Pre-Disaster Mitigation Plan

Lewis & Clark County, Montana

September 2011

PRE-DISASTER MITIGATION PLAN

FOR

LEWIS AND CLARK COUNTY MONTANA

AND

THE INCORPORATED CITIES OF

HELENA AND EAST HELENA

***Prepared for*:**

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- Lewis and Clark County Subdivision Regulations, Fire Protection Standards

LIST OF ACRONYMNS

BLM	Bureau of Land Management
BNSF	Burlington Northern-Santa Fe (Railroad)
CAA	Community Assistance Agreements
CDBG	Community Development Block Grant
CDP	Census Designated Place
cfs	Cubic Feet Per Second
CPRI	Calculated Priority Risk Index
CRS	Community Rating System
DES	Disaster and Emergency Services
DMA	Disaster Mitigation Act
DNRC	Montana Department of Natural Resources and Conservation
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GIS	Geographic Information Systems
HAZUS-MH	Hazards of the United States – Multi-Hazard
HMGP	Hazard Mitigation Grants Program
IBC	International Building Code
IRC	International Residential Code
LEPC	Local Emergency Planning Committee
MBMG	Montana Bureau of Mines and Geology

LIST OF ACRONYMNS (continued)

MDOR	Montana Department of Revenue
MDT	Montana Department of Transportation
MRL	Montana Rail Link
NCDC	National Climatic Data Center
NFIP	National Flood Insurance Program
NFP	National Fire Plan
NID	National Inventory of Dams
NOAA	National Oceanic and Atmospheric Administration
NRC	National Response Center
NRIS	Natural Resource Information System
NWS	National Weather Service
PDM	Pre-Disaster Mitigation
PDMC	Pre-Disaster Mitigation Competitive (grants program)
SHELDUS	Spatial Hazard Events and Losses Database for the United States
SHMO	State Hazard Mitigation Officer
TRI	Toxic Release Inventory
USFS	United States Forest Service
USGS	United States Geological Survey
WUI	Wildland Urban Interface
YPL	Yellowstone Pipe Line

1.0 INTRODUCTION

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

Lewis and Clark County completed and adopted a Pre-Disaster Mitigation (PDM) Plan in 2005 to help guide and focus hazard mitigation activities. The county, working together with Tetra Tech Inc., has prepared this update to the 2005 PDM Plan to satisfy the requirement that PDM Plans be updated every five years. The updated Lewis and Clark County PDM Plan profiles significant hazards to the community and identifies mitigation projects that can reduce those impacts. The purpose of the updated PDM Plan is to promote sound public policy designed to protect residents, critical facilities, infrastructure, private property, and the environment from natural and man-made hazards. The updated Lewis and Clark County PDM Plan includes resources and information to assist residents, organizations, local government, and others interested in participating in planning for natural and man-made hazards.

1.1 AUTHORITY

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

This updated Lewis and Clark County PDM Plan has been developed pursuant to the requirements in the Interim Final Rule for hazard mitigation planning and the guidance in the State and Local Plan Interim Criteria under DMA 2000.

The Lewis and Clark County Board of County Commissioners have adopted this PDM Plan. Also adopting the Plan are the incorporated communities of Helena and East Helena. These governing bodies have the authority to promote sound public policy regarding natural and man-made hazards in in their jurisdictions. Copies of these signed resolutions are included as **Appendix A**. The PDM Plan was adopted at the regularly scheduled County Commission and City Council meetings, which were open to the public and advertised through the typical process the jurisdictions use for publicizing meetings.

Lewis and Clark County will be responsible for submitting the adopted PDM Plan to FEMA for review. Upon acceptance by FEMA, Lewis and Clark County and the incorporated cities of Helena and East Helena will continue eligibility for mitigation project grants and post-disaster hazard mitigation grant projects.

1.2 ACKNOWLDGEMENTS

Many groups and individuals have contributed to the development of the Lewis and Clark County PDM Plan. The County Disaster and Emergency Services (DES) Coordinator provided support for all aspects of plan development. The PDM Planning Team met on a regular basis to guide the project, prioritize mitigation projects and review draft deliverables. The City-County Geographic Information System (GIS) department provided digital locations for the critical facilities and infrastructure used in the PDM analysis. The Tri-County FireSafe Working Group participated in the planning and review of the plan. The Local Emergency Planning Committee (LEPC) provided support during the project by attending the public meetings. The local communities participated in the planning process by attending public meetings and contributed to plan development by reviewing and commenting on the draft plan.

1.3 SCOPE AND PLAN ORGANIZATION

The process followed to update the Lewis and Clark County PDM Plan included the following:

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

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

2.0 PLANNING PROCESS

The Lewis and Clark County PDM Plan is the result of a collaborative effort between local departments and agencies as well as state, regional and federal organizations. The planning effort was facilitated by the contractor, Tetra Tech. Public participation played a key role in development of goals and mitigation projects, as outlined below. For the purposes of this planning effort, the public is defined as residents of Lewis and Clark County, state and federal agencies that support activities in the county, and neighboring communities and local partners.

2.1 PDM PLANNING TEAM

The Lewis and Clark County DES Coordinator requested that local leaders volunteer for the PDM Planning Team to assist with update of the PDM Plan. These individuals are listed in **Appendix B**. The organization and affiliation of PDM Planning Team members are presented in **Table 2.1-1.**

TABLE 2.1-1
PDM PLANNING TEAM REPRESENTATIVES

Organization	Affiliation
Augusta Fire Chief	County Response
City of Helena Fire Marshall	City – Helena
City of Helena Planning Department	City – Helena
City of Helena Public Works	City – Helena
East Helena Fire Dept Chief	City – East Helena
Lewis and Clark County Disaster & Emergency Services	County Government
Lewis and Clark County Planning Department	County Government
Lewis and Clark County Public Works	County Government
Lewis and Clark County Rural Fire Council	County Response
Lincoln Fire Department	County Response
State Capitol Complex Emergency Coordinator	State

Responsibilities of the Planning Team included attending meetings to discuss plan development, providing data for analysis in the risk assessment, attending public meetings, providing input and feedback on mitigation strategies, review of the draft plan document, and supporting the plan throughout the adoption process. The Planning Team will assist the Lewis and Clark County DES Coordinator in updating the plan again in the future.

Conference calls were held with the Planning Team while the plan was being drafted. In advance of each meeting, an agenda and/or materials to be discussed were sent to meeting participants. Conference call minutes are presented in **Appendix B**.

