Shoshone County
Multi-Jurisdictional Hazards Mitigation Plan

Shoshone County,
with the Cities of Kellogg, Mullan, Osburn, Pinehurst, Smelterville, Wallace & Wardner

August 31, 2009

This effort developed with the Shoshone County Multi-Jurisdictional Hazards Mitigation Planning Committee and environmental and regional planning services provided by:

TerraGraphics Environmental Engineering, Inc.
108 West Idaho Ave.
Kellogg, Idaho 83837

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1. Adoptions, Promulgations, and Acceptance

This Shoshone County Multi-Jurisdictional Hazards Mitigation Plan has been developed through the efforts of various organizations, agencies, and government representatives in an effort to better prepare Shoshone County residents against natural disasters affecting Shoshone County.

1.1. FEMA Region X Letter of Approval

U.S. Department of Homeland Security
Region X
130 228th Street, SW
Bothell, WA 98021-9796

FEMA

August 31,2009

Honorable Jon Cantamessa
Chair, Board of Commissioners
Shoshone County
700 Bank Street, Suite 120
Wallace, Idaho 83873-2348

Dear Chair Cantamessa:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) has approved the ***Shoshone County Multi-Jurisdictional Hazards Mitigation Plan*** as a multi-jurisdictional local plan as outlined in 44 CFR Part 201. With approval of this plan, the following entities are now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants and Flood Mitigation Assistance project grants through August 31, 2014:

Shoshone County	**City of Kellogg**	**City of Mullan**
City of Osburn	**City of Pinehurst**	**City of Smelterville**
City of Wallace	**City of Wardner**	

The plan's approval provides the above jurisdictions eligibility to apply for hazard mitigation projects through your State. All requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs.

Over the next five years, we encourage your communities to follow the plan's schedule for monitoring and updating the plan, and to develop further mitigation actions. The plan must be reviewed, revised as appropriate, and resubmitted for approval within five years in order to continue project grant eligibility.

If you have questions regarding your plan's approval or FEMA's mitigation grant programs, please contact our State counterpart, Idaho Bureau of Homeland Security, which coordinates and administers these efforts for local entities.

Sincerely,

Mark R. Carey

Mark Carey, Director
Mitigation Division

cc: David Jackson, Idaho Bureau of Homeland Security

Enclosure

KM:bb

1.2. Authorship and Conveyance

Development of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan was completed, in association with the Planning Committee members, by TerraGraphics Environmental Engineering, Inc. Project Management duties and Lead Authorship of this plan have been provided by William E. Schlosser, Ph.D., a Regional Planner and Environmental Scientist.

The undersigned do hereby attest and affirm that the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan was completed using information available at the time of its writing. Furthermore analysis techniques were implemented as appropriate to provide a clear and reasonable assessment of hazard risk exposure in Shoshone County. Recommendations made herein have been based on this information and on feedback from the Planning Committee members, and are proposed with the reasonable expectation that once implemented through a holistic hazard mitigation approach, the results will serve to protect people, structures, infrastructure, the regional economy, and the way of life in Shoshone County.

TerraGraphics
Environmental Engineering, Inc.

William E. Schlosser	*April 6, 2009*
By: William E. Schlosser, Ph.D. TerraGraphics Environmental Engineering, Inc. Lead Author and Project Mananger	Date
Jerry B. L	*April 6, 2009*
By: Jerry Lee, President TerraGraphics Environmental Engineering, Inc.	Date

1.3. Shoshone Board of County Commissioners Adoption

COMMISSIONERS:

VINCE RINALDI, District 1
VERN HANSON, District 2
JON CANTAMESSA, District 3

email: bocc@co.shoshone.id.us

Office Phone: 752-3331
Fax: 752-4304

PEGGY WHITE, CLERK DISTRICT COURT AUDITOR and RECORDER

email: pwhite@co.shoshone.id.us

Office Phone: 752-1264
Fax: 753-2711

County of Shoshone

700 BANK STREET, SUITE 120
WALLACE, IDAHO 83873-2348

RESOLUTION 2009-09

A RESOLUTION OF THE BOARD OF SHOSHONE COUNTY DECLARING COUNTY SUPPORT AND ADOPTION OF THE SHOSHONE COUNTY MULTI-JURISDICTIONAL HAZARDS MITIGATION PLAN DATED JULY 13, 2009

WHEREAS, the Shoshone County Board of Commissioners supports the contents of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan; and

WHEREAS, the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan will be utilized as a guide for planning as related to FEMA Pre-Disaster Mitigation, and other purposes as deemed appropriate by the Shoshone County Board of Commissioners.

NOW THEREFORE BE IT RESOLVED, that the Shoshone County Board of Commissioners do hereby adopt, support, and will facilitate the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan's implementation.

DATED this 21st day of July 2009.

BOARD OF COUNTY COMMISSIONERS

Jon F. Cantamessa

Jon Cantamessa, Chairman

Vern Hanson

Vern Hanson, Commissioner

D. Vince Rinaldi

Vince Rinaldi, Commissioner

ATTEST:

Susan K. Hendrixson

Susan K. Hendrixson
Administrative Assistant

1.4. Kellogg City Council Adoption

City of Kellogg

Phone: 208.786.9131
Fax: 208.784.1100
1007 McKinley Avenue
Kellogg, Idaho 83837

RESOLUTION # 233

A Resolution of the City of Kellogg, Shoshone County, Idaho declaring City support and adoption of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan.

WHEREAS, The City of Kellogg supports the Shoshone County Multi-Jurisdictional Hazardous Mitigation Plan; and

WHEREAS, The City of Kellogg has participated in the development of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan; and

WHEREAS, The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan will be utilized as a guide for planning as related to FEMA Pre-Disaster Mitigation and other purposes as deemed appropriate by the City of Kellogg;

THEREFORE, BE IT RESOLVED, that the Mayor and City Council of the City of Kellogg does hereby adopt, support, and will facilitate the Shoshone County Multi-Jurisdictional Hazardous Mitigation Plan's implementation.

DATED, this 12th day of August, 2009.

Mac Pooler

Mac Pooler, Mayor

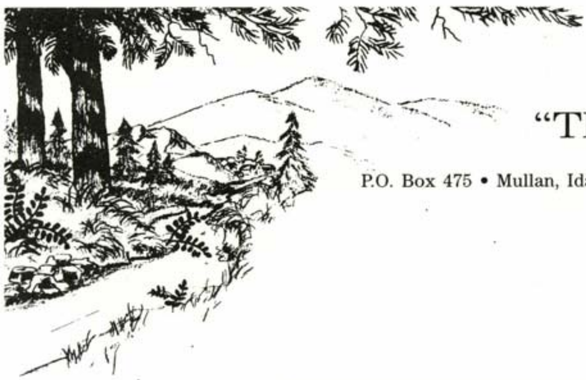
ATTEST:

Terry Sharp MMC

Terry Sharp, City Clerk

CITY OF KELLOGG SHOSHONE SEAL COUNTY IDAHO

1.5. Mullan City Council Adoption



MULLAN
"The Town of Trails"

P.O. Box 475 • Mullan, Idaho 83846-0475 • Office: (208) 744-1515 • Fax: (208) 744-1138
email: cityofmullan@nidlink.com

RESOLUTION OF THE CITY COUNCIL OF MULLAN
LOCATED IN SHOSHONE COUNTY, IDAHO
RESOLUTION NO. 081009-2

A resolution of the City Council of Mullan declaring city support and adoption of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan.

WHEREAS, The City council of Mullan supports the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan, and

WHEREAS, The City Council of Mullan has participated in the development of the Shoshone County Multi-Jurisdictional mitigation Plan, and

WHEREAS, The Shoshone County Multi-Jurisdictional Hazards mitigation plan will be utilized as a guide for planning as related to FEMA Pre-Disaster mitigation and other purposes as deemed appropriate by the City Council of Mullan, and

THEREFORE BE IT RESOLVED, that the City Council of Mullan does hereby adopt, supports, and will facilitate the Shoshone County Multi-Jurisdictional Hazards mitigation plan's implementation.

Passed and approved this 10th Day of August 2009

By: Mike Dunnigan
Mayor, City of Mullan

Tammy Scheel
Attested by: Tammy Scheel
City Clerk

1.6. Osburn City Council Adoption

RESOLUTION 2009-03

A RESOLUTION OF THE CITY OF OSBURN COUNCIL DECLARING CITY SUPPORT AND ADOPTION OF THE SHOSHONE COUNTY MULTI-JURISDICTIONAL HAZARDS MITIGATION PLAN DATED JULY 13, 2009

WHEREAS, the City of Osburn Council supports the contents of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan; and

WHEREAS, the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan will be utilized as a guide for planning as related to FEMA Pre-Disaster Mitigation, and other purposes as deemed appropriate by the City of Osburn Council.

NOW THEREFORE BE IT RESOLVED, that the City of Osburn Council does hereby adopt, support, and will facilitate the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan's implementation.

DATED this 11th day of August 2009.

Robert McPhail, Mayor

ATTEST:

Nila L. Jurkovich, City Clerk/Treasurer

1.7. Pinehurst City Council Adoption

CITY OF PINEHURST
Post Office Box 417
PINEHURST, IDAHO 83850
Telephone: (208) 682-3721
Fax: (208) 682-4644

RESOULTION OF THE CITY COUNCIL OF PINEHURST
LOCATED IN SHOSHONE COUNTY, IDAHO

RESOLUTION NO. 125

A RESOLUTION OF THE City Council of Pinehurst declaring City support and adoption of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan.

Whereas, The City Council of Pinehurst supports the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan, and

Whereas, The City Council of Pinehurst has participated in the development of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan, and

Whereas, The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan will be utilized as a guide for planning as related to FEMA Pre-Disaster Mitigation and other purposes as deemed appropriate by the City Council of Pinehurst, and

Therefore be it resolved, that the City Council of Pinehurst does hereby adopt, support, and will facilitate the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan's implementation.

Passed and approved this 11th Day of August 2009

City Council of Pinehurst located in Shoshone County, Idaho

By: Jay L. Huber
Mayor, City of Pinehurst

Carla Ross
Attested by: Carla Ross
City Clerk

1.8. Smelterville City Council Adoption

RESOLUTION 158

A RESOLUTION OF THE CITY OF SMELTERVILLE DECLARING CITY SUPPORT AND ADOPTION OF THE SHOSHONE COUNTY MULTI-JURISDICTIONAL HAZARDS MITIGATION PLAN DATED JULY 13, 2009

WHEREAS, the City of Smelterville supports the contents of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan; and

WHEREAS, the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan will be utilized as a guide for planning as related to FEMA Pre-Disaster Mitigation, and the other purposes as deemed appropriate by the Smelterville City Council.

NOW THEREFORE BE IT RESOLVED, that the City of Smelterville does hereby adopt, support, and will facilitate the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan's implementation.

DATED this 12th day of August, 2009.

IN WITNESS WHEREOF, I have hereunto set my hand at the City of Smelterville City Hall, Shoshone County, Idaho on this 12th day of August, 2009.

Thomas F. Benson, Mayor

ATTEST:

Mary Eixenberger, City Clerk

CITY OF SMELTERVILLE
OFFICIAL SEAL
IDAHO

1.9. Wallace City Council Adoption

CITY OF WALLACE

STATE OF IDAHO

703 Cedar Street
Wallace, Idaho 83873-2396
(208) 752-1147
Fax (208) 752-7741

Mayor
Ronald G. Garitone

Certified Municipal
Clerk/Treasurer
Joanne McCoy, C.M.C.

Resolution of the City Council of Wallace
Located in Shoshone County, Idaho

Resolution No. **2009-173**

A resolution of the City Council of Wallace declaring City support and adoption of the Shoshone County Multi-Jurisdictional Mitigation Plan.

Whereas, The City Council of Wallace supports the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan, and

Whereas, The City Council of Wallace has participated in the development of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan, and

Whereas, The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan will be utilized as a guide for planning as related to FEMA Pre-Disaster Mitigation
And other purposes as deemed appropriate by the City Council of Wallace, and

Therefore be it resolved, that the City Council of Wallace does hereby adopt, support, and will facilitate the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan's implementation.

Passed and approved this 12th Day of August 2009.

City Council of Wallace located in Shoshone County, Idaho.

Ronald G. Garitone, Mayor

ATTEST

Joanne McCoy Jaggard, City Clerk

1.10. Wardner City Council Adoption

City of Wardner
649 Main Street, WARDNER
P.O. Box 719
KELLOGG, IDAHO 83837

1.11. *Wardner City Council Adoption*

Resolution of the City Council of Wardner
located in Shoshone County, Idaho
Resolution No. 2009-1

A resolution of the City Council of Wardner declaring City support and adoption of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan.

Whereas, The City Council of Wardner supports the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan, and

Whereas, The City Council of Wardner has participated in the development of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan, and

Whereas, The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan will be utilized as a guide for planning as related to FEMA Pre-Disaster Mitigation and other purposes as deemed appropriate by the City Council of Wardner, and

Therefore be it resolved, that the City Council of Wardner does hereby adopt, support, and will facilitate the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan's implementation.

Passed and approved this 29th Day of July 2009
City Council of Wardner located in Shoshone County, Idaho

By: Jo Ann Groves
Mayor, City of Wardner

Attested by: Linda Wombolt
City Clerk

1.11. Representatives of Shoshone County Government

The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan was adopted formally through a Resolution of Adoption by the Board of Shoshone County Commissioners. The people representing various Shoshone County Departments sign here to show their involvement in the planning process and concurrence with the analysis and recommendations presented herein.

By: John Specht
Shoshone County Emergency Services

3-16-09
Date

By: Dan Martinsen
Shoshone County Planning and Zoning Department

3/16/09
Date

By: Jerry White
Shoshone County Assessor

3/16/09
Date

By: Mitch Alexander
Shoshone County Sheriff

031709
Date

1.12. Representatives of City Governments

The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan was adopted formally through a Resolution of Adoption by the Mayors of each Municipality in Shoshone County. The people representing various City Departments sign here to show their involvement in the planning process and concurrence with the analysis and recommendations presented herein.

By: Walter Hadley
City of Kellogg

3/12/09
Date

By: Dan White
City of Mullan

March 12, 200
Date

By: Charles Mooney
City of Osburn

March 13. 2009
Date

By: Carla Ross
City of Pinehurst

March 12, 2009
Date

By: Lee Haynes
City of Smelterville

City of
Smelterville
Elevation 2,234 ft

March 12, 2009
Date

By: Chase Sanborn
City of Wallace

March 12, 2009
Date

By: Rhonda Kays
City of Wardner

3-12-09
Date

1.13. Structural Fire Protection Services Representatives

The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan and all of its components were developed in close cooperation with the participating fire districts listed herein. Fire protection districts which are a part of a city have their adoptions included in the adoptions of the municipalities by the duly elected representatives. State and Federal wildfire protection agencies have indicated their concurrence with this plan in accompanying signature sections.

By: James R. Walcker
Chief, Fire District №1

March 12, 2009
Date

By: Dale Costa
Chief, Fire District №2

03-12-2009
Date

FIRE DISTRICT #3
Mullan & Larson

By: Larry Hoven, Chief
Mullan Volunteer / Fire District №3

03/18/09
Date

FIRE DISTRICT #4
The Western St. Joe River Valley

By: Terry Dickensen, Chief
Fire District №4

3-26-09
Date

By: James Cleveland or Steven Coyle, Chief
Prichard / Murray Volunteer Fire Department, Inc.

March 18, 2009
Date

1.14. Representatives of Federal and State Agencies, Communities and Companies

The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan was developed in cooperation and collaboration with these additional listed agencies and organizations. These entities listed below are not elligible to "formally adopt" this plan, but were involved in its development and where practible, will strive to implement its recommendations.

By: Jay D. Baker, North Area Field Officer Idaho Bureau of Homeland Security		3-12-09 Date
By: Mellisa Stoor Clarkia Area Citizen	CLARKIA ! Headwaters of the St. Maries River	3-12-09 Date
By: Karen Anderson Clarkia Area Citizen	CLARKIA ! Headwaters of the St. Maries River	3/25/09 Date
By: Dennis 'Barney' Norris Central Shoshone County Water District		3/20/09 Date
By: Ross Stout South Fork Sewer District		3-12-09 Date
By: Len Young Fire Warden Idaho Department of Lands		3/12/09 Date
By: Kjell Truesdall Idaho Department of Lands		3/12/09 Date
By: Allison Sieverding Avista Corporation		3-20-09 Date

By: Jerry Cobb
Panhandle Health District

3/12/09
Date

By: Terry Harwood, Executive Director
Basin Environmental Improvement Project Commission

3/12/09
Date

By: Justin Custis
Shoshone Family Medical Center

3-12-9
Date

By: Kimberly Johnson
Deputy District Ranger
US Forest Service

3-18-09
Date

By: Kurt Pavlat
Assistant Field Manager
U.S. Bureau of Land Management

12 MAR 09
Date

2. Planning Environment

The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan has been developed in cooperation and collaboration with the Board of Shoshone County Commissioners, County Departments, and the Municipalities of Kellogg, Mullan, Osburn, Pinehurst, Smelterville, Wallace, and Wardner. This Multi-Jurisdictional Hazards Mitigation Plan has been completed in compliance with requirements set forth in Title 44 (Emergency Management and Assistance) Code of Federal Regulations Part 78 (Flood Mitigation Assistance) and Part 201 (Mitigation Planning – section 6 Local Mitigation Plans) and summarized in the Federal Emergency Management Agency (FEMA) Crosswalk used to analyze a plan's compliance with federal regulations.

