of Philipsburg

Overall Hazard Rating	Low	
Probability of High Impact Event	Low	The town does not lie in a hazard area.
Vulnerability	Low-Moderate	The town would not be directly impacted by a dam failure, but its water supply and system could be lost.

Table 4.3D Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.3.1 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.

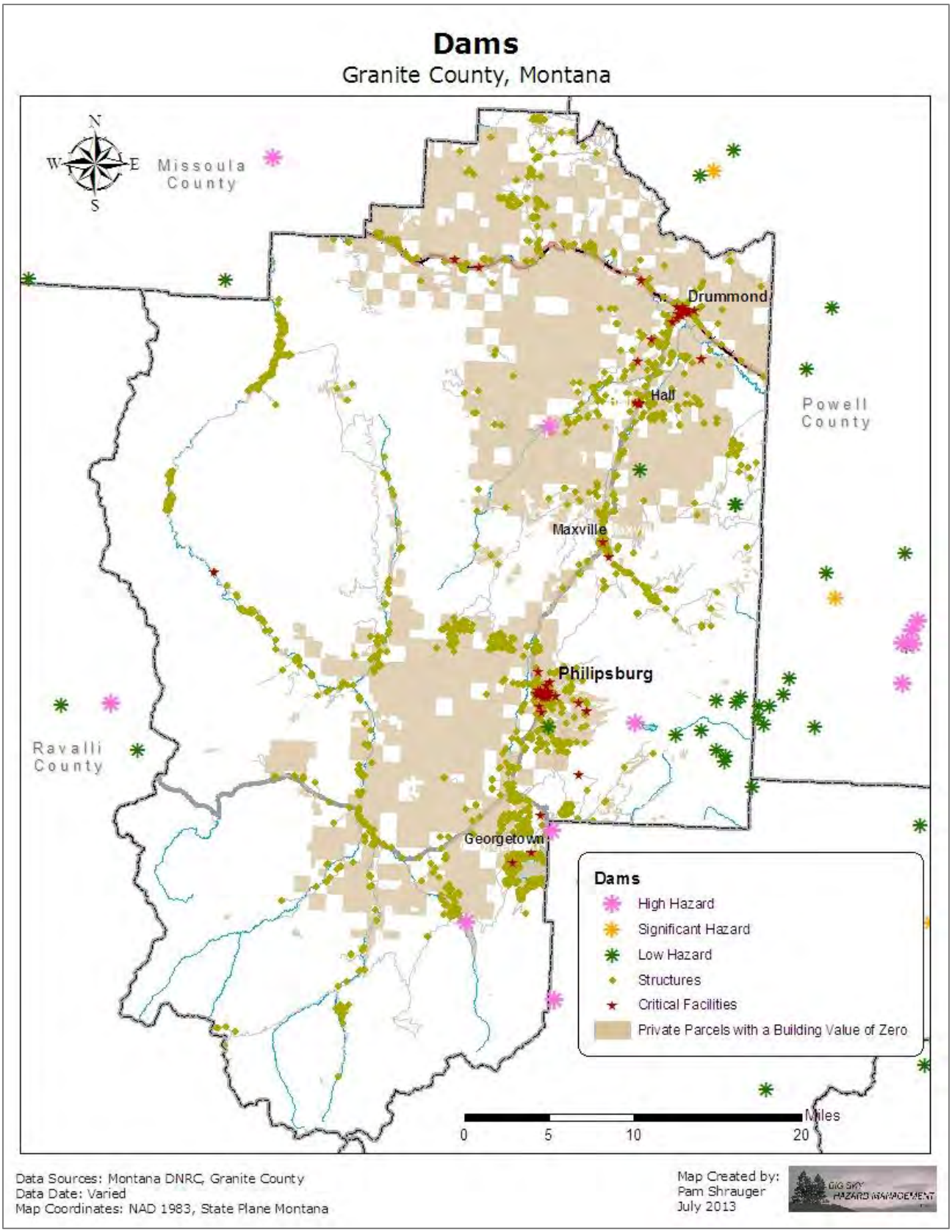
Granite County has four high hazard dams and twelve low hazard dams as shown in Table 4.3.1A. The locations and hazard assignment of dams in Granite County can be found on Map 4.3.1B. Inundation mapping for the four high hazard dams exist in their Emergency Action Plans. Copies of these plans are kept by the Granite County Sheriff's Department and other offices in the county.

Table 4.3.1A Dams in Granite County, Montana

Dam Name	River	Year Finished	Hazard	Owner
East Fork Rock Creek	East Fork of Rock Creek	1938	High	State of Montana
Flint Creek	Flint Creek	1905	High	Granite County
Fred Burr Lake	Fred Burr Creek	1930	High	Town of Philipsburg
Lower Willow Creek	Lower Willow Creek	1962	High	Lower Willow Creek Drainage District
Albicaulis Lake	North Fork of Racetrack Creek Tributary	1936	Low	Loubren Corporation
Alpine Lake	North Fork of Racetrack Creek	1933	Low	Loubren Corporation
Bayer #1	Dirty Dick Creek	1900	Low	William Bayer
Big Racetrack Lake	Racetrack Creek	1973	Low	Glenn Launderville
Caruthers Lake	Dempsey Creek Tributary	1973	Low	Tamcke Brothers
Douglas Creek	Douglas Creek	1968	Low	Ernest Wight
Fisher Lake	Racetrack Creek Tributary	1921	Low	Loubren Corporation
Goldberg East	Ditch from North Fork Gold Creek	1956	Low	Bender & Baggett
Goldberg West	Deerlodge Creek	1956	Low	Bender & Baggett
Pozega #1	Racetrack Creek Tributary	1955	Low	Lemon Ranch
Pozega #2	Racetrack Creek Tributary	1955	Low	Mt. Haggin
Pozega #3	Racetrack Creek Tributary	1958	Low	Leo Nicholes

Source: US Army Corps of Engineers, 2005.

Map 4.3.1B


Dams
Granite County, Montana
N
W
E
S
Missoula County
Drummond
Hall
Powell County
Maxville
Philipsburg
Ravalli County
Georgetown
Dams
High Hazard
Significant Hazard
Low Hazard
Structures
Critical Facilities
Private Parcels with a Building Value of Zero
0
5
10
20
Miles
Data Sources: Montana DNRC, Granite County
Data Date: Varied
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
July 2013
GIS SKY HAZARD MANAGEMENT

4.3.2 History

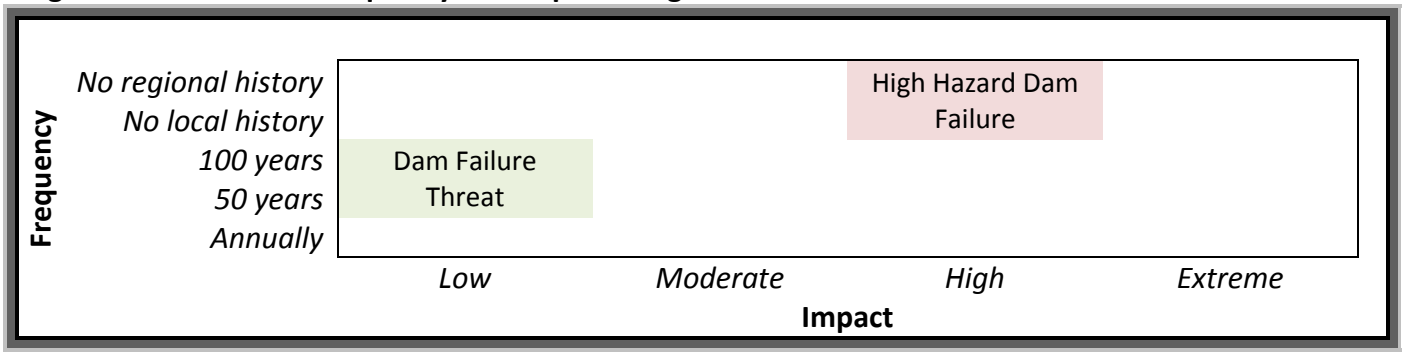
On June 29, 1996, a US Forest Service employee observed muddy water flowing from the main embankment of East Fork Dam. The Montana Department of Natural Resources and Conservation, the Flint Creek Water Users Association, and the Granite County Sheriff were notified and arrangements were made for constant monitoring of the dam. Reservoir releases were increased immediately to reduce pressure against the dam and reduce the potential of a breach, or failure. The area downstream of the dam was evacuated until the reservoir contents were reduced to a safe level. Design investigations began almost immediately and construction of the repairs began in early August. (Racicot, 1999) On July 11, 1996, an "incident" was declared by the Governor (Executive Order 16-96) that authorized the use of state resources for the protection of life and property.

The Fred Burr Lake Dam is owned by the Town of Philipsburg and the reservoir serves as the municipal water supply for the town. In 1998, dam repairs totaling $284,384 were made after significant seepage raised safety concerns. (Racicot, 1999)

4.3.3 Probability and Magnitude

The probability of dam failure in Granite County is considered low. High hazard dams are the most probable to cause damages, and none are known to be unstable. The Lower Willow Creek Dam is believed to be vulnerable to earthquake. Conditions could certainly change, but the high hazard dams are monitored the most carefully and breaches can often be mitigated before catastrophic failure.

Figure 4.3.3A Hazard Frequency and Impact Ranges



4.3.4 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 East Fork Rock Creek Dam has the capability to "smash bridges and cars" should it fail. The dam inundation area would extend along Rock Creek and would likely affect the East Fork and Bighorn Campgrounds, residences, Quigley, and then Clinton in Missoula County. (Montana Department of Natural Resources and Conservation, 1998)

The Flint Creek Dam, also known as the Georgetown Lake Dam, would flood along Flint Creek through a narrow canyon to Porter's Corner. The inundation area then expands in the valley and remains west of Highway 1 past Philipsburg, 10.5 miles downstream from the dam. The inundation area continues along Flint Creek, crosses Highway 1 south of Hall, and remains south of Interstate 90 until the confluence with the Clark Fork River. Vulnerabilities in the inundation area include occupied dwellings, Highway 1, Montana Rail Link railway, and Interstate 90. The Emergency Action Plan lists in its contacts 12 residents within 3 miles of the dam and 21 residents 4-10 miles from the dam. (Granite County, 2001)

The Fred Burr Lake Dam sits on Fred Burr Creek, a tributary of Flint Creek and the Clark Fork River. The dam is owned by the Town of Philipsburg as a municipal water supply 7.6 miles southeast of Philipsburg. Assets in the inundation area include occupied dwellings, Highway 1, and private, county, and state bridges. The nearest residence is 4.5 miles downstream. Nineteen structures are within the inundation area and 23 others would be evacuated due to isolation with an estimated 67 evacuees. The plan contains an Emergency Evacuation Area Map. (Town of Philipsburg, 2004)

A failure at the Lower Willow Creek Dam would affect Hall within 1.7 hours and Drummond in 6.1 hours. Twenty-two structures along Willow Creek, including the fire hall in Drummond, would be affected. In Hall, twenty structures, including the Post Office and Hall School, would be inundated. (Lower Willow Creek Drainage District, 2005)

Critical Facilities and Infrastructure

Table 4.3.4A shows the critical facilities and infrastructure that would potentially be affected by dam failures of the high hazard dams in Granite County. Bridge losses were estimated at $50,000 each.

Table 4.3.4A Critical Facilities and Infrastructure in Dam Inundation Areas

Dam	Critical Facilities and Infrastructure Likely Affected
East Fork Rock Creek Dam	▪ Lolo National Forest, Rock Creek Ranger Station ▪ 20 bridges - Estimated Losses: $1,000,000
Flint Creek Dam	▪ Flint Creek Hydroelectric Plant ▪ Northwestern Energy Gas Substation, Drummond ▪ Northwestern Energy Electric Substations, Drummond ▪ Montana DOT Weigh Station, Eastbound ▪ Blackfoot Telephone Bearmouth Substation ▪ Montana DOT Clinton Shop ▪ 32 bridges – Estimated Losses: $1,600,000
Fred Burr Dam	▪ Philipsburg Water Supply and Infrastructure ▪ 5 bridges – Estimated Losses: $250,000
Lower Willow Creek Dam	▪ Granite County Shop, Hall ▪ Hall Elementary School ▪ Hall Post Office ▪ Valley Rural Fire District / Drummond Fire ▪ Northwestern Energy Gas Substation, Drummond ▪ Northwestern Energy Electric Substations, Drummond ▪ Montana DOT Weigh Station, Eastbound ▪ Blackfoot Telephone Bearmouth Substation ▪ Montana DOT Clinton Shop ▪ 15 bridges – Estimated Losses: $750,000

Existing Structures

Table 4.3.4B shows the estimated exposure (based on the median value of housing units) and losses (based on a 30% damage factor).

Table 4.3.4B Potential Losses from High Hazard Dam Failure

Dam	Estimated Structures in the Inundation Area	Structure Value Exposure	Estimated Potential Losses	Other Estimated Exposures
East Fork Rock Creek Dam	245 structures	$41,846,000	$12,553,800	4 campgrounds 1 trailhead
Flint Creek Dam	177 structures	$30,231,600	$9,069,480	
Fred Burr Dam	19 structures	$3,245,200	$973,560	23 additional residences evacuated
Lower Willow Creek Dam	42 structures	$7,173,600	$2,152,080	

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 1.12 people per residence (3,079 people / 2,751 housing units), Table 4.3.4C shows the estimated population at risk. The campgrounds were estimated to have a population of 50 people each. The actual population risk will be highly dependent on warning time and notification success.

Table 4.3.4C Estimated Population in the Dam Inundation Areas

Dam	Estimated Structures in the Inundation Area	Other Estimated Populated Exposures	Estimated Population at Risk
East Fork Rock Creek Dam	245 structures	4 campgrounds	484 people
Flint Creek Dam	177 structures		198 people
Fred Burr Dam	19 structures	23 additional residences evacuated	47 people
Lower Willow Creek Dam	42 structures		47 people

Values

Since most dam failures would not impact downtown areas, the economic impacts would likely be limited to agriculture and the usual emotional impacts that result from disasters, especially if lives are lost.

Future Development

Much of the development in Granite County is occurring outside the dam inundation areas. Many agricultural and undeveloped lands are in the inundation areas, and therefore, the potential for significant development does exist. Should development occur in those areas, the structures, infrastructure, and population at risk would increase, particularly in the short warning time areas. Currently, subdivision regulations do not specifically consider dam inundation areas but do recognize flood hazard areas.

Vulnerabilities and Impacts

Table 4.3.4A Hazard Vulnerabilities and Impacts

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Granite County Drummond	Critical Facilities		▪ Losses in the millions ▪ Structural losses ▪ Contents losses ▪ Critical functional losses ▪ Critical data losses ▪ Clean-up/debris removal costs	Moderate
Philipsburg	Critical Facilities		▪ $0 losses	Low
Granite County Drummond Philipsburg	Critical Infrastructure		▪ Losses in the millions ▪ Road closures ▪ Loss of electricity ▪ Loss of potable water	Moderate
Granite County	Existing Structures		▪ Up to $12+ million ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses ▪ Clean-up/debris removal costs	Moderate
Drummond Philipsburg	Existing Structures		▪ $0 losses	Low
Granite County	Population		▪ Up to 484 people at risk ▪ Injuries ▪ Fatalities	Moderate
Drummond Philipsburg	Population		▪ No identified populations at risk	Low
Granite County Drummond Philipsburg	Values		▪ Agricultural losses ▪ Emotional impacts ▪ Aesthetic value losses	Low-Moderate
Granite County	Future Structures		▪ Somewhat likely to occur in hazard areas ▪ Many undeveloped parcels within the dam inundation areas	Moderate
Drummond Philipsburg	Future Structures		▪ Unlikely to occur in hazard areas, but future annexation of hazard areas is possible in the long term	Low

* in addition to probable (100-year) impacts

4.3.5 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.

4.4 Drought

Table 4.4A Hazard Summary for Granite County

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Moderate	Droughts of high magnitude occur roughly every 100 to 500 years.
Vulnerability	Low-Moderate	Impacts to agriculture could have substantial impact on the regional economy.

Table 4.4B Hazard Summary for the Town of Drummond

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 Drummond water supply and local agriculture economy could be significant.

Table 4.4C Hazard Summary for the Town of Philipsburg

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 Philipsburg water supply and local agriculture economy could be significant.

Table 4.4D 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.

4.4.1 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 Granite 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 Granite 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/.

4.4.2 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)

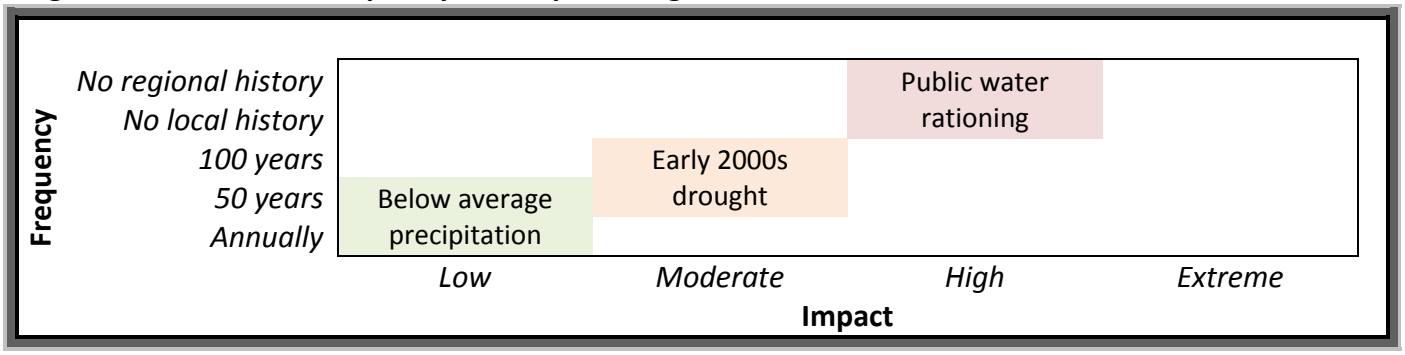
1990s – Drought emergencies were declared in a number of Montana counties with 83% of the state reported under drought conditions by mid-August 1994. Impacts included stress to stream fisheries (low water levels, high temperatures), reduced crop yields, and wildfires. (Montana Disaster and Emergency 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. In 2003, concerns were raised by the Town of Philipsburg over low public water supplies. Most protective measures were conducted at the county level. 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) In May 2005, Granite County had "extreme" to "severe" drought intensity.

4.4.3 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 4.4.3A Hazard Frequency and Impact Ranges



4.4.4 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, Granite County had 166 farms covering 302,973 acres. The total market value of agricultural products sold in 2007 was $12,121,000 for livestock, poultry, and their products and $960,000 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 Granite 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.

Vulnerabilities and Impacts

Table 4.4.4A Hazard Vulnerabilities and Impacts

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
All	Critical Facilities		▪ $0 losses ▪ Critical functional losses	Low
All	Critical Infrastructure		▪ $1,000,000 losses ▪ Loss of potable water	Low-Moderate
All	Existing Structures		▪ $0 losses	Low
All	Population		▪ Increased illness	Low
All	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
All	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

4.4.5 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.

4.6 Flood

including riverine, flash, and ice jam floods

Table 4.6A Hazard Summary for Granite County

Overall Hazard Rating	High	
Probability of High Impact Event	Moderate	History of damaging flood events.
Vulnerability	Moderate-High	Many structures and infrastructure at risk and potential for future development near high risk areas.

Table 4.6B Hazard Summary for the Town of Drummond

Overall Hazard Rating	High	
Probability of High Impact Event	Moderate	History of damaging flood events and areas of town within the 100-year floodplain.
Vulnerability	Moderate-High	Structures and infrastructure at risk.

Table 4.6C Hazard Summary for the Town of Philipsburg

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Moderate	Limited history of damaging flood events. Identified areas within the 100-year floodplain.
Vulnerability	Moderate	Structures and infrastructure at risk, mostly during a 500-year flood event.

Table 4.6D Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
FEMA-DR-640	1981	Public Assistance Individual Assistance	None	Total federal and state assistance to the entire disaster area = $5,958,548
FEMA-DR-761	1986	Public Assistance	None	Total federal and state assistance to the entire disaster area = $1,996,384
FEMA-DR-1996	2011	Public Assistance	None	Total federal public assistance to the entire disaster area = $36,136,221

4.6.1 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 Granite County normally occurs during periods of excessive rainfall or snowmelt. Granite County has three primary valleys: Clark Fork, Flint Creek, and Rock Creek. Each river or creek has its own flood challenges.

The Flint Creek Valley has many smaller tributaries that pass through developed areas. In Philipsburg, Camp Creek is diverted through an underground conduit under the central business district. When the stormwater exceeds the capacity of the 21-inch conduit with a less than 10-year flood capacity, water flows down Broadway Street. Sheet flooding from Frost Creek in Philipsburg can also cause flooding. The culvert on Sansome Street can carry the 10-year flood event, but flows greater than this cause flooding in adjacent areas. (Federal Emergency Management Agency, 1982)

Drummond is prone to riverine flooding from the Clark Fork River. Interstate 90 and railroad beds act as levees along the Clark Fork, and in some cases, restrict flow and elevate the 100- and 500- year flood elevations. The limited capacity of the culvert under Highway 10A causes ponding and flooding in the area. (Federal Emergency Management Agency, 1982) The flood stage for the Clark Fork River at Drummond is 8.5 feet when floodwaters affect areas adjacent to the river channel. At 10.5 feet, flooding is likely in low lying areas, including the City Park and Rodeo Grounds. At 12.0 feet, homes and roads in the southern section of Drummond are threatened. (National Weather Service, 2013)

The flood stage for the gauge on Rock Creek near Clinton is 9.0 feet. At this point, homes upstream from Clinton between mile markers 10 and 15 are affected. Road washouts are also possible in the upper reaches of the creek. (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.

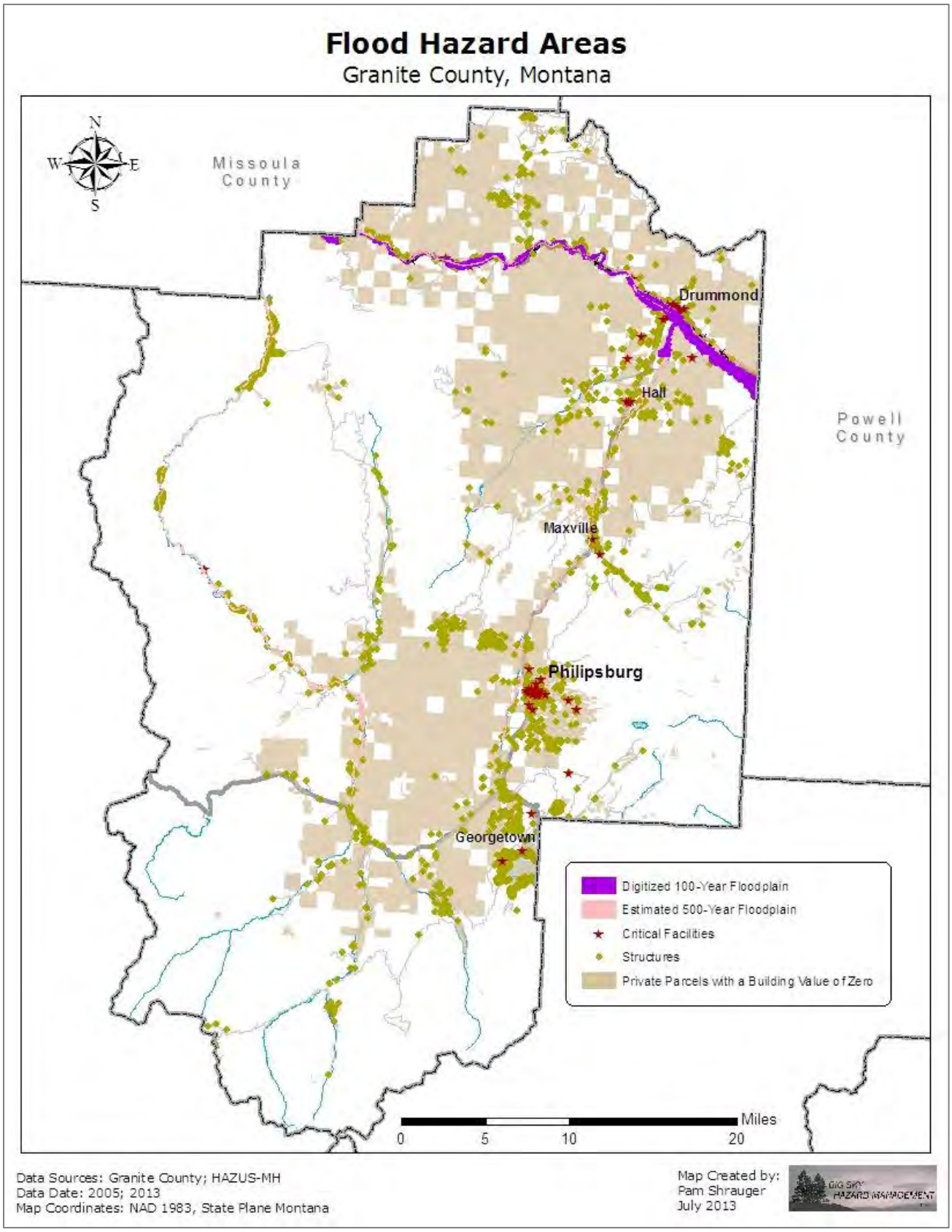
(Federal Emergency Management Agency, 2009) Locations outside the 100-year floodplain may also experience flood conditions during greater magnitude floods, localized events, or along unmapped creeks, streams, and ditches.

The Flood Insurance Rate Maps (FIRMs) depicting flood-prone areas and the associated Flood Insurance Studies for Granite County, Drummond, and Philipsburg have effective date of January 5, 1982.

The primary waterways in Granite County are the Clark Fork River, Flint Creek, and Rock Creek. Camp Creek and Frost Creek, tributaries to Flint Creek, pass through Philipsburg. Stretches of the 100-year floodplain have been mapped for these areas and other creeks. Most of this mapping exists in paper format, although efforts to digitize the maps are underway. Very basic digital mapping for the Clark Fork River does exist. HAZUS-MH, a loss estimation software program, was used to estimate the 500 year flood hazard areas on selected reaches in Granite County. Map 4.6.1A shows the 100-year floodplain along the Clark Fork River. Development in the 100-year floodplain must meet floodplain construction requirements adopted by Granite County and the Towns of Drummond and Philipsburg, and most borrowers must purchase flood insurance. Map 4.6.1A also shows the estimated 500 year flood hazard areas in the county.