The Planning Team, along with other stakeholders at the kick-off meeting, reviewed and analyzed each section of the 2005 PDM plan, as described in **Table 2.1-2.**

TABLE 2.1-2 REVIEW AND ANALYSIS OF 2005 PDM PLAN	
2005 PDM Plan Sections	**How Reviewed and Analyzed**
Section 1 - Preface	Reviewed and analyzed existing section through discussion at kick-off meeting. Plan focused on three hazards; earthquake, wildfire, flooding. Need to expand to include other hazards in PDM update.
Section 2 - Executive Summary	Reviewed and analyzed existing section through discussion at kick-off meeting. Summary of historic occurrence and mitigation projects to be updated.
Section 3 - Introduction	No review and analysis needed. Community profile will be included as separate section in updated plan.
Section 4 - Terms & Acronyms	No review and analysis needed. Update to include revised list.
Section 5 - Planning Process & Risk Assessment	Reviewed and analyzed existing section through discussion at kick-off meeting. Planning process expanded by utilizing project website. Hazard profiles discussed at kick-off meeting and during Planning Team conference calls. Determined that current hazards (earthquake, wildfire, flooding) were relevant but additional hazards (winter storm, summer storm, dam failure, hazardous material incidents, railroad accidents) should be included in plan update. Risk assessment for some hazards (communicable disease, drought, structure fire, terrorism/violence, transportation accidents, volcanic ash) would be qualitative. Risk assessment for other hazards would be quantitative using SHELDUS or other data.
Section 6 - Wildfire Mitigation Projects	Reviewed by Planning Team during the course of kick-off meeting and subsequent conference calls. New projects developed, existing projects re-worded and/or deleted, completed projects documented.
Section 7 - Development Trends/Capability Assessment	Reviewed and analyzed existing section through discussion during Planning Team conference calls.
Section 8 - Local Plans & Studies	Reviewed and analyzed existing section through discussion at kick-off meeting. A number of plans and studies were identified that should be reviewed as part of the planning process.
Section 9 - Mitigation Goals	Reviewed and analyzed existing section through discussion during kick-off meeting and Planning Team conference calls.
Section 10 - Flood Mitigation Projects	Reviewed and analyzed existing section through discussion during kick-off meeting and Planning Team conference calls. New projects developed, existing projects re-worded and/or deleted, completed projects documented.
Section 11 - Earthquake Mitigation Projects	Reviewed and analyzed existing section through discussion during kick-off meeting and Planning Team conference calls. New projects developed, existing projects re-worded and/or deleted, completed projects documented.
Section 12 - Implementation Measures	Reviewed and analyzed existing section through discussion during Planning Team conference calls.
Section 13 - Plan Maintenance Procedures	Reviewed and analyzed existing section through discussion during kick-off meeting and Planning Team conference calls. Determined that plan maintenance procedures outlined in previous plan had not been implemented.

The 2005 PDM Plan was extensively re-written for the 2011 update; therefore, no log of changes is provided. **Appendix D** presents a table reconciling the 2005 mitigation strategy to what is presented herein as the 2011 mitigation strategy.

2.2 PROJECT STAKEHOLDERS

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

On the County level, project stakeholders included the Commissioners and representatives from the following offices: Community Development, DES, GIS, Health Department, Planning Department, Public Works Department, Road and Bridge Department, Rural Fire Council, School District, Sheriff's office and fire chiefs from Augusta and Lincoln. Participation by these entities included attendance at public meetings, providing information for the risk assessment, and review of the draft PDM Plan.

Stakeholders from the City of Helena included: the Mayor and City Clerk, and representatives from the Fire Department, Police Department, Planning Department, and Public Works Department. Stakeholders from Helena also included representatives from the Helena Regional Airport, St. Peters Hospital and the local media. These entities participated by providing data or information for the plan, attending the public meetings, and/or reviewing the draft plan.

Stakeholders from the City of East Helena included: the Mayor, Public Works Director, Councilmen, and Fire Department. The East Helena Fire Chief participated on the PDM Planning Team and other East Helena stakeholders participated by reviewing the draft plan.

Stakeholders from Federal agencies included representatives from: the National Weather Service (NWS), the Bureau of Land Management (BLM), and the U.S. Forest Service (USFS). These agencies participated by attending one or more of the project meetings and/or reviewing the draft plan.

Stakeholders from State agencies included representatives from: the Montana Department of Natural Resources and Conservation (DNRC), Department of Transportation, Governor's Office of Community Development, Department of Administration-General Services, Montana DES, and the Montana State University Fire Training School. These agencies participated by attending one or more of the project meetings and/or reviewed the draft plan.

Utilities invited to participate in the planning process included: NorthWestern Energy. This entity did not offer input on development of the PDM Plan update.

Non-governmental stakeholders including non-profits and other businesses in the community included: Amateur Radio Emergency Services, American Red Cross, Civil Air Patrol, Rocky Mountain Development Council, United Way, Conoco-Phillips, Spartan Consulting (Emergency Operations Plan contractor), DTM Consulting (flood study contractor) and a number of wildfire management companies that are part of the Tri-County FireSafe Working Group. Several of these entities attended the project meetings and/or reviewed the draft PDM Plan update.

Planning partners from adjoining counties included DES Coordinators from Broadwater, Cascade, Flathead, Jefferson, Meagher, Powell and Teton counties, and the DES District 3 Representative. The Broadwater and Jefferson County DES Coordinators attended one of the project meetings.

2.3 REVIEW OF EXISTING PLANS AND STUDIES

At the initiation of the PDM Plan update project, planning documents and studies completed for the project area were provided to the contractor to review in order to determine how mitigation is (or could be) integrated into existing (and future)planning mechanisms and programs. Plans, ordinances, and regulations reviewed included:

EMERGENCY OPERATIONS

- Lewis and Clark County Emergency Operations Plan, 2011
- Emergency Action Plan, Hauser Dam
- Emergency Action Plan, Holter Dam
- Emergency Action Plan, Canyon Ferry Dam and Reservoir
- Emergency Action Plan, Three Mile Dam
- Emergency Action Plan, Nilan North and East Dam
- Emergency Action Plan, Willow Creek Dam
- Emergency Action Plan, Helena Valley Reservoir
- Emergency Action Plan, Chessman Main and Saddle Dam
- Emergency Action Plan, Gibson Dam (Teton County)
- Emergency Action Plan, Pishkun Dikes (Teton County)
- Emergency Action Plan, Northern Pacific Dam (Jefferson County)
- Emergency Action Plan, Park Lake Dam (Jefferson County)

GROWTH POLICIES

- Lewis and Clark County Growth Policy, 2004
- City of Helena Growth Policy, 2011
- City of East Helena Growth Policy, 2009
- Lincoln Planning Area Growth Policy, 2005

ORDINANCES, REGULATIONS, CODES

- Lewis and Clark County Zoning Ordinance
- City of East Helena Zoning Ordinance, 2009
- City of Helena Zoning Ordinance, 2011
- Lewis and Clark County Floodplain Regulations, 2002
- Lewis and Clark County Subdivision Regulations, 2010
- City of Helena Subdivision Regulations, 2010
- City of Helena Building Codes, 2011