Planning leadership was provided by the Board of Shoshone County Commissioners and the Shoshone County Emergency Management Department. The Board of Shoshone County Commissioners hired TerraGraphics Environmental Engineering, Inc. (TerraGraphics), of Kellogg, Idaho, through a competitive bidding process, to assist the county in developing the Multi-Jurisdictional Hazards Mitigation Plan. Representatives of each municipality in the County participated in the plan's development through attendance at planning meetings, by providing important planning documents to the planning team, and collaborating in information exchange and document review.

Public involvement activities included press releases, a public mail survey, public meetings and an open public review opportunity during the plan's development.

Effective November 1, 2004, a Local Hazard Mitigation Plan approved by FEMA became a requirement for Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation Program (PDM) eligibility. The HMGP and PDM programs provide funding, through state emergency management agencies, to support local mitigation planning and projects to reduce potential disaster damages.

The local hazard mitigation plan requirements for HMGP and PDM eligibility are based on the Disaster Mitigation Act of 2000, which amended the Stafford Disaster Relief Act, to promote and integrate cost effective mitigation activities. Local hazard mitigation plans are required to meet minimum requirements of the Stafford Act-Section 322, as outlined in the criteria contained in 44 CFR Part 201. The plan criteria cover the planning process, risk assessment, mitigation strategy, plan maintenance, and adoption requirements.

2.1. Development and Approval Process

The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan was drafted in sections by TerraGraphics, led by Environmental Planner, William E. Schlosser, Ph.D. All sections of the plan were subjected to an internal review at TerraGraphics when first written. After this internal review sections were then submitted to a review process by the Multi-Jurisdictional Hazards Mitigation Plan Committee. This extended process provided all municipalities, agencies, organizations, and interested parties with editing opportunities to supply additional information to augment observations and findings throughout the plan's development. The Idaho Bureau of Homeland Security also provided initial reviews of documents as they were drafted.

This effort utilizes the best and most appropriate science from all partners and the integration of local and regional knowledge about hazard risks and exposure, while meeting the needs of county residents, the regional economy, and the significance of this region to the rest of Idaho.

2.1.1. Mission Statement

To make Shoshone County residents, communities, and businesses less vulnerable to the negative effects of natural hazards through the effective administration of hazard mitigation grant programs, hazard risk assessments, wise and efficient mitigation measures, and a coordinated approach to mitigation policy through county, state, federal, regional, and local planning efforts. Our combined prioritization is the protection of people, structures, infrastructure, economy, and unique ecosystems that contribute to our way of life and the sustainability of the local and regional economy.

2.1.2. Vision Statement

Institutionalize and promote a county-wide hazard mitigation ethic through leadership, professionalism, and excellence, leading the way to a safe, sustainable Shoshone County and local municipalities.

2.1.3. Goals

The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan Committee has adopted a series of primary and secondary goals intended to benefit each populated place, municipality, and the county's residents and visitors.

Primary Goal Set:

1. Promote and implement disaster-resistant development policies.
2. Build and support local capacity to enable the local government and the community to prepare for, respond to, and recover from disasters.
3. Reduce the possibility of damages and losses due to Floods.
4. Reduce the possibility of damages and losses due to Wildfire.
5. Reduce the possibility of damages and losses due to Landslides.
6. Reduce the possibility of damages and losses due to Earthquakes.
7. Reduce the possibility of damages and losses due to Severe Weather.

Parallel Goals:

- Reduce the threats to public health and safety posed by natural hazards;
- Reduce the threat and negative impacts of past soil contamination in Shoshone County as released and redistributed by natural disasters, especially flooding;
- Prioritize the protection of people, structures, and infrastructure that contribute to our way of life and the sustainability of the local and regional economy;
- Educate people and communities about the unique challenges of hazard mitigation in their daily lives;
- Establish mitigation priorities and develop mitigation strategies;
- Reduce the negative environmental impacts of natural hazards;
- Reduce the long-term costs of disaster recovery and disaster mitigation through intelligent and strategic mitigation policies and practices; and
- Identify and facilitate the management for sustainable land use in light of natural hazards and our management of the land resources.

2.1.3.1. Objectives to Meet Goals

This Multi-Jurisdictional Hazards Mitigation Plan will implement the following philosophical practices in order to achieve these goals outlined in this plan:

- Improve hazard area identification and emergency warnings to citizens and visitors.

- Increase public awareness of natural hazards and improve appropriate preparation for and response to such hazards.
- Prevent new development in areas that are vulnerable to hazards or ensure that development occurs in such a way as to mitigate risks to the new development without putting others at increased risk.
- Assess, protect, alter, and/or relocate existing developments in those areas where developments are at current risk to natural hazards, to make them less susceptible to catastrophic loss.
- Ensure that the implementation plan developed to protect existing developments is the most cost effective alternative, given considerations for:
    - Personal and business investments
    - Natural resources
    - Existing land use plans
    - Economy of Shoshone County
- Utilize the cost / benefit analysis criteria when evaluating implementation plans for mitigation measures (during implementation) to insure that the benefits of the plan outweigh the costs of implementation – both short-term and long-term.
- Maintain, improve and where appropriate formalize, coordination and consistency between the Shoshone County government the policies and actions with other neighboring jurisdictions and governmental activities, as appropriate, including.
    - State of Idaho
        - Kootenai County
        - Benewah County
        - Latah County
        - Clearwater County
    - State of Montana
    - Idaho State Agencies
        - Idaho Department of Lands
        - Idaho Department of Environmental Quality
        - Idaho Transportation Department
    - Federal Governmental Organizations:
        - Environmental Protection Agency
        - USDA: Forest Service
        - USDI: Bureau of Land Management
        - Homeland Security: Federal Emergency Management Agency

2.2. FEMA Disaster Mitigation Planning

FEMA conducts reviews of all local hazard mitigation plans submitted through the appropriate State Hazard Mitigation Officer (SHMO). FEMA will review the final version of a plan prior to local adoption to determine if the plan meets the criteria, but FEMA is unable to approve any plan prior to adoption by the local municipalities and county.

The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan has been developed in compliance with these listed FEMA program requirements, and in adherence to Idaho State Code concerning open public meeting laws.

The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan has been developed and internally evaluated to adhere to a variety of FEMA developed criteria, including:

- Adoption by the Local Governing Body
- Multi-jurisdictional Plan Adoption
- Multi-jurisdictional Planning Participation
- Documentation of Planning Process
- Identifying Hazards
- Profiling Hazard Events
- Assessing Vulnerability: Identifying Assets
- Assessing Vulnerability: Estimating Potential Losses
- Assessing Vulnerability: Analyzing Development Trends
- Multi-Jurisdictional Risk Assessment
- Local Hazard Mitigation Goals
- Identification and Analysis of Mitigation Measures
- Implementation of Mitigation Measures
- Multi-jurisdictional Mitigation Strategy
- Monitoring, Evaluating, and Updating the Plan
- Implementation Through Existing Programs
- Continued Public Involvement

2.3. Linkage to the Idaho State Mitigation Plan

The State of Idaho Hazard Mitigation Plan, November 2007 (IBHS 2007), was adopted and approved by Governor Otter, Idaho State Agencies, and FEMA Region X. This plan developed a blueprint for state recognition of a variety of hazards and appropriate responses to these threats. The intent of this state plan is to reduce disaster assistance costs and preserve disaster assistance eligibility for the state and local governments in Idaho. This comprehensive state plan provides a strategy to reduce future disaster losses through sound mitigation projects.

The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan has used this approach as a template for assessing potential risks in Shoshone County, and developing a comprehensive and integrated disaster mitigation approach. This local planning effort should be viewed as a part of the larger, integrated approach to hazard mitigation planning led by the Idaho State Bureau of Homeland Security.

2.4. Guidance and Integration with County Planning Activities

The goals of this planning process in Shoshone County include the integration of the National Fire Plan, the Idaho Statewide Implementation Strategy of the National Fire Plan, the Healthy Forests Restoration Act, the Idaho State Hazard Mitigation Plan 2007, the Shoshone County Emergency Operations Plan (January 2009), and the requirements of FEMA for a countywide Multi-Jurisdictional Hazards Mitigation Plan. This effort utilizes the best and most appropriate science from all partners, and the integration of local and regional knowledge about man made and natural hazards, while meeting the needs of local citizens, the regional economy, and the significance of this region to the rest of Idaho and the Inland West.

A complete summary of legal and regulatory resources developed and adopted for Shoshone County is summarized in Table 2.1.

Table 2.1. Shoshone County Legal and Regulatory Resources Available for Hazard Mitigation Efforts.

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans	Shoshone County EOP	Defines Responsibilities	All	Preparedness and Response	No
	County Comprehensive Plan	Defines level of importance	All	All	Yes
	County Fire Mitigation Plan	Identifies threats and hazard mitigation activities for wildfire	Wildfire	All	No
Policies	Zoning Ordinance	Identifies land use locations	All	Mitigation, Preparedness	Yes
	Subdivision Ordinance	Specifies Densities	All	Mitigation, Preparedness	Yes
	Floodplain Ordinance	Identifies Restricted or controlled areas	Flood	Mitigation, Preparedness, Recovery	Yes
	Site Disturbance Ordinance	Controls Construction Disturbance	All	All	Yes
	Institutional Controls Program	Autonomous District Program to Address Superfund Site Disturbances. Shoshone County adopted ordinances requiring ICP to sign for building permits before the county signs the building permit	All	All	Yes
Programs	County Fire Mitigation Program	Reduces Threat	Fire	Mitigation, Preparedness	No
	Superfund Cleanup Program (EPA & IDEQ)	Efforts to cleanup soil contamination and protect human health	All	All	Yes

2.5. Municipality Planning Guidance

Shoshone County is home to seven incorporated municipalities namely Kellogg, Mullan, Osburn, Pinehurst, Smelterville, Wallace, and Wardner. Several other populated places are located over the 1.6 million acres of Shoshone County. All of the incorporated municipalities in Shoshone County have taken active roles in the development of the Multi-Jurisdictional Hazards

Mitigation Plan. Several community members from populated places (unincorporated) have also participated actively in the planning committee effort.

The planning guidance and integration of this effort with established and on-going municipality efforts are summarized in Table 2.2. It is important to acknowledge that all municipalities and Shoshone County have adopted the Institutional Controls Program adopted by the State of Idaho in an effort to remediate contaminated soils and protect that remediation from natural and man made disasters.

Table 2.2. Local Municipality Legal and Regulatory Guidance for Hazard Mitigation Efforts.

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans	City of Kellogg				
	Kellogg City Comprehensive Plan	City Comprehensive Plan acknowledges hazards	All	Mitigation, Preparedness, Response, Recovery	Yes
	City of Kellogg Floodplain Ordinance	City ordinance to guide growth within the floodplain. Meets the directives of the NFIP and CRS.	Flood	Mitigation, Preparedness, Response, Recovery	Yes
	City of Kellogg Land Use Ordinance	Identifies desired land use planning objectives within the city.	All	Mitigation	Yes
	City of Kellogg Landscaping and Soil Stabilization Controls	Identifies development activities affecting site specific disturbances	Landslides, Storm water	Mitigation	Yes
	City of Kellogg Storm Water Runoff Standards	Identifies development activities affecting site specific disturbances	Storm water, Flood	Mitigation	Yes
	City of Mullan				
	City of Mullan Land Use Ordinance	Identifies desired land use planning objectives within the city.	All	Mitigation	Yes
	Mullan City Comprehensive Plan	City Comprehensive Plan acknowledges hazards	All	No	Yes
	City of Osburn				
	City of Osburn Comprehensive Plan	City Comprehensive Plan acknowledges hazards	All	Mitigation, Preparedness, Response, Recovery	Yes
	City of Osburn Land Use Ordinance	Identifies desired land use planning objectives within the city.	All	Mitigation	Yes
	Shoshone County EOP	City relies on County EOP and the City's Role in that planning document	All	Response	No
	City of Pinehurst				
	Pinehurst City Comprehensive Plan	Defines Flood Hazard Areas	Flood	Mitigation, Preparedness, Response	Yes

Table 2.2. Local Municipality Legal and Regulatory Guidance for Hazard Mitigation Efforts.

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
	City of Pinehurst Land Use Ordinance	Identifies desired land use planning objectives within the city.	All	Mitigation	Yes
	Disaster Plan	Defines Roles & Responsibilities	All	Preparedness & Response	No
			City of Smelterville		
	Shoshone County EOP	City relies on County EOP and the City's Role in that planning document	All	Preparedness & Response	No
	City of Smelterville Storm Water Runoff Standards	Identifies development activities affecting site specific disturbances	Storm water, Flood	Mitigation	Yes
	City of Smelterville Land Use Ordinance	Identifies desired land use planning objectives within the city.	All	Mitigation	Yes
	Smelterville City Comprehensive Plan	City Comprehensive Plan acknowledges hazards	All	No	Yes
			City of Wallace		
	City of Wallace Land Use Ordinance	Identifies desired land use planning objectives within the city.	All	Mitigation	Yes
	Wallace City Comprehensive Plan	City Comprehensive Plan acknowledges hazards	All	No	Yes
			City of Wardner		
	Wardner Planning and Zoning Ordinances	Mitigation	All	No	Yes
	City of Wardner Land Use Ordinance	Identifies desired land use planning objectives within the city.	All	Mitigation	Yes
	City of Wardner Comprehensive Plan	City Comprehensive Plan acknowledges hazards	All	No	Yes
	City of Wardner Storm Water Runoff Standards	Identifies development activities affecting site specific disturbances	Storm water, Flood	Mitigation	Yes
	Wildfire Evacuation Plan for Wardner (County plan)	Preparedness	Wildfire	Preparedness	No
Policies			**City of Kellogg**		
	Kellogg City is in the CRS class 8 community program	10% floodplain reduction for all residents who have flood insurance premiums	Flood	No	Yes
	Institutional Controls Program	Adopted ordinances requiring ICP to sign for building permits before the city signs the building permit.	All	Mitigation, Preparedness & Recovery	Yes

Table 2.2. Local Municipality Legal and Regulatory Guidance for Hazard Mitigation Efforts.

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
	City of Mullan				
	Zoning Ordinances	Identifies Land Use Locations and adopts the National Building Codes	All	Mitigation Preparedness	Yes
	Institutional Controls Program	Adopted ordinances requiring ICP to sign for building permits before the city signs the building permit.	All	Mitigation, Preparedness & Recovery	Yes
	City of Osburn				
	Planning & Zoning Ordinance	Identifies Land Use Locations	All	Mitigation Preparedness	Yes
	Subdivision Ordinance	Specifies Structure Density	All	Mitigation Preparedness	Yes
	Institutional Controls Program	Adopted ordinances requiring ICP to sign for building permits before the city signs the building permit.	All	Mitigation, Preparedness & Recovery	Yes
	City of Pinehurst				
	Zoning Ordinance	Identifies Land Use Locations	All	Mitigation & Preparedness	Yes
	Flood Plain Ordinance	Identifies Restricted or Controlled Areas	Flood	Mitigation, Preparedness & Recovery	Yes
	Site Disturbance Ordinance	Controls Construction Disturbance	All	All	Yes
	Institutional Controls Program	Adopted ordinances requiring ICP to sign for building permits before the city signs the building permit.	All	Mitigation, Preparedness & Recovery	Yes
	City of Smelterville				
	Building & Zoning Site Disturbance	Identifies Land Use Locations	All	Mitigation & Preparedness	Yes
	Storm Water Runoff	Establishes Criteria	All	Mitigation	Yes
	Institutional Controls Program	Adopted ordinances requiring ICP to sign for building permits before the city signs the building permit.	All	Mitigation, Preparedness & Recovery	Yes
	City of Wallace				
	Coordination with federal agencies for land use management	Identifies Land Use Locations	All	Mitigation & Preparedness	Yes

Table 2.2. Local Municipality Legal and Regulatory Guidance for Hazard Mitigation Efforts.					
Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
	Adopted International Building Code	Identifies Land Use Locations and adopts the National Building Codes	All	Mitigation Preparedness	Yes
	Planning and Zoning	Identifies Land Use Locations	All	Mitigation Preparedness	Yes
	Institutional Controls Program	Adopted ordinances requiring ICP to sign for building permits before the city signs the building permit.	All	Mitigation, Preparedness & Recovery	Yes
	City of Wardner				
	Institutional Controls Program	Adopted ordinances requiring ICP to sign for building permits before the city signs the building permit.	All	Mitigation, Preparedness & Recovery	Yes
Programs	No Cities Reporting Established Programs that are not already addressed by the County.				