A Channel Migration study, depicting the current and historic river channel locations and the potential for migration into other areas, is in process for downstream of Drummond. The maps are usually intended to be a basic screening tool for guiding management decisions and are not regulatory.

Map 4.6.1A


Flood Hazard Areas
Granite County, Montana
N
W
E
S
Missoula County
Drummond
Hall
Powell County
Maxville
Philipsburg
Georgetown
Digitized 100-Year Floodplain
Estimated 500-Year Floodplain
Critical Facilities
Structures
Private Parcels with a Building Value of Zero
Miles
0
5
10
20
Data Sources: Granite County; HAZUS-MH
Data Date: 2005; 2013
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 FIS and FIRM maps for Granite County, Philipsburg, and Drummond were last updated in 1982. The areas considered in the Flood Insurance Study are Clark Fork, Edwards Gulch, Flint Creek, Camp Creek, Frost Creek, Rock Creek, Boulder Creek, Upper Willow Creek, Ranch Creek, and Douglas Creek. (Federal Emergency Management Agency, 1982)

The floodplain in Granite County and the Towns of Drummond and Philipsburg is managed through floodplain ordinances in compliance with the National Flood Insurance Program (NFIP). A designated floodplain administrator for each of the jurisdictions issues and reviews permits for development in the floodplain. Public feedback from the Growth Policy development indicates that some residents would like to see the management of areas not in the designated floodplain, but along waterways in the county.

Flood Insurance

Residents of Granite County and the Towns of Drummond and Philipsburg have the opportunity to purchase flood insurance through the National Flood Insurance Program (NFIP). As of May 31, 2013, 20 policies covering over $3.8 million in property were in force in unincorporated parts of Granite County and 2 policies covering $444,000 were in force in the Town of Drummond. (Federal Emergency Management Agency, 2013a) Granite County and the Towns of Drummond and Philipsburg do 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 Granite 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 Granite 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.

4.7.2 History

Granite County has a long history of flooding. The first major documented flood occurred in June 1908 with the most recent in 1997. The historical record has been compiled from the 1982 Flood Insurance Study, the National Climatic Data Center Storm Events database, river gauge data, and newspaper accounts.

Clark Fork River, June 1, 1908 – The Clark Fork River in Drummond peaked at a reported stage of 15.5 feet. With a flood stage of 8.5 feet, this flood was considered a major flood. "Residents along the river fled with the rise of the water. Bridges washed out. The high flows shut down the rail lines as tracks flooded or were buried in landslides, leaving thousands of passengers stranded." (Bonner Milltown History Center, 2013)

Rock Creek, 1927 - A 50-year event occurred on Rock Creek near Clinton.

Flint Creek, March 28, 1943 – A 100-year flood event at Maxville primarily flooded agricultural lands.

Rock Creek, June 1, 1972 – A 10-year event occurred on Rock Creek near Clinton (8.52 feet, 6,500 cfs).

Edwards Gulch, June 20, 1974 – Heavy rains and snowmelt from Edwards Gulch near Drummond created sheet flooding through town. Several railroad bridges were lost. This flooding incident was estimated as a 500-year event.

Clark Fork River and Rock Creek, June 20, 1975 – A 10-year event occurred on Rock Creek near Clinton (7.49 feet, 5,520 cfs) and on the Clark Fork River in Drummond (10.6 feet, 7,967 cfs). A federal disaster for flooding was declared throughout Montana.

Clark Fork River, May 23, 1981 – The Clark Fork River in Drummond reached a stage of 12.44 feet (15,800 cfs). Rock Creek near Clinton reached a stage of 7.53 feet (5,140 cfs), below flood stage. A federal disaster was declared, including Granite County. Federal and state assistance for the entire disaster area totaled about $6 million.

Flint Creek, February 24, 1986 – Flint Creek flooded from heavy snow melt. Hall was the hardest area hit. Highway 10A was shut down and wells, septic systems, and basements were flooded. By late afternoon, Drummond began flooding. (Montana Standard, 1986) Granite County was declared a federal disaster area. Federal and state assistance for the entire disaster area totaled nearly $2 million.

Clark Fork River, February 9, 1996 – The Clark Fork River in Drummond reached a stage of 10.03 feet (9,800 cfs).

Rock Creek, June 9, 1997 – Rock Creek near Clinton reached a stage of 8.1 feet.

Edwards Gulch, August 5, 2010 – A flash flood came out of Edwards Gulch, bringing mud, rocks, and water into buildings on the west side of Drummond. Basements were also flooded. (National Climatic Data Center, 2013)

Clark Fork River, Rock Creek, and Boulder Creek, June 7-11, 2011 – Heavy snow runoff coupled with heavy rain events within a couple of weeks, saturated the ground and caused region-wide flooding. On June 7, Boulder Creek near Maxville flooded and isolated one resident. A road flooded near the East Fork of Rock Creek and debris piled up against many bridges across the county. Many residents protected their property with sandbags. (National Climatic Data Center, 2013) The Clark Fork River in Drummond reached a stage of 9.79 feet on June 11. A federal disaster was declared for Granite County to receive assistance through the Public Assistance program. Federal assistance in the Public Assistance categories alone totaled over $36 million. (Federal Emergency Management Agency, 2013)

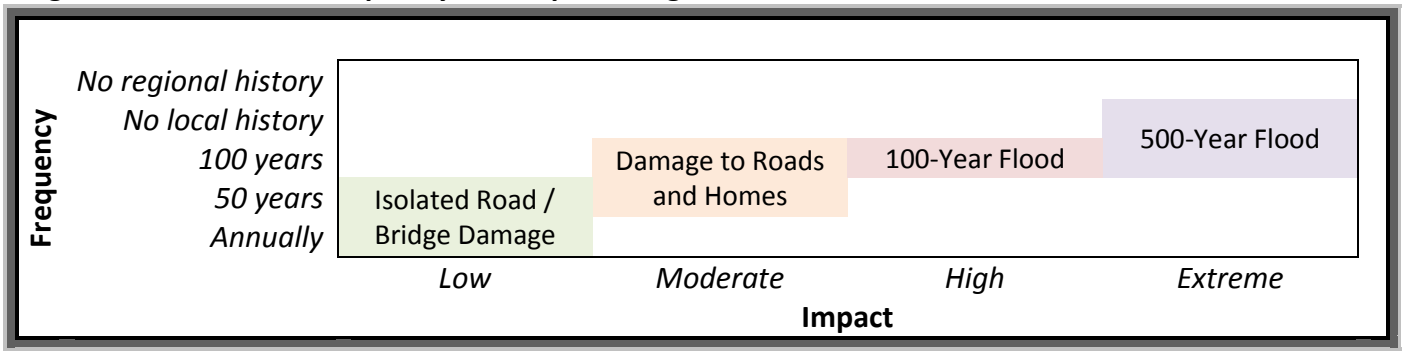
4.6.3 Probability and Magnitude

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. Flooding has been noted 13 times since 1908 in Granite County. Some level of flooding should be expected every decade. Probabilities are often measured in exceedance probabilities using discharges (in cubic feet per second) at various locations. Table 4.6.3A shows the discharges for the stream gauges in and around Granite County.

Table 4.6.3A Peak Discharges and Exceedance Probabilities for Streams in Granite County

Location	Probability of Exceedance			
	1% 100-year event	2% 50-year event	4% 25-year event	10% 10-year event
Boulder Creek at Maxville	1,360 cfs	1,150 cfs	953 cfs	726 cfs
Clark Fork at Drummond	16,200 cfs	13,900 cfs	11,700 cfs	8,850 cfs
Clark Fork Tributary near Drummond	361 cfs	287 cfs	221 cfs	147 cfs
Edwards Gulch at Drummond	443 cfs	311 cfs	209 cfs	113 cfs
Flint Creek at Maxville	1,450 cfs	1,270 cfs	1,090 cfs	862 cfs
Middle Fork Rock Creek near Philipsburg	1,920 cfs	1,790 cfs	1,640 cfs	1,430 cfs
Morris Creek near Drummond	45 cfs	37 cfs	30 cfs	21 cfs

Figure 4.6.3B Hazard Frequency and Impact Ranges



4.6.4 Vulnerabilities

Methodology

Two methods were used to identify vulnerabilities to flood. First, digital floodplain mapping of the 100-year flood hazard area for the Clark Fork River was compared to mapped critical facilities and structures.

HAZUS-MH MR2, FEMA's loss estimation software was also used to estimate 500-year flood losses on Rock Creek, and Flint Creek. A 500-year HAZUS-MH analysis was performed for the Clark Fork River and was found to be less significant than the digitized 100-year flood hazard area.

For population estimates, the 2010 county population of 3,079 was divided by the total number of structures in the Granite County GIS database of 3,234 for a rough estimate of 1 person 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:

100-year event (Clark Fork River only), digital flood map comparison:

- Blackfoot Telephone Bearmouth Substation
- Cenex Bulk Plant (propane), Drummond
- Drummond Water Tower
- Drummond Well House
- Montana Department of Transportation, Clinton Shop
- Montana Department of Transportation Weigh Station, Eastbound
- Northwestern Energy, Drummond Clark Fork Electric Substation
- Northwestern Energy, Drummond East Electric Substation
- Northwestern Energy, Drummond Electric Substation

No additional facilities were identified with the 500-year HAZUS-MH estimate comparison. These results should only be used for planning purposes and are not actual flood zone determinations.

Granite County has one critical scour potential bridge structure at Flint Creek, 11 miles south of Drummond. (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. 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 4.6.4A shows the estimated percentages of building and contents losses from flooding at depths of one foot, three feet, and six feet.

Table 4.6.4A 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 Granite GIS contractor was compared to the digital flood hazard areas. Tables 4.6.4B and 4.6.4C show 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%. Philipsburg lies outside of the 500-year flood hazard areas identified, but known flood sources such as Camp Creek and Frost Creek could certainly place structures at risk.

Table 4.6.4B Estimated 100-Year Flood Exposure along the Clark Fork River

Jurisdiction	Estimated Number of Structures in the Flood Hazard Area	Estimated Total Building Value	Estimated Losses
Granite County, unincorporated	36 structures	$5,935,870	$1,780,761
Town of Drummond	15 structures	$962,887	$288,866
TOTAL	51 structures	$6,898,757	$2,069,627

Table 4.6.4C Estimated 500-Year Flood Exposure Using HAZUS-MH Generated Flood Hazard Areas

Study Area	Estimated Number of Structures in the Flood Hazard Area	Estimated Total Building Value	Estimated Losses
Flint Creek	14 structures	$2,353,951	$706,185
Rock Creek	95 structures	$17,553,985	$5,266,196
TOTAL	109 structures	$19,907,936	$5,972,381

Table 4.6.4D shows the results generated by HAZUS-MH. HAZUS-MH used census block data to estimate damages to structures for the 500-year floods on the reaches indicated.

Table 4.6.4D HAZUS-MH Flood Module Estimated 500-Year Building-Related Economic Losses

Study Area	Estimated Building Damage	Building-Related Economic Loss
Flint Creek	1 slightly damaged residence	$260,000
Rock Creek	20 slightly damaged residences	$1,510,000

Table 4.6.4E provides National Flood Insurance Program data, as of May 31, 2013.

Table 4.6.4E National Flood Insurance Program Statistics

Location	Policies	Insurance In-Force	Total Loss Payments 1978 – May 2013
Granite County, unincorporated areas	20	$3,872,400	$52,953
Town of Drummond	2	$444,000	$0
TOTAL	22	$4,316,400	$52,953

Source: Federal Emergency Management Agency, 2013a.

Population

Due to the terrain and hazard areas in Granite 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 of the Clark

Fork River is about 51 people. Flint Creek and Rock Creek are more likely to quickly flood with little warning. These areas have about 14 people and 95 people residing in the 500-year hazard areas, respectively. 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

All jurisdictions within Granite County adhere to National Flood Insurance Program (NFIP) requirements for new and improved developments in the mapped floodplain. These requirements do not prohibit development in the floodplain; rather, they require the development to meet certain standards. Future development of lands within the floodplain is possible. About 153 private, undeveloped parcels of land coincide with the 100-year Clark Fork floodplain; however, these parcels may also contain possible building sites outside the 100-year floodplain boundaries. Similarly, 172 private, undeveloped parcels of land coincide with the estimated 500-year floodplains for Flint Creek and Rock Creek.

Vulnerabilities and Impacts

Table 4.6.4F Hazard Vulnerabilities and Impacts

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Granite County Drummond	Critical Facilities	▪ $100,000 losses ▪ Structural losses ▪ Contents losses ▪ Critical functional losses ▪ Critical data losses ▪ Clean-up/debris removal costs	▪ $500,000 losses	Moderate
Philipsburg	Critical Facilities		▪ $100,000 losses ▪ Structural losses ▪ Contents losses ▪ Critical functional losses ▪ Critical data losses ▪ Clean-up/debris removal costs	Low-Moderate
Granite County Drummond	Critical Infrastructure	▪ $500,000 losses ▪ Road closures ▪ Loss of electricity ▪ Loss of potable water	▪ $1,000,000 losses	Moderate-High

Table 4.6.4F Hazard Vulnerabilities and Impacts (continued)

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Philipsburg	Critical Infrastructure		▪ $500,000 losses ▪ Road closures ▪ Loss of electricity ▪ Loss of potable water ▪ Loss of sanitary sewers	Moderate
Granite County	Existing Structures	▪ $1,781,000 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses Clean-up/debris removal costs	▪ $6,000,000 losses	Moderate-High
Drummond	Existing Structures	▪ $289,000 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses Clean-up/debris removal costs	▪ $1,000,000 losses	Moderate
Philipsburg	Existing Structures		▪ $500,000 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses ▪ Clean-up/debris removal costs$1,000,000 losses	Low-Moderate
All	Population		▪ Injuries ▪ Fatalities	Moderate
All	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
All	Future Structures	▪ Somewhat likely to occur in hazard areas ▪ 153 undeveloped parcels in the 100-year floodplain	▪ 172 additional undeveloped parcels in the 500-year floodplain	Moderate

* in addition to probable (100-year) impacts

4.6.5 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 and a lack of digital versions.

4.7 Hazardous Materials Release

including fixed, mobile, and pipeline releases

Table 4.7A Hazard Summary for Granite County

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Moderate	Significant potential exists due to interstate, railroad, and pipeline, but only a limited history of releases.
Vulnerability	Moderate	Damages to critical facilities, infrastructure, structures, the population, and values possible.

Table 4.7B Hazard Summary for the Town of Drummond

Overall Hazard Rating	High	
Probability of High Impact Event	Moderate	Significant potential exists due to interstate, railroad, and pipeline.
Vulnerability	Moderate-High	Significant damages possible to the population, critical facilities, and values. Some damages to structures possible.

Table 4.7C Hazard Summary for the Town of Philipsburg

Overall Hazard Rating	Low	
Probability of High Impact Event	Low	Limited amounts of hazardous materials regularly exist in the town.
Vulnerability	Low-Moderate	Damages possible to the population and values.

Table 4.7D Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.7.1 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 Granite 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. Granite County has historically and continues to

have an active mining industry. The mines and transportation of associated goods carry the risk of a hazardous material release.

A major fuel pipeline, the Yellowstone Pipeline, runs through northern Granite County, near Interstate 90 and just south of Drummond. This pipeline transports refined petroleum products between Billings, MT and Spokane, WA. Should an explosion or leak occur on this pipeline, a large hazardous material release of the fuel and/or fumes could result and threaten the population, property, and/or the environment.

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 northern Granite County in an east-west direction through the Town of Drummond. This Interstate is widely used by vehicles transporting hazardous materials. For the most part, the railroad parallels Interstate 90 and the Clark Fork River. The railroad is owned and operated by Montana Rail Link. Hazardous materials and wastes are continually present on these corridors.

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 4.7.1A 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.

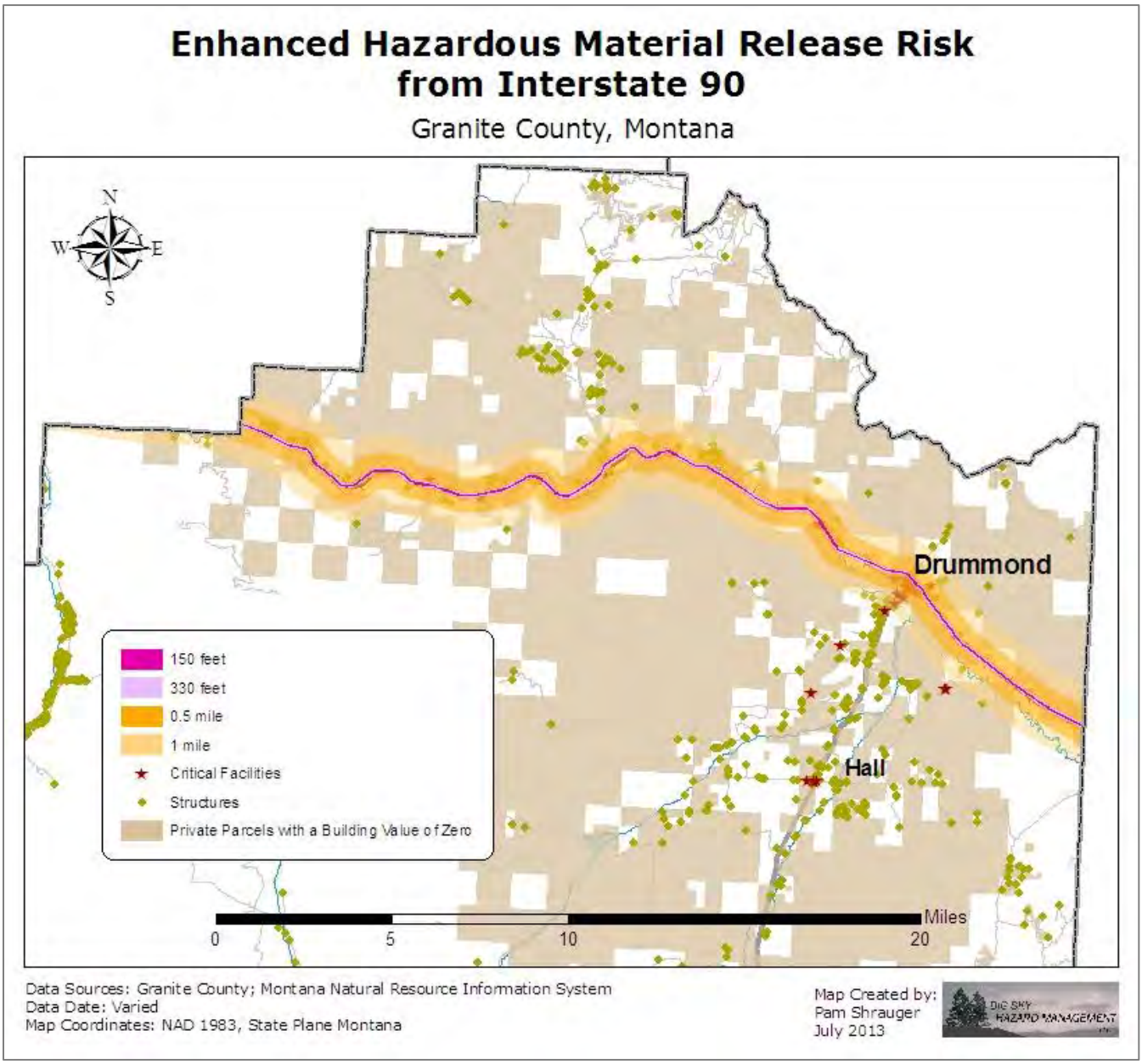
Table 4.7.1A Evacuation Radii for Hazardous Material Releases

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

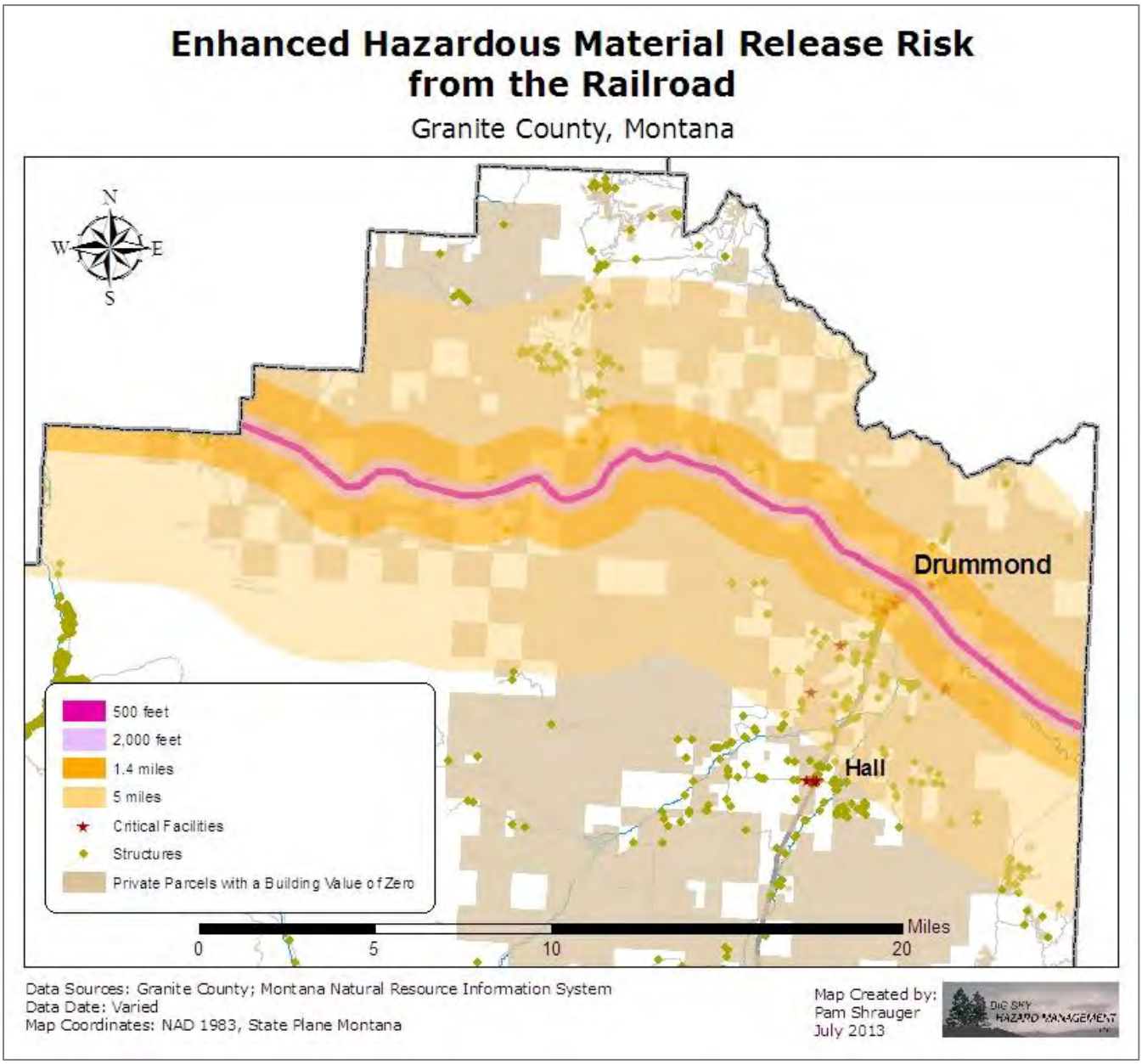
Source: US Department of Transportation, 2008.

The buffers around the interstate, railroad, and pipelines shown in Maps 4.7.1B, 4.7.1C, 4.7.1D, 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 4.7.1A. 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. Along the pipelines, buffers of 500 feet and ½ mile were used for petroleum products such as fuels.