HAZARD RECOGNITION AND MITIGATION

- Lewis and Clark County Pre-Disaster Mitigation Plan, 2005
- Lincoln Rural Fire District, Fire Risk Management Strategy Community Protection Plan, 2005
- Tri-County Fire Working Group, Regional Community Wildfire Protection Plan, 2005
- Helena Area HAZUS Analysis Project, Earthquake Hazards and Mitigation, 2002
- Wildland-Urban Interface Communities-At-Risk Hazard Assessment, Bureau of Land Management (BLM) 2004
- Wildland-Urban Interface Communities-At-Risk Mitigation Plan, BLM 2004
- State of Montana Critical Facility Seismic Evaluation and Hazard Reduction Inventory Report, 2010
- State of Montana Pre-Disaster Mitigation Plan and Statewide Hazard Assessment, 2010

FLOODING AND DRAINAGE

- City of East Helena, Flood Insurance Study, 1979
- City of Helena, Flood Insurance Study, 1980
- Lewis and Clark County, Flood Insurance Study, 1985, 2002
- Prickly Pear / Ten Mile Creeks, Channel Migration Zone Mapping, 2011
- City of Helena Stormwater Drainage Master Plan, 2003

NATURAL RESOURCE ASSESSMENT

- Helena Open Lands Management Plan, Ecosystem Research Group & LandArc, 2004
- Forest Land Assessment of the City of Helena Lands in the Upper Ten Mile Creek Watershed, 2007
- Forest Inventory and Mountain Pine Beetle Survey for the City of Helena Open Lands, 2008

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

2.4 PROJECT WEBSITE

A website was setup at the start of the project to provide information to project stakeholders and the citizens of Lewis and Clark County. The project website can be viewed at: www.lcc-jefco-pdm.com. The website remained active during the course of the project through adoption of the plan.

The website contained a home page and pages for project contacts, planning team, meetings, plan documents, reference materials, and project stakeholders. The Home page contained a letter inviting participation in development of the plan update. The Contacts page contained contact information for the DES Coordinator and Tetra Tech personnel involved in management of the project. The Planning Team page contained maps for the planning team to review prior to the conference calls. The Meetings and Presentation page contained the public meeting schedule, notes from the public meetings, meeting presentations, as well as the schedule, agenda, and notes from the Planning Team conference calls. The Plan page contained sections from the draft plan for stakeholder review. The Reference Material page contained the 2005 Lewis and Clark County PDM Plan, FEMA guidance on preparing multi-jurisdictional hazard mitigation plans, the FEMA Region 8 Crosswalk, and internet links to the State of Montana Hazard Mitigation Plan, the Montana DES and FEMA websites. The Stakeholders page contained name and affiliation of the planning team and a list of the project stakeholders. Each page of the website had a comment field where viewers could log in their issues or concerns.

2.5 PROJECT MEETINGS

Project meetings were conducted during initial plan development including a kick-off meeting where the 2005 PDM Plan was reviewed and hazards identified; a meeting with the Tri-County FireSafe Working Group; and a series of public meeting to present the draft results of the risk assessment to the communities. Sign-in sheets, presentation materials and meeting notes are contained in **Appendix B** and posted on the project website.

A project kick-off meeting was held on January 20, 2010 at the Lewis and Clark County Law Enforcement Center in Helena. The meeting was advertised in the January 14th and 16th, 2011 Helena Independent Record newspaper and on the project website (**Appendix B**). Notice of the meeting was also sent by e-mail to the project stakeholders. Tetra Tech made a presentation at the meeting which reviewed each section of the 2005 mitigation plan, outlined the background and rationale for updating the PDM Plan, the process and methodology for the plan update, and the project schedule. The meeting presentation was placed on the project website for stakeholders who could not attend the meeting (**Appendix B**). The Planning Team was established at the kick-off meeting from local agency and department representatives at the meeting. Approximately 34 individuals participated in the meeting including the Independent Record newspaper who did a follow-up story on the project (**Appendix B**).

A presentation on the PDM Plan update was made at a regularly scheduled meeting of the Tri-County FireSafe Working Group in Helena on January 13, 2011. Seventeen (17) federal, state, and local wildfire specialists were in attendance as well as several private fuel management contractors. Sign-in sheets from this meeting are presented in **Appendix B.**

Three public meetings were held during the drafting process of the plan in June and July, 2011 including: June 28 in Helena at the City-County Building; July 1 at the library in Lincoln; and July 8 at the senior center in Augusta. Notice of these meetings were sent to the project stakeholders list, advertised in the June 29, 2011 editions of the Blackfoot Valley Dispatch and Fairfield Sun Times newspapers and listed on the project website. In addition to newspaper notices, the DES Coordinator was interviewed on the KBLL "Coffee Break" radio talk shows on June 2 and 17, 2011 and the KMTX "Headline Helena" radio talk show on June 27, 2011, and during numerous TV interviews during June with three stations: KTVH, KXLH AND KFBB. Flyers announcing the meetings in Helena, Lincoln and Augusta were also placed in the City-County Building, Courthouse, Law Enforcement and the Arcade Building in downtown Helena.

Tetra Tech presented preliminary results of the risk assessment at the meeting as well as the draft mitigation strategy. The public was asked what specific mitigation measures should be included in the plan to reduce property loss and human suffering. Seven individuals attended the public meeting in Helena including representatives from County Planning and DES, City of Helena Planning and Fire Department, a media representative, and two members of the public. Twenty (20) individuals attended the public meeting in Lincoln including two County Commissioners, the Sheriff, Public Works Director,

DES Coordinator, Planning, Rural Fire District, U.S. Forest Service, media, and several members of the pubic. Twenty (20 individuals also attended the public meeting held in Augusta including two County Commissioners, the County Sheriff, Public Works Director, DES Coordinator, Solid Waste, Rural Fire/Ambulance, and several members of the public. Most attendees networked before and after the meeting, listened to the presentation and some asked questions.

2.6 PLAN REVIEW

The planning process for the PDM Plan update began on January 1st, 2011 and lasted approximately nine months. The public was provided at least two opportunities for comment prior to adoption of the plan. The first opportunity was during the drafting process. An advertisement was run in the local newspaper on August 11, 2011 **(Appendix B**) notifying the public of the availability of the draft PDM Plan on the project website, available electronically on compact disk upon request, and in hard copy at the County Commissioner's office. An e-mail announcement was sent to the project stakeholders list announcing the availability of the draft PDM Plan for review with instructions on how to comment.