2.6. Agency Planning Guidance

Several state and federal agencies provide services in Shoshone County and many of these were invited to participate in the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan committee. The state and federal agencies participating in this effort include:

- Idaho Transportation Department
- Idaho Bureau of Homeland Security
- Idaho Department of Lands
- Idaho Department of Environmental Quality (IDEQ)
- Panhandle Health District
- Basin Environmental Improvement Project Commission
- US Forest Service
- Bureau of Land Management

The U.S. Forest Service and Bureau of Land Management (BLM) provided detailed information concerning their existing planning efforts affecting hazard mitigation. These ongoing efforts are summarized in Table 2.3.

Table 2.3. U.S. Forest Service & BLM Legal and Regulatory Resources Available for Hazard Mitigation Efforts.

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans - USFS	Forest Plan Idaho Panhandle National Forests 1987	Defines Management Direction on all National Forest Land	All	Mitigation	N/A

Table 2.3. U.S. Forest Service & BLM Legal and Regulatory Resources Available for Hazard Mitigation Efforts.

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
	Idaho Panhandle National Forests Fire Management Plan	Defines Program to manage wildland and prescribed fire.	Wildfire	Mitigation, Preparedness, and Response	Yes
	Interagency Standards for Fire and Fire Aviation Operations	Provides program management direction and guiding principles	Wildfire	Mitigation, Preparedness, and Response, or Recovery	Yes
	North Idaho Interagency Fire Danger Rating Operating Plan	Provides tools for fire managers to correlate fire danger ratings with appropriate fire business decisions.	Wildfire	Mitigation, Preparedness, and Response	No
	Coeur d'Alene Interagency Dispatch Center Standard Operating Procedures	Provide Management oversight of the operation of Coeur d'Alene Interagency Dispatch Center (CDC).	All	Mitigation, Preparedness, and Response, or Recovery	No
Plans – BLM	Coeur d'Alene Resource Management Plan 2007	Defines Management Direction on all BLM Managed Public Lands	All	Mitigation	N/A
	Coeur d'Alene Field Office Fire Management Plan 2004	Defines Program to Manage Wildland and Prescribed Fire	Wildfire	Mitigation, Preparedness, Response and Recovery	Yes

2.7. Organizational Planning Guidance

In addition to Shoshone County, the incorporated cities of Shoshone County, and informal representation of local communities, state and federal agencies operating in the county, there was significant involvement in the planning process by organizations. The local power supply company, Avista Corporation, participated in all committee planning events. The Shoshone Medical Center also provided valued input and provided information on that organization's planning environment concerning hazard response and mitigation (Table 2.4.).

Table 2.4. Shoshone Medical Center Regulatory Resources Available for Hazard Mitigation Efforts.

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans	Disaster Plan	Defines Hospital Hazards Internal/External	External Fire BIO/CHM Bomb Threat Evacuation	Preparedness and Response	No

2.8. Membership on Planning Committee Summary

The Board of Shoshone County Commissioners facilitated the participation of the Mayors and City Councils from each of the seven incorporated cities in Shoshone County. The County also allocated the time and resources of several county departments to dedicate to this planning effort. In particular, the Shoshone County Emergency Manager, John Specht, was identified as the County's point of contact for all activities associated with the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan.

In addition to county and city participation, a number of additional agencies, organizations, and even "citizens-at-large" were invited to join the planning team. In response to a letter sent by the Board of Shoshone County Commissioners, several individuals responded on behalf of their organization to the invitation to participate. These respondents became the core of the planning committee and included the individuals listed in Table 2.5.

Table 2.5. Planning Committee Membership and attendance.

Representing: Department, Agency, City, etc.	Name	Meeting Attendance Record				
		11/13/08	12/11/08	1/8/09	2/5/09	3/12/09
Avista Corporation	Allison Sieverding	√	√	√		
Basin Environmental Improvement Project Commission	Terry Harwood	√	√	√	√	√
Bureau of Land Management	Kurt Pavlat	√	√	√	√	√
Bureau of Land Management	Kurt Pindel		√	√		
Central Shoshone Water District	Barney Norris		√	√	√	
City of Kellogg	Walter Hadley	√	√	√	√	√
City of Kellogg, Mayor	Mac Pooler			√	√	
City of Mullan	Dan White	√	√	√		√
City of Osburn, Mayor	Bob McPhail	√		√	√	
City of Osburn	Charles Mooney	√			√	
City of Pinehurst, City Clerk	Carla Ross	√	√	√	√	√
City of Smelterville, City Council	Dennis Rose		√	√	√	
City of Smelterville	Lee Haynes	√	√	√	√	√
City of Wallace, City Council	Chase Sanborn	√	√	√	√	√
City of Wallace, City Council	Bill Dire				√	
City of Wardner	Rhonda Kays	√	√	√	√	√
City of Wardner, Mayor	Jo Ann Groves				√	
Clarkia Community	Karen Anderson	√	√		√*	
Clarkia Community	Mellisa Stoor	√	√		√*	√
Fire District №1, Chief	Jim Walcker	√	√	√	√	√
Fire District №1 / LEPC	Joe Wallace	√				
Fire District №2, Chief	Dale Costa	√	√	√	√	√
Fire District №2	Darrel Knoll	√	√	√	√	√
Fire District №3	Bruce VanBroeke				√	
Fire District №4 – Chief St. Joe Valley Fire Depart.	Terry Dickinson			√*		
Fire District №4 – Fire District Commissioner	Sherm Hatley			√*		
Fire District №4 – Fire District Commissioner	Donna Farada			√*		
Fire District №4 – Fire District Commissioner	Chuck Barn			√*		
Fire District №4 – Fire District Engineer	Dennis Scott			√*		
Idaho Bureau of Homeland Security	Jay D. Baker	√	√			√
Idaho Bureau of Homeland Security	Mark Stephensen					√
Idaho Department of Lands	Kjell Truesdell	√	√		√	√

Table 2.5. Planning Committee Membership and attendance.

Representing: Department, Agency, City, etc.	Name	Meeting Attendance Record				
		11/13/08	12/11/08	1/8/09	2/5/09	3/12/09
Idaho Department of Lands	Len Young		√	√	√	√
Idaho Department of Lands	Bob Burke				√	
National Weather Service (NOAA)	Kerry Jones					√
Osburn Police Department	Charles Angle	√	√			
Panhandle Health District	Jerry Cobb	√	√	√	√	√
Panhandle Health District	Mike Dancer				√	
School District #391, Kellogg – Superintendent	Sandra Pommerening				√	
School District #391, Kellogg – Principal	Cal Ketchum				√	
School District #392, Mullan – Facilities	Steve Trogden				√	
School District #392, Mullan – Superintendent	Robin Stanley				√	
School District #393, Wallace – Superintendent	Bob Ranells				√	
Shoshone County Commissioner	Jon Cantamessa	√	√	√		√
Shoshone County Commissioner	Vern Hanson					√
Shoshone County Commissioner	Sherry Krulitz		√			
Shoshone County Planning and Zoning	Dan Martinsen	√	√		√	√
Shoshone County Public Works	John Thomas		√	√		
Shoshone County, Emergency Services	John Specht	√	√	√	√	√
Shoshone County, Sheriff Department	Jeremy Groves	√	√			√
Shoshone Medical Center	Justin Custis	√	√	√		√
South Fork Sewer District	Ross Stout	√	√	√		√
TerraGraphics Environmental Engineering, Inc.	Dan McCracken	√	√	√	√	√
TerraGraphics Environmental Engineering, Inc.	William Schlosser	√	√	√	√	√
U.S. Forest Service, Coeur d'Alene Ranger District	Sam Gibbons	√			√	
U.S. Forest Service, Coeur d'Alene Ranger District	Kimberly Johnson		√	√		
U.S. Forest Service, Coeur d'Alene Ranger District	Shawn Pearson					√
U.S. Forest Service, Idaho Panhandle St. Joe	James Grasham	√				

√* Attendance at the indicated meeting was held at an alternate date and location to facilitate communications and distance challenges.

2.9. Planning Process Summary

The Shoshone County Multi-Jurisdictional Hazards Mitigation Plan effort was initiated by the Shoshone Board of County Commissioners in 2007 with the application for funding assistance from the Idaho Bureau of Homeland Security and FEMA Region X.

Funding from FEMA and the Idaho Bureau of Homeland Security for the preparation of the Multi-Jurisdictional Hazards Mitigation Plan was received by Shoshone County in August 2008 (Figure I). The County started work with the Cities, and laid the groundwork for putting together a Hazard Mitigation Planning Committee.

Figure I. Press Release announcing the FEMA award for planning.

WEDNESDAY, AUGUST 27, 2008

SHOSHONE NEWS-PRESS

50 CENTS Visit us online at www.shoshonenewspress.com

County awarded pre-disaster planning grant

By ROBERT DEANE
Staff writer

SHOSHONE COUNTY — Shoshone County has been awarded a Pre-Disaster Mitigation (PDM) Planning Grant, according to FEMA and the Idaho Bureau of Homeland Security Information Center.

The $66,633 grant covers the costs of preparing a mitigation plan for the county.

"The money goes to the county, which will then organize the mitigation plan," said Dave Jackson, hazard mitigation officer with the Idaho Bureau of Homeland Security.

The county will organize the plan with the different communities of the county, Jackson continued.

"Once the area is organized, a risk and vulnerability assessment will be made to assess risk exposure," said Jackson.

Part of the risk exposure assessment will be what areas are at risk of natural disaster hazards such as wild fires, flooding and avalanches.

"Once we identify what is vulnerable we will identify and prioritize certain projects," said Jackson.

Projects can include storm water management to reduce or eliminate long-term risk from flood hazards, protection for utilities, water and sanitary sewer systems and infrastructure.

"We can also raise home elevations on flood plains or voluntarily buy out and relocate homes," said Jackson.

GRANT

Continued from Page 1

Jackson said the property would then be converted into park land or other open spaces.

To make the plan work, feedback from the county's communities is necessary, he said.

"Their input will address the projects that need to be prioritized," said Jackson.

The plan, when approved, will grant the county access to FEMA's Hazard Mitigation programs that help prevent future hazard losses, he said.

"As soon as the papers are received by the IBS, the county will be able to begin using the money," said Jackson.

The IBS will then work with the county to make sure the mitigation plan meets FEMA requirements.

The cost sharing plan for the PDM is 75 percent FEMA and 25 percent Shoshone County.

Following a competitive Request for Proposals process, the Shoshone Board of County Commissioners hired TerraGraphics of Kellogg, Idaho, to assist the planning committee with the process of planning and writing the Multi-Jurisdictional Hazards Mitigation Plan. Leadership for Shoshone County was provided by John Specht, Emergency Manager for Shoshone County. Project Management by the contractor, TerraGraphics was provided by Dr. William E. Schlosser, an Environmental Scientist and Regional Planner. Together, these two individuals provided leadership for the planning committee.

The Shoshone County Emergency Manager contacted potential representatives to serve on the planning committee including each incorporated city (Kellogg, Pinehurst, Mullan, Osburn, Smelterville, Wallace, and Wardner), agency representatives (regional, state and federal), fire protection organizations, school districts, and public service organizations. In addition, openings on the committee were created for citizens-at-large to serve without an affiliation as otherwise identified.

Formal Letters of Invitation to serve on the planning committee were sent by Shoshone Board of County Commissioners. The request was met by over 40 dedicated individuals including Shoshone County representatives and delegates from each municipality accompanied by envoys from agencies, organizations, businesses, and the general citizenry. Planning meetings were held monthly from November 2008 through March 2009, on the second Thursday of each month. Attendance to these meetings is summarized in Table 2.5.

The most remote community of Shoshone County is Clarkia. Two citizen-at-large positions were filled by volunteers from this community. They received no funding to offset their expenses or time (Clarkia is an unincorporated community), and their travel route to attend the monthly meetings was extremely long, especially when the committee meetings were held through the winter months. In order for these two volunteers to attend the monthly meetings, they had to depart Clarkia, located very near the Shoshone-Clearwater-Latah County borders, then leave Shoshone County to drive through Benewah County and Kootenai County, and finally re-enter Shoshone County to arrive at Kellogg. The one-way trip took nearly two hours. These two individuals attended each meeting and represented the best effort of dedication of the people who gave their time and energy to this planning effort.

Initial press releases about the launch of the planning process appeared in the regional newspaper, the Shoshone News Press, in October and November 2008. The November 25, 2008, article announced the planning committee's efforts, and described the attendance by over 40 planning committee members for the kickoff meeting (SNP 11/25/2008). Additional announcements fed through the local media updated the planning process monthly.

In January 2009, the Shoshone New Press printed an announcement by the committee, again updating the public on the progress of the planning effort and the focus on designing mitigation projects (SNP 1/24/2009). In this press release, information was detailed concerning two significant events. First, the article included an announcement that 200 randomly selected homes in Shoshone County were sent a public mail survey for use in determining hazard exposures and past encounters with natural hazards in Shoshone County. The second announcement in this article introduced two public meetings scheduled for Kellogg and Wallace, both scheduled on February 5, 2009.

During each of the Planning Committee's meetings, a progressive theme of accomplishments was scheduled. This "meeting theme" technique began with the discussion and identification of the goals, objectives, and vision of the planning committee. This first meeting also included discussions about a Phase I Hazard Profile, which identified the combined potential for a hazard to occur and its potential to impact people, structures, infrastructure, and the economy of Shoshone County. At this meeting the planning committee identified and endorsed the plan of work to accomplish a hazard resistant community philosophy.

As the planning committee meetings progressed into December, a series of discussions took place about the risk exposure in each municipality and rural area. Lengthy discussions were augmented with large-formatted map sets including aerial photography, parcel ownership, FEMA flood zones, landslide prone landscapes, fire prone landscapes, seismic shaking hazards and fault lines, and other descriptive mapping products (each will be discussed in this plan). These map sets were provided to planning committee members, each municipality, the County and others as requested.

Potential mitigation measures took the center focus at the January, February, and March 2009, interactive planning committee meetings, and the public meetings involved attendees designing and locating potential efforts. At the same time, Environmental Engineers from TerraGraphics supplemented and augmented these potential mitigation measures with additional projects designed to meet the goals and objectives of the county.

Accessing the South Fork Coeur d'Alene River Valley, where the majority of the population is located, from the remote areas of the county is extremely difficult. All of the committee meetings were held in Kellogg, on the western side of the South Fork Coeur d'Alene River Valley. Although two volunteers from Clarkia (the most remote area) were able to make the journey monthly, not all of the committee membership was able to make this commitment. This inability to attend the meetings was brought on by a combination of extended travel distance and work-related commitments. Fire District #4 and the community of Calder, located on the St. Joe River, and the Prichard-Murray Volunteer Fire Department were faced with this challenge. Both fire departments are staffed by volunteers and work full-time jobs in the private sector. In order to facilitate the involvement by these groups, the Shoshone County Emergency Manager worked directly with these individuals, shared planning committee documents, and collected their input for inclusion with the planning committee's labors.

For instance, John Specht met with five residents from Calder including the St. Joe Valley Fire District #4 Chief, three Fire District Commissioners, and one local citizen on January 29, 2009. This Fire District is staffed by 12 volunteers. The session covered the agenda conducted at the regular planning meeting earlier that month. In addition, they discussed fire equipment, communications issues, training of volunteers and facilities owned by the district.

Their information was introduced to the planning process. This facilitation was repeated with other participants in the planning committee who were not able to attend the monthly scheduled meetings for a variety of reasons. Between telephone, e-mail, and face-to-face interactions, all of the listed participants were able to directly, and indirectly, provide input and feedback for the plan.

An Internet Website page and a File Transfer Protocol (FTP) site were established for use by the planning committee (both hosted by TerraGraphics). The web site included information about the committee meetings, copies of FEMA guidance for developing plans, the Idaho State Hazard Mitigation Plan, other relevant documents for planning committee use, and the schedule of meetings and outreach efforts.

The FTP site allowed planning committee members the ability to send the Project Manager documents, photographs, and other electronic files for use in the planning process. The Project Manager was also able to post files for dissemination to the committee members for review and comment (many times files were too large for attachment to e-mail correspondence). In addition, the large map set files (totaling 550 MB), which were created and stored in Adobe PDF files, were made available for download by all planning committee members. These sets included detailed mapping for all seven municipalities plus eleven more populated places. One map set was created for the entire county (lower resolution). Each map set was formatted to display on 24"x20" sheets within Adobe Acrobat Reader. Each set included between 5 and 11 individual maps on one specific area (a total of over 75 maps).

This format of providing mapping analysis products (in PDF format and at high resolution) was selected for the ability to display detailed attributes otherwise not recognizable when reduced to a normal page size of 8½"x11". Server logs for the FTP site indicated that over 200 file downloads from this site were conducted between December 2008 and March 2009. Copies of these maps were used by the agencies, organizations, municipalities, and local citizenry while developing an understanding of risk exposure and potential mitigation measures.

Committee members were provided draft sections of the analysis as they were developed. This issuance of sections, monthly at the planning committee meetings, allowed the committee members the ability to comment and provide feedback as the analysis progressed (Figure II). Thus, the entire committee shared the same perspective of risk exposure, vulnerability to losses, and potential mitigation measures. When the public review draft of the plan was prepared for dissemination, there was little that the planning committee members had not previously seen and reviewed.

Figure II. Planning Committee interactions during planning committee meetings from November 2008 through March 2009.