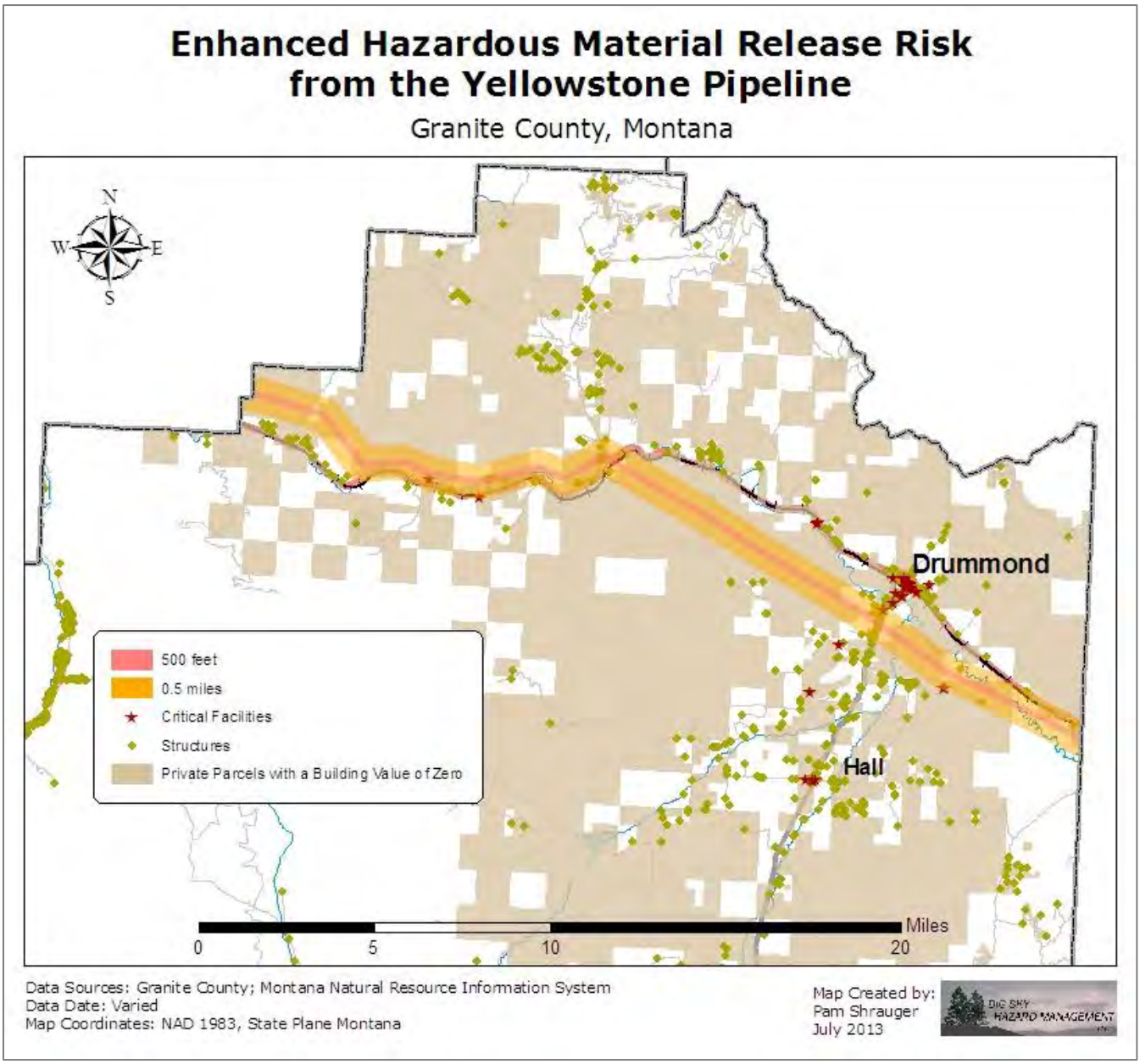
Map 4.7.1B


Enhanced Hazardous Material Release Risk from Interstate 90
Granite County, Montana
N
W
E
S
Drummond
Hall
150 feet
330 feet
0.5 mile
1 mile
Critical Facilities
Structures
Private Parcels with a Building Value of Zero
0
5
10
20
Miles
Data Sources: Granite County; Montana Natural Resource Information System
Data Date: Varied
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
July 2013
BIG SKY HAZARD MANAGEMENT

Map 4.7.1C


Enhanced Hazardous Material Release Risk from the Railroad
Granite County, Montana
N
W
E
S
Drummond
Hall
500 feet
2,000 feet
1.4 miles
5 miles
Critical Facilities
Structures
Private Parcels with a Building Value of Zero
0
5
10
20
Miles
Data Sources: Granite County; Montana Natural Resource Information System
Data Date: Varied
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
July 2013
BIG SKY HAZARD MANAGEMENT

Map 4.7.1D



4.7.2 History

Historically, incidents have been small enough to prevent a large evacuation and long-term impacts however, hazardous materials incidents do occur in Granite County. The incidents logged with the National Response Center are shown in Table 4.7.2A. Note this database likely does not contain all incidents.

Table 4.7.2A Hazardous Material Releases from 1990-2010

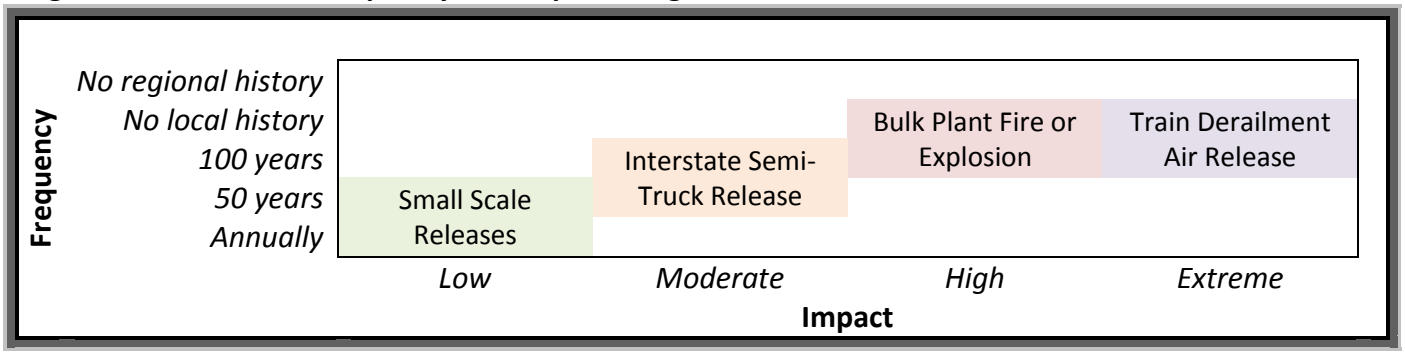
Date	Location	Material	Cause/Impacts
05/27/1991	Railroad Mile, 94.3, Clinton	N/A	15 car derailment
02/05/1993	Drummond, Cenex Station	Diesel, 40 gallons	Failure of automatic shut-off
03/09/1993	Drummond, Cenex Station	Gasoline, 600 gallons	Broken pipe on storage tank
06/10/1993	Hall, Cheryl Crossing	Diesel, 50 gallons Hydraulic Oil, 50 gallons	Crane fell off of truck
09/25/1993	I-90, Mile 139	Diesel, 20 gallons	Truck diesel line fell off due to striking debris
01/02/1994	I-90 W, Mile 143	Diesel, 80 gallons	Tractor trailer accident resulted in diesel leaking into the river
12/30/1995	Railroad, Mile 82, Bearmouth	1 car had anhydrous ammonia, others non-hazardous	23 car derailment Anhydrous ammonia car did not release $350,000 damages
09/20/1996	MT Highway 1	Diesel, 90 gallons	Portable tank in pickup that overturned
12/20/1997	I-90, Mile 137	Diesel, 50 gallons Other Oil, 5 gallons	Tractor trailer saddle tank rupture when truck slid off icy road
04/07/1998	Drummond, Helmville Road	Diesel, 10 gallons	Fuel truck rolled and saddle tank leaked. Cargo tank remained intact.
03/07/1999	Mine at Phosphate I-90 Exit	Waste Oil, Antifreeze, and Asbestos dumped	
01/05/2004	Drummond City Sub-station	PBC Mineral Oil, 1.5 gallons	Bushing failed on an electrical circuit breaker unit
08/22/2005	Drummond High School	Hydraulic Oil	Release from a pump truck due to equipment failure
03/27/2007	Clark Fork River, Drummond	Unknown	Caller reported an unknown material floating down river for the last four years

Source: National Response Center, 2013.

4.7.3 Probability and Magnitude

The probability of a hazardous materials release can only be realistically assessed qualitatively. The history of events in Granite County is 14 recorded events (some without an actual release) over the past 23 years, none of which have resulted in a disaster declaration. The exposure, however, is high with Interstate 90, a petroleum pipeline, and an active railroad passing within close proximity to critical facilities in and around Drummond. Twelve of those 14 events occurred in Drummond or along the Interstate 90 – railroad corridor. 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.

Figure 4.7.3A Hazard Frequency and Impact Ranges



4.7.4 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, the railroad, and the Yellowstone Pipeline. 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 3,079 was divided by the total number of structures in the Granite County GIS database of 3,234 for a rough estimate of 1 person 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 4.7.4A shows the critical facility exposure to the various hazardous material risk areas.

Table 4.7.4A Hazardous Material Incident Exposure to Critical Facilities

Within Buffer Zone	Exposure	Specific Facilities
150 feet of Interstate 90	1 critical facility	MDT Weigh Station
330 feet of Interstate 90	1 critical facility	MDT Weigh Station
½ mile of Interstate 90	25 critical facilities	Nearly all Drummond facilities, including schools, emergency response agencies, and critical infrastructure
1 mile of Interstate 90	28 critical facilities	

Table 4.7.4A Hazardous Material Incident Exposure to Critical Facilities (continued)

Within Buffer Zone	Exposure	Specific Facilities
500 feet of the Railroad	12 critical facilities	Blackfoot Telephone Bearmouth Station Blackfoot Telephone Drummond Office Cenex Bulk Plant (fuel), Drummond Cenex Bulk Plant (propane), Drummond Drummond Ambulance Drummond Lift Station / Sewer Facility Drummond Water Tower Drummond Well House Granite Mountain Bank, Drummond Granite Co. Public Health, Drummond MDT Weigh Station Valley RFD / Drummond Fire
2,000 feet of the Railroad	26 critical facilities	
1.4 miles of the Railroad	31 critical facilities	
5 miles of the Railroad	33 critical facilities	
500 feet of the Yellowstone Pipeline	None	
½ mile of the Yellowstone Pipeline	5 critical facilities	Blackfoot Telephone Bearmouth Station MDT – Clinton Shop MDT – Drummond Shop NWE – Drummond Pump Substation Yellowstone Pipeline Gas Substation

Existing Structures

Comparing the structure database provided by the Granite County GIS contractor to the buffer zones, Table 4.7.4B 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 4.7.4B Structure Vulnerabilities to Hazardous Material Releases

Within Buffer Zone	Estimated Number of Structures
150 feet of Interstate 90	7 structures
330 feet of Interstate 90	28 structures
½ mile of Interstate 90	349 structures
1 mile of Interstate 90	404 structures
500 feet of the Railroad	160 structures
2,000 feet of the Railroad	333 structures
1.4 miles of the Railroad	431 structures
5 miles of the Railroad	611 structures
500 feet of the Yellowstone Pipeline	12 structures
½ mile of the Yellowstone Pipeline	57 structures

Population

Table 4.7.4C shows the estimated population within each of the buffer zones. These estimates are based on 1 person 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 4.7.4C Population Vulnerabilities to Hazardous Material Releases

Within Buffer Zone	Estimated Number of Structures	Estimated Population
150 feet of Interstate 90	7 structures	7 people
330 feet of Interstate 90	28 structures	28 people
½ mile of Interstate 90	349 structures	349 people
1 mile of Interstate 90	404 structures	404 people
500 feet of the Railroad	160 structures	160 people
2,000 feet of the Railroad	333 structures	333 people
1.4 miles of the Railroad	431 structures	431 people
5 miles of the Railroad	611 structures	611 people
500 feet of the Yellowstone Pipeline	12 structures	12 people
½ mile of the Yellowstone Pipeline	57 structures	57 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 Drummond. Given this scenario, a conservative estimate of 250 structures could be directly affected and/or evacuated. With an estimated 1 person per structures (and possibly higher for Drummond), approximately over 250 people would be at greatest risk in such an event.

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 major road and rail networks in the county. The potential, however, does exist for development of agricultural lands bordering the

highways and railroad, particularly in the unincorporated parts of Granite County. Very few restrictions are in place to prevent development in these areas. The Granite County Subdivision Regulations specifically list areas of severe toxic or hazardous waste exposure as unsuitable for development without mitigation. Table 4.7.4D provides the number of private, undeveloped parcels within each of the enhanced risk areas.

Table 4.7.4D Undeveloped Parcel Vulnerabilities to Hazardous Material Releases

Within Buffer Zone	Estimated Number of Parcels
150 feet of Interstate 90	82 parcels
330 feet of Interstate 90	114 parcels
½ mile of Interstate 90	229 parcels
1 mile of Interstate 90	311 parcels
500 feet of the Railroad	125 parcels
2,000 feet of the Railroad	220 parcels
1.4 miles of the Railroad	358 parcels
5 miles of the Railroad	674 parcels
500 feet of the Yellowstone Pipeline	56 parcels
½ mile of the Yellowstone Pipeline	146 parcels

Vulnerabilities and Impacts

Table 4.7.4E Hazard Vulnerabilities and Impacts

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Granite County Drummond	Critical Facilities	▪ Critical functional losses	▪ $100,000 losses ▪ Structural losses ▪ Contents losses ▪ Critical data losses ▪ Clean-up/debris removal costs	Low-Moderate
Philipsburg	Critical Facilities		▪ $100,000 losses ▪ Structural losses ▪ Contents losses ▪ Critical functional losses ▪ Critical data losses ▪ Clean-up/debris removal costs	Low
Granite County Drummond	Critical Infrastructure	▪ Road closures	▪ $500,000 losses ▪ Loss of electricity ▪ Loss of utility gas ▪ Loss of potable water	Low-Moderate
Philipsburg	Critical Infrastructure		▪ $100,000 losses ▪ Road closures ▪ Loss of electricity ▪ Loss of utility gas ▪ Loss of potable water	Low

Table 4.7.4E Hazard Vulnerabilities and Impacts (continued)

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Drummond	Existing Structures	▪ Displacement/functional losses	▪ $500,000 losses ▪ Structural losses ▪ Contents losses ▪ Clean-up/debris removal costs	Low-Moderate
Granite County Philipsburg	Existing Structures		▪ $500,000 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses ▪ Clean-up/debris removal costs	Low
Drummond	Population	▪ Illness ▪ Injuries ▪ Fatalities		High
Granite County Philipsburg	Population		▪ Illness ▪ Injuries Fatalities	Moderate
Granite County Drummond	Values	▪ Business disruption losses ▪ Agricultural losses ▪ Habitat damages ▪ Reduced air quality ▪ Reduced water quality ▪ Soil contamination ▪ Cancellation of activities ▪ Restrictions on activities	▪ Service industry losses ▪ Biodiversity losses ▪ Historic structure losses ▪ Historic site losses ▪ Historic item losses ▪ Emotional impacts ▪ Aesthetic value losses	Moderate-High
Philipsburg	Values		▪ Business disruption losses ▪ Service industry losses ▪ Biodiversity losses ▪ Historic structure losses ▪ Historic site losses ▪ Historic item losses ▪ Habitat damages ▪ Reduced air quality ▪ Reduced water quality ▪ Soil contamination ▪ Cancellation of activities ▪ Restrictions on activities Emotional impacts ▪ Aesthetic value losses	Moderate

Table 4.7.4E Hazard Vulnerabilities and Impacts (continued)

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Granite County Drummond	Future Structures	▪ Likely to occur in hazard areas ▪ Nearly 700 parcels available for development in enhanced risk areas ▪ Increases the total hazard exposure		Moderate
Philipsburg	Future Structures		▪ Likely to occur in hazard areas ▪ Increases the total hazard exposure	Low

* in addition to probable (100-year) impacts

4.7.5 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.
- Digital mapping of fixed facilities housing significant amounts of hazardous materials would allow for more detailed analysis of impacts related to releases at those facilities.

4.8 Terrorism

Table 4.8A Hazard Summary for Granite County

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

Table 4.8B Hazard Summary for the Town of Drummond

Overall Hazard Rating	Low	
Probability of High Impact Event	Low	History does not indicate these types of incidents with high impacts are likely.
Vulnerability	Low	Very few high impact targets exist in Drummond.

Table 4.8C Hazard Summary for the Town of Philipsburg

Overall Hazard Rating	Low	
Probability of High Impact Event	Low	History does not indicate these types of incidents with high impacts are likely.
Vulnerability	Low	Very few high impact targets exist in Philipsburg.

Table 4.8D Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.8.1 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, such as Anthrax, Ricin, and Smallpox, to infect the population, plants, or animals with disease.

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.

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.

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.

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 4.8.1A lists several, but not all, types of organizations existing in the United States that could initiate a terrorist incident.

Table 4.8.1A 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.
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.

Table 4.8.1A Types of Domestic Hate and Terrorist Organizations and Movements (continued)

Type	Description
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 Granite County. (Southern Poverty Law Center, 2013)

The populated areas, such as Drummond and Philipsburg, 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 Granite County are not considered to be high risk terrorism targets, but surprise and unpredictability are often attributes favored by terrorists.

Granite County, Philipsburg, and Drummond are home to many events throughout the year. Those that occur annually and involve a large group of people include:

- Annual Rib Cook-Off in Philipsburg (May) – 1 Day
- Mule Days in Drummond (June) – 3 Days
- Miner’s Union Day Picnic in Philipsburg (June) – 1 Day
- Drummond Kiwanis PRCA Rodeo in Drummond (July) – 1 Day
- Four by Four Rally – A cross-county dogsled race (July) – 5 Days
- Flint Creek Valley Days in Philipsburg (July) – 3 Days
- Art and Jazz on Broadway in Philipsburg (July) – 1 Day
- Rock Mountain Accordion Celebration in Philipsburg (August) – 3 Days
- Writers in the Round in Philipsburg (August) – 1 Day
- Art and Jazz on Broadway in Philipsburg (August) – 1 Day
- Antique Tractors and Quilt Day in Drummond (October) – 1 Day
- Yule Night on Broadway in Philipsburg (December) – 1 Day

4.8.2 History

Fortunately, Granite County has not been the location of a modern terrorism or civil unrest incident. Significant terrorist incidents occurring in the United States are shown in Table 4.8.2A.

Table 4.8.2A Significant Modern US Terrorist Incidents

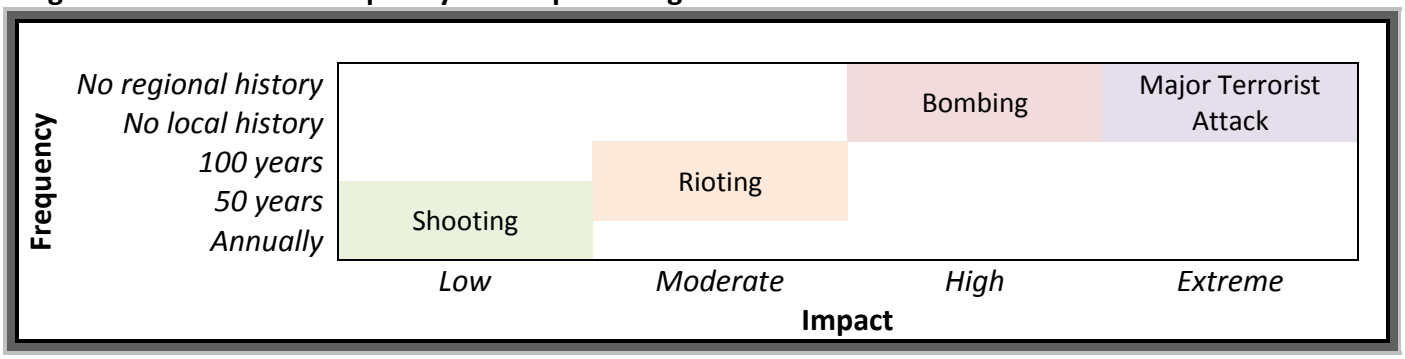
Incident	Date	Description
World Trade Center Bombing	02/29/1993	A bombing in the parking area of the World Trade Center killed 6 and wounded about 1,000. The bombing was organized by the foreign terrorist organization, Al Qaeda.
Oklahoma City Bombing	04/19/1995	Domestic terrorist Timothy McVeigh blew 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.

4.8.3 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 4.8.3A Hazard Frequency and Impact Ranges



4.8.4 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 Granite 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 Granite 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 Granite 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 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 4.8.4A Hazard Vulnerabilities and Impacts

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
All	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
All	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
All	Existing Structures	▪ Displacement/functional losses ▪ Clean-up/debris removal costs	▪ $1,000,000 losses ▪ Structural losses ▪ Contents losses	Low-Moderate
All	Population	▪ Illness ▪ Injuries ▪ Fatalities		High
All	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
All	Future Structures		▪ Somewhat likely to occur in hazard areas ▪ Increases the total hazard exposure	Low-Moderate

* in addition to probable (100-year) impacts

4.8.5 Data Limitations

Data limitations include:

- Inability to quantify the probability and magnitude of a terrorism incident.
- General uncertainties related to how and when future terror incidents may occur.

4.9 Transportation Accident

including highway, aircraft, and railroad accidents

Table 4.9A Hazard Summary for Granite County

Overall Hazard Rating	High	
Probability of High Impact Event	Moderate-High	The roadways are regularly used by residents and visitors and can be treacherous at times. Aircraft and railroad accidents are also possible.
Vulnerability	Moderate	The greatest vulnerability is to the population.

Table 4.9B Hazard Summary for the Town of Drummond

Overall Hazard Rating	High	
Probability of High Impact Event	Moderate-High	Vehicle, aircraft, and railroad accidents are possible. The stretch of interstate through town is accident-prone.
Vulnerability	Moderate	The greatest vulnerability is to the population.

Table 4.9C Hazard Summary for the Town of Philipsburg

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Low-Moderate	Vehicle and aircraft accidents are possible.
Vulnerability	Moderate	The greatest vulnerability is to the population.

Table 4.9D Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.9.1 Description

A transportation accident, for the purposes of this plan, is any large scale transportation accident involving mass casualties. The most likely locations for an incident of this magnitude would be on Interstate 90 or on Highway 1. Interstate 90 crosses northern Granite County in an east-west 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. Highway 1 is also frequently used by buses transporting children to Discovery Basin Ski Area during the winter. Both Interstate 90 and Highway 1 can become very treacherous during winter storms. Mining traffic associated with the local mining industry increases the number of large vehicles traveling on Granite County roadways.

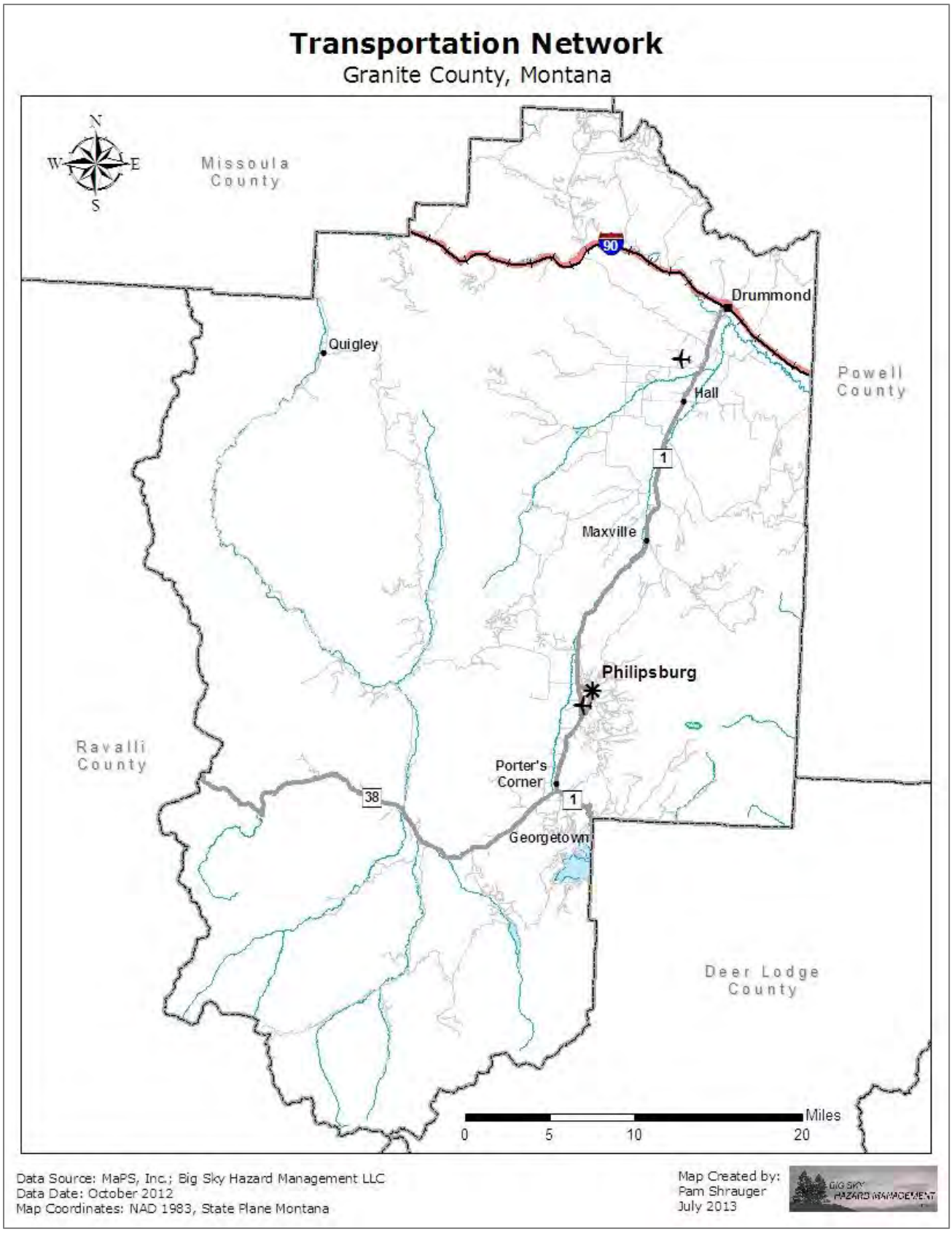
Aviation accidents can occur for a multitude of reasons from mechanical failure to poor weather conditions to intentional causes. Accidents can vary from small single engine aircraft to large commercial jets. The location of the accident, such as a remote area versus a populated location, also plays an important role in the amount of destruction caused. Granite County has two small airports – Riddick Field (U05), 1 mile south of Philipsburg, and Drummond Airport (M26), southwest of Drummond.

These airports serve non-commercial, private commuter, and recreational aircraft. Commercial service is provided by a number of area airports including Butte, Missoula, and Helena. Large passenger aircraft serving these airports often fly over Granite 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. Other locations, such as the Granite County Medical Center, may have helicopter traffic conducting medical transports.

Goods, including hazardous materials, are transported by Montana Rail Link (MRL) via the rail network across Granite County in an east-west direction, roughly parallel to Interstate 90 and passing through the Town of Drummond. The active railroad through Granite County could experience a derailment or collision. The significance of such incidents depends on the location, number of cars derailed, and the associated injuries and fatalities.

A significant concern in transportation accidents is the release of hazardous materials. This hazard is addressed in the hazardous materials release profile. Map 4.9.1A shows the transportation routes in Granite County.

Map 4.9.1A


Transportation Network
Granite County, Montana
N
W
E
S
Missoula County
90
Drummond
Quigley
Hall
Powell County
1
Maxville
Philipsburg
Ravalli County
Porter's Corner
38
1
Georgetown
Deer Lodge County
Miles
0
5
10
20
Data Source: MaPS, Inc.; Big Sky Hazard Management LLC
Data Date: October 2012
Map Coordinates: NAD 1983, State Plane Montana
Map Created by:
Pam Shrauger
July 2013

4.9.2 History

The history of highway transportation accidents in Granite 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 4.9.2A shows the traffic fatalities in Granite County from 1980-2011. In the mid 1980s, residents recall a bus accident on Highway 1, six miles north of Philipsburg, in which 6-7 people were injured.