The draft document was produced with line numbers to aid in the review process. Reviewers were asked to submit their comments on the draft plan to the County DES office or via the project website after a 30-day review period. The DES Coordinator reviewed the comments and in consultation with the Planning Team submitted a consolidated list of comments to the contractor. Comments were incorporated into a final draft document and the PDM Plan was submitted to the State Hazard Mitigation Officer (SHMO) and the Federal Emergency Management Agency (FEMA) for compliance with the Region 8 Crosswalk.

Comments received from the SHMO and FEMA were addressed and the final plan was produced and posted to the project website. At this point a second opportunity was provided to the public to comment on the PDM Plan. The final plan was posted on the project website and stakeholders were notified of its availability via an e-mail message and press release in the local newspaper. Final comments were addressed in a second plan revision and the final plan was posted on the project website and provided to the Lewis and Clark County Commissioners and the incorporated cities of Helena and East Helena for adoption. After adoption, final copies of the plan were submitted to the SHMO and FEMA.

Future comments on the PDM Plan should be addressed to:

Lewis and Clark County Disaster and Emergency Services
221 Breckenridge
Helena, Montana 59601
406-447-8285

3.0 COMMUNITY PROFILE

Lewis and Clark County has two incorporated cities; Helena and East Helena. Unincorporated communities within the County include Augusta, Canyon Creek, Canyon Ferry, Craig, Fort Harrison, Lincoln, Marysville, Wolf Creek and York. **Figure 1A** presents a location map of Lewis and Clark County.

3.1 PHYSICAL SETTING

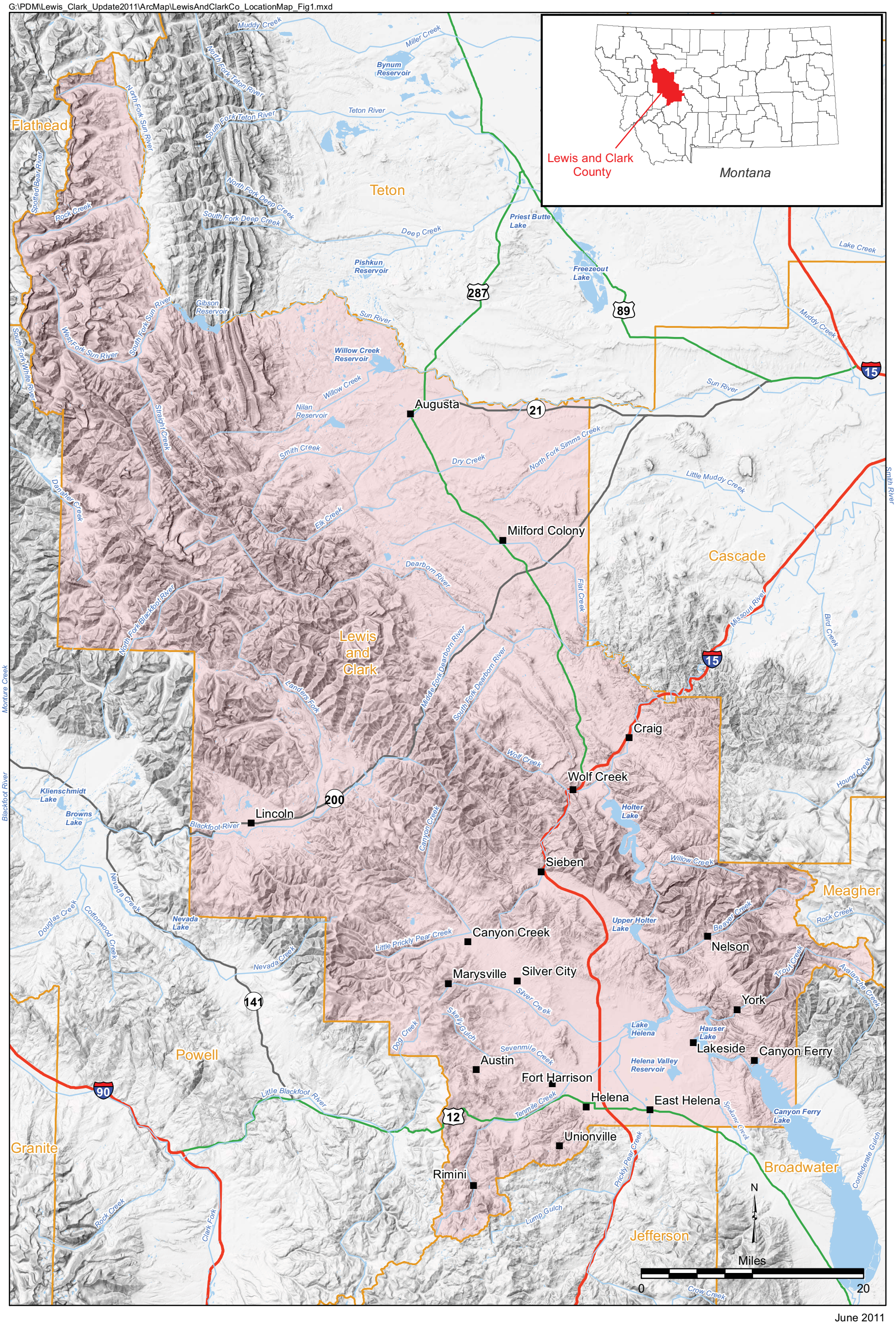
Lewis and Clark County is located in the southwestern portion of the Northern Rocky Mountains Physiographic Province and is characterized by broad intermountain valleys between major mountain ranges. The county encompasses an area of approximately 3,513 square miles and ranges in elevation from 3,400 feet on the Missouri River, where it flows northward out of the county, to peaks more than 8,000 feet along the Continental Divide. More than 70 percent of the land is mountainous. The population density in Lewis and Clark County is 18 people per square mile. Land ownership in Lewis and Clark County is 43.5 percent private, 48 percent federal, and 7.6 percent state. Land ownership and population density are presented on **Figure 2**.

The cities of Helena and East Helena are situated on the southern edge of Lewis and Clark County in the southern portion of the Helena Valley, a wide area west of the Missouri River. The Helena Valley is bounded by the Elkhorn Mountains to the south and the Spokane Hills and Big Belt Mountains to the north and east. Much of the Helena valley floor was in agricultural use prior to residential and commercial development. Ten Mile Creek and Prickly Pear Creek cross the valley on their way to Lake Helena. Lands along these creeks contain riparian areas and 500-year floodplains and have a higher susceptibility for liquefaction during an earthquake. The hills south of Helena have slopes of 15 to 30 percent and carry a high to severe fire-risk rating.