Figure II. Planning Committee interactions during planning committee meetings from November 2008 through March 2009.

Figure II. Planning Committee interactions during planning committee meetings from November 2008 through March 2009.

2.10. Public Involvement Summary

Public involvement in this planning process was made a priority from the inception of the effort. Initial press releases beginning in late 2008 introduced the County's launch of the planning effort made possible by the FEMA funding award (Figure I). Continued outreach was achieved mainly through the use of press releases in the Shoshone News Press, the only media source in Shoshone County. A summary of the press releases is provided in the previous sub-section of this chapter.

Additional efforts included the posting of Hazard Risk Assessments (maps provided to the planning committee members) at the offices of the County, Cities, and organizations participating on the planning committee.

Two open public meetings were held on February 5, 2008. One was held in Kellogg, Idaho, from 2:00 to 3:00 pm. The second was held in Wallace, Idaho, from 6:00 to 7:00 pm. The meetings were well attended with a total of 40 people participating in the two events.

Additional presentations were made to public service groups during February and March, 2009. All three presentations were made by the Shoshone County Disaster Manager, John Specht. The first presentation was held on February 24, 2009, to the Silver Valley Kiwanis Club in Kellogg (12:30-1:30 PM) to approximately 10 members in attendance. The second public service organization presentation was made on March 5, 2009, to the Silver Valley Rotary Club in Kellogg (6:00-6:30 PM) to about 18 members in attendance. The third was made to the Shoshone County Natural Resources Committee in Wallace on March 17, 2009, to 10 members of the Committee in attendance.

All presentations discussed the planning process, the importance of the effort to the county and each city, an overview of the risk profile developed for the region, and what facilities are at-risk to natural disasters. Additional discussions identified how public comments are being integrated into the plan and specifically the information about how to obtain the public review document for consideration.

The preparation for the public meetings involved the meeting rooms displaying a variety of maps of the county, including high resolution maps of the areas surrounding the meeting locations. These maps included the geospatial analysis risk maps for floods, landslides, seismic shaking hazards, fault lines, fire prone landscapes, historic fire regime, and fire regime condition class. Parcel ownership and population density were also displayed alongside high resolution aerial photography of the areas.

These maps created the setting of "place" for the attendees at the meetings and were accompanied by a series of potential mitigation measure posters prepared for several locations where the meetings were held. These posters were placed on tables surrounding the meeting rooms and were accompanied by handouts concerning the hazard mitigation effort.

The formal portion of the meetings lasted one hour, and the informal portion lasted up to another hour. The attendees were welcomed by Shoshone County Emergency Manager, John Specht, who provided a brief overview of the planning process and introduced Project Manager, Dr. William E. Schlosser, who made the slideshow presentation (Figure III and Table 2.6). This slideshow was an interactive discussion between the attendees and the planning committee members present, including the presenter. The entire overview of the process and the initial findings were given with the request that at the end of the presentation people would be willing to draw and write ideas with the moderators on the maps and posters to include new and innovative solutions to mitigating natural hazards.

The meetings spawned discussions and ideas from the audience, and interactions led to the map tables where people wrote their ideas and asked questions about combining efforts to mitigate multiple hazards at once.

Figure III. Public meeting slideshow overview.

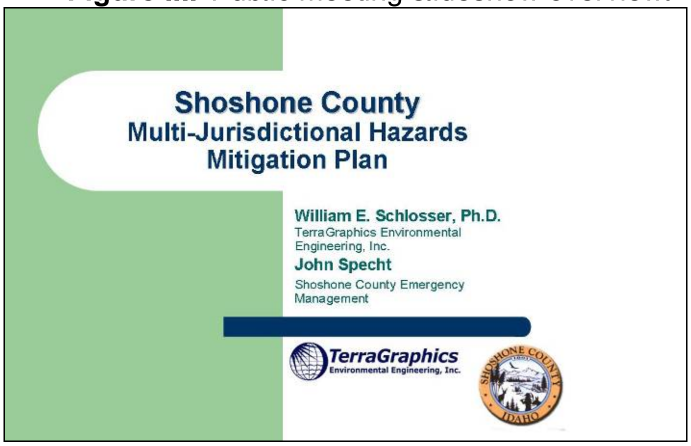
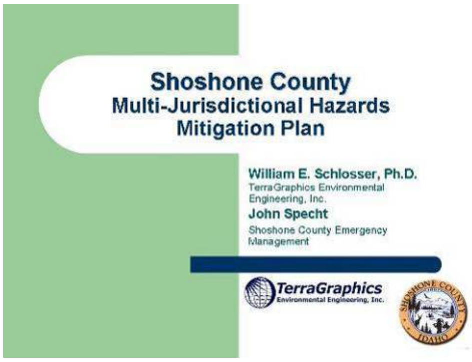


Table 2.6. Public meeting slide show, February 5, 2009.

Slide 1



Slide 2

Table 2.6. Public meeting slide show, February 5, 2009.

Slide 3

TerraGraphics

Shoshone County Response

- The Flood damage from the Spring 2008 caused numerous disasters and damages to structures, infrastructure, and the local economy;
- A state and federal disaster was declared for Shoshone and Kootenai Counties;
- In order to compete for nearly $1.8 million in FEMA Disaster Relief Funding, Shoshone County must complete, adopt, and have approved a FEMA Multi-Jurisdictional Hazards Mitigation Plan by May 30, 2009.

Slide 4

TerraGraphics

Shoshone County Response

- TerraGraphics Environmental Engineering, Inc., was retained by Shoshone County to assist in the following areas:
  - Assessment of natural hazards,
  - Develop and implement planning activities,
  - Characterize past hazard events,
  - Characterize future potential hazard events,
  - Assist in developing mitigation measures to reduce the negative impacts of natural hazards on Shoshone County.

Slide 5

TerraGraphics

Participating Municipalities

- Shoshone County Departments,
- City of Kellogg,
- City of Mullan,
- City of Osburn,
- City of Pinehurst,
- City of Smelterville,
- City of Wallace,
- City of Wardner,
- Community of Clarkia.

Slide 6

TerraGraphics

Participating Organizations & Agencies

- Bureau of Land Management
- US Forest Service
- Idaho Department of Lands
- Idaho Department of Environmental Quality
- Panhandle Health District
- Basin Environmental Improvement Project Commission
- Shoshone Medical Center
- Avista Corporation
- Idaho Bureau of Homeland Security
- Central Shoshone Water District
- South Fork Sewer District
- Fire District #1
- Fire District #2
- Fire District #3
- Fire District #4
- Prichard / Murray Volunteer Fire Department

Slide 7

TerraGraphics

Planning Committee

- Members attend and participate in monthly planning meetings;
- Members provide data which is being included in the planning process;
- Members review and analyze specific sections of the planning document as they are developed;
- Members develop potential mitigation measures for implementation in the plan and for group discussions to create an holistic approach to mitigation planning.

Slide 8

TerraGraphics

Planning Committee

Slide 9

TerraGraphics

Public Involvement

- Public Meetings in February – ***ALL ARE WELCOME!***
- Public Mail Survey;
  - Sent to 200 homes in Shoshone County
  - Three Mailings total – currently two have been sent
  - Questions about risk exposure and preparedness
  - Current response rate of 47%!
  - Extras are available if you want to submit one ☺
- Press Releases published periodically;
- Draft Review of complete document in February & March;
- Comments always welcome!

Slide 10

TerraGraphics

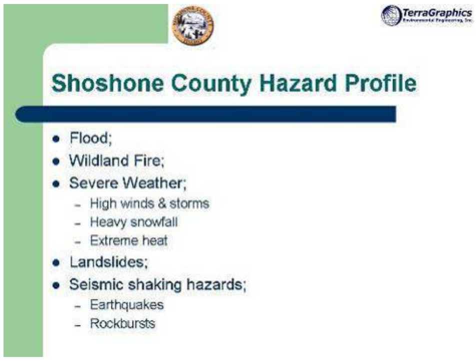
Shoshone County Hazard Profile

Probability of Occurrence	Low	Medium	High
High	Drought	Avalanches	Wildfire Severe Winter Weather Flood
Medium	Insect & Disease (crops & livestock)	Wind Storms	Landslide
Low	Epidemics Terrorism Civil Unrest	Earthquake	Hazardous Materials

Potential to Impact People, Structures, Infrastructure, and the Economy

Table 2.6. Public meeting slide show, February 5, 2009.

Slide 11



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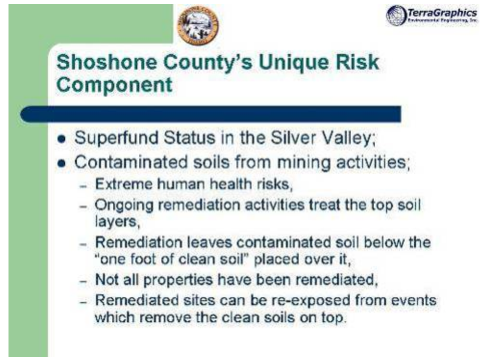

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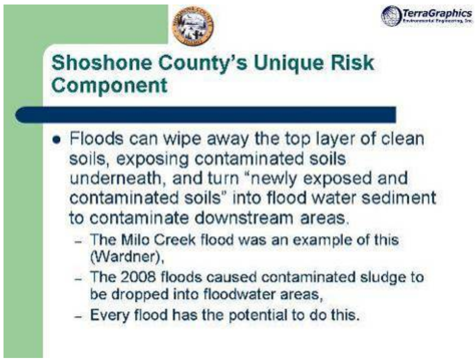

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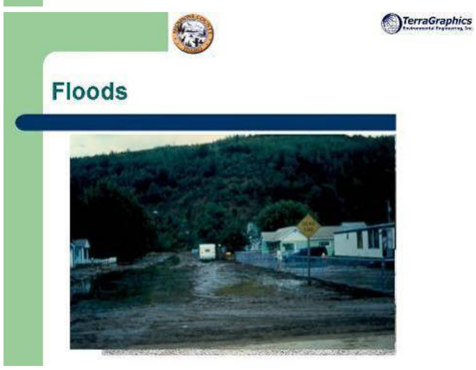

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Table 2.6. Public meeting slide show, February 5, 2009.

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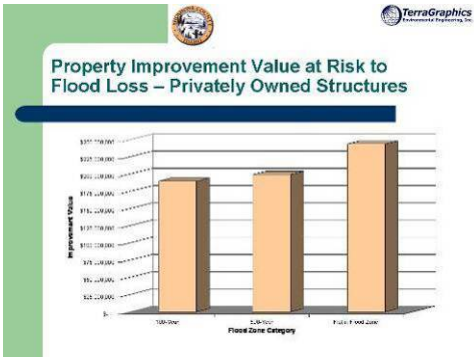

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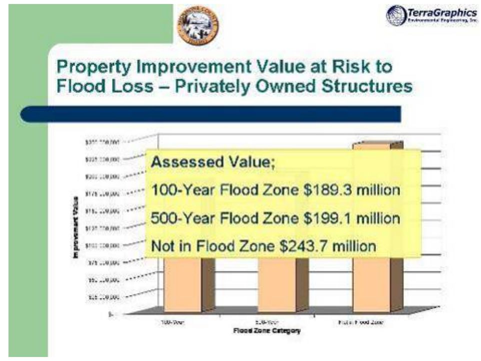

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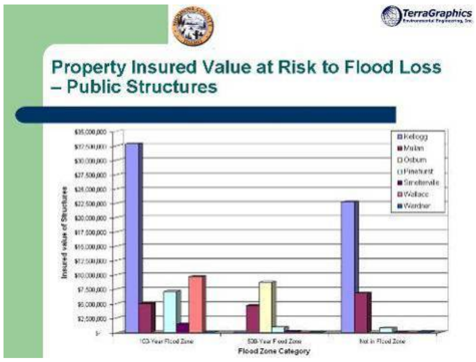

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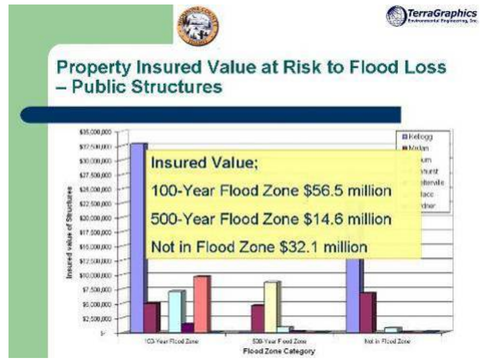

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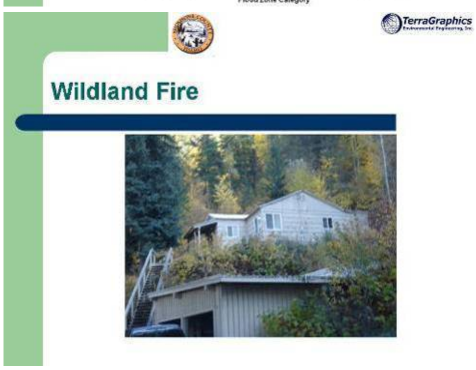

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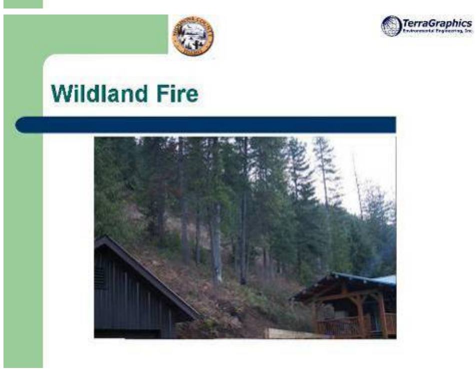

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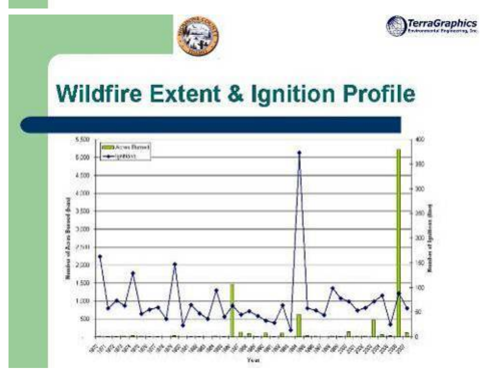

Table 2.6. Public meeting slide show, February 5, 2009.

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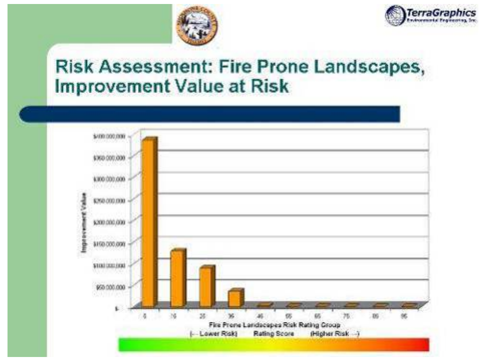

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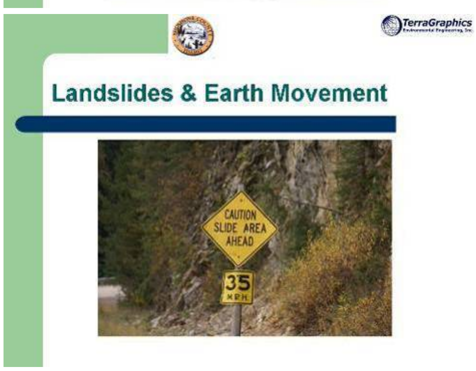

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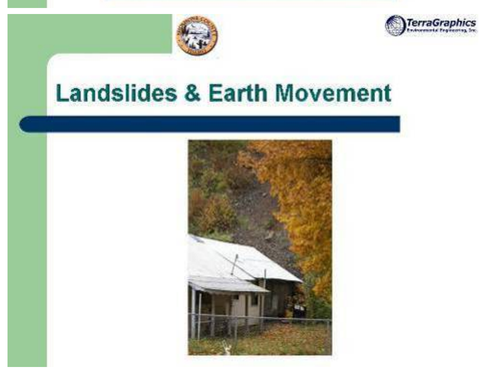

Table 2.6. Public meeting slide show, February 5, 2009.

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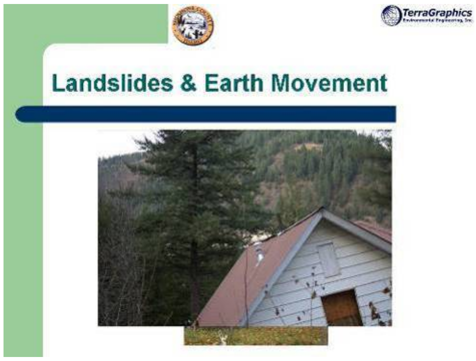

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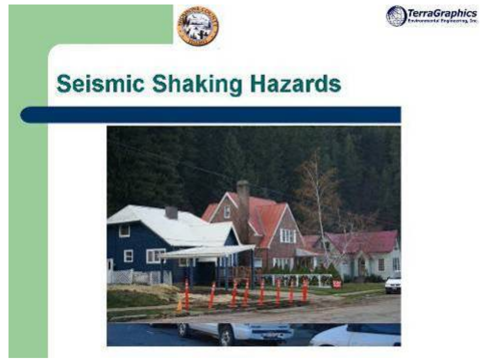

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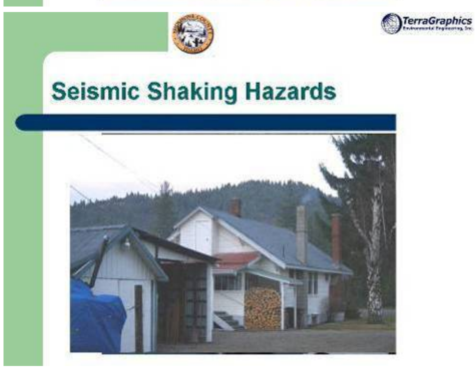

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Table 2.6. Public meeting slide show, February 5, 2009.