Table 4.9.2A Traffic Fatalities

Year	Fatalities	Year	Fatalities	Year	Fatalities	Year	Fatalities
1980	5	1990	5	2000	4	2010	0
1981	3	1991	2	2001	4	2011	1
1982	1	1992	3	2002	2		
1983	1	1993	1	2003	1		
1984	1	1994	3	2004	3		
1985	3	1995	2	2005	5		
1986	3	1996	0	2006	1		
1987	0	1997	4	2007	2		
1988	1	1998	3	2008	2		
1989	0	1999	3	2009	3		
Annual Average	1.8	Annual Average	2.6	Annual Average	2.7	Annual Average	0.5

Source: Montana Highway Patrol, 2012.

Table 4.9.2B briefly summarizes the accident reports filed by the National Transportation Safety Board (NTSB) as occurring in Granite County. Residents also recall a military B-52 crash on Stewart Ridge during the late 1950s. The number of casualties and additional information are unknown.

Table 4.9.2B NTSB Incident Report Summary

Date	Location	Casualties	Additional Information
May 25, 1967	Drummond	None	Plane experienced cylinder failure and landed in a ditch.
March 25, 1968	Maxville	None	Plane rolled on landing.
January 25, 1970	Near Drummond	None	Wings iced on a flight from Butte to Missoula and plane landed in trees when unable to clear a mountain ridge.
February 25, 1971	Near Drummond	None	Flight from Kalispell to Billings experienced engine failure, landed on highway, and went into ditch.
August 6, 1971	Drummond	None	Aircraft collided with fence on takeoff in wet, high grass.
October 2, 1971	Philipsburg	None	Flight from Townsend forgot to put landing gear down.
May 20, 1972	Drummond	None	Due to poor pilot planning, aircraft fell short of runway.
March 18, 1974	Near Philipsburg	None	Flight going from Oregon to Missoula encountered bad weather and landed on a frozen lake.
September 19, 1978	Near Hall	4 fatal	Flight from Missoula to Bozeman crashed in poor weather conditions, pilot was not instrument rated.

Source: National Transportation Safety Board, 2013.

Table 4.9.2C outlines the accidents in Granite County documented by the Federal Railroad Administration since 1980.

Table 4.9.2C Railroad Accidents 1980-2012

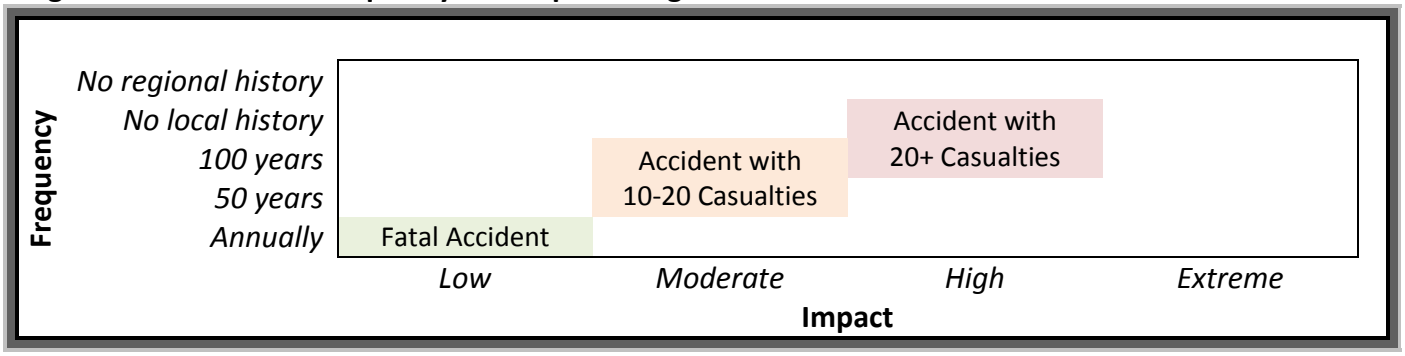
Year	# of Accidents	Fatalities	Injuries
1988	1	0	0
1989	1	0	0
1993	3	0	0
1996	1	0	0
1997	1	0	1
2003	1	0	1
2005	1	0	1
2006	1	0	1
2010	1	0	1
TOTAL	11	0	5

Source: Federal Railroad Administration, 2013.

4.9.3 Probability and Magnitude

Despite a relatively low history of major transportation accidents, the possibility of a large scale highway accident is very concerning to local residents. 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. On average, 2-3 fatalities occur annually in Granite County from traffic accidents. While these individual incidents do not typically result in a community-wide disaster, they demonstrate the potential for an accident with much more pronounced impacts. The probability of an accident of this scale is more likely in the county areas than the town areas due to traffic speeds. Similarly, small scale aircraft and railroad accidents occur every few years and highlight the possibility of larger scale events. An aircraft or railroad accident in a town area would certainly be more devastating than a similar accident in most county areas.

Figure 4.9.3A Hazard Frequency and Impact Ranges



4.9.4 Vulnerabilities

Methodology

Since the location and probability of a significant transportation 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 multi-vehicle accident involving a bus and resulting in 25-50 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 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. The only infrastructure that can be considered at a slightly higher risk are the tall communications towers and power lines; these can be hit by aircraft or vehicles. Should the incident be large enough, the largest expenditures would probably be in responding agency costs.

Existing Structures

Typically, most losses from a 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 transportation accidents. Transportation accidents have 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 fluids or hazardous materials seep into a water supply, the quality of that water body could be threatened. 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

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 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 4.9.4A Hazard Vulnerabilities and Impacts

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
All	Critical Facilities		▪ $0 losses	Low
All	Critical Infrastructure	▪ Road closures	▪ $100,000 losses ▪ Loss of electricity ▪ Loss of telephone service ▪ Loss of internet service	Low-Moderate
All	Existing Structures		▪ $200,000 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses ▪ Clean-up/debris removal costs	Low-Moderate
All	Population	▪ Injuries ▪ Fatalities		High
All	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
All	Future Structures		▪ Increases the total hazard exposure ▪ All types of future structures are at risk	Low-Moderate

* in addition to probable (100-year) impacts

4.9.5 Data Limitations

Data limitations include:

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

4.10 Utility and Communications Failure

Table 4.10A Hazard Summary for Granite County

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

Table 4.10B Hazard Summary for the Town of Drummond

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Low-Moderate	Limited history of significant utility outages.
Vulnerability	Moderate	Residents rely on a number of community services, including water, natural gas, sewer, and electricity.

Table 4.10C Hazard Summary for the Town of Philipsburg

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Low-Moderate	Limited history of significant utility outages.
Vulnerability	Moderate	Residents rely on a number of community services, including water, natural gas, sewer, and electricity.

Table 4.10D Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.10.1 Description

A utility or communications failure 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 Granite 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 or communications failure, 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 Granite County.

Granite 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. NorthWestern Energy supplies most of the county with electricity while Lower Rock Creek is served by the Missoula Electric Cooperative. Five major regional electric transmission lines cross the county. Along with above ground electrical utility lines, NorthWestern Energy has numerous substations. NorthWestern Energy also has a network of underground natural gas lines. Each jurisdiction and/or business is responsible for the care and operation of other utilities including water treatment plants, wastewater treatment plants, and gasoline, diesel, and propane bulk plants.

4.10.2 History

Residents of Granite 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.

Granite 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.

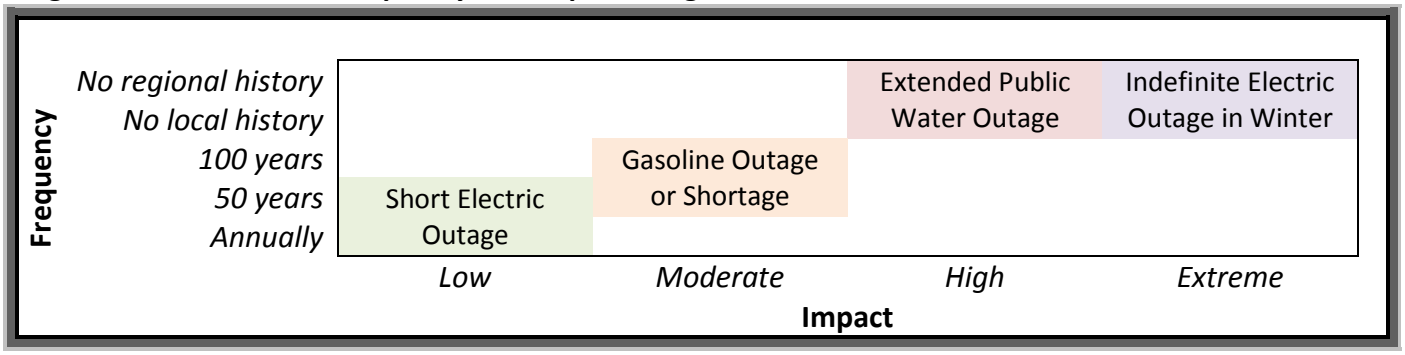
Residents recall following a heavy wet snowfall on June 4, 2001, power to many Northwestern Energy residents was out for about 10 days. Ten inches of snow was recorded in Drummond. Residents recall 40 inches in Granite County, but that amount could not be verified through climate data but is plausible at some of the higher elevations.

4.10.3 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 Granite 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 4.10.3A Hazard Frequency and Impact Ranges



4.10.4 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 Granite County Medical Center. Others, such as the Granite County Sheriff's Office and 911 Center, may have limited functionality following an event due to a utility failure. For example, many critical facilities require electricity for certain types of equipment to work. 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.

The primary source for Philipsburg's water supply is through a pipeline that is exposed for a length of about four miles. A wide variety of hazards could cause damage to this line, threatening the water supply for the town. Damage to this pipeline could lead to an extended water outage in the Town of Philipsburg.

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, 641 people in Granite County rely on natural gas for heat, 418 rely on propane, and 165 rely on electric heat. 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 4.10.4A Hazard Vulnerabilities and Impacts

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
All	Critical Facilities	▪ Critical functional losses	▪ $0 losses	Low-Moderate
All	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
All	Existing Structures		▪ $0 losses ▪ Displacement/functional losses	Low-Moderate
All	Population		▪ Illness ▪ Injuries ▪ Fatalities	Moderate

Table 4.10.4A Hazard Vulnerabilities and Impacts (continued)

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
All	Values	▪ Business disruption losses ▪ Service industry losses ▪ Restrictions on activities	▪ Agricultural losses ▪ Emotional impacts ▪ Cancellation of activities	Moderate
All	Future Structures		▪ Likely 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:

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

4.11 Volcanic Ash

Table 4.11A Hazard Summary for Granite County

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 4.11B Hazard Summary for the Town of Drummond

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 4.11C Hazard Summary for the Town of Philipsburg

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 4.11D Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.11.1 Description

Granite 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. Granite 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.

4.11.2 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 two inches fell over Granite County. The Montana Governor asked businesses to close and individuals with breathing problems to stay indoors until the threat was assessed. The public was recommended not to drive and to wear respirators when outside. No reports of structure damage were received, and the health concerns lasted for a three day period.

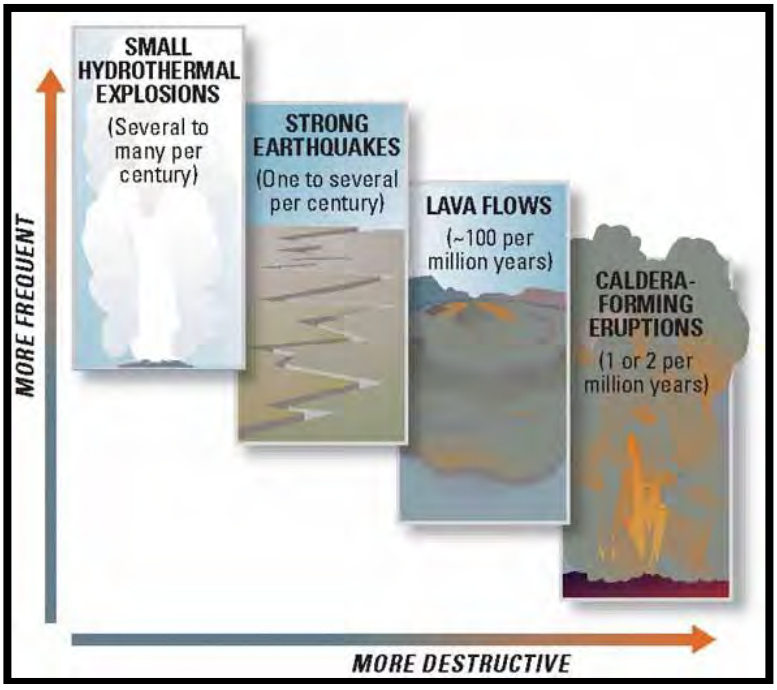
The Yellowstone region has produced three exceedingly large volcanic eruptions in the past 2.1 million years. In each of these cataclysmic events, enormous volumes of magma erupted at the surface and into the atmosphere as mixtures of red-hot pumice, volcanic ash (small, jagged fragments of volcanic 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)

4.11.3 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 4.11.3A shows the probability of the various events that can occur in Yellowstone National Park.

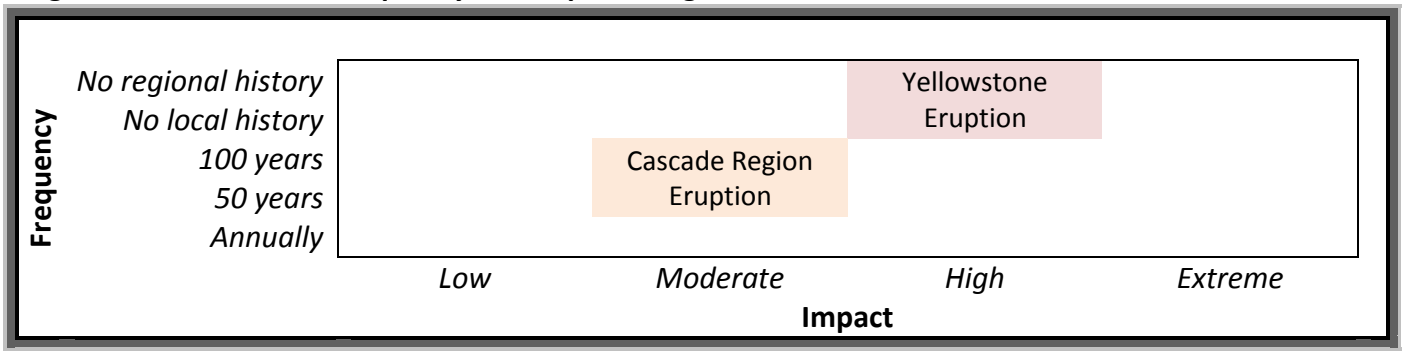
The Cascade region, being more active, has a higher probability of eruptions over the next 100 years. Based on eruptions in the Cascade region over the past 4,000 years, the probability of an eruption is about 1.25% in any given year or approximately 1-2 eruptions per 100 years within the Cascade Range.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

Figure 4.11.3A Recurrence Intervals for Geological Events in Yellowstone National Park



Source: US Geological Survey, 2005.

Figure 4.11.3B Hazard Frequency and Impact Ranges



4.11.4 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 Granite 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 Granite 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 Granite 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 Granite County and increase the population and property values at risk.

Vulnerabilities and Impacts

Table 4.11.4A Hazard Vulnerabilities and Impacts

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
All	Critical Facilities	▪ Critical functional losses ▪ Clean-up/debris removal costs	▪ $1,000,000 losses ▪ Structural losses ▪ Contents losses ▪ Critical data losses	Low-Moderate
All	Critical Infrastructure		▪ $5,000,000 losses ▪ Road closures ▪ Loss of electricity ▪ Loss of potable water ▪ Loss of telephone service ▪ Loss of internet service	Moderate
All	Existing Structures	▪ Clean-up/debris removal costs	▪ $1,000,000 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses	Low-Moderate
All	Population	▪ Illness	▪ Injuries ▪ Fatalities	Moderate
All	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

Table 4.11.4A Hazard Vulnerabilities and Impacts (continued)

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
All	Future Structures		▪ Likely to occur in hazard areas ▪ Increases the total hazard exposure ▪ Lacking building codes to minimize losses	Low-Moderate

* in addition to probable (100-year) impacts

4.11.5 Data Limitations

Data limitations include:

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

4.12 Water Supply and Watershed Contamination

Table 4.12A Hazard Summary for Granite County

Overall Hazard Rating	Low	
Probability of High Impact Event	Low	Widespread contamination of wells is unlikely.
Vulnerability	Low-Moderate	The population is highly dependent on clean water sources.

Table 4.12B Hazard Summary for the Town of Drummond

Overall Hazard Rating	Low	
Probability of High Impact Event	Low-Moderate	Contamination of the town's water supply is not a probable event.
Vulnerability	Low-Moderate	The population is highly dependent on the town's water supply.

Table 4.12C Hazard Summary for the Town of Philipsburg

Overall Hazard Rating	Moderate	
Probability of High Impact Event	Moderate	The town's water supply is susceptible to wildfires and vandalism.
Vulnerability	Low-Moderate	The population is highly dependent on the town's water supply.

Table 4.12D Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.12.1 Description

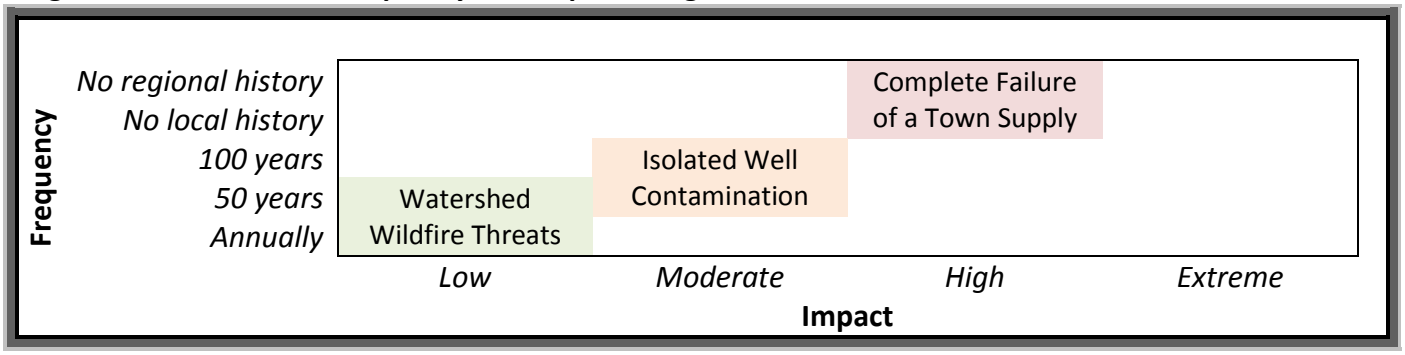
Contamination of the watershed serving the public water systems in Granite County would leave many residents without clean water for drinking, cooking, or cleaning. Contamination could occur naturally through wildfire or intentionally through terrorism or vandalism. Mining activities are a contamination source of concern to some residents. Specifically, Philipsburg is served by a public water system fed from Fred Burr Lake and Silver Springs. This system has about 925 users and two storage tanks that can hold 200,000 gallons each. This water supply is served by an exposed pipeline in an unpopulated area. This area is also at risk from wildfires. The sediment from a wildfire could easily clog the system or contaminate the water. Many residents outside the municipalities are served by individual wells, and ground water contamination could lead to well contamination.

4.12.2 History

Fortunately, the water supplies in Granite County have never been contaminated. The watershed serving Philipsburg has been threatened by wildfire in past years.

4.12.3 Probability and Magnitude

Figure 4.12.3A Hazard Frequency and Impact Ranges



4.12.4 Vulnerabilities

Methodology

To assess the vulnerabilities from water supply and watershed contamination, the loss of water supply for at least one hundred people was considered for analysis purposes.

Exposure

Critical Facilities and Infrastructure

Critical facilities could certainly lose functionality should the water supply be contaminated. In the case of heavy sedimentation, water treatment facilities could be significantly damaged if preventative actions are not taken. Facilities housing vulnerable populations would become particularly susceptible in their ability to care for their populations.

Existing Structures

Water supply contamination would not directly affect structures.

Population

The population impacts would likely be the most significant from a supply or watershed contamination event. Depending on the time lapse to the discovery of the contamination, the result could be actual illnesses and death or logistical in providing necessary drinking water to the population. During the recognition period of the contamination, residents may become sickened until boil orders or contamination notifications are made. The affected population could receive alternative water supplies from neighboring communities to supplement their basic water needs. Should assistance be limited, however, the population could be displaced.

Values

Temporary business closures and associated business disruption losses may occur with a water supply or watershed contamination event. The functionality of businesses would be lost without water services for employees and customers. Should water contamination persist for several days, the business losses could be significant. Social values such as cancelled activities and emotional impacts related to significant population losses or associated illness are also possible.

Future Development

Increased populations add to the challenges of managing a long term utility water outage but would not increase the damages necessarily. The subdivision regulations specifically list areas with polluted or non-potable water supply as unsuitable for development without mitigation. Therefore, the impacts to future development are minimal.

Vulnerabilities and Impacts

Table 4.12.4A Hazard Vulnerabilities and Impacts

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Granite County	Critical Facilities	▪ Critical functional losses		Low-Moderate
Drummond Philipsburg	Critical Facilities	▪ Critical functional losses	▪ $1,000,000 losses	Moderate
All	Critical Infrastructure	▪ Loss of potable water		Moderate
All	Existing Structures		▪ Displacement/functional losses	Low
All	Population		▪ Illness ▪ Fatalities	Moderate
All	Values	▪ Business disruption losses ▪ Service industry losses ▪ Reduced water quality ▪ Cancellation of activities ▪ Restrictions on activities	▪ Emotional impacts	Moderate
All	Future Structures		▪ Likely to occur in hazard areas ▪ Increases the total hazard exposure	Low

* in addition to probable (100-year) impacts

4.12.5 Data Limitations

Data limitations include:

- Estimating the probability and associated impacts of a contamination event, lacking a local history of such events.

4.13 Wildfire

Note: Some information for this hazard profile was summarized from the Granite County Community Wildfire Protection Plan dated November 2005. The Granite 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 4.13A Hazard Summary for Granite County

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 4.13B Hazard Summary for the Town of Drummond

Overall Hazard Rating	Low	
Probability of High Impact Event	Low-Moderate	Infrequent occurrence of damaging wildfires.
Vulnerability	Low-Moderate	Most structures within town limits are not at high risk of wildfires.

Table 4.13C Hazard Summary for the Town of Philipsburg

Overall Hazard Rating	High	
Probability of High Impact Event	Moderate	Wildfire threatening the town is possible, but historically has not happened.
Vulnerability	Moderate-High	Structures, critical facilities, and critical infrastructure within Philipsburg and its water supply are at possible risk from wildfires.

Table 4.13D 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

4.13.1 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 Granite County range from dense timber stands in varying terrain to native grasslands. Douglas fir, black cottonwood, juniper, lodgepole pine, quaking aspen,

ponderosa pine, sub-alpine fir, western larch, whitebark pine, sagebrush-junipers, and a variety of grasses make up many of the wildland fuels in the county. (Granite 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 arson. (Granite 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.

Wildfire 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, Bitterroot National Forest, Lolo National Forest, Anaconda Pintler Wilderness, Welcome Creek Wilderness, 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.

Granite County has large areas of government owned lands. The national forests and wilderness areas are managed by the US Forest Service. Scattered across 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. Over half of the county's acreage is National Forest lands.

Problems with wildfire 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 high or very high risk include the following locations, as identified in the Granite County Community Wildfire Protection Plan:

- Beavertail
- Eagle Canyon
- Georgetown Lake South
- Georgetown Lake West
- Maxville
- Upper Willow Creek
- Bearmouth
- Philipsburg

Source: Granite County, 2005.

Wildfire potential and the wildland urban interface can be mapped in a variety of ways since many factors play into wildfire risk. The Granite 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 608,244 acres of Granite County are considered wildland urban interface by this definition, including 211,795 acres of private and timber company lands. Figure 5 of the Granite County Community Wildfire Protection Plan 2005 shows the wildland urban interface. Note: This plan can be found on the Granite County website.

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. Specifically, the watershed serving the Town of Philipsburg's public water supply is in a wildland area. 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.

4.13.2 History

Granite 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 3,106 fires burning 199,351 acres in the greater Granite County area were calculated through 2004. (Granite County, 2005) The Montana Department of Natural Resources and Conservation database has 488 fires burning 23,204 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 Granite County can be found in Tables 4.13.2A and 4.13.2B.

Table 4.13.2A Largest Wildland Fires by Acreage Burned

Name	Start Date	Acres Burned
Sawmill Complex[1]	July 28, 2007	67,490 acres
Cooney Ridge[2]	August 9, 2003	25,793 acres
Middle Fork Complex[3]	July 23, 2000	17,535 acres
Ryan Gulch	August 6, 2000	17,118 acres
Alder	August 24, 2000	5,594 acres
Moose Meadow	July 25, 2013	3,500 acres
Packer Gulch	July 18, 2006	3,059 acres
Gilbert Creek	February 9, 1998	1,750 acres
Strawberry Complex[4]	August 14, 2003	1,021 acres
Bearmouth	August 1, 2006	1,008 acres

1 includes the Fisher Point, Wyman #2, and Sawmill fires.
2 only a small portion in Granite County.
3 includes the Falls Creek, Cougar Creek, Coyote Springs, Medicine Lake, Skalkaho Pass, Lick Creek, and Cooper Creek fires.
4 includes the Strawberry, Slide Rock, Brewster Creek, and Edelman fires.
Sources: Montana Department of Natural Resources and Conservation, 2013; National Interagency Fire Center, 2013.