3.2 CLIMATE

The overall climate of Lewis and Clark County, including the amount of precipitation, varies with elevation. The Helena Regional Airport, located in the semi-arid southern portion of the County, receives about 11 inches of rainfall annually. The mountains experience 60 inches or more. Peak river flows usually occur in late May or early June, as spring rains melt winter snow packs. Ice jams in the water courses may cause backwater flooding in late winter months. Flash floods from intense localized storms can occur in tributary watersheds from spring throughout the summer. Winters in Lewis and Clark County are generally sunny, cold, and windy, with frequent storm fronts. Summers are warm with cool nights brought on by air drainage into valley bottoms. The Lewis and Clark County Growth Policy (2004) describes the climate in six sub-areas within the county, as presented below:

G:\PDM\Lewis_Clark_Update2011\ArcMap\LewisAndClarkCo_LocationMap_Fig1.mxd



June 2011

Figure 1

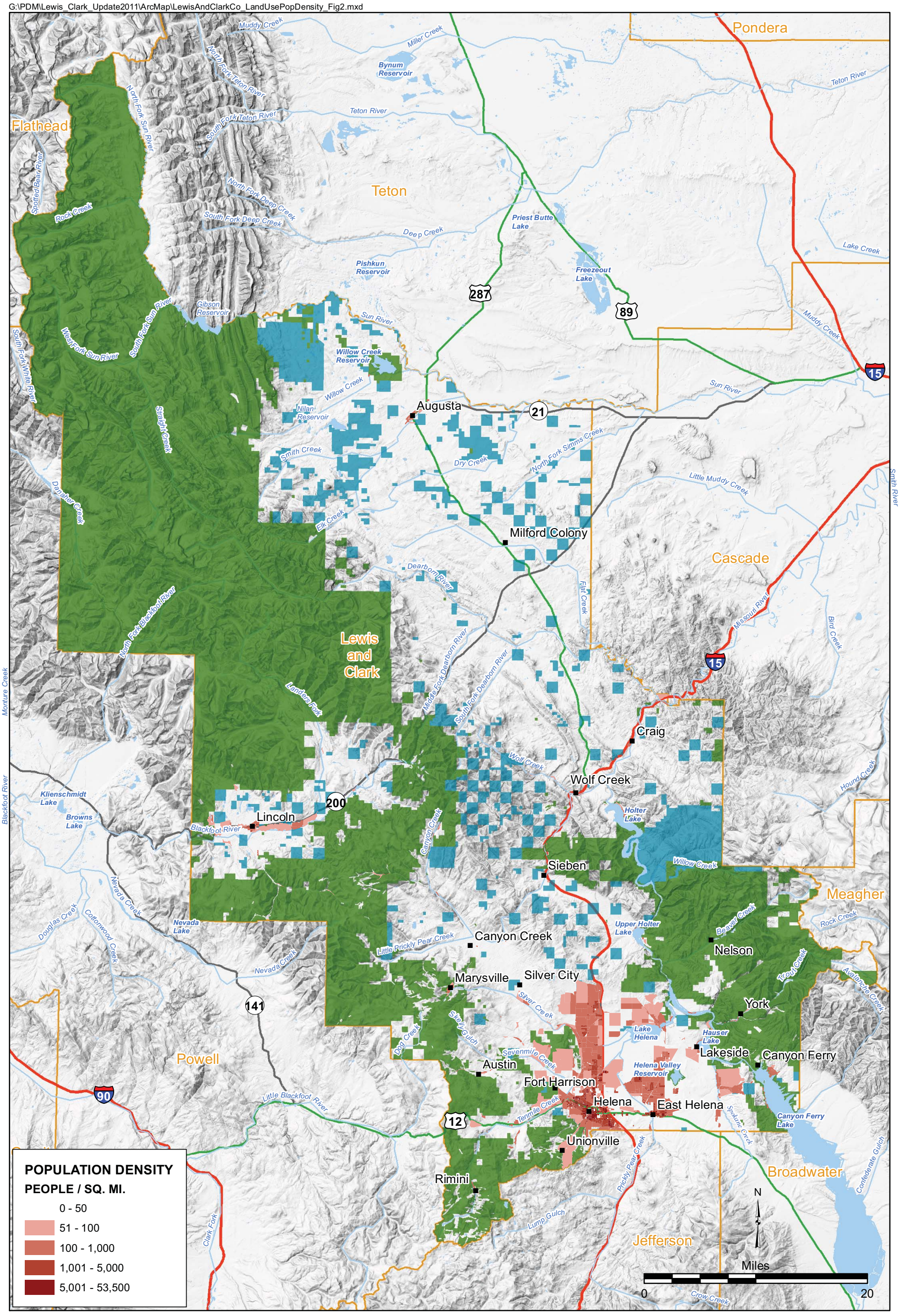
Location Map

Lewis and Clark County, Montana

Pre-Disaster Mitigation Plan

Place Names
County Boundary
River/Stream
Lake/Reservoir
Interstate
U.S. Highway
Montana Highway

G:\PDM\Lewis_Clark_Update2011\ArcMap\LewisAndClarkCo_LandUsePopDensity_Fig2.mxd



Land Use
- State
- Federal
- Private

- Place Names
- County Boundary

- River/Stream
- Lake/Reservoir

- Interstate
- U.S. Highway
- Montana Highway

June 2011

Figure 2

Land Use & Population Density

Lewis and Clark County, Montana

Pre-Disaster Mitigation Plan

The **Augusta** area experiences climatic variation due to differences in topographic conditions. The western portion along the continental divide receives more than 40 inches of average annual precipitation, the majority as snowfall during the winter. The eastern portions are the driest, receiving about 10 to 12 inches of average annual precipitation, the majority as rainfall in the spring and from occasional summer storms. Winds are generally westerly to southwesterly. The area experiences strong Chinook winds associated with the east side of the Rocky Mountains.

The **Canyon Creek/Marysville** area is located along the eastern front of the Rocky Mountains and exhibits climatic characteristics of the modified maritime climate typical of the mountainous areas of western Montana and the continental climate of eastern Montana. Weather patterns are influenced by Pacific and Canadian fronts. Winds are predominantly out of the northwest and may have wind gusts in excess of 40 mph. Average precipitation varies according to elevation, with the higher elevation along the Continental Divide receiving 25 to 30 inches per year and the Silver Valley area only receiving 10 to 12 inches per year. June is typically the wettest month and January receives the most snowfall. The annual temperatures can range from -35° to 100°F.

The climate of the **Canyon Ferry/York** area is classified as a modified continental climate; it is influenced by Pacific Ocean air masses, drainage of cooler air from the surrounding mountains, and the protection afforded by the surrounding mountains. The average annual temperature is around 44° and the annual precipitation 12 to 13 inches in the lower elevations. The higher elevations are typically cooler and receive considerably more precipitation. Frequent storm fronts move along the slopes of the mountains with winds of 20 to 35 mph. These winds typically switch directions as the storm fronts pass.