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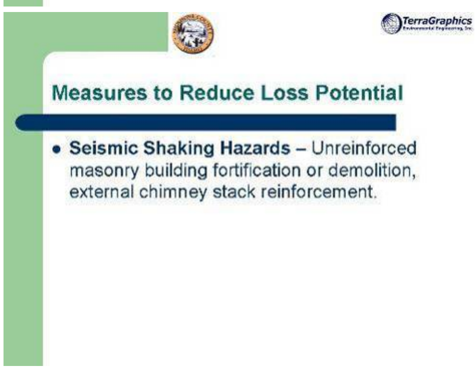

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Table 2.6. Public meeting slide show, February 5, 2009.

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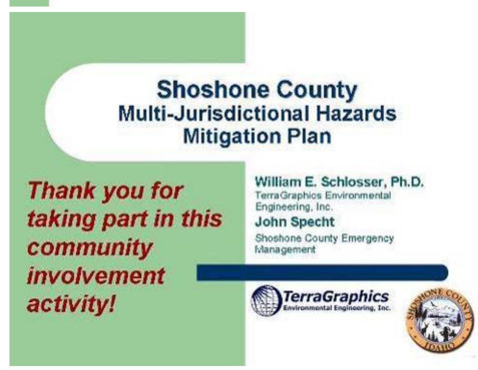


Discussions and ideas from the public meetings were combined with the ideas developed by the planning committee to create a well rounded potential mitigation matrix addressing most of the populated places in Shoshone County and each of the major hazards considered. Perhaps the biggest accomplishment from the entire public involvement effort was the realization by everyone involved that people share in the mitigation ethic articulated by the planning committee membership.

Figure IV. Public meeting photographs from Kellogg and Wallace on February 5, 2009.

2.10.1. Press Releases

On February 6, 2009, the day after two public meetings were held in Kellogg and Wallace, the Shoshone News Press printed an article covering the meetings and further disseminated information about the planning process (section 2.10.1.1).

2.10.1.1. Public Meetings Media Coverage

Reproduced from Shoshone News Press Online:

Shoshone County is on the fast track to complete a Multi-Jurisdictional Hazards Mitigation Plan, paving the way for federal grant funding and laying the foundation for county-wide emergency management in the future.

The federal compliance document, required of all cities, counties and tribes to qualify for federal disaster relief funds, is a work in progress, drawing from a wellspring of community input and collaboration, William Schlosser of TerraGraphics Environmental Engineering Inc., told a group of stakeholders in Kellogg.

Schlosser led a pair of meetings Thursday — one in Kellogg and the other in Wallace — to update the public on progress being made by TerraGraphics and a planning committee to wrap up the mitigation plan by May 30. By design, Schlosser said, the process has focused on finding common threads and practical solutions.

"We've had a full room every time," Schlosser said. "Folks are engaged and are really making things happen."

Though the first county in the nation to implement a fire mitigation plan, Shoshone County is now the sole Idaho county lacking a Multi-Jurisdictional Hazards Mitigation Plan. The county, currently out of compliance, is now on target to complete community meetings this month, present a draft of the document for public comment, and submit a final version to FEMA and the Bureau of Homeland Security for a stamp of approval.

After the county and local cities adopt the plan, Schlosser said Shoshone County Emergency Manager John Specht will be tasked with keeping the document up-to-date and relevant. The county hired TerraGraphics to pull various components of the plan together, and to bring groups with varying perspectives — including the Bureau of Land Management, the Panhandle Health District, the Forest Service and local water, sewer and fire districts — to the bargaining table.

"Think outside the box," Specht urged the group gathered at the jobs services building. "We want to know the specifics as well as (your) wild thoughts."

Following an assessment of the county, Specht, Schlosser and the planning committee zeroed in on floods, wildland fires, severe weather, landslides and seismic hazards, addressing each potential emergency in the mitigation plan.

Shoshone County has a unique risk component, Schlosser noted: Contaminated soil from mining activities. Though the top foot of soil has been removed, Schlosser said the underlying areas of contamination pose lingering human health risks. In the case of flooding, he said, the top layer of soil can be swept away, in addition to contaminated flood water sediment spread to downstream areas. Landslides can similarly disseminate contaminated soil, and wildfires increase the potential for erosion.

"This is the epicenter," Schlosser said of the contaminated soil. "This is where the contamination levels were the highest." Schlosser noted Thursday that two-thirds of private structures in Shoshone County are located either within the border of 100- or 500-year flood zones, or are immediately adjacent. Also, more than $56 million worth of public buildings in the county, including city halls and fire departments, are in the 100-year flooding area.

On the wildfire front, Schlosser said most assessed value in terms of private and public structures is located in low-risk areas. "That doesn't mean we're out of the forest yet," Schlosser cautioned, urging homeowners to take fire prevention into their own hands by clearing nearby areas of fire fuel and considering metal roofs and flame-retardant decks.

Dangers posed by landslides, seismic shaking and severe weather, such as the unprecedented snowfall that buried the Wallace bus barn last winter, should also be on the radar for the county. "These are the kinds of issues that need to be addressed," he said.

Measures being wrapped into the plan are far reaching, according to Schlosser. Mitigation could range from the development of building codes that define where and what type of new development occurs in the county to improving or reinforcing structures at risk of flood, landslide or earthquake; developing infrastructure such as levies and snow staging areas; and continuing to foster coordinated responses from emergency officials at the city, county and state level.

"We're well along in the process," Schlosser reported. "So far it's going really well."

(SNP 2/6/2009)

2.10.1.2. Public Review Period Announced

The week of March 16, 2009, this plan is being released for public review. The results of that review will be summarized in this section of the document.

A press release will instruct interested persons how to obtain a copy of the draft for review, including the Shoshone County Courthouse, each City Hall Office, State and Federal Offices in the County, and to an Internet web site for electronic downloads (PDF format), at http://www.TerraGraphics.com/Shoshone/. Questions and comments will be directed to the Shoshone County Emergency Manager.

2.10.2. Public Mail Survey

A public mail survey was developed for use in this planning process. The public mail survey was intended to collect information from a random selection of residential homeowners in Shoshone County concerning past experiences with natural hazards, the characteristics of risk for those homes, and preparedness for natural hazards.

The selection of residential homeowners in Shoshone County was made from the list of property owners maintained by the Shoshone County Assessor. The random selection of homeowners included 202 unique owners and addresses. Since this list was generated from the Shoshone County Assessor's list of properties it included only homeowners who live on the property (not renters), and whose mailing address is in Shoshone County (residential owners only).

In order to ensure a broad based query of county residents, a non-uniform selection probability was employed. A standard probability of selection in the county, with this sample size, was approximately 2%. This sample probability was increased in the very rural areas of the county to ensure a minimum number of ten samples requested in small communities (Table 2.7). The 202 homes sampled were sent a mailing on January 15, 2009.

The initial mailing included a cover letter sent from William Schlosser, Project Manager, from TerraGraphics. The cover letter briefly explained the project efforts and introduced a one-page, tri-fold survey asking for participation. A return envelope was provided. As an incentive for participation, respondents were offered a free aerial photography map print from any one of eleven areas evaluated during the hazard mitigation planning process.

Approximately ten days after the launch of the initial mailing, a postcard reminder was sent to the non-respondents asking again to complete and return the survey for consideration. Then a week after the postcard reminder was sent to non-respondents, another mailing was sent with a cover letter, replacement survey, replacement return envelope, and another map request form, pleading with the non-respondents to take the time to fill out the survey and return it to the TerraGraphics office in Kellogg. This sample procedure followed the Dillman Total Design Method recommended for mail surveys (Dillman 1978).

The result of the repeated mailings, the press releases, and the public meetings was a total response rate of 60%, from 122 returned surveys (Table 2.7). All of the surveys provided the planning effort valuable information which is summarized here.

Response rates by community were variable, ranging from a low of only 38% from residents living in the City of Smelterville, to a high response rate of 100% from the community of Silverton. However, it must be recognized that a differential selection probability was used in the smaller population areas and the 100% response rate in Silverton represents a total of only 4 samples which were all completed and returned (Table 2.7). The "Response Rate Overall" column of Table 2.7 shows the responses received from each community as a percentage of the total number of responses received and indicates that each sampled community has an average response rate of 8% of the total sample. Therefore, no one "large population community" offsets any "low population community" in the analysis of the results.

Table 2.7. Sample intensity and response rate by community for the public mail survey.

Community	Sample Intensity	Number of Responses	Response Rate by Community	Response Rate Overall
AVERY	58%	8	73%	6%
CALDER	32%	7	50%	5%
CATALDO	20%	8	53%	6%
CLARKIA AREA	47%	9	64%	5%
KELLOGG & WARDNER	2%	17	89%	12%
KINGSTON	3%	7	58%	5%
MULLAN	3%	9	82%	7%
MURRAY & PRICHARD	57%	12	71%	9%
OSBURN	4%	17	65%	13%
PINEHURST	3%	18	69%	13%
SILVERTON	2%	5	100%	4%
SMELTERVILLE	6%	8	50%	6%
WALLACE	3%	9	53%	7%
TOTAL (202 Surveys Mailed)	4,437 Unique Residential Owners*	134 Returned Surveys	66% Completed Surveys	100%

* Unique Residential Homeowners are determined as individuals who own real property in Shoshone County, and have a primary address in Shoshone County. Residential Homeowners who own multiple parcels in Shoshone County were represented only once in the database to ensure equal probability of selection for this survey. Based on these criteria, there are 4,437 unique homeowner names in Shoshone County.

Virtually all of the respondents identified that they have emergency 9-1-1 service in their area. Only one respondent, living in the very remote area of Avery indicated they do not have this telephone service, and it could be surmised that telephone service may be the limiting factor, not the availability of 9-1-1 service on a telephone.

Approximately 84% of the respondents correctly indicated that their home is located in a structural fire protection coverage area. At the same time, approximately 11% of the respondents correctly indicated that their home is not protected by a structure fire department. Most of these latter respondents were from the Clarkia, Fernwood, and Avery areas of the county where structure fire protection services are not currently available. However, an equal ratio of respondents, 2.5% each, incorrectly indicated their fire protection status: either as protected when they are not protected, or as unprotected when in actuality they are protected by a fire department. These latter two indicators point to i) a potential for fire protection organizations in the county to better indicate their fire protection service areas where available, and ii) an opportunity for county emergency services to better educate residents about where these services are unavailable and seek consensus about expanding existing fire protection, such as expanding the service area of Fire District #4 along the St. Joe River to extend as far as Avery. The potential also exists to provide coverage to populated areas of the county that do not currently have structure fire protection, such as Clarkia and Fernwood.

The respondents to the survey indicated the roofing materials covering their home. Approximately 52% indicated a metal roof, while 44% indicated a composite roofing material. The remaining 4% of respondents specified a ceramic roofing material. None of the respondents to the survey listed a wooden roofing material such as cedar shakes or shingles. From a wildfire mitigation standpoint, this is a rather good set of factors as the indicated roofing material is not ignitable by wildfire brands or embers.

The average driveway length listed by survey respondents was about 410 feet long, with the longest driveway listed at 3¼ miles. All of the driveways over ½ mile long were reported to possess a turn-out which can allow two vehicles to pass each other. Respondents indicated the driveway surfaces were predominately gravel (53%) and paved (37%), with the remaining 10% bearing a dirt surface. The average driveway surface indicated was 20 feet wide. Approximately 93% of respondents with a driveway longer than 500 feet specified a winter-time plowing of their driveway.

Respondents to the survey indicated limiting overhead obstructions to their driveways. The average clearance of respondent driveways was 18 feet with the most limiting obstruction at only 7 feet on one response. However, approximately 12% of respondents indicated a limiting height clearance of only 10 feet or less on the access to their homes.

Survey respondents provided information about the steepness, or grade, of their driveways. Roughly 52% indicated a flat grade, 25% showed a slight grade, 17% signaled a moderate grade, and the remaining 7% of respondents indicated a steep grade to access their homes. At the same time, approximately 46% of the respondents to the survey indicated that they do not have alternative access to and from their home in the event the primary access route was cut off due to a natural hazard such as wildfire, flood or landslide.

Only 7% of respondents indicated that their driveway crosses an open water conveyance system such as a stream, river or canal. However, of those driveways that do cross this water conveyance system, slightly more than 44% of those homeowners do not have an alternate ingress and egress route in the event this access route is compromised because of a flood situation. Conversely, the remaining 56% of homeowners in a similar situation do have alternative access.

Survey recipients were asked to identify if their address numbers are clearly visible from the nearest public road. Almost 87% of respondents signified a positive response to this question, confirming what has been a substantial effort by many of the fire departments and citizens of Shoshone County to make structure addressing visible for emergency responders.

Communications in populated places, and even in the remote areas of Shoshone County, have changed substantially in the past decade. Approximately 66% of respondents indicated they have an alternate communication device available when their primary telephone service is inoperable. Of those respondents with alternate communications, about 56% use a cell phone, 11% use a CB or Ham Radio, while others use a combination of satellite phones, closed channel radios, or even internet telephone services. Approximately 71% of the respondents indicated they have internet connections, and a computer to use it, at their home.

During natural hazards, power supplies are often compromised. Survey responses indicated that about 27% of residents have alternate power supplies. Approximately two-thirds (66%) of the respondents to the survey live inside an incorporated city limit; the remaining 34% live in rural areas. Of these rural citizens of Shoshone County, approximately 61% own alternative power supplies. On the other hand, respondents who live within a city limit reported an average ownership of alternative power supplies at only 10% of the households.

Emergency services training within the household is an indicator of a family's exposure to safety issues and awareness in emergency situations. This training can include one or more family members participating in volunteer activities (such as volunteer fire fighting), or from employment based training, or from other venues. Respondents indicated training in the following areas within the last 10 years: 15% wildland fire, 10% city or rural fire fighting, 19% paramedic or EMT, 59% basic first aid, and 11% in search and rescue. Overall, about 60% of respondents reported at least one of these training activities for at least one member of the household. Just over one-third of those respondents with training in the household, indicated a combination of two or more training categories. A respectable 7% of respondents with training in the house, indicated training in all five categories listed, within the last 10 year period.

As this Multi-Jurisdictional Hazards Mitigation Plan will discuss in subsequent sections, severe weather, wildfire, and flooding risks in Shoshone County are the most widespread natural hazards. Wildfire risks are often very pronounced because of the vastness of the areas potentially impacted each summer. Homes and businesses are scattered around populated places and into rural and often very remote places. Respondents to the survey were asked to evaluate four categories of wildfire risk in the areas immediately surrounding their homes (Table 2.8, Carree *et al.* 1998). The right side column reports the average response rates by category, as summarized further in Table 2.9.

Table 2.8. Wildfire Fuel Hazard Rating Worksheet.

		Rating	Results
Fuel Hazard	Small, light fuels (grasses, forbs, weeds, shrubs)	1	45%
	Medium size fuels (brush, large shrubs, small trees)	2	24%
	Heavy, large fuels (woodlands, timber, heavy brush)	3	30%
Slope Hazard	Mild slopes (0-5%)	1	58%
	Moderate slope (6-20%)	2	21%
	Steep Slopes (21-40%)	3	15%
	Extreme slopes (41% and greater)	4	7%
Structure Hazard	Noncombustible roof and noncombustible siding materials	1	30%
	Noncombustible roof and combustible siding material	3	45%
	Combustible roof and noncombustible siding material	7	9%
	Combustible roof and combustible siding materials	10	16%
Additional Factors	Rough topography that contains several steep canyons or ridges	+2	Average -2.0 pts
	Areas having history of higher than average fire occurrence	+3	
	Areas exposed to severe fire weather and strong winds	+4	
	Areas with existing fuel modifications or usable fire breaks	-3	
	Areas with local facilities (water systems, rural fire districts, dozers)	-3	

Values below are the average response values to each question in the survey.

Fuel hazard 1.9 x Slope Hazard 1.7	=	3.2
Structural hazard	+	3.9
Additional factors	(+ or -)	-2.0
Average Hazard Points	**=**	**5.1**

Table 2.9. Percent of respondents in each wildfire risk category as determined by the survey responses (Carree et al. 1998).

01% – Extreme Risk = 26 + points
04% – High Risk = 16–25 points
37% – Moderate Risk = 7–15 points
58% – Low Risk = 6 or less points

The relative risk scores (Table 2.9) of respondents who live within city limits were compared to those living in rural areas. This comparison revealed no statistically significant difference between these two populations. The overall self-evaluation performed by the homeowners places approximately 58% of the homes at low risk, 37% at a moderate risk, and the remaining 5% at high to extreme risk factors to loss from wildfire (Table 2.9).