Table 4.13.2B Costliest Wildland Fires

Name	Start Date	Cost	Acres Burned	Losses
Sawmill Complex[1]	July 28, 2007	$20,300,000	67,490 acres	
Cooney Ridge[2]	August 9, 2003	$18,700,000	25,793 acres	
Middle Fork Complex[3]	July 23, 2000	$17,300,000	17,535 acres	
Ryan Gulch	August 6, 2000	$7,300,000	17,118 acres	2 structures
Moose Meadow	July 25, 2013	$6,200,000	3,500 acres	
Packer Gulch	July 18, 2006	$3,700,000	3,059 acres	3 structures
Strawberry Complex[4]	August 14, 2003	$1,700,000	1,021 acres	
Bearmouth	August 1, 2006	$1,300,000	1,008 acres	
Berret Gulch	July 20, 2005	$538,000	57 acres	
Felan Gulch	August 23, 2012	$526,000	148 acres	
Rumsey Gulch	May 13, 2013	$300,000	349 acres	8 structures

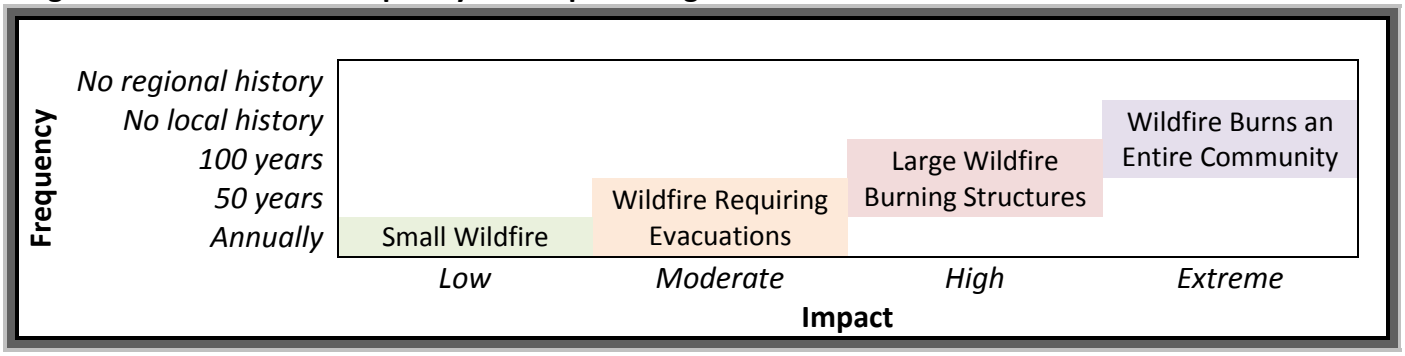
1 includes the Fisher Point, Wyman #2, and Sawmill fires.
2 only a small portion in Granite County.
3 includes the Falls Creek, Cougar Creek, Coyote Springs, Medicine Lake, Skalkaho Pass, Lick Creek, and Cooper Creek fires.
4 includes the Strawberry, Slide Rock, Brewster Creek, and Edelman fires.
Sources: Montana Department of Natural Resources and Conservation, 2013; National Interagency Fire Center, 2013.

4.13.3 Probability and Magnitude

An analysis of the Montana Department of Natural Resources and Conservation records indicates approximately 15 fire starts per year occur in Granite County on state lands or that require state

assistance (generally not including fires on US Forest Service lands). About 90% of the land burned in these fires was on private lands. The greater Granite County area, including Forest Service lands, appears to have a frequency of 50-100 per year. (Granite County, 2005)

Figure 4.13.3A Hazard Frequency and Impact Ranges



4.13.4 Vulnerabilities

Methodology

The Granite 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 Granite County Community Wildfire Protection Plan shows the associated Fire Risk / WUI Impact Model. Note: This plan can be found on the Granite County website.

For population estimates, the 2010 county population of 3,079 was divided by the total number of census housing units of 2,751 for an estimate of 1.1 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 Granite County, all critical facilities are assumed to have some risk. The Georgetown Lake Fire Station is the critical facility with the highest risk in the wildland urban interface. (Granite County, 2005) Other critical facilities at risk based on comparisons to the CWPP maps include all facilities and infrastructure outside the urban limits of Drummond and Philipsburg. Even the critical facilities in either of the towns are at some risk should a wildfire threaten the community. 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. The water supply for the Town of Philipsburg has been identified as highly vulnerable to wildfires.

Existing Structures

Wildfires have the greatest potential to substantially burn National Forest acreage; however, private residences become threatened when the fire enters the wildland urban interface. Granite County has many wildland urban interface areas that may be threatened should a wildfire encroach. The Granite County Community Wildfire Protection Plan estimates that 1,604 houses are in the wildland urban interface with a total value of $109,306,800. This value does not account for improvements or personal effects that may be at risk from a wildfire. In terms of acreage, approximately 4,700 acres are estimated to be very high risk, 124,300 acres are high risk, 274,000 acres are medium risk, and 205,300 acres are low risk. (Granite 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 $10.9 million dollars with 160 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 history has shown.

Population

Using the estimate of 160 structures affected in a major wildfire, roughly 176 people would live in the affected area (160 structures x 1.1 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 Granite County. The taxable value of the county's forestland is estimated at over $115 million. Granite County also has many historic mining sites and other places of historical significance within wildland urban interface areas that are at significant risk from wildfires. (Granite 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 Granite County is no exception. Development in the hazard areas has increased in recent years and has amplified the vulnerabilities in the unincorporated parts of Granite County significantly. Regulating growth in these areas is a delicate balance between protecting private property rights and promoting public safety.

Many of the 3,467 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 Granite County, Philipsburg, and Drummond Subdivision Regulations that have undergone some improvements to increase wildfire resistance, particularly in wildland urban interface areas. The Georgetown Lake Zoning District also has requirements specific to wildfire mitigation.

Vulnerabilities and Impacts

Table 4.13.4A Hazard Vulnerabilities and Impacts

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Granite County	Critical Facilities	▪ $500,000 losses ▪ Structural losses ▪ Contents losses ▪ Critical functional losses ▪ Critical data losses	▪ $1,500,000 losses	Moderate-High
Drummond	Critical Facilities		▪ $500,000 losses ▪ Structural losses ▪ Contents losses ▪ Critical functional losses ▪ Critical data losses	Low-Moderate
Philipsburg	Critical Facilities		▪ $2,000,000 losses ▪ Structural losses ▪ Contents losses ▪ Critical functional losses ▪ Critical data losses	Moderate
Granite County	Critical Infrastructure	▪ $500,000 losses ▪ Road closures	▪ $2,000,000 losses ▪ Loss of electricity	Moderate-High
Drummond	Critical Infrastructure		▪ $100,000 losses ▪ Road closures	Low-Moderate
Philipsburg	Critical Infrastructure	▪ Loss of potable water	▪ $500,000 losses ▪ Road closures ▪ Loss of electricity	Moderate

Table 4.13.4A Hazard Vulnerabilities and Impacts (continued)

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
Granite County	Existing Structures	▪ $1,090,000 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses	▪ $10,900,000 losses	High
Drummond	Existing Structures		▪ $500,000 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses	Low-Moderate
Philipsburg	Existing Structures		▪ $3,000,000 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses	Moderate
Granite County Philipsburg	Population		▪ Injuries ▪ Fatalities	Moderate
Drummond	Population		▪ Injuries ▪ Fatalities	Low
All	Values	▪ Agricultural losses ▪ Historic structure losses ▪ Historic site losses ▪ Historic item losses ▪ Reduced air quality ▪ Restrictions on activities ▪ Aesthetic value losses	▪ Business disruption losses ▪ Service industry losses ▪ Habitat damages ▪ Reduced water quality ▪ Soil contamination ▪ Emotional impacts ▪ Cancellation of activities	Moderate-High
Granite County	Future Structures	▪ Likely to occur in hazard areas ▪ Subdivision regulations in place to mitigate some impacts	▪ 3,467 undeveloped parcels in the wildland urban interface	Moderate-High
Drummond Philipsburg	Future Structures		▪ Somewhat likely to occur in hazard areas	Moderate

* in addition to probable (100-year) impacts

4.13.5 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, currently in the works.

4.15 Winter Storms and Extended Cold

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

Table 4.15A Hazard Summary for Granite County

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 4.15B Hazard Summary for the Town of Drummond

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 4.15C Hazard Summary for the Town of Philipsburg

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 4.15D Federal Major Disaster and Emergency Declarations

Declaration	Year	Additional Information	Casualties	Damages/Assistance
None				

4.15.1 Description

Snow storms and bitterly cold temperatures are common occurrences in Granite 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 Granite 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)

4.15.2 History

Snow and cold are normal occurrences in Granite County throughout the late fall, winter, and early spring months. From 1996-2012, the Bitterroot / Sapphire Mountain zone, which includes Granite County, had 110 heavy snow, 42 winter storm (usually a combination of snow and wind), 1 blizzard, 1 ice storm, and 5 wind chill reports. (National Climatic Data Center, 2013)

Other notable events include June 1949 when Philipsburg received 28 inches of snow. In Granite County, cold air masses can settle into the valleys and stick around for many days. Residents recall two particularly severe events - early March 1989 when elk froze standing up and February and March in the mid 1980s when Drummond was struck particularly severely by the cold and many public water lines froze.

Table 4.15.2A Winter Weather Records

Location	Period of Record	Low Temperature Record	Annual Snowfall Record
Drummond Airport	1927-2012	-48°F, January 26, 1957	101.3 inches, 1975
Philipsburg Ranger Station	1955-2012	-38°F, December 21, 1983	105.2 inches, 1964

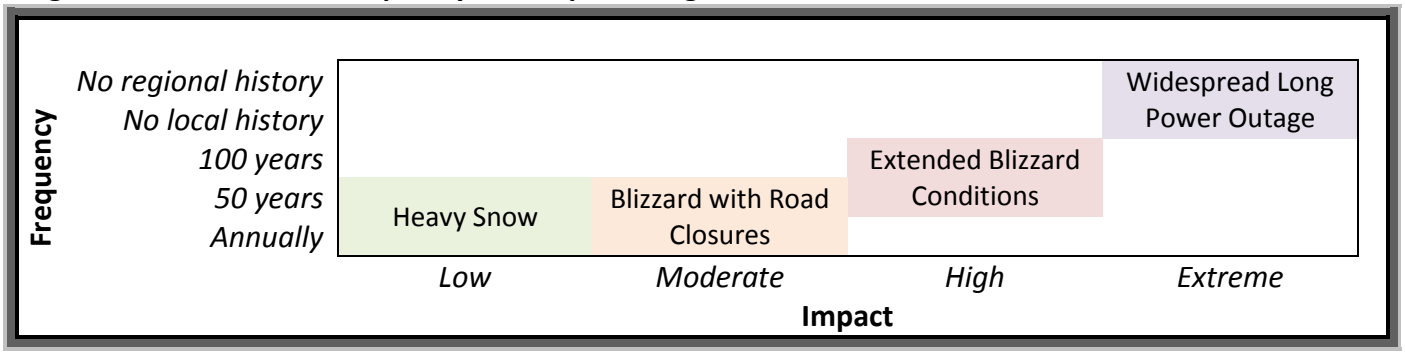
Source: Western Regional Climate Center, 2012.

4.15.3 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, Granite 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:

- 6 heavy snow events annually.
- 2-3 winter storm events annually.
- Blizzards, ice storms, and extreme wind chills less frequently, but likely at least once each decade.

Figure 4.15.3A Hazard Frequency and Impact Ranges



4.15.4 Vulnerabilities

Methodology

Since the winter weather and extended cold 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 winter storms and cold temperatures. 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 Granite 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 winter storms and cold spells typically do not cause major structural damage, the greatest threat to the population is the potential for utility failure during a cold spell. Although cold temperatures and snow are normal for Granite 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. Future structures in Granite County, Drummond, and Philipsburg are vulnerable to structure collapses due to heavy snow loads since the jurisdictions lack building codes.

Vulnerabilities and Impacts

Table 4.15.4A Hazard Vulnerabilities and Impacts

Jurisdiction(s)	Type	Probable (100-year) Impact	Extreme (500-year) Impact*	Rating
All	Critical Facilities		▪ $0 losses	Low
All	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
All	Existing Structures		▪ $500,000 losses ▪ Structural losses ▪ Contents losses ▪ Displacement/functional losses	Low-Moderate
All	Population	▪ Injuries ▪ Fatalities		Moderate
All	Values	▪ Business disruption losses ▪ Service industry losses ▪ Agricultural losses ▪ Cancellation of activities ▪ Restrictions on activities	▪ Emotional impacts	Moderate
All	Future Structures		▪ Likely to occur in hazard areas ▪ Increases the total hazard exposure ▪ Lacking 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.
- 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).

4.16 Risk Assessment Summary

The risk assessment represents an approximate history and estimated vulnerabilities to Granite County and the Towns of Drummond and Philipsburg from the hazards identified. Table 4.16A 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 4.16B shows the hazard prioritizations for Granite County and Table 4.16C and Table 4.16D are specific to the Towns of Drummond and Philipsburg, respectively.

Table 4.16A Federal Major Disaster and Emergency Declarations Summary

Hazard	Declaration	Year	Cause/Additional Information	Casualties	Damages/Assistance
Flood	FEMA-DR-640	1981	Public Assistance Individual Assistance	None	Total federal and state assistance to the entire disaster area = $5,958,548
Flood	FEMA-DR-761	1986	Public Assistance	None	Total federal and state assistance to the entire disaster area = $1,996,384
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 seven 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 4.16B Granite County Hazard Ratings

Hazard	Probability of High Impact Event	Vulnerability	Overall Hazard Rating
Wildfire	Moderate-High	Moderate-High	High
Transportation Accident	Moderate-High	Moderate	High
Winter Storms and Extended Cold	Moderate-High	Moderate	High
Flood	Moderate	Moderate-High	High
Communicable Disease	Moderate	Moderate	Moderate
Hazardous Materials Release	Moderate	Moderate	Moderate
Wind, Tornadoes, and Severe Thunderstorms	Moderate	Moderate	Moderate
Dam Failure	Low-Moderate	Moderate-High	Moderate
Drought	Moderate	Low-Moderate	Moderate
Earthquake	Low-Moderate	Moderate	Moderate
Utility and Communications Failure	Low-Moderate	Low-Moderate	Low
Terrorism	Low	Low-Moderate	Low
Water Supply and Watershed Contamination	Low	Low-Moderate	Low
Volcanic Ash	Low	Low-Moderate	Low
Avalanche and Landside	Low	Low	Low

Table 4.16C Town of Drummond Hazard Ratings

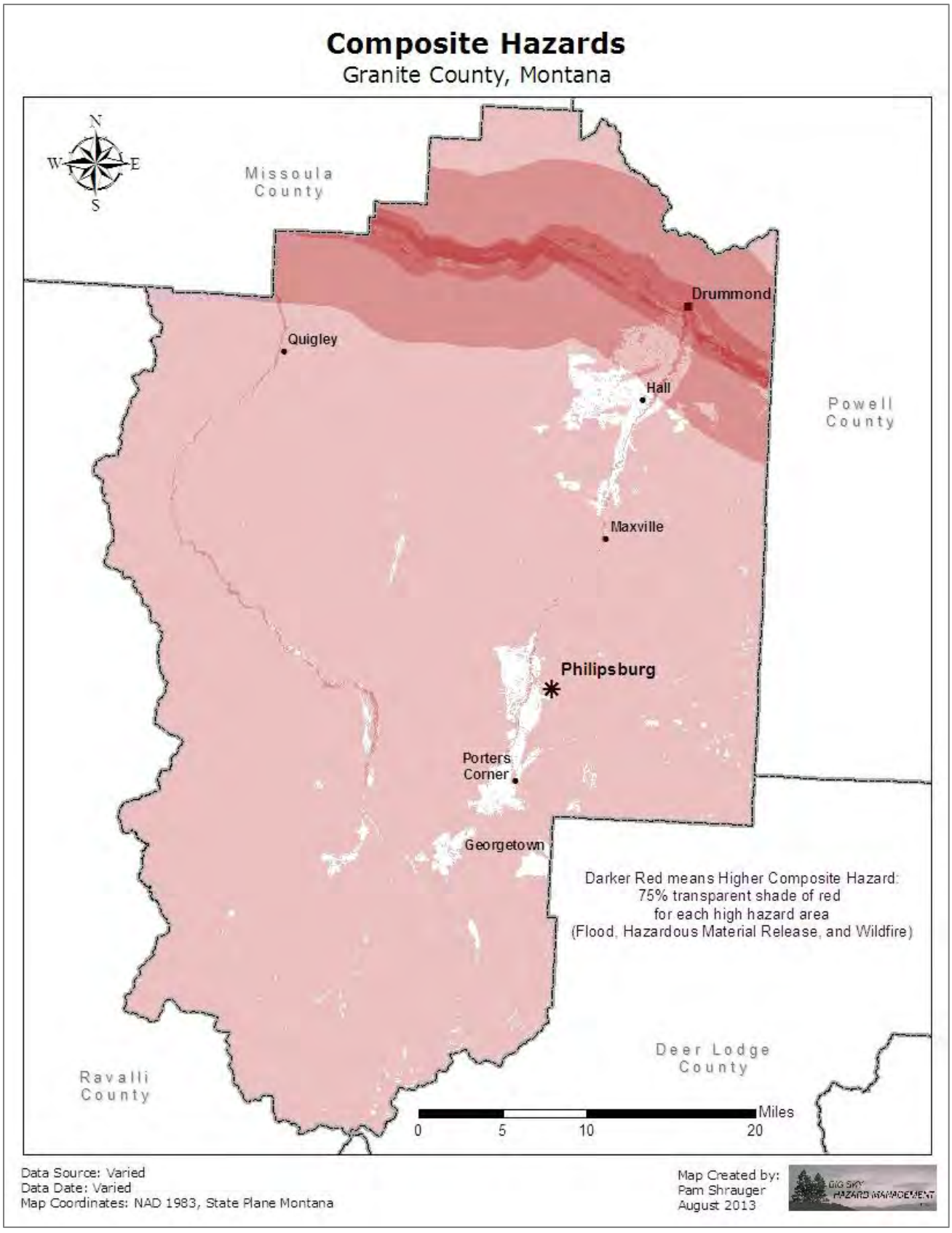
Hazard	Probability of High Impact Event	Vulnerability	Overall Hazard Rating
Flood	Moderate	Moderate-High	High
Hazardous Materials Release	Moderate	Moderate-High	High
Wind, Tornadoes, and Severe Thunderstorms	Moderate	Moderate-High	High
Transportation Accident	Moderate-High	Moderate	High
Winter Storms and Extended Cold	Moderate-High	Moderate	High
Communicable Disease	Moderate	Moderate	Moderate
Drought	Moderate	Moderate	Moderate
Earthquake	Moderate	Moderate	Moderate
Utility and Communications Failure	Low-Moderate	Moderate	Moderate
Water Supply and Watershed Contamination	Low-Moderate	Low-Moderate	Low
Dam Failure	Low-Moderate	Low-Moderate	Low
Wildfire	Low-Moderate	Low-Moderate	Low
Volcanic Ash	Low	Low-Moderate	Low
Terrorism	Low	Low	Low
Avalanche and Landside	Not Applicable	Not Applicable	Not Applicable

Table 4.16D Town of Philipsburg Hazard Ratings

Hazard	Probability of High Impact Event	Vulnerability	Overall Hazard Rating
Wind, Tornadoes, and Severe Thunderstorms	Moderate	Moderate-High	High
Wildfire	Moderate	Moderate-High	High
Winter Storms and Extended Cold	Moderate-High	Moderate	High
Communicable Disease	Moderate	Moderate	Moderate
Drought	Moderate	Moderate	Moderate
Flood	Moderate	Moderate	Moderate
Earthquake	Low-Moderate	Moderate	Moderate
Transportation Accident	Low-Moderate	Moderate	Moderate
Utility and Communications Failure	Low-Moderate	Moderate	Moderate
Water Supply and Watershed Contamination	Moderate	Low-Moderate	Moderate
Hazardous Materials Release	Low	Low-Moderate	Low
Dam Failure	Low	Low-Moderate	Low
Volcanic Ash	Low	Low-Moderate	Low
Terrorism	Low	Low	Low
Avalanche and Landside	Not Applicable	Not Applicable	Not Applicable

Maps 4.16E, 4.16F, and 4.16G are composite maps showing the areas in the jurisdictions 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.

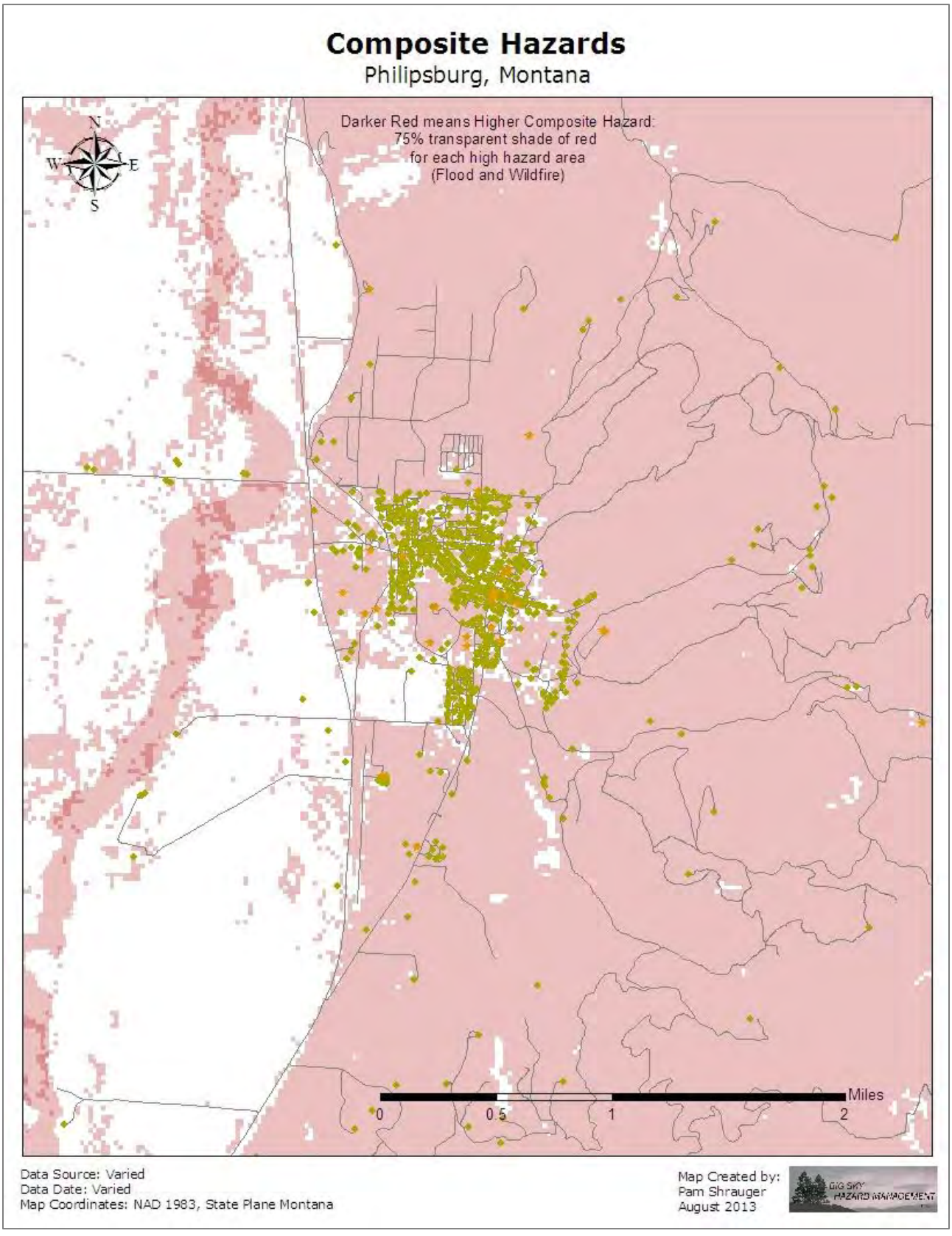
Map 4.16E


Composite Hazards
Granite County, Montana
N
W
E
S
Missoula County
Drummond
Quigley
Hall
Powell County
Maxville
Philipsburg
Porters Corner
Georgetown
Darker Red means Higher Composite Hazard:
75% transparent shade of red
for each high hazard area
(Flood, Hazardous Material Release, and Wildfire)
Deer Lodge County
Ravalli County
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 4.16F


Composite Hazards
Drummond, Montana
N
W
E
S
Darker Red means Higher Composite Hazard:
75% transparent shade of red
for each high hazard area
(Flood, Hazardous Material Release, and Wildfire)
0
0.25
0.5
1
Miles
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 4.16G


Composite Hazards
Philipsburg, Montana
Darker Red means Higher Composite Hazard:
75% transparent shade of red
for each high hazard area
(Flood and Wildfire)
N
W
E
S
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
GIG SKY HAZARD MANAGEMENT

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 Granite County and the Towns of Drummond and Philipsburg to create a vision for preventing future disasters, establish a common set of 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 and towns would like to accomplish. Goals are usually not measurable or fully attainable but rather ideals to which the county and towns should strive for as they develop and implement mitigation projects.

Rather than wait until a disaster occurs, Granite County and the Towns of Drummond and Philipsburg have 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, public meetings, and existing studies and plans. In 2013, those mitigation goals, objectives, and project ideas were reviewed by the public, refined in public meetings 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 Granite 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 Granite County and the Towns of Drummond and Philipsburg follow. Each of the projects specifies the jurisdiction or jurisdictions involved, 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.

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

Project 1.1.1: 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.

Jurisdiction(s): Granite County, Town of Philipsburg
Project Type: Educational/Informational
Responsible Agencies and Partners: Granite County Fire Departments
Resources Needed: Staff time and expertise
Potential Funding Sources: Montana DNRC, US Forest Service, US Bureau of Land Management
Goal Timeframe: Ongoing: Already initiated and continuing
Priority: High

Project 1.1.2: Fuel Reductions

- Pursue wildland urban interface fuel reduction projects in high-risk areas around the county, including near structures, road right-of-ways, utility right-of ways, and along federal and state lands.
- Reduce fuels in the Maxville Highway 1 corridor.
- Create roadside fuel breaks to protect communities and subdivisions, as applicable.
- Reduce fuels around the exposed portion of the Philipsburg water supply line.

Jurisdiction(s): Granite County, Town of Philipsburg
Project Type: Property Protection
Responsible Agencies and Partners: Granite County 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: US Forest Service; US Bureau of Land Management; Montana DNRC Western States Wildland Urban Interface grant
Goal Timeframe: Ongoing: Already initiated and continuing
Priority: High

Objective 1.2: Improve wildland firefighting capabilities.

Project 1.2.1: Dry Hydrants

- Develop dry hydrant supplies within the wildland urban interface, especially in the Georgetown Lake area, to supply substantial amounts of water within a reasonable distance for wildland firefighting efforts.

Jurisdiction(s): Granite County
Project Type: Property Protection
Responsible Agencies and Partners: Granite County 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.

Jurisdiction(s): Granite County
Project Type: Population Protection
Responsible Agencies and Partners: Granite County Fire Departments; Granite County Road Foreman; 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

GOAL 2: REDUCE FUTURE DAMAGES FROM FLOODING.