The **Helena Valley** experiences climatic variation due to differences in topographic conditions. The western portion of the area along the Continental Divide receives 20 to 30 inches of average annual precipitation, the majority as snowfall. The northeast Helena Valley, between Lakeside and the Causeway, is the driest part of the area and receives approximately 10 inches of annual precipitation, the majority as spring rainfall. The annual range of air temperatures at the Helena Regional Airport is -35° to 100° F, with mean monthly temperatures ranging from 18° F in January to 68° F in July. Winds are generally westerly to northwesterly; the area experiences Chinook winds that are associated with the east side of the Rocky Mountains.

The **Lincoln** area is located along the western front of the Rocky Mountains and exhibits characteristics of both the modified maritime climate typical of western Montana valleys and the more continental type climate of eastern Montana. The wind is predominately out of the northwest. Average annual precipitation is 18.57 inches. June is the wettest month, averaging 2.70 inches followed by May with 2.19 inches of precipitation. January receives the most snowfall with 23.11 inches average. The average annual temperature is 40° F. Several short periods of below zero temperatures occur each winter and can be accompanied by strong easterly winds and blizzard conditions. Severely cold weather generally lasts only a few days. Mild days and cool nights with occasional thunderstorms are characteristic of

summer with the daily maximum temperature being 82° F. and the average minimum 41° F. Strong night time radiation cooling causes freezing or near freezing, temperatures during each month of the summer.

Due to topographic variations, climate conditions also vary across the **Wolf Creek/Craig** area. The Gates of the Mountains Wilderness and the high ridges along the Continental Divide receive 20 to 30 inches of average annual precipitation, the majority as snowfall during the winter. Other portions of the area tend to be drier with annual average precipitation of 10 to 12 inches, the majority as rainfall in the spring and occasional summer storms. Winds are generally westerly to northwesterly. The area experiences Chinook winds associated with the east side of the Rocky Mountains.

3.3 CRITICAL FACILITITES AND INFRASTRUCTURE

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

Critical facilities in Lewis and Clark County are identified in **Appendix C.** The size and replacement value were collected where readily available; however, resource constraints prohibited the collection of values for all structures. A GIS layer of the critical facilities was created for the hazard risk assessment. Further details on Lewis and Clark County's critical facilities and infrastructure are presented below.

Water and Wastewater Services

The City of Helena utilizes several water resources to supply the daily needs of the community. The principal resources are the Ten Mile Creek watershed, Chessman and Scott Reservoirs, and the Ten Mile Water Treatment Plant. The other principal resource is the Missouri River, which is used to meet peak demands in the summer. East Helena owns and operates the water treatment system that provides drinking water to residents of the city. The East Helena water system is supplied by the McClellan and Wylie Drive sources. Outside the municipal water service areas, the population of the Helena Valley relies upon groundwater as a drinking water supply and has approximately 5,600 domestic wells and 71 public water supplies (LCC Growth Policy, 2004). There are no public/community water systems operating within other areas within Lewis and Clark County.

The City of Helena operates a mechanical wastewater treatment plant located at the north edge of the city, which treats approximately 60 percent of the entire area's wastewater. There are also six lagoon systems located in the Helena Valley that treat about 10 percent of the wastewater generated in the area. The remaining 30 percent of wastewater is treated through individual on-site treatment systems. Conventional gravity sewer mains comprise the bulk of East Helena's wastewater collection system. Wastewater treatment in the Helena Valley is provided by central treatment systems and individual septic systems. Sewage disposal for most structures within the Augusta, Craig and Lincoln town sites are provided by a central sewer system. Sewage disposal within most other areas within the county are provided by individual septic systems.

Utilities

Electrical power is generated by PPL Montana. Hauser Dam, located on the Missouri River in the northeast corner of the county, is a run-of-the-river hydropower facility with flows governed by operations at Canyon Ferry Dam. NorthWestern Energy operates the electrical distribution system. In the Augusta area, electrical power is also provided by Sun River Electric Cooperative.

Natural gas is distributed by NorthWestern Energy. The extent of the distribution system is generally confined to the Helena Valley, within the Augusta town site, and east along Highway 21. Natural gas is not available within the Canyon Ferry/York or Wolf Creek areas.

Telephone services in the area are provided by a number of entities. Qwest is the principal provider and maintains a network of lines. In the Augusta area, telephone service is provided by Three Rivers Telecommunication. In the Canyon Creek and Lincoln areas, telephone service is provided by the Lincoln Telephone Company. Since deregulation of the industry and advancements in fiber optic and cellular communications technology, other providers are also servicing the area. Several communications towers have been sited in the area.

3.4 POPULATION TRENDS

Lewis and Clark County is Montana's sixth most populous county, with an estimated 63,395 residents as of the 2010 census. Helena, the state capitol and the county seat, is the state's 6th largest city with a population of 28,190 (2010).

Lewis and Clark County's population has grown steadily since 1950, and has doubled between 1960 and 2000 (**Table 3.4-1**). The county experienced significant growth between 1970 and 1980 (29.3%) due to substantial in-migration. Most of the impetus for the county's population growth during this period can be attributed to a 30 percent increase in total employment.

TABLE 3.4-1
STATE, LEWIS AND CLARK COUNTY AND CITIES POPULATION TRENDS AND ESTIMATES

Census	State of Montana		Lewis and Clark County		City of Helena		City of East Helena	
	Population	% Change	Population	% Change	Population	% Change	Population	% Change
1930	537,606	--	18,224	--	11,803	--	1,039	--
1940	559,456	4.06%	22,131	21.44%	15,056	27.56%	1,143	10.01%
1950	591,024	5.64%	24,540	10.89%	17,501	16.77%	1,216	6.39%
1960	674,767	14.17%	28,006	14.12%	20,227	15.05%	1,490	22.53%
1970	694,409	2.91%	33,281	18.84%	22,730	12.37%	1,651	10.81%
1980	786,690	13.29%	43,039	29.32%	23,938	5.31%	1,647	-0.24%
1990	799,065	1.57%	47,495	10.25%	24,609	2.80%	1,538	-6.62%
2000	902,195	12.91%	55,716	17.31%	25,780	4.76%	1,642	6.76%
2010	968,598	7.36%	63,640	14.22%	28,182	9.32%	2,056	25.21%
2020*	1,033,880	6.74%	69,187	8.72%	32,989	17.06%	2,626	27.72%
2030*	1,113,669	7.72%	80,591	16.48%	40,200	21.86%	3,483	32.64%

Notes: * = Estimates
Source: U.S. Census, 2010

In 1950, almost 80 percent of all county residents lived in the City of Helena. By 1990, this figure dropped to less than 52 percent. The Helena Valley was relatively agricultural until the 1970s, but has since become the primary population center and economic hub for Lewis and Clark County. From 1970 to 2000, unincorporated areas of the Helena Valley grew much faster than the incorporated areas of Helena and East Helena. However, from 2000 to 2008, incorporated areas began growing faster than unincorporated areas.