Survey recipients were asked about their personal experiences in Shoshone County concerning natural hazards within the past 10 years (1999-2008). Responses indicated that winter storms have been experienced by approximately 62% of respondents, more than any other natural hazard. Some of these winter storms caused home, business, and property damages and affected real estate owned by 24% of respondents. Losses averaged $557 per occurrence of damage (Table 2.10).

Wind storms (including tornados) were experienced by approximately 22% of respondents to the survey. Approximately 14% of respondents experienced financial loss damages to their real estate averaging over $4,100 per occurrence (Table 2.10).

Flood events were experienced by almost 1 in 5 homeowners (19%) during the past 10-year period in Shoshone County. While only 8% of respondents reported monetary losses from flooding to their home, business, or real estate, the losses were significant at $9,220 per event (Table 2.10).

Table 2.10. Disasters affecting private real estate in Shoshone County (1999-2008).

↓Hazard↓	Percent of respondents reporting hazard occurrence during the period 1999-2008, near their home.	If YES, Complete these questions…	Percent of respondents experiencing monetary damage to their home, property, or business.	Approximate average monetary loss caused by each hazard (during the period 1999-2008)	Average losses estimated for private real estate in Shoshone County during the period 1999-2008
Wildfire	8%	→	2%	$267	$29,167
Flood	19%	→	8%	$9,220	$3,361,521
Earthquake	2%	→	0%	$--	$--
Landslide	3%	→	1%	$500	$18,230
Wind Storm / Tornado	22%	→	14%	$4,106	$2,544,839
Winter Storm	62%	→	24%	$557	$588,813
	↑	Data provided through the survey		↑	↑ Data derived ↑ through analysis

Based on the data collected, private homeowner losses can be extrapolated to the level of all private homeowners in Shoshone County by combining the total homeowner loss values (from the survey) for each risk (Table 2.10), and expanding these numbers to the level of the entire county (Table 2.7). Using this methodology it can be observed (Table 2.10 – right side column) that flooding has caused the largest estimated losses to private homeowners during this period, with $3.4 million in the last decade ($336,152 per year).

Wind storms have extracted private homeowner real estate damages of approximately $2.5 million in the last 10-year period, or approximately $254,484 per year (Table 2.10). Although winter storms were the most reported natural hazard experienced by survey respondents (62%), the low level of real estate losses per event extrapolates to the entire population at about $588,800 per decade, or $58,880 per year (Table 2.10).

Although wildfire is intuitively a very widespread risk in Shoshone County (affecting a significant land area), low actual losses reported by a low percentage of homeowners expands to a decadal loss of only $29,167, or $2,917 per year within the county (Table 2.10).

While the comparison of these data is extremely valuable in recognizing the recent historic impact of these natural hazards, it is critical to understand that these losses are not representative of commercial business losses, municipality or county government losses, or agency losses from these hazards. Neither are these decadal summaries of losses reflective of the expenditures in agency, municipality, county, state, or federal dollars to mitigate these natural disasters. For instance, substantial budget amounts are expended annually by state and federal forest protection agencies to mitigate wildfire losses, fight wildfires, and prevent wildfire spread in Shoshone County. Volunteer efforts concerning flood risk, and agency expenditures to mitigate flood losses are similarly considered.

Survey recipients were asked to provide a general summary of their home's exposure to natural hazards by indicating whether it is at risk to a list of these hazards. These data confirm the intuitive recognition of the widespread exposure risk of all county residents to winter weather storms (81%), wildland fires (66%), and wind storms (57%) (Table 2.11).

Table 2.11. Respondent self-assessment of home site risk exposure.

Hazard	Percent of Respondents indicating exposure to risks.
Wildfire	66%
Flood	39%
Earthquake	20%
Landslide	13%
Wind Storm	57%
Winter Storm	81%

Survey recipients were asked "If offered in your area, would members of your household attend a free or low cost, one-day training seminar designed to share with homeowners how to reduce the potential for casualty loss surrounding your home?". A clear majority of homeowners (69%) indicated a desire to participate in this type of training opportunity.

Homeowners were also asked how hazard mitigation projects should be funded in the areas surrounding homes, communities, and infrastructure such as power lines and major roads. These responses would seem to indicate a preference for home defensibility projects to reduce the exposure of individual homes to natural hazards is almost equally divided between private, cost-share, and public funding preferences (Table 2.12). Conversely, about 55% of respondents indicated a public funding preference for community defensibility projects, with 35% opting for a cost-share approach. Infrastructure project funding for hazard mitigation was preferred by 71% of respondents to be facilitated through public funding options (Table 2.12).

Table 2.12. Public opinions of hazard mitigation funding preferences.

	Public Funding	Cost-Share (Public & Private)	Privately Funded (Owner or Company)
Home Defensibility Projects →	31%	32%	37%
Community Defensibility Projects →	55%	35%	10%
Infrastructure Projects Roads, Bridges, Power Lines, Etc. →	71%	17%	12%

All survey recipients were offered an incentive to participate in the project in the form of a custom made color aerial photography wall map (24"x20") for completing and returning the survey and map request form. While most of the respondents included their map request form, others did not, but they did return a completed survey. While all of the survey recipients will remain anonymous, the entire Multi-Jurisdictional Hazards Mitigation Plan Committee extends its appreciation to those who participated in the survey.

2.10.3. Public Review Process

Review and comment on the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan has been provided through a number of avenues for the committee members as well as the members of the general public.

During regularly scheduled committee meetings in the winter of 2008 and 2009, the committee met to discuss findings, review mapping and analysis, and provide written comments on draft sections of the document. During the public meetings attendees observed map analyses, photographic collections, and discussed general findings within the Multi-Jurisdictional Hazards Mitigation Plan.

The first full-draft of the document was prepared after the public meetings and presented to the committee on March 12, 2009. The planning committee met to review changes in the document and to discuss public review release. The draft plan was made available on March 16, 2009, at all City Halls, the Shoshone County Court House, public libraries, and the TerraGraphics office in Kellogg for open public review with announcements in the Shoshone News Press regarding the review period. In addition, the press release provided readers with an Internet address (www.terragraphics.com/Shoshone) to view plan information and the ability to download a full copy of the public review plan.

Changes stemming from the extended committee review and the open public review period (Table 2.13.) were integrated into the plan's revision.

Table 2.13. Public Review period announced in regional media on March 16, 2009.

THURSDAY, MARCH 19, 2009

SHOSHONE NEWS-PRESS

Shoshone County hazard plan released

Public comments are invited through April 1

Representatives from Shoshone County, cities, organizations and agencies have been working diligently since November 2008 to prepare a FEMA compatible Multi-Jurisdictional Hazards Mitigation Plan for Shoshone County. The plan is now ready for public review. The Planning Committee, working with TerraGraphics Environmental Engineering Inc., of Kellogg, has summarized a wide range of assessments about Shoshone County, incorporated cities, and populated areas in the county. The goal of this plan is to identify which natural hazards threaten the region, what resources are at-risk, and to develop methods of reducing these risks in the future.

This plan evaluates, in detail, the natural hazards of flooding, earthquakes, landslides, severe weather and wildfire. The plan is presented in chapters and provides detailed discussions of each incorporated city and populated area in Shoshone County. Potential mitigation measures are detailed while the value of at-risk homes, businesses and infrastructure is enumerated for each area.

Public review comments are invited through April 1, 2009. Copies of the plan can be obtained from the Planning and Zoning Office in the Shoshone County Courthouse, from the city clerks at each city hall, from

see HAZARD, A5

HAZARD
from A1

each public library in the county, and from the TerraGraphics office in Kellogg (108 West Idaho Ave.).

The Web site http://www.TerraGraphics.com/Shoshone/ allows for download of an electronic version of the document and more information is provided about where printed copies can be located.

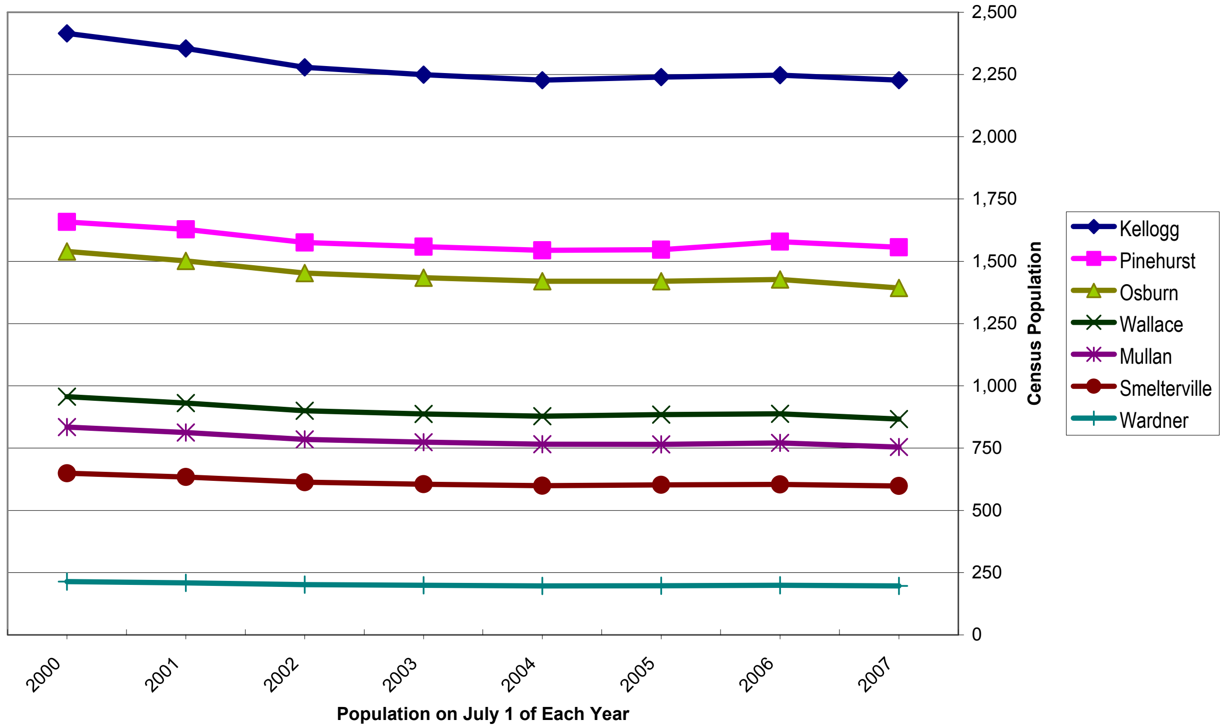
Any questions, please contact John Specht, Shoshone County Emergency Manager, at (208) 512-4555, or jspecht@co.shoshone.id.us. Review comments should be in writing and provided to John Specht at the Shoshone County Courthouse, 700 Bank St. Suite 25, Wallace, ID 83873.

3. Shoshone County and Local Municipalities

3.1. Demographics

Shoshone County is located in the Idaho Panhandle and is bounded by the Rocky Mountain western crest on the east side of the county, coinciding with the Idaho/Montana state line. Moving from the southern Shoshone County boundary clockwise, Shoshone County borders the Idaho Counties of Clearwater County, Latah County, Benewah County, Kootenai County, and Bonner County. The population of Shoshone County in 2007 is estimated at 12,838 and has experienced a 7% decline since 2000 when it was estimated at 13,771 (Census 2000). Individual communities within Shoshone County have witnessed population changes of similar magnitudes (Figure V).

Figure V. Estimated Population of Shoshone County Municipalities 2000-2007.



The vast majority of Shoshone County populated places have concentrated urban development on the valley bottoms where construction is easier but flooding is more common. An analysis of development in Shoshone County, as part of this plan's development, reveals that approximately 56% of all structures in the county were built within the 2008 Federal Insurance Rate Maps (FIRM) flood zones (100-year and 500-year flood zones combined). Further analysis reveals an overwhelming 81% of structures were built within 500 feet of the same flood zone area (including the flood zones of 100-year and 500-year magnitudes).

Shoshone County was established in 1864 and named after the Shoshone Indian Tribe. The county seat is Wallace. Shoshone County is widely known for the "Silver Valley" due to its mining history. The Silver Valley is famous nationwide for the vast amounts of silver produced from its mines. Wallace is known as the "Center of the Universe" and a manhole cover in Wallace even monuments its exact location as the "Center of the Universe".

As of the 2000 census, there were 13,771 people, 5,906 households, and 3,856 families residing in the county. The population density was 5 people per square mile. There were 7,057 housing units at an average density of 3 per square mile. The racial makeup of the county was

95.84% White, 0.11% Black or African American, 1.52% Native American, 0.23% Asian, 0.07% Pacific Islander, 0.49% from other races, and 1.74% from two or more races. Approximately 1.93% of the population were Hispanic or Latino of any race, 22.1% were of German, 14.0% American, 11.3% English, 9.7% Irish and 5.9% Norwegian ancestry, all according to US Census (2000).

Out of the 5,906 households in the county, about 27% contained children under the age of 18, 52.70% contained married couples living together, 8.10% had a female householder with no husband present, and 34.70% were designated as non-families. Individuals made up 29.40% of all households and 13.60% had someone living alone who was 65 years of age or older. The average household size was 2.30 and the average family size was 2.82 (Census 2000).

By age class, the population was spread out with 22.90% under the age of 18, 6.70% from 18 to 24; 25.50% from 25 to 44; 27.40% from 45 to 64; and 17.40% who were 65 years of age or older. The median age was 42 years. For every 100 females of any age there were 99.40 males. For every 100 females age 18 and over, there were 97.00 males aged 18 and over (Census 2000).

In 2000, the median income for a household in the county was $28,535, and the median income for a family was $35,694. Males had a median income of $30,439 versus $18,831 for females. The per capita income for the county was $15,934. About 12.40% of families and 16.40% of the population were below the poverty line, including 21.80% of those under age 18 and 10.00% of those over 65 (Census 2000).

3.2. Population Density and Development

The vast majority of homes in Shoshone County are located along the South Fork Coeur d'Alene River from the county line in the west, to the scattered rural properties of Larson to the east. These areas are characterized by urban and sub-urban conditions connected by rural areas.

The homes and businesses located in the St. Joe River Valley are tightly concentrated along the river in a mosaic of rural homes punctuated by small clusters of communities such as Calder, Big Creek, Marble Creek, Hoyt, and Avery. In the St. Joe River valley, there is little in the way of established commerce except a persistent forest industry and livestock management efforts.

In the furthest southwestern extent of Shoshone County, Clarkia is found to possess a small rural community held together by the economic forces of the forest industry, livestock husbandry, and tourism. The people of this area have a high degree of economic and social ties to nearby Clearwater, Latah, and Benewah Counties.

The Main and North Forks of the Coeur d'Alene River also support a scattered rural population centered on Prichard. The one-lane community of Murray is entrenched in a high-country setting where all forms of natural forces from flooding to wildfire, severe weather storms to landslides can be witnessed.

In order to better understand the complex population density interactions of Shoshone County, a population density analysis was completed for this mitigation plan's analysis. This population density index was created using the location, relative density, and distribution of structures mapped for this project, as derived from aerial photography collected in 2006. This structure layer was updated using Shoshone County Assessor information provided in 2008. Since people are very mobile and structures are not, structure locations in this analysis were used to serve as a proxy for the locations where people congregate.

This population density index is graphically displayed on a variety of maps[1] to show the higher densities in the Silver Valley and could be considered as various classifications of urban population density. As the distance from this population center increases, the condition of rural interface communities is seen in locations such as Prichard, Murray, Clarkia, Calder, Big Creek, and even stretches of the lower Main Fork Coeur d'Alene River. The remaining populated places, where scattered ranch houses, clusters of homes, and historic town sites are to be found, are classified as rural. The regional planning effort expands the rural status to the County's northern locations such as Tepee Creek and Magee Creek where many dozens of permanent structures have been built. These sites are well away from community support infrastructure.

This population density index is useful for illustrative purposes and to better understand the distribution of human habitation in Shoshone County. A series of map sets, one set for each community, have been created for this analysis process, and are incorporated into this document through this reference.

This type of analysis has been used in other regional planning efforts to define the Wildland-Urban Interface (WUI) for wildfire mitigation planning as part of the National Fire Plan. A parallel planning process is being conducted to update the Shoshone County Wildfire Mitigation Plan. It will be at the discretion of that planning committee to decide if this population density assessment should be used to define the WUI in Shoshone County. The following provides as a general translation of the listed categories. The High Density Urban classification is considered as WUI condition Interface. The Moderate and Low Density Urban is normally considered as WUI condition Intermix. The Rural Interface Condition is considered WUI Condition Intermix. The Rural Condition presented here translated directly into WUI Condition Rural.

3.3. Resource Economics

Over the past century, employment through mining, farming, timber harvesting and livestock ranching has been significant in north Idaho. Forestry, logging, trucking, and related support industries have relied on timber harvests from this region.

The communities of Shoshone County have been evaluated by the University of Idaho College of Natural Resources Policy Analysis Group for the degree of natural resource dependency each community experiences.