Objective 2.1: Reduce losses to private property from flooding.

Project 2.1.1: Flood Insurance Education

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

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Educational/Informational
Responsible Agencies and Partners: Granite County Commission, County and Town Floodplain Administrators, and 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 property owners and tenants are most interested
Priority: High

Project 2.1.2: Bridge, Culvert, and Road Improvements

- Upgrade bridges, culverts, and roads to allow sufficient passage of floodwaters.
- Install culverts in areas prone to washouts or drainage problems.
- Stabilize roadsides that are prone to mudslides and/or landslides.
- Increase the capacities of storm drains and culverts in problem areas such as downtown Philipsburg along Camp Creek to prevent Broadway Street flooding, Philipsburg along Frost Creek, and under Highway 10A in Drummond.
- Study and implement a solution to minimize the damage from Edwards Gulch flooding
- Perform regular maintenance to remove debris from culverts, bridges, and ditches.

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Infrastructure Protection
Responsible Agencies and Partners: County and Town Road/Street Foremen
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 and Town Budgets
Goal Timeframe: Near Term: Initiated within 0-3 years; Post-Disaster: During bridge, culvert, and/or road repairs
Priority: High

Project 2.1.3: Floodplain Ordinances

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

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Policy/Regulatory
Responsible Agencies and Partners: Granite County Commission, Town Councils, Floodplain Administrators, Planners
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

GOAL 3: REDUCE POTENTIAL LOSSES FROM EARTHQUAKES.

Objective 3.1: Prevent earthquake damages to critical facilities, infrastructure, and facilities housing vulnerable populations.

Project 3.1.1: 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 in schools and other facilities with vulnerable populations.
- Conduct earthquake drills in schools.
- Structurally retrofit important government facilities, as needed.

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Property Protection
Responsible Agencies and Partners: Granite County Disaster and Emergency Services; County and Town Department Directors and Facility Managers; School Administrators; Private Facility Managers
Resources Needed: Staff time and expertise; Funding for supplies
Potential Funding Sources: Federal Emergency Management Agency mitigation grants
Goal Timeframe: Mid Term: Initiated within 3-6 years
Priority: Medium

Project 3.1.2: 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.

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Infrastructure Protection
Responsible Agencies and Partners: Granite County Disaster and Emergency Services; County and Town Road and Public Works Directors; Private Utility Companies
Resources Needed: Staff time and expertise; Funding for improvements
Potential Funding Sources: Federal Emergency Management Agency mitigation grants; County and Town Budgets for staff and equipment time and supplies
Goal Timeframe: Mid Term: Initiated within 3-6 years; Post Disaster: when making repairs
Priority: Medium

Objective 3.2: Prevent residential and commercial losses from earthquakes.

Project 3.2.1: Earthquake Retrofit Education

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

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Educational/Informational
Responsible Agencies and Partners: Granite County 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: Long Term: Initiated within 7-10 years
Priority: Low

GOAL 4: MINIMIZE THE IMPACTS FROM A TRANSPORTATION OR HAZARDOUS MATERIALS ACCIDENT.

Objective 4.1: Reduce the probability of hazardous materials affecting a populated area.

Project 4.1.1: Highway Barriers

- Place highway barriers along Interstate 90 in Drummond.

Jurisdiction(s): Town of Drummond
Project Type: Population Protection
Responsible Agencies and Partners: Montana Department of Transportation; Granite County Disaster and Emergency Services Coordinator; Drummond Fire Department; Drummond Town Council
Resources Needed: Staff time and expertise; Funding for barriers and placement
Potential Funding Sources: Montana Department of Transportation
Goal Timeframe: Near Term: Initiated within 0-3 years
Priority: High

Project 4.1.2: Fuel Tank Protection

- Investigate options for protecting the fuel tanks in Drummond from a train derailment.
- A possible alternative includes relocating the tanks.

Jurisdiction(s): Town of Drummond
Project Type: Infrastructure Protection
Responsible Agencies and Partners: Montana Rail Link; Fuel Tank Owners; Drummond Fire Department, Drummond Town Council
Resources Needed: Staff time and expertise; Funding for protection measures
Potential Funding Sources: Montana Rail Link; Private Grants
Goal Timeframe: Near Term: Initiated within 0-3 years
Priority: High

Objective 4.2: Minimize injuries and fatalities from transportation accidents.

Project 4.2.1: School Bus Safety Program

- Develop a school bus safety program to improve the safety of occupants, including but not limited to, physical improvements to the buses and training for drivers.

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Population Protection
Responsible Agencies and Partners: Granite County School Districts; Granite County Medical Center
Resources Needed: Staff time and expertise; Funding for improvements
Potential Funding Sources: National Highway Traffic Safety Administration; Montana Department of Transportation
Goal Timeframe: Near Term: Initiated within 0-3 years
Priority: High

GOAL 5: REDUCE THE COMMUNITY RISK FROM PUBLIC HEALTH THREATS.

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.

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Population Protection
Responsible Agencies and Partners: Granite County Public Health Nurse; Granite County Medical Center
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

Objective 5.2: Prevent water contamination.

Project 5.2.1: Public Water Supply Protection

- Bury the water supply line for the Town of Philipsburg's water system.
- Educate the public on water conservation measures and prepare to implement them should the line be compromised.
- Add hydrants along the exposed portion of the line for fire protection.

Jurisdiction(s): Town of Philipsburg
Project Type: Population Protection
Responsible Agencies and Partners: Philipsburg Public Works
Resources Needed: Staff time and expertise; Funding for equipment and supplies
Potential Funding Sources: Town Budget
Goal Timeframe: Long Term: Initiated within 7-10 years
Priority: Low

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

Objective 6.1: Develop resources than can be used to further study and prepare for multiple hazards.

Project 6.1.1: HAZUS-MH GIS Data

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

Jurisdiction(s): Granite County
Project Type: Educational/Informational
Responsible Agencies and Partners: Granite County GIS Coordinator; Granite County Disaster and Emergency Services Coordinator
Resources Needed: Staff time and expertise; Funding for education and data development
Potential Funding Sources: Federal Emergency Management Agency mitigation grants
Goal Timeframe: Mid Term: Initiated within 3-6 years
Priority: Medium

Objective 6.2: Protect the population from utility outages.

Project 6.2.1: Generators

- Install generators at critical facilities and vulnerable population locations, such as the Granite County Sheriff's Office and Granite County Medical Center.
- Increase sheltering capabilities by installing generators at possible large capacity shelter facilities such as schools.

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Population Protection
Responsible Agencies and Partners: Granite County Disaster and Emergency Services Coordinator; County and Town 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: Federal Emergency Management Agency Hazard Mitigation grant
Goal Timeframe: Mid Term: Initiated within 3-6 years; Post Disaster: when funding may be available
Priority: Medium

Project 6.2.2: Electric Infrastructure Protection

- Encourage electric companies to improve maintenance of and around power lines and substations.

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Infrastructure Protection
Responsible Agencies and Partners: Granite County Disaster and Emergency Services Coordinator; Electric Companies; Granite County Commission; Town Councils
Resources Needed: Staff time and expertise; Funding for maintenance projects
Potential Funding Sources: Electric Company Budgets
Goal Timeframe: Mid Term: Initiated within 3-6 years; Post Disaster: when funding may be available
Priority: Medium

Objective 6.3: Improve public warning capabilities.

Project 6.3.1: Storm Ready Community

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

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Population Protection
Responsible Agencies and Partners: Granite County Disaster and Emergency Services Coordinator; National Weather Service Warning Coordination Meteorologist
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: NOAA Weather Radio

- Install a NOAA Weather Radio Transmitter in Philipsburg.
- Place NOAA Weather Radios in critical facilities and schools

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Population Protection
Responsible Agencies and Partners: Granite County Disaster and Emergency Services Coordinator; National Weather Service Warning Coordination Meteorologist
Resources Needed: Staff time and expertise; Funding for a transmitter and radios
Potential Funding Sources: National Weather Service
Goal Timeframe: Mid Term: Initiated within 3-6 years
Priority: Medium

Objective 6.4: Plan for population protection needs.

Project 6.4.1: Functional Annexes

- Develop functional annexes to the Granite County Emergency Operations Plan, specifically sheltering, evacuation, and continuity of operations.

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Population Protection
Responsible Agencies and Partners: Granite County Disaster and Emergency Services Coordinator; County Commission; Town Councils
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 6.5: Mitigate the impact of hazards on future development through land use and building regulations.

Project 6.5.1: Building Codes

- Adopt and enforce the state building code.

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Policy/Regulatory
Responsible Agencies and Partners: Granite County Commission; Town Councils
Resources Needed: Staff time and expertise; Funding for education and program development
Potential Funding Sources: County and Town Budgets
Goal Timeframe: Near Term: Initiated within 0-3 years; Post Disaster: when residents are most interested
Priority: High

Project 6.5.2: Growth Policies and Subdivision Regulations

- Update the growth policies 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 wildfire.
- Ensure the new state requirements for wildfire considerations in growth policies are met.

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Policy/Regulatory
Responsible Agencies and Partners: Granite County Commission and Planners; Town Councils; Granite County Fire Departments; County and Town Attorneys
Resources Needed: Staff time and expertise
Potential Funding Sources: None needed
Goal Timeframe: Near Term: Initiated within 0-3 years
Priority: High

Project 6.5.3: Capital Improvements Plans

- Develop and/or update Capital Improvements Plans to include relevant hazard mitigation projects and hazard considerations during improvements.

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Policy/Regulatory
Responsible Agencies and Partners: Granite County Commission and Planners; Town Councils
Resources Needed: Staff time and expertise
Potential Funding Sources: None needed
Goal Timeframe: Mid Term: Initiated within 3-6 years; Post Disaster: when updates may be needed
Priority: High

Project 6.5.4: Conservation Easements

- Protect values in hazard areas through conservation easements.
- If necessary, consider a local bond to generate funds.

Jurisdiction(s): Granite County, Town of Drummond, Town of Philipsburg
Project Type: Policy/Regulatory
Responsible Agencies and Partners: Granite County Commission, Town Councils; Floodplain Administrators; Planners; 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 and Town Budgets; Private Conservation Organizations
Goal Timeframe: Mid Term: Initiated within 3-6 years; Post-Disaster: when landowners are most interested
Priority: High

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 4.16), 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 for the jurisdiction. 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 4.16	High	5
	see Section 4.16	Moderate	3
	see Section 4.16	Low	1

Table 5.2C Hazards and Development Mitigated by Each Proposed Project

	Avalanche and Landslide	Communicable Disease	Dam Failure	Drought	Earthquake	Flood	Hazardous Materials Release	Terrorism	Transportation Accident	Utility and Communications Failure	Volcanic Ash	Water Supply and Watershed Contamination	Wildfire	Wind, Tornadoes, and Severe Thunderstorms	Winter Storms and Extended Cold	Existing Development	Future Development
Project 1.1.1: WUI Assessments													X			X	
Project 1.1.2: Fuel Reductions										X		X	X			X	
Project 1.2.1: Dry Hydrants													X			X	X
Project 1.2.2: Ingress/Egress Road Improvements									X				X			X	
Project 2.1.1: Flood Insurance Education						X										X	
Project 2.1.2: Bridge, Culvert, and Road Improvements	X		X			X										X	X
Project 2.1.3: Floodplain Ordinances						X											X
Project 3.1.1: Critical Facility Seismic Retrofits					X											X	
Project 3.1.2: Infrastructure Seismic Improvements					X					X						X	X
Project 3.2.1: Earthquake Retrofit Education					X											X	
Project 4.1.1: Highway Barriers							X		X								
Project 4.1.2: Fuel Tank Protection							X		X								
Project 4.2.1: School Bus Safety Program									X								
Project 5.1.1: Communicable Disease Prevention Program		X															
Project 5.2.1: Public Water Supply Protection		X					X			X		X					
Project 6.1.1: HAZUS-MH GIS Data					X	X								X			
Project 6.2.1: Generators					X			X		X				X	X		
Project 6.2.2: Electric Infrastructure Protection					X			X		X				X	X	X	
Project 6.3.1: Storm Ready Community			X			X	X	X			X	X	X	X	X		

Table 5.2C Hazards and Development Mitigated by Each Proposed Project (continued)

	Avalanche and Landslide	Communicable Disease	Dam Failure	Drought	Earthquake	Flood	Hazardous Materials Release	Terrorism	Transportation Accident	Utility and Communications Failure	Volcanic Ash	Water Supply and Watershed Contamination	Wildfire	Wind, Tornadoes, and Severe Thunderstorms	Winter Storms and Extended Cold	Existing Development	Future Development
Project 6.3.2: NOAA Weather Radio			X			X	X	X			X	X	X	X	X		
Project 6.4.1: Functional Annexes			X		X	X	X	X		X			X	X	X		
Project 6.5.1: Building Codes					X						X			X	X		X
Project 6.5.2: Growth Policies and Subdivision Regulations						X							X				X
Project 6.5.3: Capital Improvements Plans	X		X		X	X		X		X	X	X		X	X	X	X
Project 6.5.4: 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
Educational/Informational									
Project 1.1.1: WUI Assessments	3	1	3	2	3	2	2	5	21
Project 2.1.1: Flood Insurance Education	5	2	2	1	3	2	1	5	21
Project 3.2.1: Earthquake Retrofit Education	5	1	2	2	2	2	1	3	18
Project 6.1.1: HAZUS-MH GIS Data	3	2	3	1	1	2	2	5	19
Policy/Regulatory									
Project 2.1.3: Floodplain Ordinances	5	1	2	2	3	3	2	5	23
Project 6.5.1: Building Codes	5	1	1	3	4	2	1	5	22
Project 6.5.2: Growth Policies and Subdivision Regulations	5	1	2	2	3	2	2	5	22
Project 6.5.3: Capital Improvements Plans	5	1	3	2	2	2	2	5	22
Project 6.5.4: Conservation Easements	1	2	2	2	3	3	3	5	21
Property Protection									
Project 1.1.2: 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 3.1.1: Critical Facility Seismic Retrofits	4	2	3	2	1	2	3	3	20
Infrastructure Protection									
Project 2.1.2: Bridge, Culvert, and Road Improvements	2	2	3	2	2	2	3	5	21
Project 3.1.2: Infrastructure Seismic Improvements	3	2	2	2	3	2	3	3	20
Project 6.2.2: Electric Infrastructure Protection	3	2	2	2	2	2	2	5	20
Population Protection									
Project 2.2.3: Ingress/Egress Road Improvements	2	2	3	3	1	2	2	5	20
Project 4.1.1: Highway Barriers	3	2	2	3	1	2	3	5	21
Project 4.1.2: Fuel Tank Protection	2	2	2	3	2	2	3	5	21
Project 4.2.1: School Bus Safety Program	4	1	3	4	1	2	1	5	21
Project 5.1.1: Communicable Disease Prevention Program	5	2	2	4	1	2	2	3	21
Project 5.2.1: Public Water Supply Protection	1	2	2	4	2	2	3	3	19
Project 6.2.1: Generators	3	2	2	3	1	2	2	5	20
Project 6.3.1: Storm Ready Community	5	1	3	2	1	2	2	5	21
Project 6.3.2: NOAA Weather Radio	2	2	2	4	1	2	2	5	20
Project 6.4.1: Functional Annexes	5	2	3	3	1	2	2	5	23

Following are the top priorities by hazard and jurisdiction. These priorities were established based on the high hazards for each jurisdiction and the basic review of cost versus benefit for that particular hazard and jurisdiction. The priorities were reviewed at open public meetings.

Granite County

Wildfire

- Project 6.4.1: Functional Annexes
- Project 6.5.2: Growth Policies and Subdivision Regulations
- Project 1.1.1: WUI Assessments
- Project 1.1.2: Fuel Reductions
- Project 1.2.1: Dry Hydrants
- Project 6.5.4: Conservation Easements

Transportation Accident

- Project 4.2.1: School Bus Safety Program
- Project 2.2.3: Ingress/Egress Road Improvements

Winter Storms and Extended Cold

- Project 6.4.1: Functional Annexes
- Project 6.2.1: Generators
- Project 6.2.2: Electric Infrastructure Protection

Flood

- Project 2.1.3: Floodplain Ordinances
- Project 6.5.2: Growth Policies and Subdivision Regulations
- Project 6.5.3: Capital Improvements Plans
- Project 2.1.1: Flood Insurance Education
- Project 2.1.2: Bridge, Culvert, and Road Improvements
- Project 6.5.4: Conservation Easements

Town of Drummond

Flood

- Project 2.1.3: Floodplain Ordinances
- Project 6.5.2: Growth Policies and Subdivision Regulations
- Project 6.5.3: Capital Improvements Plans
- Project 2.1.1: Flood Insurance Education
- Project 2.1.2: Bridge, Culvert, and Road Improvements
- Project 6.5.4: Conservation Easements

Hazardous Materials Release

- Project 6.4.1: Functional Annexes
- Project 4.1.1: Highway Barriers
- Project 4.1.2: Fuel Tank Protection
- Project 6.3.1: Storm Ready Community

Wind, Tornadoes, and Severe Thunderstorms

- Project 6.5.1: Building Codes
- Project 6.3.1: Storm Ready Community
- Project 6.2.1: Generators
- Project 6.2.2: Electric Infrastructure Protection

Winter Storms and Extended Cold

- Project 6.4.1: Functional Annexes
- Project 6.2.1: Generators
- Project 6.2.2: Electric Infrastructure Protection

Town of Philipsburg

Wind, Tornadoes, and Severe Thunderstorms

- Project 6.5.1: Building Codes
- Project 6.3.1: Storm Ready Community
- Project 6.2.1: Generators
- Project 6.2.2: Electric Infrastructure Protection
- Project 6.3.2: NOAA Weather Radio

Wildfire

- Project 6.4.1: Functional Annexes
- Project 6.3.1: Storm Ready Community
- Project 6.5.2: Growth Policies and Subdivision Regulations
- Project 1.1.1: WUI Assessments
- Project 1.1.2: Fuel Reductions
- Project 6.3.2: NOAA Weather Radio

Winter Storms and Extended Cold

- Project 6.4.1: Functional Annexes
- Project 6.2.1: Generators
- Project 6.2.2: Electric Infrastructure Protection

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 Granite 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 and towns to focus on the types of projects with the greatest benefits.

Table 5.3A Implementation Scheme for Mitigation Projects

Proposed Action	Jurisdiction(s)	Priority	Goal Timeframe
Educational/Informational			
Project 1.1.1: WUI Assessments	Granite County Philipsburg	High	Ongoing
Project 2.1.1: Flood Insurance Education	All	High	Near Term Post Disaster
Project 6.1.1: HAZUS-MH GIS Data	Granite County	Medium	Mid Term
Project 3.2.1: Earthquake Retrofit Education	All	Low	Long Term
Policy/Regulatory			
Project 1.1.2: Floodplain Ordinances	All	High	Near Term Post Disaster
Project 6.5.1: Building Codes	All	High	Near Term Post Disaster
Project 6.5.2: Growth Policies and Subdivision Regulations	All	High	Near Term
Project 6.5.3: Capital Improvements Plans	All	High	Mid Term Post Disaster
Project 6.5.4: Conservation Easements	All	High	Mid Term Post Disaster

Table 5.3A Implementation Scheme for Mitigation Projects (continued)

Proposed Action	Jurisdiction(s)	Priority	Goal Timeframe
Property Protection			
Project 1.1.2: Fuel Reductions	Granite County Philipsburg	High	Ongoing
Project 1.2.1: Dry Hydrants	Granite County	High	Near Term
Project 3.1.1: Critical Facility Seismic Retrofits	All	Medium	Mid Term
Infrastructure Protection			
Project 2.1.2: Bridge, Culvert, and Road Improvements	All	High	Near Term Post Disaster
Project 3.1.2: Infrastructure Seismic Improvements	All	Medium	Mid Term Post Disaster
Project 6.2.2: Electric Infrastructure Protection	All	Medium	Mid Term Post Disaster
Population Protection			
Project 6.4.1: Functional Annexes	All	High	Near Term Post Disaster
Project 4.1.1: Highway Barriers	Drummond	High	Near Term
Project 4.1.2: Fuel Tank Protection	Drummond	High	Near Term
Project 4.2.1: School Bus Safety Program	All	High	Near Term
Project 6.3.1: Storm Ready Community	All	High	Near Term
Project 5.1.1: Communicable Disease Prevention Program	All	Medium	Mid Term
Project 2.2.3: Ingress/Egress Road Improvements	Granite County	Medium	Mid Term
Project 6.2.1: Generators	All	Medium	Mid Term Post Disaster

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 Granite County and the Towns of Drummond and Philipsburg. The traditional mitigation programs that are especially relevant for the county and towns 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.

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 and towns 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.

Granite County primarily consists of rural areas and 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. Similarly, the towns are relatively small communities. These jurisdictions may require additional assistance and support in order to perform the most basic mitigation activities such as grant applications or community outreach. Granite County has one part-time coordinator to manage Disaster and Emergency Services activities for the county and towns. Each jurisdiction participates in the National Flood Insurance Program (NFIP) and has a designated floodplain administrator; however, floodplain administration is only one of many responsibilities for these individuals. In general, the county and towns have 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
Granite County Growth Policy	October 2004
Granite County, Town of Philipsburg, Town of Drummond Subdivision Regulations	2006
Georgetown Lake Zoning District and Code	2011
Granite County Community Wildfire Protection Plan	November 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
- Granite County Floodplain Ordinance
- Granite County, Town of Philipsburg, Town of Drummond Subdivision Regulations
- Town of Drummond Floodplain Ordinance

- Town of Philipsburg Floodplain Ordinance
- Georgetown Lake Zoning Code

As the jurisdictions develop 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 and towns, 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 local planning departments and/or boards 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
Building Codes	▪ Adopt and 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, and volcanic ashfall.
Capital Improvement Plans	▪ When developed or 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.
Economic Development Strategies	▪ When developed or updated, include elements of the risk assessment and mitigation strategy, considering sustainability and disaster resistance a top priority as disasters often lead to economic problems.
Emergency Operations Plans	▪ Integrate the operational, response, training, and preparedness needs that are not directly tied to mitigation into the county's emergency operation plan.
Growth Policies	▪ 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 / Municipal Codes	▪ Adopt ordinances that create disaster resistance such as fire reduction ordinances, flood ordinances, and open space zoning in hazard areas.

Note: Some activities such as building codes and land use regulations are more easily implemented by some jurisdictions than others because of the community, planning, and enforcement resources available.

6. PLAN MAINTENANCE

An important aspect of any useable plan is the maintenance and upkeep of the document. The Granite County Commission, Drummond Town Council, and Philipsburg Town Council are 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 Granite 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 and communities. 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 Granite County DES Coordinator and the Granite County 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 Granite County DES Coordinator and the Granite County 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 jurisdiction and 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, local planning boards will be encouraged to participate in all plan review and updates.

Available resources working on mitigation activities will be evaluated periodically by the Granite County DES Coordinator and Granite County 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 Granite County DES Coordinator and the Granite County 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 Granite County DES Coordinator and the Granite County 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 Granite 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. All jurisdictions must participate in the plan update process for the plan to remain approvable for each jurisdiction.

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

Granite County and the Towns of Drummond and Philipsburg are 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 Granite County Disaster and Emergency Services' Office, the Granite County Commissioners' Office, Town of Drummond Office, and the Town of Philipsburg 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 Granite County Local Emergency Planning Committee at:

Granite County Local Emergency Planning Committee
c/o Mike Kahoe
PO Box 925
Philipsburg, MT 59858
406-859-3771

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. 2012-2013 Invited Stakeholders

Name	Organization	Participation
Charlene Bucha Gentry	Beaverhead Deerlodge National Forest, Pintler Ranger District	
Pam Shrauger	Big Sky Hazard Management LLC	Meeting
Ronni Luoma	Drummond Chamber of Commerce	
Gail Leeper	Drummond Mayor	Meeting
Bryan Kott	Drummond Public Schools	Meeting
Michael O'Dell	Drummond Town Council Drummond Ambulance	Meeting
Kurt Luoma	Drummond Volunteer Fire Department	
Fred Bjorklund	Georgetown Lake Volunteer Fire Department	
Jeff Brock	Georgetown Lake Volunteer Fire Department	Meeting
Lee Erickson	Georgetown Lake Volunteer Fire Department	Meeting
Ed Niland	Georgetown Lake Volunteer Fire Department	Meeting
Justin Smith	Georgetown Lake Volunteer Fire Department	
	Granite County Commission	
Mike Kahoe	Granite County Administration	Meeting
Chris Miller	Granite County Attorney	Meeting
Scott Adler	Granite County Commission	Meeting
Maureen Connor	Granite County Commission	
Cliff Nelson	Granite County Commission	Meeting
Bart Bonney	Granite County Commission Granite County Disaster and Emergency Services	Meeting
Ryan Lee	Granite County Disaster and Emergency Services	Meeting Plan Review
Linda Cirincione	Granite County Local Emergency Planning Committee	Meeting
Daniel W. Boatman	Granite County Medical Center	Meeting
Sharon Fillbach	Granite County Medical Center	Meeting
Frank Pawlak	Granite County Medical Center	
Brian Spuhler	Granite County Medical Center	Meeting
Jeff Prater	Granite County Medical Facilities	
Linda Bouck	Granite County Planning	
	Granite County Public Health	
JoAnn Husbyn	Granite County Schools	
Larry Craig	Granite County Search and Rescue	Meeting
Joe Eder	Granite County Search and Rescue	
Wendy Labahn	Granite County Search and Rescue	
Stephen Immenschuh	Granite County Sheriff	Meeting
Scott Dunkerson	Granite County Sheriff	Meeting
Kathe Kane	Granite County Sheriff's Office, Dispatch	Meeting

Table A1. 2012-2013 Invited Stakeholders (continued)

Name	Organization	Participation
Al Hilshey	Lolo National Forest, Missoula Ranger District	Meeting
Paul Matter	Lolo National Forest, Missoula Ranger District	
Mark Hayden	Missoula Electric Cooperative	
Cory Calnan	Montana Department of Natural Resources and Conservation	
Jonathan Clark	Montana Department of Natural Resources and Conservation	Meeting
Mike Meyer	Montana Department of Natural Resources and Conservation	
Leo Graham	Montana Department of Transportation	
Kent Atwood	Montana Disaster and Emergency Services	
Martha Jo Smith	Montana Disaster and Emergency Services	Meeting
Dan Lucas	Montana State University Extension	
Marty Whitmore	National Weather Service, Missoula	
	Northwestern Energy	
Jason Wingo	Philipsburg Ambulance	
	Philipsburg Chamber of Commerce	
Michael Stafford	Philipsburg Mail	Meeting
	Philipsburg Mayor and Town Council	
Dick Hoehne	Philipsburg Public Works	
John Vukonich	Philipsburg Public Works	Meeting
Joe Brabender	Philipsburg Volunteer Fire Department	Meeting
Bill Dirkes	Philipsburg Volunteer Fire Department	
Matt LaTray	Philipsburg Volunteer Fire Department	Meeting
David Ray	Philipsburg Volunteer Fire Department	Meeting
Scott Shake	Philipsburg Volunteer Fire Department	
Chad Lanes	Tri-County Sanitarian	
Elena Gagliano	TVF Montana	Meeting Plan Review
Terina Goicoechea	US Bureau of Land Management	Meeting
Craig Engelhard	US Natural Resources Conservation Service	
Kenny Kane	Valley Fire / Drummond Ambulance	Meeting
Mark Ransford	Valley Fire / Drummond Ambulance	Meeting
Sean O'Connor	Valley Rural Fire District	
Blain Bradshaw		
Mike Cutler		
Jodi Dallasera		
Dee Dunkerson		
Jim Jenner		
Jerry Jenson		
Kitty Logan		
D Miller		
Dick Motta		Meeting

Table A1. 2012-2013 Invited Stakeholders (continued)

Name	Organization	Participation
Jo Radtke		
Jim Waldbillig		
Jean Wallace		

Appendix B. PUBLIC INFORMATION

5-October 14, 2004 - Philipsburg Mail

Public Meeting scheduled to develop Granite County hazard mitigation plan

Granite County Disaster and Emergency Services is trying to make the community safer. The county has received a grant from the Department of Homeland Security, Federal Emergency Management Agency (FEMA) 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 can be taken to make the communities more disaster resistant. The entire county, including Philipsburg and Drummond, will be assessed as part of this initiative. 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 disaster and mitigation funds.