The senior population is a significant and growing presence in Lewis and Clark County. Twenty (20) percent of the households in the 2000 census included at least one individual 65 years of age or older. People 60 years and older made up 15.7 percent of the population, a figure that has been increasing in recent decades as the population ages (U.S. Census Bureau, 2002).

Table 3.4-2 presents population statistics for the unincorporated areas within Lewis and Clark County represented as Census Designated Places (CDP). This data indicates that the greater Helena Valley accounts for a significant portion of the growth in the county.

TABLE 3.4-2
LEWIS AND CLARK COUNTY POPULATION - CENSUS DESIGNATED PLACES

CDP	1990	2000	% Change Since Last Census	2010	% Change Since Last Census
Augusta CDP	--	284	--	309	8.1%
Craig CDP	--	--	--	43	--
Helena Valley NE CDP	1,585	2,122	25.3%	2,995	29.1%
Helena Valley NW CDP	1,215	2,082	71.4%	3,482	67.2%
Helena Valley SE CDP	4,601	7,141	55.2%	8,227	15.2%
Helena Valley West-Central CDP	6,327	6,983	10.4%	7,883	12.9%
Helena West Side CDP	1,847	1,711	-7.4%	1,637	-4.3%

TABLE 3.4-2 LEWIS AND CLARK COUNTY POPULATION - CENSUS DESIGNATED PLACES					
CDP	**1990**	**2000**	**% Change Since Last Census**	**2010**	**% Change Since Last Census**
Lincoln CDP	--	1,100	--	1,013	-7.9%
Marysville CDP	--	--	--	80	--

Notes: CDP = Census Designated Place; -- = data not available; Changes in Place population between years may be due to population growth or decline, due to significant boundary changes, or a combination of factors.
Source: U.S. Census Bureau, 2011

3.5 HOUSING STOCK

The housing stock in Lewis and Clark County has increased considerably during the past 40 years, more than doubling between 1970 and 2000. Census 2000 estimated 25,672 units in the county, and the 2009 Census estimated 26,536 housing units in the county, which is an increase of 3.3 percent in nine years. At the time of Census 2000, 38.1 percent of all owner-occupied housing units in Lewis and Clark County were valued at $99,999 or less, and the median value of an owner-occupied house in Lewis and Clark County was $112,200. A further breakdown of the housing units from the census is presented in **Table 3.5-1.** This housing table will be updated when data from the 2010 census is available.

TABLE 3.5-1 2000 U.S. CENSUS HOUSING DATA			
	Lewis and Clark County	**City of Helena**	**City of East Helena**
Number of Occupied Housing Units	22,850	12,133	723
Median Value of Housing Units	$112,200	$113,000	$88,400
Year Structure Built			
1999 to March 2000	615	2,833	154
1995 to 1998	2,413	3,389	194
1990 to 1994	1,748	1,864	81
1980 to 1989	3,699	1,739	88
1970 to 1979	6,451	827	59
1969 or earlier	10,746	868	115
Census Estimated Value	$2,563,770,000	$1,371,029,000	$63,913,200

Source: U.S. Department of Commerce, Bureau of Census, 2000

The City of Helena had a building boom in the 1960's through the 1970's. From the mid-1990s through the 2007-2008 building season, the number of housing units being built in Helena and the surrounding area again increased. Most building activity occurred outside the city limits (Helena Growth Policy, 2011). The City of East Helena has experienced accelerated growth in housing units since 2000 making the period 2000-2007 the busiest period of housing construction since the city's early settlement (East Helena Growth Policy, 2009).

3.6 ECONOMY AND SOCIOECONOMICS

Non-farm employment accounts for over 98 percent of the employment opportunities in Lewis and Clark County. According to a University of Montana Bureau of Business and Economic Analysis, employment in the year 2000 included the following sectors: service industry 32.3 percent; government

23.8 percent; financial, insurance, and real estate 8.2 percent; construction 5.2 percent, retail trade 17.2 percent, and other 13.3 percent (LCC Growth Policy, 2004). **Table 3.6-1** presents the top private employers in Lewis and Clark County in 2009.

TABLE 3.6-1
ECONOMIC AND SOCIOECONOMIC DATA

	State of Montana	Lewis and Clark County	City of Helena	City of East Helena
Per Capita Income (2009 data)	$22,881	$25,745	$28,285	$21,978
Median household income (2008 data)	$43,948	$49,959	$50,018	$35,455
Seasonally Adjusted Unemployment Rate	7.2% (2010)	5.1% (2010)	6% (2009)	8.6% (2000)
Percent of Population Living Below the Poverty Level (2009 data)	14.6%	14.6% (2008)	14.5%	8.6%
Top private employers in Lewis and Clark County (excluding railroad and government) (2009 data)	St. Peter's Hospital, BlueCross/Blue Shield, Carroll College, Rocky Mountain Development Council, Wal-Mart, Albertson's, American Chemet, Costco, Family Outreach, Heritage Propane, Independent Record, Intermountain Children's Home, Mountain West Bank, Shodair Hospital, Student Assistance Foundation, Summit Aeronautics, Town Pump, Valley Bank, Vans Thriftway, West Mont			

Source: U.S. Census Bureau; Montana Dept. Labor and Industry, Research & Analysis Bureau and Montana Dept. of Commerce, Census and Economic Information Center (2010)

The unincorporated areas not dependant on employment in Helena are more reliant on agriculture as a basis of their economies. Tourism and recreational services also contribute to their economic base including use of public lands, Canyon Ferry, Hauser and Holter lakes, and the Missouri River.

Lewis and Clark County ranked third in the state in average per capita income behind Yellowstone and Gallatin Counties. Based on 2000 census data, per capita income in the City of Helena was 6.7 percent above the county average, while the City of East Helena was 15.3 percent below the county average (**Table 3.7-1**). The unemployment rates in both Lewis and Clark County and the City of Helena are below the state average (**Table 3.7-1**) due to the importance of the government and service sectors in supporting the local economy.

According to the 2000 census, 14.6 percent of individuals in Montana live at or below the poverty level (**Table 3.7-1**). The City of Helena's poverty level is consistent with that of the state and county while the City of East Helena had 6 percent fewer individuals living below the poverty level than either the state or county.