Idaho communities with more than 10% employment in resource-based sectors (wood products, travel & tourism, agriculture, and mining) were evaluated by Harris *et al.* (2003). Their findings indicate the following (Harris *et al.* 2003):

Kellogg .... Travel, Tourism & Mining

Mullan.. Mining Only

Osburn .... Travel & Tourism Only

Pinehurst .... Wood Products, Travel & Tourism

Smelterville.. Travel, Tourism & Mining

Wallace .... Travel, Tourism & Mining

Wardner .... Agriculture Only

[1] All maps referenced in this Shoshone County Multi-Jurisdictional Hazards Mitigation Plan were created by the TerraGraphics Geospatial Analysis & Mapping Center and are printed on a combination of 24"x20" and 24"x36" map sets organized by community. Each set of community maps includes a variety of themes to characterize land forms, ownership, infrastructure, hazard risk assessments, and proposed mitigation measures. These maps sets are available at each city office and the Shoshone County Planning and Zoning Office. Electronic copies of these maps in PDF format are available on request.

While the resource dependency indicated in the preceding list is largely intuitive and confirms commonly accepted knowledge, the designation for Wardner as an Agriculture based economy may be misleading as the commonality with Kellogg characteristics would seem more intuitive.

Harris *et al.* (2003) further evaluated Idaho communities based on their level of direct employment in several industrial sectors. Their findings for communities in Shoshone County are summarized in Table 3.1. The previous comment concerning Wardner's characteristics may be appropriate for these data as well.

Table 3.1. Levels of direct employment by industrial sector.

Community	Economic Diversity Index	Agriculture	Timber	Travel and Tourism	State / Local Gov.	Federal Gov.	Mining and Minerals
Kellogg	High	Low	Low	Med. High	Med. Low	Low	Med. High
Mullan	Low	Low	Low	Low	Low	High	High
Osburn	Med. High	Low	Med. Low	Med. High	High	Low	Med. Low
Pinehurst	High	Low	Med. High	High	Med. High	Low	Low
Smelterville	Med. Low	Low	Low	High	High	Low	Med. High
Wallace	Med. Low	Low	Low	Med. High	High	Med. Low	Med. High
Wardner	Low	High	Low	Low	Low	Low	Low

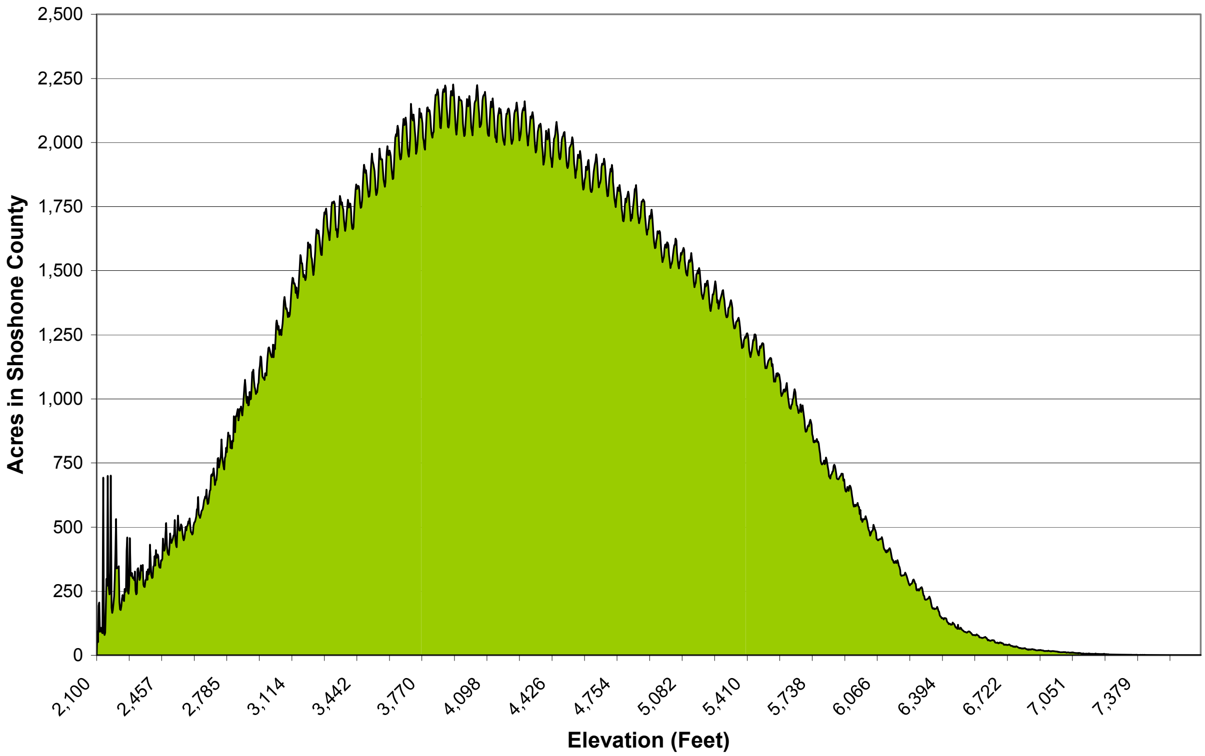
A "low" level of direct employment represents 5% or less of total employment in a given sector; "med. low," 6 to 10%; "med. high" 11 to 19%; and "high" 20% or more of total employment in a given sector (Harris *et al.* 2003)

3.4. Land Areas and Cover

The total area of Shoshone County is 1,682,327 acres (2,628.6 square miles), making it the eighth largest land area county in Idaho. This also makes Shoshone County slightly larger than the entire State of Delaware (2,489 square miles), and 70% larger than the State of Rhode Island (1,545 square miles).

The lowest elevation in Shoshone County is located along the St. Joe River as it enters Benewah County to the west at 2,132 feet (650 meters). The Coeur d'Alene River exit point from Shoshone County into Kootenai County is 2,145 feet (654 meters), just 12 feet higher in elevation than the exit point of the St. Joe River into Benewah County (Figure VI).The highest summit in Shoshone County rests at 7,700 feet (2,346 meters) at Illinois Peak, the very highest headwater contribution point to the St. Joe River. This high point is also along the political boundary between Shoshone County, Idaho, and Mineral County, Montana. The average elevation in Shoshone County is 4,255 feet (1,297 meters).

Figure VI. Elevation distribution of Shoshone County displayed in feet.



The National Land Cover Database 2001 was produced through a cooperative effort conducted by the Multi-Resolution Land Characteristics (MRLC) Consortium. The MRLC Consortium is a partnership of federal agencies (www.mrlc.gov), consisting of the U.S. Geological Survey (USGS), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), the USDA Forest Service (USFS), the National Park Service (NPS), the U.S. Fish and Wildlife Service (FWS), the USDI Bureau of Land Management (BLM) and the USDA Natural Resources Conservation Service (NRCS). One of the primary goals of the project is to generate a current, consistent, seamless, and accurate National Land Cover Database (NLCD) circa 2001 for the United States at medium spatial resolution (MRLC 2001).

The NLCD was used to assess the natural vegetation in Shoshone County. The classification of evergreen forest and scrub/shrub lands comprise an overwhelming 99% of the county (MRLC 2001, Table 3.2). Only a small trace of land area in Shoshone County is agricultural land and much of this is located along the river systems of the Coeur d'Alene River, St. Joe River, and St. Maries River. Most of this agricultural land is used for pasture and hay to feed livestock and horses. Populated places in Shoshone County occupy a small percent of the total area, but sum to approximately 7,900 acres (including the high, medium, and low intensity developed areas in combination with developed open space). Much of these populated areas are located in the valleys of the major river systems including the Coeur d'Alene River (especially the South Fork), the St. Joe River, and to a lesser extent, the St. Maries River system (Table 3.2).

Table 3.2. Vegetative land cover in Shoshone County.

Cover Type	Percent of Total Area	Approximate Total Acres
Evergreen Forest	77.88%	1,310,280
Shrub/Scrub	20.51%	345,013
Grassland/Herbaceous	0.42%	7,128
Emergent Herbaceous Wetlands	0.42%	7,095

Table 3.2. Vegetative land cover in Shoshone County.		
Cover Type	**Percent of Total Area**	**Approximate Total Acres**
Developed open space	0.21%	3,520
Developed low intensity	0.14%	2,346
Developed medium intensity	0.11%	1,790
Woody Wetlands	0.09%	1,490
Barren Land (Rock/sand/clay)	0.08%	1,304
Open Water	0.06%	989
Pasture / Hay	0.03%	498
Deciduous Forest	0.02%	408
Developed high intensity	0.01%	220
Mixed Forest	0.01%	203
Cultivated Crops	0.00%	30
Perennial Ice/Snow	0.00%	12

3.5. Land Ownership

Landownership in Shoshone County is dominated by federal ownership, mainly by the USFS and the BLM, who together manage approximately 76% of the land area in Shoshone County (Table 3.3). Private land holdings (66,272 acres) occupy slightly more than State of Idaho Department of Lands managed forests (61,680 acres) at about 4% of the total land area each. Significant land holdings are managed by forest industry in Shoshone County with 263,220 acres (16%). Although this latter category is considered a form of private lands, they have been evaluated separately (Table 3.3).

Table 3.3. Land ownership in Shoshone County by acres and percent of total area.		
Land Ownership Category	**Acres**	**Percent of Total**
CITY	1	0.00%
CITY/COUNTY	1,604	0.10%
COEUR D'ALENE TRIBE	402	0.02%
EPA	258	0.02%
FISH AND GAME	12,578	0.75%
FOREST INDUSTRY	263,220	15.65%
PRIVATE	66,272	3.94%
STATE	61,680	3.67%
USDA FOREST SERVICE (USFS)	1,204,823	71.62%
USDI BUREAU OF LAND MANAGEMENT (BLM)	71,490	4.25%
Total Acres	**1,682,328**	

3.6. Climatic Conditions

The Rocky Mountain western foothills continental climatic conditions prevail in much of Shoshone County. This weather pattern carries storm systems from the Pacific Ocean onto the continent, crossing the high Rocky Mountain crest along the eastern edge of Shoshone County. Because of this pattern, precipitation can be heavy at times and is frequently accompanied by high winds and extreme temperature variations.

Tables 3.4 through 3.8 contain temperature and precipitation summaries for several key areas in Shoshone County. These data show that average annual total precipitation ranges from 31 inches to nearly 39 inches per year. Temperature variations on a monthly basis range from a low of 18º F (average January temperature in Wallace and Clarkia) to an average high of 85º F (average July temperature in Kellogg).

Data are not available for the many unpopulated places in Shoshone County.

3.6.1. Kellogg

Monthly Climate Summary. Period of Record: 2/1/1905 to 12/31/2007

Table 3.4. Climate summaries for Kellogg, Idaho in Shoshone County.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	34.9	40.9	48.9	58.6	68.0	75.2	85.2	84.0	73.7	59.9	44.0	35.9	59.1
Average Min. Temperature (F)	20.4	23.5	28.3	33.7	40.3	46.4	50.0	48.1	41.9	34.8	28.7	23.0	34.9
Average Total Precipitation (in.)	3.81	2.84	2.94	2.35	2.57	2.22	1.00	1.12	1.68	2.68	3.82	3.87	30.89
Average Total Snow Fall (in.)	18.7	9.9	5.6	0.7	0.0	0.0	0.0	0.0	0.0	0.3	5.1	14.1	54.4
Average Snow Depth (in.)	5	4	1	0	0	0	0	0	0	0	0	2	1

Percent of possible observations for period of record. Max. Temp.: 97.5% Min. Temp.: 97.4% Precipitation: 98.1% Snowfall: 97.3% Snow Depth: 89.4% (WRCC 2009).

3.6.2. Wallace – Woodland Park

Monthly Climate Summary. Period of Record: 3/ 1/1941 to 12/31/2007

Table 3.5. Climate summaries for Wallace – Woodland Park, Idaho in Shoshone County.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	33.2	38.9	45.1	54.5	63.8	70.3	80.4	80.1	70.4	57.5	41.7	34.4	55.9
Average Min. Temperature (F)	18.9	22.2	25.6	31.8	38.4	44.3	47.9	46.9	40.4	33.5	27.4	21.6	33.3
Average Total Precipitation (in.)	4.78	3.70	3.38	2.70	2.70	2.59	1.14	1.23	1.85	2.98	4.79	4.98	36.83
Average Total Snow Fall (in.)	23.7	15.1	10.7	2.5	0.3	0.0	0.0	0.0	0.0	0.6	8.5	21.8	83.2
Average Snow Depth (in.)	11	10	6	1	0	0	0	0	0	0	1	5	3

Percent of possible observations for period of record. Max. Temp.: 98.1% Min. Temp.: 97.8% Precipitation: 98.5% Snowfall: 96.8% Snow Depth: 94.3% (WRCC 2009).

3.6.3. Mullan

Monthly Climate Summary. Period of Record: 11/1/1975 to 6/30/1997

Table 3.6. Climate summaries for Mullan, Idaho in Shoshone County.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	34.5	39.8	47.4	56.4	64.1	71.8	78.6	78.6	69.7	57.6	39.9	32.9	55.9
Average Min. Temperature (F)	21.4	23.5	27.0	32.5	38.0	44.3	47.1	47.2	40.4	33.1	26.8	21.3	33.6
Average Total Precipitation (in.)	3.41	3.54	3.22	2.72	2.94	2.63	1.54	1.59	1.79	2.82	4.72	4.32	35.24

Table 3.6. Climate summaries for Mullan, Idaho in Shoshone County.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Total Snow Fall (in.)	25.6	21.8	13.7	4.4	0.6	0.0	0.0	0.0	0.0	2.0	16.4	27.3	111.9
Average Snow Depth (in.)	16	15	7	0	0	0	0	0	0	0	2	8	4

Percent of possible observations for period of record. Max. Temp.: 95.6% Min. Temp.: 95.5% Precipitation: 95.6% Snowfall: 95.6% Snow Depth: 94.7% (WRCC 2009).

3.6.4. Avery

Monthly Climate Summary. Period of Record: 11/1/1968 to 12/31/2007

Table 3.7. Climate summaries for Avery, Idaho in Shoshone County.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	30.3	35.9	44.7	55.4	66.6	75.2	83.1	83.8	71.3	55.0	38.8	31.3	56.0
Average Min. Temperature (F)	20.7	25.0	28.4	33.3	39.8	46.3	49.4	49.2	42.4	35.1	29.1	23.3	35.2
Average Total Precipitation (in.)	5.89	3.80	3.43	2.91	3.05	2.18	1.26	1.17	1.93	2.40	4.44	5.13	37.58
Average Total Snow Fall (in.)	29.5	14.7	4.4	0.3	0.0	0.0	0.0	0.0	0.0	0.3	7.5	20.8	77.4
Average Snow Depth (in.)	13	14	6	0	0	0	0	0	0	0	1	6	3

Percent of possible observations for period of record. Max. Temp.: 81.5% Min. Temp.: 81.6% Precipitation: 83.4% Snowfall: 72.1% Snow Depth: 69% (WRCC 2009).

3.6.5. Clarkia

Monthly Climate Summary. Period of Record: 2/ 1/1950 to 2/28/1975

Table 3.8. Climate summaries for Clarkia, Idaho in Shoshone County.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	31.1	37.1	43.1	51.2	66.7	73.4	82.1	83.3	71.3	57.0	40.8	31.1	55.7
Average Min. Temperature (F)	18.5	21.3	22.3	29.2	35.1	41.5	41.7	40.2	34.8	29.8	27.2	19.5	30.1
Average Total Precipitation (in.)	7.62	4.02	3.55	2.66	2.34	2.50	0.96	0.99	1.74	2.99	3.11	6.33	38.82
Average Total Snow Fall (in.)	37.3	15.9	9.7	2.3	0.0	0.0	0.0	0.0	0.0	0.1	5.6	29.9	100.9
Average Snow Depth (in.)	22	23	13	1	0	0	0	0	0	0	1	9	6

Percent of possible observations for period of record. Max. Temp.: 39.2% Min. Temp.: 38.5% Precipitation: 45.9% Snowfall: 39% Snow Depth: 37.9% (WRCC 2009).

3.7. USGS Annual Peak Streamflow

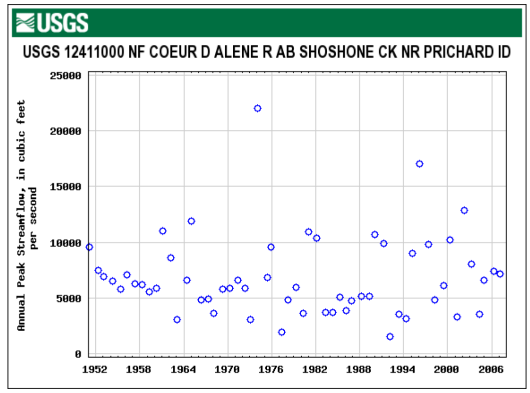
The USGS monitors streamflow stations throughout Shoshone County. These stations record daily streamflow rates in cubic feet per second. The subsequent sub-sections of this document detail peak annual streamflow amounts in a representative sample of locations in the county.

This information provides location specific details about high flow rates which generally correspond to flood events in the years where streamflow rates were highest.