"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 Granite County less vulnerable to disasters to attend the public meetings. This plan will guide how the community deals with disaster prevention in the future."

The first community meeting is scheduled for 7:00 PM to 9:00 PM on Wednesday, October 20th at the Sunshine Station. This meeting will focus on hazard identification and vulnerabilities. For more information or to provide suggestions, please contact Jim Minor at 859-2809 or by email at jminor@blackfoot.net or Pam Pedersen at 406-581-4512 or pam@bigskyhazards.com.

p. 16 — Philipsburg Mail — April 21, 2005

Is Granite County a hazardous place?

Granite County is identifying the major hazards that threaten the community and is asking for the public's help in profiling those hazards. Ultimately, the hazard analysis will lead to the development of strategies to mitigate or lessen the effects of disasters. "The goals and strategies in this plan are only as good as the community support they receive," says Jim Minor, Granite County Disaster and Emergency Services Coordinator, "We hope to develop a plan that will make Granite County a safer place to live and work in the long term. Public involvement is highly encouraged."

A public meeting is scheduled for Thursday, April 28 from 7-9 p.m. at the Sunshine Station. A presentation will be given on the initial hazard analysis and attendees will then brainstorm major historical events and identify hazard priorities.

The county is writing a Pre-Disaster Mitigation Plan through a grant received from the Department of Homeland Security and Montana Disaster and Emergency Services. All Granite County areas, including the Philipsburg and Drummond jurisdictions, are part of this inclusive planning effort. The plan, once approved, will allow Granite County and the incorporated communities to apply for future federal and state mitigation grants.

p. 4 — Philipsburg Mail — April 28, 2005

LETTERS TO THE EDITOR

Pre-disaster planning meeting

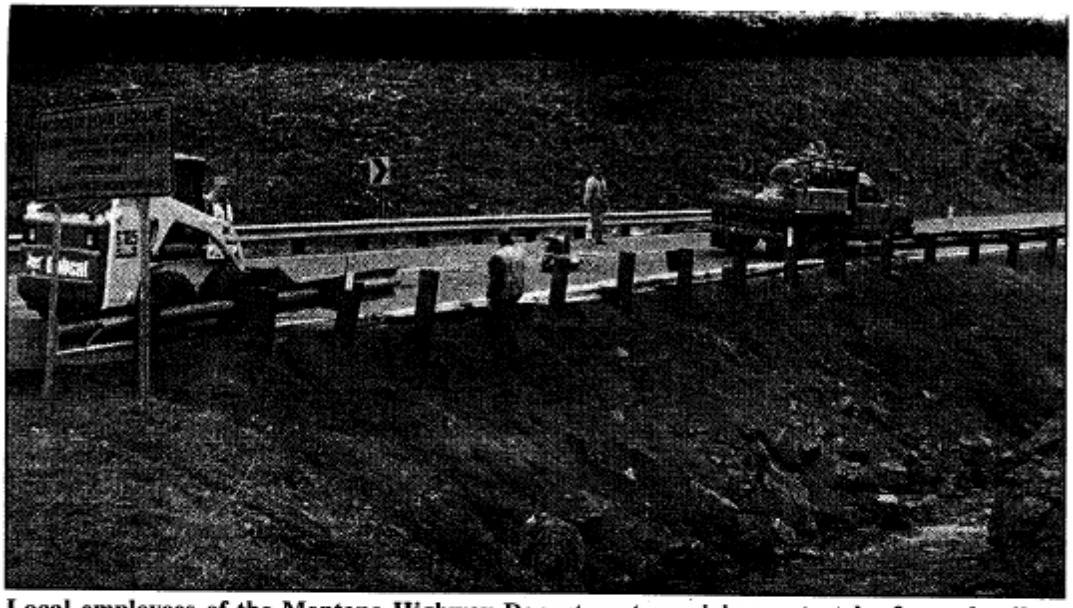
Granite County needs your help to provide information for our Pre-Disaster Mitigation Plan. This plan will assist the citizens of the county in the following ways: (1) it will allow the county to apply for grants to help lessen the impact of natural disasters on citizens and property in Granite County before a natural disaster occurs; (2) it will allow the county to apply for grants from FEMA in the event the county declares a disaster but the state does not; (3) it will help the commissioners plan and prioritize needs to benefit the people they serve; and (4) according to some sources, it will allow citizens to apply for insurance which they otherwise could not obtain if the county does not have this plan in place.

This is a one-time meeting scheduled Thursday (04/28/05) at the Sunshine Station in Philipsburg from 7 p.m. to 9 p.m. Your assistance will help to ensure that the plan accurately reflects the needs of the county. I do hope you are able to attend.

If you have any questions please feel welcome to contact me by phone at 859-2809.

Jim Minor, DES coordinator
Philipsburg

May 19, 2005 — Philipsburg Mail — 5



Local employees of the Montana Highway Department repairing a stretch of guard rail on Montana Highway One, on the Flint Creek Grade on May 17, 2005. The rail has been holding vehicles on the road in this stretch, but is crumpled in several spots. *photo by Maureen Connor*

Granite County identifies hazards

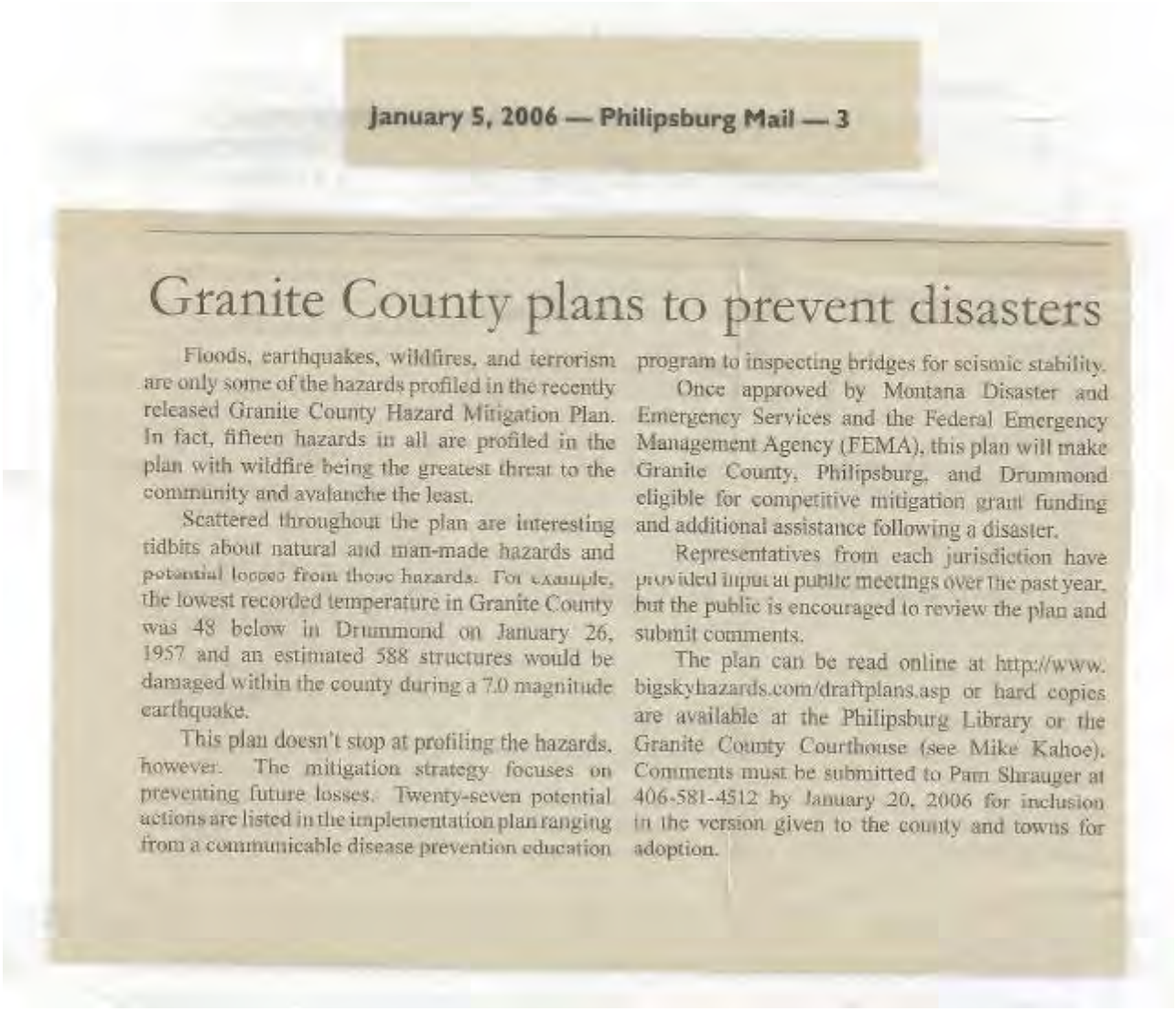
Attendees at a recent public meeting on the Granite County Pre-Disaster Mitigation Plan identified the major hazards that threaten the community. The hazards were chosen based on their potential to cause a large-scale community disaster. The hazards identified include:

Avalanche/Landslide, Communicable Disease, Dam Failure, Earthquake, Flooding, Hazardous Material Release, Terrorism, Transportation Accident, Utility Failure, Volcanic Ash, Water Supply/Watershed Contamination, Wind, Tornadoes, and Severe Thunderstorms, Winter Storms and Extended Cold

Wildfire is being addressed in the Community Wildfire Protection Plan currently under development.

Another public meeting is scheduled for Thursday, May 26 from 7-9 p.m. at the Sunshine Station. A presentation on the draft risk assessment for these hazards will be given and attendees will then develop disaster prevention goals, objectives, and actions. Public input is a major part of the plan's content.

The county is writing a Pre-Disaster Mitigation Plan through a grant received from the Department of Homeland Security and Montana Disaster and Emergency Services. All Granite County areas, including the Philipsburg and Drummond jurisdictions, are part of this inclusive planning effort. The plan, once approved, will allow Granite County and the incorporated communities to apply for future federal and state mitigation grants.



January 5, 2006 — Philipsburg Mail — 3

Granite County plans to prevent disasters

Floods, earthquakes, wildfires, and terrorism are only some of the hazards profiled in the recently released Granite County Hazard Mitigation Plan. In fact, fifteen hazards in all are profiled in the plan with wildfire being the greatest threat to the community and avalanche the least.

Scattered throughout the plan are interesting tidbits about natural and man-made hazards and potential losses from those hazards. For example, the lowest recorded temperature in Granite County was 48 below in Drummond on January 26, 1957 and an estimated 588 structures would be damaged within the county during a 7.0 magnitude earthquake.

This plan doesn't stop at profiling the hazards, however. The mitigation strategy focuses on preventing future losses. Twenty-seven potential actions are listed in the implementation plan ranging from a communicable disease prevention education program to inspecting bridges for seismic stability.

Once approved by Montana Disaster and Emergency Services and the Federal Emergency Management Agency (FEMA), this plan will make Granite County, Philipsburg, and Drummond eligible for competitive mitigation grant funding and additional assistance following a disaster.

Representatives from each jurisdiction have provided input at public meetings over the past year, but the public is encouraged to review the plan and submit comments.

The plan can be read online at http://www.bigskyhazards.com/draftplans.asp or hard copies are available at the Philipsburg Library or the Granite County Courthouse (see Mike Kahoe). Comments must be submitted to Pam Shrauger at 406-581-4512 by January 20, 2006 for inclusion in the version given to the county and towns for adoption.

Sent to the Philipsburg Mail, 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 Granite County, Philipsburg, and Drummond 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 Noon to 1:00 p.m. in the Sunshine Station Meeting Room located at 3830 Highway 1, Philipsburg, 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 Philipsburg Mail, 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 Granite 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 fifteen major hazards and details each, including information on historical occurrence, probability, and impacts to critical facilities and the population. Mitigation strategies for Granite County and the Towns of Drummond and Philipsburg 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 following free, public meetings:

Thursday, August 29, 2013 at 2:00 p.m.
Sunshine Station, Meeting Room
3830 Highway 1, Philipsburg

Thursday, August 29, 2013 at 7:00 p.m.
Drummond Ambulance Shed
204 East Front Street, Drummond

"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."

Philipsburg Mail, August 22, 2013

Granite County
Hazard Mitigation Plan Update

The public is invited to comment on the Hazard Mitigation Plan designed to minimize future disaster losses.

Please join us:

Thursday, August 29

2:00pm – Sunshine Station, Philipsburg

7:00pm – Ambulance Shed, Drummond

Or review the draft plan at:

www.bigskyhazards.com/draftplans.asp

For more information, please call 406-581-4512.

Appendix C. MEETING ATTENDANCE RECORDS

Granite County Mitigation Plan Meeting – 10/20/04

Name	Title	Organization	Phone
Jim Minor	DES Coordinator	Granite County	
Pam Pedersen	Contractor	Big Sky Hazard Mgmt	

PDM MTG 4/23/05 PBURG 5/10 GWPP...

Name	Dept.	Where from?
Jim Minor	DES	Philipsburg
Tom Hillbilly Citizen		Philipsburg
David Ray	p-burg FIRE	p-burg
DICK HOEHNE	TOWN OF PHILIPSBURG	PHILIPSBURG
Mike Kahoe	Granite Co. Commission Rep	
Pam Pedersen	Big Sky Hazard Mgmt LLC	
Dan BOLSTED	VALLEY FIRE	Drummond
T.J. Vieta	Sheriff's Office	Philipsburg

May 26, 2005

Name	Position	Where From?	Phone #
~~T.J. Victor~~			
T. J. Victor	Victim's Advocate	P. Burg	859-3129
DICK HOEHNE	DIRECTOR OF PUBLIC WORKS	P-BURG	859-3455
STEVE IMBERSCHUH	SHERIFF		~~859~~ 325/
SUZANNE BROWNING	GR. CO. COMMISSION	DRUMMOND	288-3546
David Ray	Fire Chief	P-burg	859-3181
Jim Minor	Gr. Co DES	P. burg	859-2809

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EMPG IN KIND MATCH

Meeting/Training: GRANITE CO. HAZARD MITIGATION PLAN-PUBLIC MTG, 2011-2012
Location: PHILIPSBURG, MT. ~ SUNSHINE STATION
Date: FEB. 17, 2012 **Start Time:** 12:00 PM **End Time:** 1:30 PM
Instructor/Facilitator: PAM SHRAUGER BART BONNEY

	Name & Affiliation	E-mail and phone number	Federally Funded	Miles Traveled (one way)
1	Name: CLIFF NELSON Organization: C.C.		Yes (No)	30
2	Name: STEPHEN IMMENSCHUH Organization: SHERIFF		Yes (No)	100,000,000
3	Name: SHARON Fillbach Organization: Granite County Medical Center	SFillbach@gcmedcenter.org	Yes (No)	1
4	Name: TERINA MULLEN Organization: USDI - BLM	tmmullen@blm.gov 406-533-7665	(Yes) No	—
5	Name: Jonathan Clark Organization: MT-DNRC - Anaconda	jclark2@mt.gov 406-563-6078	Yes (No)	25
6	Name: Linda Cirincione Organization: Volunteer - Emerg Plng. Committee	lcirincione@montana.com 406-859-2400	Yes (No)	—
7	Name: E Gaughen Organization: FVFM	4068595016 phl5016@blackfoot.net	Yes (No)	2
8	Name: Brian Spuhler RN 208-881-6505 Organization: GCMC Trauma - Disaster Prep. Coordinator	brianspuhler@msn.com bspuhler@gcmedcenter.org	Yes (No)	1
9	Name: BART BONNEY Organization: DES Coordinator	jbinspect@msn.com 560-0695	(Yes) No	~~18~~
10	Name: ED WILAND Organization: GTLVFD	MMATOLD GEORGE @ HOTMAIL 560 6281	Yes (No)	18
11	Name: LEE ERICKSON Organization: GTLVFD	tlwsan@hotmail 560 4836	Yes (No)	18
12	Name: Organization:		Yes No	
13	Name: Organization:		Yes No	
14	Name: Organization:		Yes No	
15	Name: Organization:		Yes No	
16	Name: Organization:		Yes No	
17	Name: Organization:		Yes No	
	Name: Organization:		Yes No	

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EMPG IN KIND MATCH

Meeting/Training: GRANITE CO. HAZARD MITIGATION PLAN - PUBLIC MTG. **FY** 2011-2012

Location: PHILIPSBURG MT. ~ SUNSHINE STATION

Date: FEB. 17, 2012 **Start Time:** 12:00 PM **End Time:** 1:30 PM

Instructor/Facilitator: PAM SHRAUGER BART BONNEY

	Name & Affiliation	E-mail and phone number	Federally Funded	ONE WAY Miles Traveled
1	Name: Joe Brabender Organization: [redacted] PVFD	Jbrabender@fs.fed.us 859-3211	(Yes) No	1
2	Name: MATTLATRAY Organization: [redacted] PVFD	MLATRAY@SS.Fed.US 859-3211	(Yes) No	1
3	Name: Mike Kahoe Organization: Granite County	mike@co.granite.mt.us 859-7023	Yes (No)	1
4	Name: AL HILSHEY Organization: USFS - MISSOULA RD	ah.ilshey@fs.fed.us 329-3962	(Yes) No	—
5	Name: RICK MOTTA Organization: RESIDENT	18 COHN LANE 859-5016	Yes (No)	0
6	Name: RANDA GAGLIANO Organization: RESIDENT	18 COHN LANE 859-5016	Yes (No)	0
7	Name: David Ray Organization: Philipsburg Fire Town	560-1691	Yes (No)	0
8	Name: JOHN R. MUKOMILCH Organization: PHILIPSBURG PWKS	859-3455	Yes (No)	1
9	Name: Gail Leeper Organization: Town of Drummond	townofdrummond@blackfoot.net 288-3231 544-8002	Yes (No)	30
10	Name: MICHAEL STAFFORD Organization: PHILIPSBURG MAIL	NEWS@PBURGMAIL.COM	Yes (No)	0.65
11	Name: Kenny Kane Organization: Valley Fire, Drummond & Ambulance	KennyKKane@hotmail.com 406-288-8888	Yes (No)	30
12	Name: Pam Shrauger Organization: Big Sky Hazard mgmt	pam@bigskyhazards.com	(Yes) No	n/a
13	Name: Jeff Brock Organization: GVLVFD Chief	406 691 0150	Yes (No)	18
14	Name: Organization:		Yes No	
15	Name: 20 x 1.5 hrs x $20.85 = Organization:	625.50	Yes No	
16	Name: 178 mi. x 2 x .555/mi. = Organization:	197.58	Yes No	
17	Name: Organization: TOTAL SOFT MATCH	$ 823.08	Yes No	
	Name: Organization:		Yes No	

Rev. 6/1/09

Granite County / Drummond / Philipsburg Hazard Mitigation Plan Public Meeting

August 29, 2013 · 7:00 – 8:00 p.m. · ~~Ambulance Shed, Drummond~~ Sunshine Station, Philipsburg

Name	Title(s) & Organization(s)	E-mail or Mailing Address	Salary-Federally Funded? Round Trip Miles Traveled
[illegible signature]	Administrator Granite County Medical Center	daniel.w.[illegible]@granitecmc.org	Yes or No (circle one) ______ miles
Cliff Nelson	Granite Co. Comm.	–	Yes or No (circle one) ______ miles
Rick Potts	Resident	rickp@[illegible].net	Yes or (No) (circle one) ______ miles
Michael Stafford	Editor, Philipsburg Mail	news@pburgmail.com	Yes or (No) (circle one) ______ miles
Larry Craig	Granite County Search & Rescue	lcraig911@gmail.com	Yes or (No) (circle one) ______ miles
[illegible signature]	TVF Montana	phlsoil@blackfoot	Yes or No (circle one) ______ miles
David Ray	Philipsburg Fire, Town	pburgchief1@yahoo	Yes or No (circle one) ______ miles
John Vukonich	Philipsburg Director of Public Works	john.vukonich@yahoo.com	Yes or (No) (circle one) ______ miles
Sharon Filbach	Emergency Preparedness Coor	sharon.filbach@granitecmc.org	Yes or (No) (circle one) ______ miles

Granite County / Drummond / Philipsburg Hazard Mitigation Plan Public Meeting

August 29, 2013 · 7:00 – 8:00 p.m. · ~~Ambulance Shed, Drummond~~ Sunshine Station, Philipsburg

Name	Title(s) & Organization(s)	E-mail or Mailing Address	Salary-Federally Funded? Round Trip Miles Traveled
Ryan Lee	Granite County DES/DEM	G_CountyDES@yahoo.com or rlee@co.granite.mt.us	(Yes) or ~~No~~ (circle one) ____ miles
Chris Miller	Granite Co Atty	cmiller@co.granite.mt.us.	Yes or (No) (circle one) ____ miles
MARTHA SMITH	DISTRICT REP MONTANA DES	montanades1@gmail.com	(Yes) or No (circle one) ____ miles
Mark Ransford	Valley Fire Drummond	drm3416@blackfoot.net	Yes or (No) (circle one) ____ miles
			Yes or No (circle one) ____ miles
			Yes or No (circle one) ____ miles
			Yes or No (circle one) ____ miles
			Yes or No (circle one) ____ miles
			Yes or No (circle one) ____ miles

Granite County

Local Emergency Planning Committee (LEPC)

Meeting Date: 8-29-13 @ 1900 City: Drummond

Please Print Legibly:

Name	Organization	E-mail
Kathe Kane	GCSO - Dispatch	kathek@granitecosheriff.org
[illegible]	Comm's Ln	
Scott Dunkerson	Sheriff's Dept.	scottd@granitecosheriff.org
Pam Shrauger	Big Sky Hazards	pam@bigskyhazards.com
Ryan Lee	Granite County DES	G_County DES@yahoo.com
Michael O'Dell	Drummond & Ambulance/Town Council	rrrrodell@blackfoot.
Bryan Kott	DES	Bkott@hiS@blackfoot.net
Kenny K Kane	VALLEY FIRE	Kenny K Kane + HOTMAIL

Appendix D. MEETING NOTES

Granite County Hazard Mitigation Plan Public Meeting Notes
February 17, 2012, Noon-1:00 p.m. in Philipsburg, Montana

Attendees:

Joe Brabender	Philipsburg Volunteer Fire Department
Jeff Brock	Georgetown Lake Volunteer Fire Department
Linda Cirincione	Granite County Local Emergency Planning Committee
Jonathan Clark	Montana Department of Natural Resources and Conservation
Lee Erickson	Georgetown Lake Volunteer Fire Department
Sharon Fillbach	Granite County Medical Center
Elena Gagliano	Citizen
Al Hilshey	US Forest Service
Stephen Immenschuh	Granite County Sheriff
Mike Kahoe	Granite County
Kenny Kane	Valley Fire / Drummond Ambulance
Matt Latray	Philipsburg Volunteer Fire Department
Gail Leeper	Town of Drummond
Dick Motta	Citizen
Terina Mullen	US Bureau of Land Management
Cliff Nelson	Granite County Commission
Ed Niland	Georgetown Lake Volunteer Fire Department
David Ray	Philipsburg Volunteer Fire Department
Pam Shrauger	Big Sky Hazard Management LLC
Brian Spuhler	Granite County Medical Center
Michael Stafford	Philipsburg Mail
John Vukonich	Philipsburg Public Works

Note: 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.

Granite 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: Granite County, the Town of Drummond, and the Town of Philipsburg are required to be involved in the planning process and adopt the finished plan. If a community decides not to participate, this will be documented, and they will not be eligible for certain types of federal funding.

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.

Granite 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

Unless otherwise noted, the hazards listed are for all jurisdictions.

<u>High Hazards</u>:

- Wildfire (Granite County areas)
- Flooding

<u>Moderate Hazards</u>:

- Earthquake
- Dam Failure
- Hazardous Material Release (all areas, but primarily Drummond)
- Winter Storms and Extended Cold
- Communicable Disease
- Utility and Communications Failure
- Drought
- Wind, Tornadoes, and Severe Thunderstorms
- Transportation Accident

<u>Low Hazards</u>:

- Terrorism
- Water Supply and Watershed Contamination (all areas, but primarily Philipsburg)
- Volcanic Ash
- Avalanche and Landslide (Granite County areas)

Granite County Mitigation Strategy 2005

Goal 1: Prevent community losses from wildfires.