3.7 LAND USE AND FUTURE DEVELOPMENT

Most vacant residential property within the city of Helena has been developed in recent years, fueling an increase in annexations and development outside of the city boundaries to satisfy housing demand. Although agriculture is still the predominant land use in the Helena Valley, large areas of agricultural lands have been converted to residential uses. Retail development has significantly increased in the Helena vicinity in the last decade. A number of large retailers and shopping centers have been established near North Montana Avenue, Custer Avenue, and Washington Street. They have been

attracted to the area by large tracts of vacant land within the city and the I-15/Custer Avenue interchange scheduled for completion in 2012. Industrial uses have been concentrated in the area located along Highway 12, east of I-15, and north to the airport. (Helena Growth Policy, 2011)

Low density residential areas are evenly scattered within the incorporated boundaries of East Helena. High density residential areas are concentrated outside the eastern city limits. Commercial developments are primarily located in the downtown central business district, and in proximity to and between U.S. Highway 12 and Main Street (Old U.S. Highway 12). Industrial development is primarily located on the south side of U.S. Highway 12 in the vicinity of the former ASARCO smelter and American Chemet's operating plant. Irrigated agricultural lands are located northeast of the city. (East Helena Growth Policy, 2009)

Unincorporated communities within Lewis and Clark County contain residential development either along a grid system of streets or within platted subdivisions. Outside of the towns, most residential development is associated with ranch and farming operations and is scattered in an open and rural environment. Recreational cabin and second home development exists throughout the area. (Lewis and Clark County Growth Policy, 2004)

3.7.1 Land Use Implementation Tools

Industrial, commercial and residential land use is managed with zoning ordinances and subdivision regulations in accordance with guidelines set forth in the county and city growth policies. A description of these guidelines and regulations are presented above with more detailed discussion under the hazard profiles in *Section 4.0*.

Growth Policies

Lewis and Clark County adopted a growth policy in 2004 to help address growth pressures. The City of Helena adopted a growth policy revision in 2011, the City of East Helena completed a growth policy in 2009, and the unincorporated community of Lincoln adopted a growth policy in 2005.

The Lewis and Clark County Growth Policy recognizes that development in environmentally critical areas, particularly in places identified at high risk for flooding or wildfires, has proven costly for residents, local government, and the natural environment and has outlined a number of goals and policies to mitigate impacts from these hazards.

- Encourage development in areas with few environmental hazards or development constraints to minimize degradation of the natural environment, and the loss of capital investment and life due to natural disasters. (Goal 1)

- Encourage development in areas that are relatively free of environmental problems (e.g., soils, slope, bedrock, high water table, and flood prone areas). (Policy 1.1)
- Discourage or prevent development that is incompatible with the designated 100-year floodplain. Prohibit development in designated floodways. (Policy 1.2)
- Prevent increased storm water runoff from new development adversely impacting other properties. (Policy 1.3)
- Preserve hazardous areas (e.g., subject to geologic and flood hazards) as open space wherever possible. (Policy 1.5)
- Systematically reduce the existing level of storm water damage. Diminish exposure of people and property to storm water runoff, and reduce flood hazard. (Policy 1.6)
- Improve the usefulness of flood-prone lands as active and passive recreational areas. Policy 1.7
- Discourage development within areas designated by the Tri-County FireSafe Working Group as "Severe" fire hazard risk, unless developed in a manner consistent with the "Fire Protection Guidelines for Wildland Residential Interface Development," and the design standards in the Lewis and Clark County Subdivision Regulations. (Policy 1.9)
- Examine the cumulative effects of development on floodplains, flood ways, levels of flood activity, and potential property damage. (Policy 2.0)

The Helena Growth Policy (2011) contains a variety of development constraints that do not always prohibit development but may require mitigation. It is suggested that proper mitigation could be addressed by amending the Subdivision Regulations and/or other City Codes as well. Helena Valley Planning Priorities, outlined in the Lewis and Clark County Growth Policy, also indicate that development should be encouraged in areas without environmental constraints or where constraints can be properly mitigated.

Zoning Ordinances

Zoning is a tool used by local government to control and direct land use in communities, in order to protect the public health, safety and welfare. Zoning ordinances regulate where future growth should or should not be allowed (e.g., which areas of the county are most suitable for development as well as least suitable due to issues such as earthquake or liquefaction prone areas, floodplains, seasonal high groundwater, and wildland urban-interface areas.) The cities of Helena and East Helena have adopted zoning ordinances. At this time, Lewis and Clark County continues to work on getting zoning ordinances in place.

Subdivision Regulations

Lewis and Clark County and the Cities of Helena and East Helena control development through the use of subdivision regulations. The county's subdivision regulations state that all subdivisions must be designed so that potentially significant adverse impacts to public health and safety have been avoided or

reasonably minimized. Among other things, public health and safety is defined as: flooding, fire or wildfire hazards, rock falls or landslides, unstable soils, steep slopes, and other natural hazards.

Building Codes

Building codes are also a tool to control future development. The main purpose of building codes are to protect public health, safety and general welfare as they relate to the construction and occupancy of buildings and structures. They comprise a set of rules that specify the minimum acceptable level of safety for buildings and often contain requirements for snow and wind loads, roof construction, and seismic risk. Building codes are generally intended to be applied by architects and engineers, but are also used by building inspectors. Building codes are in effect in the Cities of Helena and East Helena; however, Lewis and Clark County has no building department or inspectors to ensure compliance with codes adopted by the State of Montana.

3.7.2 Future Development

The Helena Valley is expected to experience substantial growth in the coming decades to serve an increasing population's need for new housing. The City of Helena's Growth Policy (2011) discusses those areas of the valley with the development and infrastructure levels that will likely make them the most compatible with expanded residential development, as summarized below.

Three urban areas adjacent to the City of Helena will eventually be annexed to the City of Helena, including: the urban area on the west side of Helena; the area southeast of Helena (on both sides of the Interstate); and an area north of Helena (within one mile, roughly between I-15 and Green Meadow Drive). Future development in the balance of Helena Valley is dependant on the environmental constraints identified on the property. The *Environmental Constraints Map* in the City's Growth Policy outlines areas of floodplain, faults, liquefaction, and wildland urban interface.

Future development in East Helena is discussed in their Growth Policy (2009) indicating that future development will be implemented by annexation and zoning. It is expected that the city would expand outward into areas designated in the growth policy as "*Future Urban*" within the next five to 10 years. It is anticipated that the majority of this land will be developed for residential uses with commercial uses located in proximity to high traffic intersections. It is anticipated that new residential subdivisions will be developed on existing agricultural or undeveloped lands near the community.

High groundwater and floodplain issues in the towns of Augusta and Wolf Creek present challenges for their ability to expand. Future housing developments in the Lincoln area is expected to take place outside of the town site while areas north of Highway 200 have been identified for possible future commercial/retail development.

Scenic areas of the county are anticipated to continue to attract residents with demands for seasonal cabins and recreational homes expected to increase. Much of this development is expected to be scattered and rural in character.

Section 4.11 provides a discussion on how the hazard areas affect various future development projects identified in the county.