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

- Conduct individual WUI wildfire assessments.
- Encourage homeowners to reduce fuels around structures and create a fire defensible space.
- Revise subdivision regulations with a better focus on defensible space/maintenance requirements in the wildland/urban interface.
- Reduce fuels in the Maxville Highway 1 corridor.

Objective 1.2: Improve wildland firefighting capabilities.

- Develop dry hydrant water supplies in the Georgetown Lake area.
- Improve ingress/egress options in existing subdivisions.

Goal 2: Reduce future damages from flooding.

Objective 2.1: Reduce losses to private property from flooding.

- Educate the public on flood insurance.
- Increase the capacity of the downtown Philipsburg storm drain for Camp Creek to prevent Broadway Street flooding.
- Increase the capacity of the Sansome Street culvert in Philipsburg on Frost Creek.
- Increase the capacity of the culvert under Highway 10A in Drummond.

Goal 3: Reduce potential losses from earthquakes.

Objective 3.1: Prevent earthquake damages to critical facilities, infrastructure, and facilities housing vulnerable populations.

- Tie down/secure objects in schools that could fall during an earthquake.
- Conduct earthquake drills in the schools.
- Retrofit critical government facilities for earthquakes.
- Inspect key bridges for seismic stability.

Objective 3.2: 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 4: Minimize the impacts from hazardous materials releases.

Objective 4.1: Reduce the probability of hazardous materials spilling into Drummond.

- Place highway barriers along Interstate 90 in Drummond.

Goal 5: Reduce potential losses from winter storms and extended cold.

Objective 5.1: Protect the population from utility outages during winter storms and extended cold periods.

- Install generators at critical facilities, especially the Sheriff's office/911 Center.
- Develop a sheltering plan specifically for utility outages.

Objective 5.2: Prevent power outages.
- Encourage the electric companies to improve maintenance of and around power lines and substations.

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: Prevent water supply contamination.

Objective 7.1: Protect public water supply systems.
- Bury the water line that supplies the Town of Philipsburg's water system.

Goal 8: Optimize the use of all-hazard mitigation measures.

Objective 8.1: 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 estimation models.
- Become a National Weather Service Storm Ready Community.

Objective 8.2: Enhance all-hazard warning systems.
- Place a NOAA Weather Radio Transmitter in Philipsburg.
- Put NOAA Weather Radios in critical facilities and schools.
- Develop evacuation plans for the communities.

Discussion Items:

1. Are we missing any important participants or organizations that should be represented when updating this mitigation plan?
   - None mentioned. Good representation at the meeting.

2. Should the title of the plan continue to be "Granite County Hazard Mitigation Plan"? If not, what would be more appropriate?
   - Include Philipsburg and Drummond in the long title.

3. Hazards included in the 2005 plan were:
   - Avalanche and Landslide
   - Communicable Disease
   - Dam Failure
   - Drought
   - Earthquake
   - Flooding
   - Hazardous Materials Release
   - Terrorism
   - Transportation Accident
   - Utility and Communications Failure
   - Volcanic Ash
   - Water Supply / Watershed Contamination
   - Wildfire
   - Wind, Tornadoes, and Severe Thunderstorms
   - Winter Storms and Extended Cold

Should we make any changes?
- Make sure bus accidents are included in the Transportation Accident profile. Make special note of the busses transporting children to Discovery Basin Ski Area. One person recommended that Transportation Accident should be moved to the top of the list due to the potential for mass child fatalities in a bus accident.
- Include mining industry hazards where appropriate (Hazardous Material Release, Transportation Accident, Water Supply/Watershed Contamination, etc.)
- Include electromagnetic pulse hazards in the Utility and Communications Failure profile.

4. Are there any new studies, data, or information that may be valuable when re-analyzing the hazards?
   - Granite County Growth Policy (one person noted that the policy contains inaccuracies)
   - 2010 US Census data
   - Granite County Emergency Operations Plan
   - The Granite County Community Wildfire Protection Plan will be updated in the near future.

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.
   - A new hydroelectric plant is a flood/dam failure concern.
   - Flood concerns were raised about the new sewer treatment plant for Philipsburg.

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: Residential wildfire assessments are ongoing through three different fire departments in Granite County.
      - Objective 1.1: The US Forest Service has conducted several fuel reduction projects in the Georgetown Lake area.
      - Objective 1.1: Fuel reductions were conducted in the area of the Lolo National Forest Rock Creek Ranger Station and are ongoing.
   b. Updates or changes needed to the strategies.
      - None mentioned.
   c. New ideas, goals, or objectives for the updated plan.
      - Objective 2.1: Add a flood mitigation project for Edwards Gulch.
      - Objective 4.1: Add a project or projects focused on mitigating a train derailment in Drummond, particularly in the vicinity of the fuel tanks.
      - Objective 6.1: Add immunization efforts to the communicable disease strategies.
      - Add an objective/strategy related to the need for bus seat belts.

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.
   - One person was concerned about the federal regulations with federal grant funding.

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)?
    - Cell towers need to be emphasized as critical infrastructure.

Additional items may be sent to Pam Shrauger, Big Sky Hazard Management LLC, 406-581-4512 or pam@bigskyhazards.com. The next public meetings will be held in Philipsburg and Drummond 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 jbinspect@msn.com an email regarding the amount of time you spent working on the plan review/update.

Granite County ▪ Drummond ▪ Philipsburg Hazard Mitigation Plan Meeting Notes
August 29, 2013, 2:00-3:00 p.m. in Philipsburg, Montana

Attendees:

Daniel Boatman	Granite County Medical Center
Larry Craig	Granite County Search and Rescue
Sharon Fillbach	Granite County Medical Center
Elena Gagliano	The View from Montana
Ryan Lee	Granite County Disaster and Emergency Services
Chris Miller	Granite County Attorney
Dick Motta	Resident
Cliff Nelson	Granite County Commission
Mark Ransford	Valley Fire / Drummond Ambulance
David Ray	Philipsburg Volunteer Fire Department
Pam Shrauger	Big Sky Hazard Management LLC
Martha Smith	Montana Disaster and Emergency Services
Michael Stafford	Philipsburg Mail
John Vukonich	Philipsburg Public Works

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, for each incorporated jurisdiction. Without an adopted and approved plan, the jurisdiction is not eligible to receive certain types of federal disaster mitigation assistance following a disaster. As additional incentive, each jurisdiction with an adopted and approved plan is eligible to apply for nationally competitive pre-disaster mitigation funds.

The Granite 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:

- The Transportation Accident hazard should be a high hazard for the Town of Drummond due to the interstate. The stretch of interstate through town is particularly accident prone.
- The Lower Willow Creek Dam is susceptible to earthquake.

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.
- Over 300 wildland urban interface residential inspections have been conducted.

- A Reverse 911 system is in place.
- School risk assessments and response plans have been and are being developed.
- The old hospital generator will be available for another location, per approval by the county commission. A school or other emergency shelter location is preferred. The Sheriff's Office does have a small generator to run equipment. Public shelter capacity is needed.
- Include a Continuity of Operations Plan annex in Project 6.4.1.
- The Town of Philipsburg's water supply line continues to be exposed and vulnerable from a variety of hazards for about four miles. In addition to burying the line, other mitigation ideas include water conservation education (should it be compromised), clearing wildland fuels from around the line, and adding hydrants to help protect the line.

Next Steps:
Following the public comment period, any comments received will be incorporated into the plan where applicable. Each jurisdiction 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 jurisdictions will be asked to adopt the plan by resolution (a sample resolution will be included on the CD). The jurisdictions are encouraged to apply for grants and to implement or continue many of the activities listed in the plan. Annually, each jurisdiction 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.

Granite County ▪ Drummond ▪ Philipsburg Hazard Mitigation Plan Meeting Notes
August 29, 2013, 7:00-8:00 p.m. in Drummond, Montana

Attendees:

▪ Scott Adler	Granite County Commission
▪ Scott Dunkerson	Granite County Sheriff
▪ Kathe Kane	Granite County Sheriff's Office, Dispatch
▪ Kenny Kane	Valley Fire
▪ Bryan Kott	Drummond Public Schools
▪ Ryan Lee	Granite County Disaster and Emergency Services
▪ Michael O'Dell	Drummond Town Council Drummond Ambulance
▪ Pam Shrauger	Big Sky Hazard Management LLC

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.

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The Granite County Hazard Mitigation Plan consists of five major components:

6. Planning Process
7. Assets and Community Inventory
8. Risk Assessment
9. Mitigation Strategy
10. Plan Implementation/Maintenance

Risk Assessment Overview Comments/Discussion Items:

- The Transportation Accident hazard should be a high hazard for the Town of Drummond due to the interstate. The stretch of interstate through town is particularly accident prone.
- A new Cenex fertilizer plant may be a future development.

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.
- A security and notification system was recently installed on the Flint Creek Dam.
- Rip rap on Rock Creek was installed through an HMGP grant.
- An alternative to the fuel tank protection project is to relocate the tanks.

Next Steps:
Following the public comment period, any comments received will be incorporated into the plan where applicable. Each jurisdiction 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 jurisdictions will be asked to adopt the plan by resolution (a sample resolution will be included on the CD). The jurisdictions are encouraged to apply for grants and to implement or continue many of the activities listed in the plan. Annually, each jurisdiction 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
BFE – Base Flood Elevation
BLM – Bureau of Land Management
CAMA – Computer Assisted Mass Appraisal
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
GC – Granite County
GIS – Geographic Information System
HAZUS-MH – Hazards United States Multi-Hazard
HFRA – Healthy Forest Restoration Act
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
NTSB – National Transportation Safety Board
NWS – National Weather Service
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
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
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
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
Bart Bonney Granite County DES	01/23/2012	Phone Email	Initial public meeting
Philipsburg Mail	01/25/2012	Email	Newspaper advertising
All Stakeholders	01/30/2012	Email Mail	Invitation to the public meeting
Philipsburg Mail	01/30/2012	Email	Press release and display ad
Mike Kahoe Granite County Administration	01/30/2012	Email	County commission notification
Grace Silverstein Philipsburg Mail	02/01/2012	Email	Public information
Bart Bonney Granite County DES	02/01/2012	Email	Additional meeting invitations
All Stakeholders	02/13/2012	Email	Public meeting reminder and discussion items
Mike Kahoe Granite County Administration	02/13/2012	Email	County commission participation
Elena Gagliano	02/13/2012	Email	Plan review
Meeting Attendees	02/17/2012	Meeting	Initial public meeting
Bart Bonney Granite County DES	02/21/2012	Email	Meeting attendance
All Stakeholders	02/24/2012	Email	Meeting notes
Mike Kahoe Granite County Administration	02/24/2012	Email	County commission participation
Brian Spuhler Granite County Medical Center	02/24/2012	Email	Plan comments
Mike Kahoe Granite County Administration	02/27/2012	Email	Meeting notes change
Bart Bonney Granite County DES	02/27/2012	Email	Plan comments
Sharon Fillbach Granite County Medical Center	02/27/2012	Email	Mitigation strategy
Terina Mullen BLM	02/27/2012	Email	Mitigation completed
Sharon Fillbach Granite County Medical Center	02/29/2012	Email	Mitigation strategy
Sharon Fillbach Granite County Medical Center	03/23/2012	Email	Mitigation strategy

Table G1. Plan Communication Tracking (continued)

Name/Organization	Date	Type	Reason(s)
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
Sharon Fillbach Granite County Medical Center	07/27/2012	Email	Hazard vulnerabilities
Bill Converse ADLC DES	08/02/2012	Email	Contract extension
Bill Converse ADLC DES	08/09/2012	Email	Contract extension
Elena Gagliano	08/09/2012	Email	Meeting notes
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
Jay Slocum ADLC GIS	10/26/2012	Email	GIS data
Matt Pearce MaPS, Inc.	10/29/2012	Email	GIS data
Bill Converse ADLC DES	02/19/2013	Email	Status update
Bart Bonney Granite County DES	03/04/2013	Email	Critical facilities
All Stakeholders	03/15/2013	Email	Critical facilities
Elena Gagliano	03/18/2013	Email	Plan update
Mike Kahoe Granite County Administration	03/18/2013	Email	County commission participation
Marty Whitmore National Weather Service	03/18/2013	Email	Plan review
Mike Kahoe Granite County Administration	03/19/2013	Email	County commission plan review
Ryan Lee Granite County DES	03/21/2013	Email	Critical facilities
Bill Converse ADLC DES	05/10/2013	Email	Status update

Table G1. Plan Communication Tracking (continued)

Name/Organization	Date	Type	Reason(s)
Kent Atwood MT DES	06/27/2013	Email	Grant extension
Ryan Lee Granite County DES	06/27/2013	Email	Grant extension
Linda Bouck Granite County Planning	07/16/2013	Email	Recent development
Kent Atwood MT DES	07/31/2013	Email	Repetitive loss properties
Ryan Lee Granite County DES	08/02/2013	Email	Final public meetings
Ryan Lee Granite County DES	08/07/2013	Email	Plan review
Ryan Lee Granite County DES	08/14/2013	Phone Email	Final public meetings
Ryan Lee Granite County DES	08/15/2013	Phone Email	Public information
All Stakeholders	08/15/2013	Email Mail	Invitation to the final public meetings and plan review opportunity
Philipsburg Mail	08/16/2013	Email	Press release and display ad
Bart Bonney Granite County Commission	08/16/2013	Email	Final public meetings
Mike Kahoe Granite County Administration	08/19/2013	Email	Final public meetings
Philipsburg Mail	08/19/2013	Email	Display ad
Ryan Lee Granite County DES	08/25/2013	Phone Email	Final public meetings and plan changes
Elena Gagliano	08/26/2013	Email	Plan update
All Stakeholders	08/28/2013	Email	Meeting reminder
Sharon Fillbach Granite County Medical Center	08/28/2013	Email	Final public meetings
Mike Kahoe Granite County Administration	08/28/2013	Email	Final public meetings
All Stakeholders	09/23/2013	Email	Meeting notes
Mike Kahoe Granite County Administration	09/23/2013	Email	Meeting notes change

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, jurisdiction participation, 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 section was put into its own section.	3
4	Updated the Critical Facilities list through internet research, GIS searches, and stakeholder input.	3
4	Updated the Critical Facilities GIS and mapping.	3.1
4	Added information regarding Critical Infrastructure.	3.1
4	Updated census 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 to include updated plans and estimates.	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
4	Incorporated new studies and data into the hazard profiles.	4

Table H1. 2013 Plan Changes (continued)

2005 Section	Changes	2013 Section
4	Updated mapping in the hazard profiles.	4
4	Added a hazard summary for each jurisdiction for each hazard 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	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	Conducted a new HAZUS run for earthquake.	4.5
4	Used HAZUS to model flood hazard areas.	4.6
4	Used buffer zones more in line with the Emergency Transportation Guidelines for the hazardous materials release vulnerabilities.	4.7
4	Made the transportation accident hazard profile more robust in line with community concerns.	4.9
4	Used the hazard areas identified in the Community Wildfire Protection Plan rather than crown fire potential to assess the wildfire vulnerabilities.	4.13
4	Added a Federal Major Disaster and Emergency Declarations Summary table to the Risk Assessment Summary section.	4.16
4	Rated hazards by jurisdiction rather than just the county.	4.16
4	Added Composite Hazards mapping.	4.16
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 jurisdiction(s), responsible agencies and partners, resources needed, potential funding sources, and goal timeframes specific to each project.	5.1
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	Prioritized the projects by jurisdiction.	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

Table H1. 2013 Plan Changes (continued)

2005 Section	Changes	2013 Section
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.	No change	Remains an important goal.
Reduce future damages from flooding.	No change	Remains an important goal.
Reduce potential losses from earthquakes.	No change	Remains an important goal.
Minimize the impacts from hazardous materials releases.	Modified	Expanded to include transportation accidents.
Reduce potential losses from winter storms and extended cold.	Removed	All associated objectives and actions merged into other all hazard strategies.
Reduce community risk from communicable disease.	Modified	Combined with other related goals and objectives.
Prevent water supply contamination.	Modified	Combined with other related goals and objectives
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 losses to private property from flooding.	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.
Reduce the probability of hazardous materials spilling into Drummond.	Modified	Expanded to include other geographic areas.
Protect the population from utility outages during winter storms and extended cold periods.	No change	Remains an important objective.
Prevent power outages.	Modified	Moved and expanded to include other utility outages.
Slow the spread of communicable disease.	No change	Remains an important objective.

Table J1. Changes to the 2005 Mitigation Strategy (continued)

2005 Goal/Objective/Action	Status	Reason
Protect public water supply systems.	Modified	Expanded to include all water supplies.
Develop resources that can be used to further study and prepare for all hazards.	Modified	Minor wording change.
Enhance all-hazard warning systems.	Modified	Minor wording changes.
ACTIONS		
Conduct individual WUI wildfire assessments.	Modified	Some work completed, but still ongoing. Description expanded.
Encourage homeowners to reduce fuels around structures and create a fire defensible space.	Modified	Some work completed, but still ongoing. Description expanded.
Revise subdivision regulations with a better focus on defensible space/maintenance requirements in the wildland/urban interface.	Modified	Completed, but future and improved revisions could be made.
Reduce fuels in the Maxville Highway 1 corridor.	No change	Some work completed, but still ongoing.
Develop dry hydrant water supplies in the Georgetown Lake area.	Modified	Not completed but still needed. Description expanded.
Improve ingress/egress options in existing subdivisions.	Modified	Not completed but still needed. Description expanded.
Educate the public on flood insurance.	Modified	Not completed but still needed. Description expanded.
Increase the capacity of the downtown Philipsburg storm drain for Camp Creek to prevent Broadway Street flooding.	No change	Not completed but still needed.
Increase the capacity of the Sansome Street culvert in Philipsburg on Frost Creek.	No change	Not completed but still needed.
Increase the capacity of the culvert under Highway 10A in Drummond.	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. Description expanded.
Conduct earthquake drills in the schools.	No change	Not completed but still needed.
Retrofit critical government facilities for earthquakes.	Modified	Not completed but still needed. Description expanded.
Inspect key bridges for seismic stability.	Modified	Not completed but still needed. Description expanded.

Table J1. Changes to the 2005 Mitigation Strategy (continued)

2005 Goal/Objective/Action	Status	Reason
Educate home and business owners on simple earthquake retrofits.	No change	Not completed but still needed.
Survey commercial structures for earthquake stability and recommend retrofits.	No change	Not completed but still needed.
Place highway barriers along Interstate 90 in Drummond.	No change	Not completed but still needed.
Install generators at critical facilities, especially the Sheriff's office/911 Center.	Modified	Not completed but still needed. Description expanded.
Develop a sheltering plan specifically for utility outages.	Modified	Not completed but still needed. Description expanded.
Encourage the electric companies to improve maintenance of and around power lines and substations.	No change	Not completed but still needed.
Create a public education communicable disease prevention program.	Modified	Not completed but still needed. Description expanded.
Bury the water line that supplies the Town of Philipsburg's water system.	Modified	Not completed but still needed. Description expanded.
Develop GIS data that can be used with FEMA's HAZUS loss estimation models.	No change	Not completed but still needed.
Become a National Weather Service Storm Ready Community.	Modified	Not completed but still needed. Description expanded.
Place a NOAA Weather Radio Transmitter in Philipsburg.	No change	Not completed but still needed.
Put NOAA Weather Radios in critical facilities and schools.	No change	Not completed but still needed.
Develop evacuation plans for the communities.	Modified	Not completed but still needed. Description expanded.

Additions to the 2005 mitigation strategy in 2013 include:

Objective 4.2: Minimize injuries and fatalities from transportation accidents.
Objective 6.4: Plan for population protection needs.
Objective 6.5: Mitigate the impact of hazards on future development through land use and building regulations.

Project 1.1.2: Fuel Reductions

- Pursue wildland urban interface fuel reduction projects in high-risk areas around the county, including near structures, road right-of-ways, utility right-of ways, and along federal and state lands.
- Reduce fuels in the Maxville Highway 1 corridor.
- Create roadside fuel breaks to protect communities and subdivisions, as applicable.
- Reduce fuels around the exposed portion of the Philipsburg water supply line.

Project 2.1.2: Bridge, Culvert, and Road Improvements

- Upgrade bridges, culverts, and roads to allow sufficient passage of floodwaters.
- Install culverts in areas prone to washouts or drainage problems.
- Stabilize roadsides that are prone to mudslides and/or landslides.

Project 2.1.3: Floodplain Ordinances

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

Project 3.1.2: 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 4.1.2: Fuel Tank Protection

- Investigate options for protecting the fuel tanks in Drummond from a train derailment.
- A possible alternative includes relocating the tanks.

Project 4.2.1: School Bus Safety Program

- Develop a school bus safety program to improve the safety of occupants, including but not limited to, physical improvements to the buses and training for drivers.

Project 6.5.1: Building Codes

- Adopt and enforce the state building code.

Project 6.5.2: Growth Policies and Subdivision Regulations

- Update the growth policies 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 wildfire.
- Ensure the new state requirements for wildfire considerations in growth policies are met.

Project 6.5.3: Capital Improvements Plans

- Develop and/or update Capital Improvements Plans to include relevant hazard mitigation projects and hazard considerations during improvements.

Project 6.5.4: Conservation Easements

- Protect values in hazard areas through conservation easements.
- If necessary, consider a local bond to generate funds.

Appendix K. COMPLETED MITIGATION ACTIVITIES

November 2005 through August 2013

Mitigation Activities

Linked to 2005 Goal #1: Prevent community losses from wildfires.

- Residential wildfire assessments are ongoing through three different fire departments in Granite County. Over 300 residential wildfire assessments have been conducted.
- The US Forest Service has conducted several fuel reduction projects in the Georgetown Lake area.
- Fuel reductions were conducted in the area of the Lolo National Forest Rock Creek Ranger Station and are ongoing.
- The Missoula Field Office of the Bureau of Land Management has conducted vegetation projects, such as fuels reduction, prescribed burns, and timber sales, on about 2,500 acres since 2005.
- A countywide Community Wildfire Protection Plan was completed in November 2005.
- Wildfire improvements to the Granite County Subdivision Regulations were made in 2006.
- The Georgetown Lake Fire Service Area Fire Protection Standards adopted in January 2007 provide additional standards for the area, specific to fire protection.

Linked to 2005 Goal #2: Reduce future damages from flooding.

- A security and notification system was installed on Flint Creek Dam.
- Rip rap was placed along Rock Creek. Through public-private partnerships, the rip rap areas were re-vegetated in 2012.

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.
- New septic permits are being entered into GIS.
- A grant application for a generator at the Granite County Medical Center was approved. The plan for the old generator is to establish shelter capacity, probably at a school, for use during a power outage.
- A Reverse 911 system has been put in place through Granite County 911.
- Some school risk assessments and response plans have been developed; others are in the process.

Plan Integration Opportunities

- Concepts from this plan were integrated into the Granite County Community Wildfire Protection Plan and the Granite County Subdivision Regulations update.
- The mitigation plan has been used when developing mitigation grant applications.

Grant Funding

- Granite County, via Anaconda – Deer Lodge County, received a Pre-Disaster Mitigation grant in 2010 for the five-year update of the Hazard Mitigation Plan.
- The Granite County Medical Center is receiving a generator through the Hazard Mitigation Grant Program, 5% Initiative Funding Program.

Appendix L. GRANT PROGRAM INFORMATION

Appendix M. LOCAL MITIGATION PLAN REVIEW TOOL

Appendix N. STATE AND FEMA APPROVAL LETTERS

Appendix P. ADOPTION DOCUMENTATION

COPY

Resolution No. 2006-5

A GRANITE COUNTY RESOLUTION
ADOPTING THE HAZARD MITIGATION PLAN

WHEREAS, all citizens and property within Granite County are at risk from a wide range of hazards such as, but not limited to, avalanche, communicable disease, communications failure, dam failure, drought, earthquake, extended cold, flooding, hazardous materials release, landslide, severe thunderstorms, terrorism, tornadoes, transportation accidents, utility failure, volcanic ash, water supply/watershed contamination, wildfire, wind, and winter storms.

WHEREAS, Granite 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 Granite County in making decisions for pre-disaster and post-disaster mitigation projects.

NOW, THEREFORE, BE IT RESOLVED that the Board of Commissioners of Granite County, Montana, hereby adopts the Hazard Mitigation Plan dated November 2005.

UNANIMOUSLY PASSED AND ADOPTED by the Board of County Commissioners of Granite County, Montana this 14th day of February, 2006 A.D.

THE SEAL OF GRANITE COUNTY STATE OF MONTANA PHILIPSBURG

BOARD OF COUNTY COMMISSIONERS
OF GRANITE COUNTY

NOT AVAILABLE FOR SIGNATURE

Suzanne Browning, Chairperson

Clifford Nelson, Commissioner

Barry C. Carnahan, Commissioner

ATTEST: Blanche Pederson
Blanche Pederson, Clerk

HAZARD MITIGATION PLAN
Town of Drummond, Montana

Resolution No. 194

WHEREAS, all citizens and property within the Town of Drummond are at risk from a wide range of hazards such as, but not limited to, communicable disease, communications failure, dam failure, drought, earthquake, extended cold, flooding, hazardous materials release, severe thunderstorms, terrorism, tornadoes, transportation accidents, utility failure, volcanic ash, water supply/watershed contamination, wildfire, wind, and winter storms.

WHEREAS, the Town of Drummond, 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 the Town of Drummond in making decisions for pre-disaster and post-disaster mitigation projects.

NOW, THEREFORE, BE IT RESOLVED that the Town Council of Drummond, Montana, hereby adopts the Hazard Mitigation Plan dated November 2005.

PASSED AND ADOPTED by the Town Council of Drummond, Montana this 21 day of March 2006.

Betty June Banks, Council person
Chad Reynolds
Tom Weaver
Cary McClure

RESOLUTION # 349

A RESOLUTION TO ACCEPT THE GRANITE COUNTY HAZARD MITIGATION PLAN.

BE IT RESOLVED AS FOLLOWS:

The Town Council has resolved to accept the Granite County Hazard Mitigation Plan, dated November 2005.

Be it noted that this policy will take effect as of March 8th, 2006.

ADOPTED this 7th day of March, 2006.

TOMME L. CARLYON NOTARIAL SEAL STATE OF MONTANA

(ATTEST)

Anne E. Tillman
Mayor

Tomme Carlyon
Town Clerk, Tomme Carlyon