3.7.1. Main Fork Coeur d'Alene River System

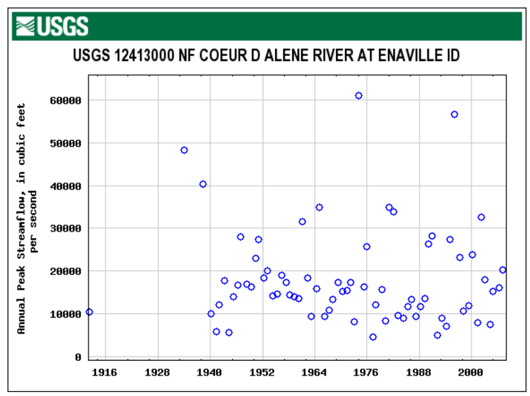
USGS 12411000 NF COEUR D ALENE R AB SHOSHONE CK NR PRICHARD ID

Shoshone County, Idaho
Hydrologic Unit Code 17010301
Latitude 47°42'22", Longitude 115°58'45" NAD83
Contributing drainage area 335 square miles
Gage datum 2,485.00 feet above sea level NGVD29



USGS 12413000 NF COEUR D ALENE RIVER AT ENAVILLE ID

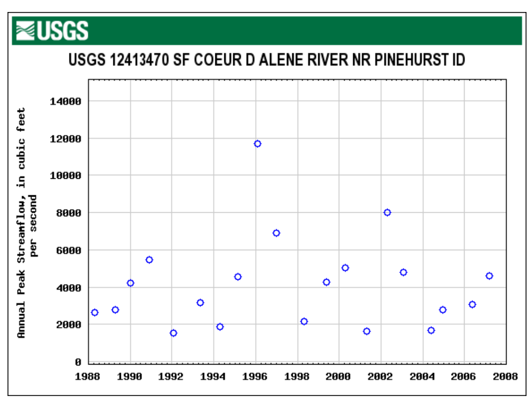
Shoshone County, Idaho
Hydrologic Unit Code 17010301
Latitude 47°34'08", Longitude 116°15'12" NAD83
Contributing drainage area 895 square miles
Gage datum 2,100 feet above sea level NGVD29



3.7.2. South Fork Coeur d'Alene River System

USGS 12413470 SF COEUR D ALENE RIVER NR PINEHURST ID

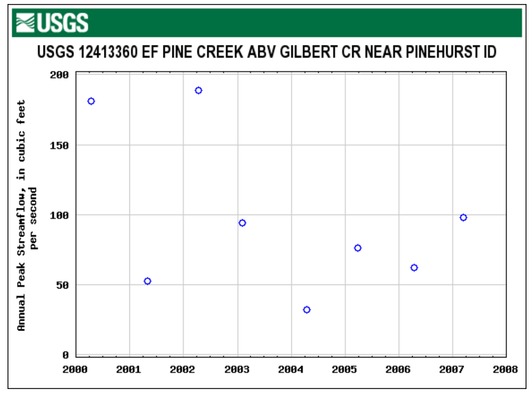
Shoshone County, Idaho
Hydrologic Unit Code 17010302
Latitude 47°33'07", Longitude 116°14'11" NAD83
Contributing drainage area 299 square miles



3.7.2. South Fork Coeur d'Alene River System

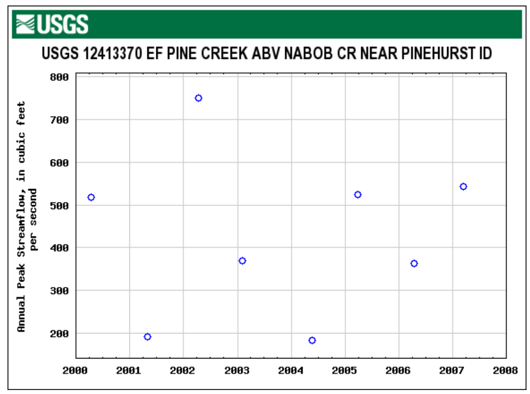
USGS 12413360 EF PINE CREEK ABV GILBERT CR NEAR PINEHURST ID

Shoshone County, Idaho
Hydrologic Unit Code 17010302
Latitude 47°26'25", Longitude 116°10'31" NAD83
Contributing drainage area 3.47 square miles
Gage datum 1,960 feet above sea level NGVD29



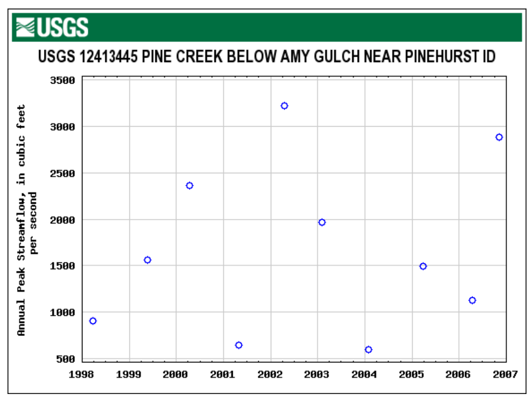
USGS 12413370 EF PINE CREEK ABV NABOB CR NEAR PINEHURST ID

Shoshone County, Idaho
Hydrologic Unit Code 17010302
Latitude 47°28'36", Longitude 116°13'18" NAD83
Contributing drainage area 28.2 square miles
Gage datum 2,490 feet above sea level NGVD29



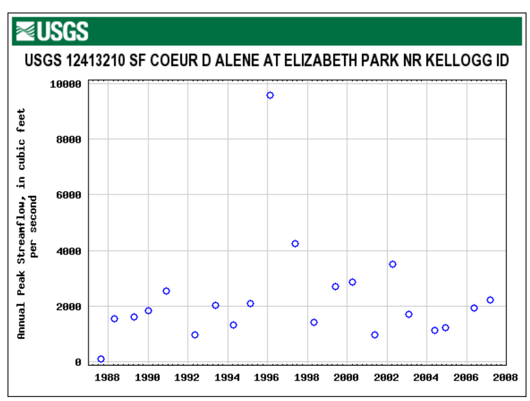
USGS 12413445 PINE CREEK BELOW AMY GULCH NEAR PINEHURST ID

Shoshone County, Idaho
Hydrologic Unit Code 17010302
Latitude 47°30'52", Longitude 116°14'31" NAD83
Contributing drainage area 73.2 square miles
Gage datum 2,300 feet above sea level NGVD29



USGS 12413210 SF COEUR D ALENE AT ELIZABETH PARK NR KELLOGG ID

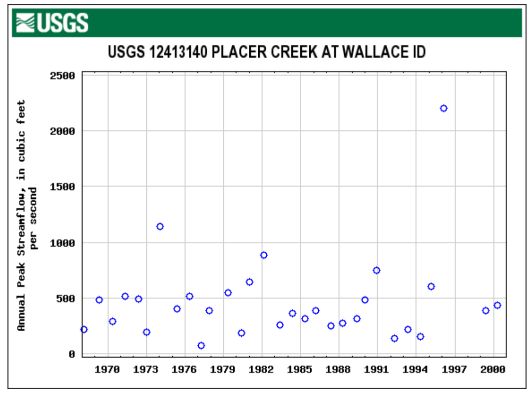
Shoshone County, Idaho
Hydrologic Unit Code 17010302
Latitude 47°31'53", Longitude 116°05'33" NAD83
Contributing drainage area 182 square miles
Gage datum 2,300 feet above sea level NGVD29



3.7.2. South Fork Coeur d'Alene River System

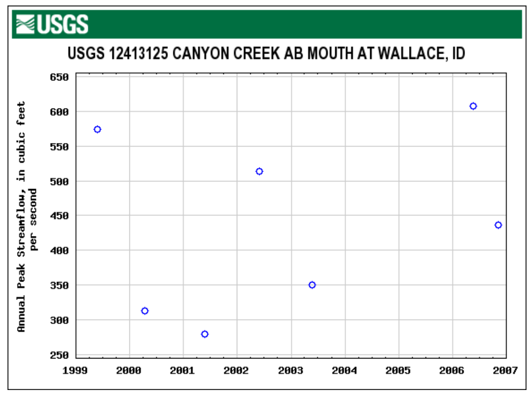
USGS 12413140 PLACER CREEK AT WALLACE ID

Shoshone County, Idaho
Hydrologic Unit Code 17010302
Latitude 47°27'46.78", Longitude 115°56'13.63" NAD83
Contributing drainage area 14.90 square miles
Gage datum 2,840 feet above sea level NGVD29



USGS 12413125 CANYON CREEK AB MOUTH AT WALLACE, ID

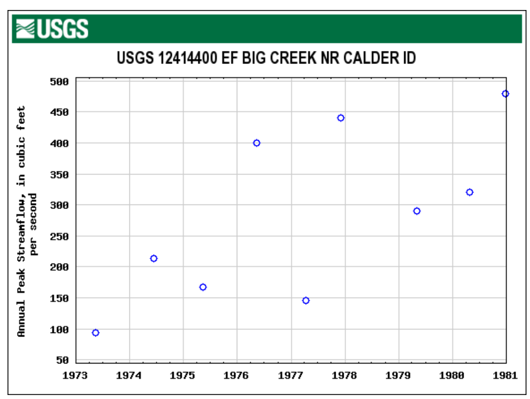
Shoshone County, Idaho
Hydrologic Unit Code 17010302
Latitude 47°28'21", Longitude 115°54'53" NAD83
Contributing drainage area 22 square miles



3.7.3. St. Joe River System

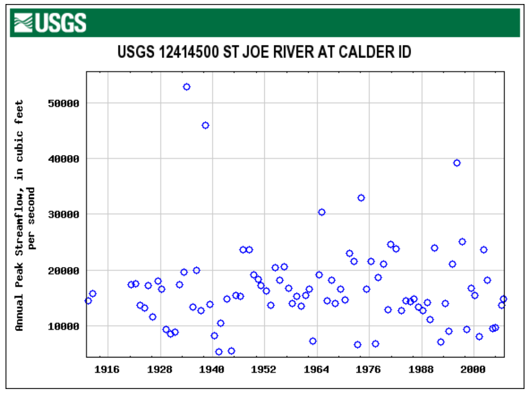
USGS 12414400 EF BIG CREEK NR CALDER ID

Shoshone County, Idaho
Hydrologic Unit Code 17010304
Latitude 47°18'07", Longitude 116°07'05" NAD27
Contributing drainage area 15.40 square miles
Gage datum 2,400 feet above sea level NGVD29



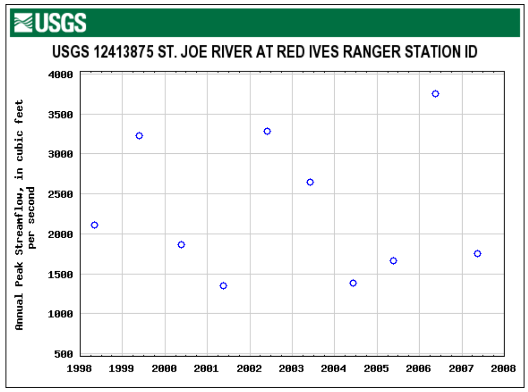
USGS 12414500 ST JOE RIVER AT CALDER ID

Shoshone County, Idaho
Hydrologic Unit Code 17010304
Latitude 47°16'29", Longitude 116°11'17" NAD27
Contributing drainage area 1,030 square miles
Gage datum 2,171.76 feet above sea level NGVD29



USGS 12413875 ST. JOE RIVER AT RED IVES RANGER STATION ID

Shoshone County, Idaho
Hydrologic Unit Code 17010304
Latitude 47°03'22", Longitude 115°21'08" NAD27
Contributing drainage area 107 square miles
Gage datum 3,710 feet above sea level NGVD29



All USGS streamflow data (USGS 2009).

3.8. Municipal Water Supply Systems in Shoshone County

The Idaho Department of Water Resources maintains data on the public and municipal water supplies in geospatial and tabular format (IDWR 2009). These data have been evaluated for this effort, especially in terms of placement in FEMA flood zones as will be discussed in the section concerning hazard exposure to flood risks. These data summarize over 1,230 sites in Shoshone County that provide a variety of water supply needs. Table 3.9 summarizes fifty-three municipal water supplies included in this summary.

Table 3.9. Idaho Water Resources database of municipal water supplies in Shoshone County.

Name	Service Type	Source Name	Source Type	Latitude	Longitude	Population Serviced
CATALDO WATER DIST	Community	WELL #1	Groundwater	47.55004	-116.32300	600
KINGSTON WATER DIST 1	Community	WELL	GWUDI	47.55726	-116.26994	800
BIG EDDY RESORT	Non-community Transient	WELL #1	Groundwater	47.29483	-116.26557	100
USFS CLARKIA WORK CENTER	Non-community Transient	WELL #1	Groundwater	47.01750	-116.25889	50
CLARKIA WATER AND SEWER DIST	Community	WELL #1	Groundwater	47.00419	-116.25774	75
CENTRAL SHOSHONE COUNTY WATER DIST	Community	ENAVILLE WELL	GWUDI	47.55868	-116.25731	4,052
SERENITY TERRACE	Community	WELL #1	Groundwater	47.59120	-116.25394	26
ALBERTS PLACE TAVERN	Non-community Transient	WELL #1	Groundwater	47.57109	-116.25392	30
PINEHURST WATER DIST	Community	WELL #1	Groundwater	47.53312	-116.23851	2,000
PINEHURST WATER DIST	Community	WELL #2	Groundwater	47.53312	-116.23851	2,000

Table 3.9. Idaho Water Resources database of municipal water supplies in Shoshone County.

Name	Service Type	Source Name	Source Type	Latitude	Longitude	Population Serviced
CENTRAL SHOSHONE WATER DIST	Community	SILVER CK E	Surface Water	47.53081	-116.19530	120
SNIP AND DALES RESTAURANT	Non-community Transient	WELL	Groundwater	47.54060	-116.19012	70
CALDER WATER ASSN	Community	WELL #1	Groundwater	47.27890	-116.18765	100
CENTRAL SHOSHONE COUNTY WATER DIST	Community	MILO CREEK	Surface Water	47.51013	-116.14327	4,052
MOUNTAIN VIEW PARK	Community	WELL 1	Groundwater	47.89372	-116.10471	75
USFS BIG HANK CAMPGROUND WEST	Non-community Transient	WELL #1	Groundwater	47.82486	-116.10361	25
USFS BIG HANK CAMPGROUND EAST	Non-community Transient	WELL #1	Groundwater	47.82382	-116.10086	25
BLM HUCKLEBERRY CAMPGROUND	Non-community Transient	WELL #1	Groundwater	47.26830	-116.08264	75
SUNNY ACRES	Community	WELL #1	Groundwater	47.50452	-116.08130	25
SUNSHINE PRECIOUS METALS INC	Non-community Non-transient	BIG CREEK #1	Surface Water	47.49247	-116.06984	320
CENTRAL SHOSHONE COUNTY WATER DIST	Community	BIG CREEK	Surface Water	47.48745	-116.06391	4,052
CENTRAL SHOSHONE COUNTY WATER DIST	Community	SHIELDS CREEK	Surface Water	47.54158	-116.04931	4,052
ST JOE LODGE RESTAURANT	Non-community Transient	WELL #1	Groundwater	47.24971	-116.03602	50
GENE DAY PARK SHOSHONE COUNTY	Non-community Transient	WELL	Groundwater	47.51521	-116.03261	25
USFS DEVILS ELBOW CAMPGROUND	Non-community Transient	WELL #1	Groundwater	47.77111	-116.03261	25
LEISURE ACRES TRAILER COURT	Community	WELL #1	Groundwater	47.51233	-116.02978	180
MARBLE CREEK SERVICE	Non-community Transient	WELL #1	Groundwater	47.25050	-116.02669	50
USFS MARBLE CREEK INTERPRETATIVE SITE	Non-community Transient	WELL	Groundwater	47.24932	-116.02121	54
SUNNYSLOPE SUBD	Community	WELL #1	Groundwater	47.51116	-116.01877	150
CENTRAL SHOSHONE COUNTY WATER DIST	Community	MCFARREN CREEK	Surface Water	47.49531	-116.01751	4,052
USFS KIT PRICE CAMPGROUND	Non-community Transient	WELL #1	Groundwater	47.73933	-116.00776	49
BLUE ANCHOR TRAILER COURT	Non-community Transient	WELL A	Groundwater	47.50887	-116.00698	120
BABINS TRAILER COURT	Non-community Transient	WELL #1	Groundwater	47.63617	-115.98215	30
GLORIAS STEAK HOUSE AND BAR	Non-community Transient	WELL #1	Groundwater	47.64049	-115.97520	100
Y TAVERN	Non-community Transient	WELL #1	Groundwater	47.64118	-115.97329	25
SHOSHONE BASE CAMP	Non-community Transient	WELL #1	Groundwater	47.71019	-115.97176	90
PRICHARD TAVERN	Non-community Transient	WELL #1	Groundwater	47.65636	-115.97033	25
ASARCO GALENA UNIT	Non-community Non-transient	LAKE CK	Surface Water	47.47803	-115.96632	170

Table 3.9. Idaho Water Resources database of municipal water supplies in Shoshone County.

Name	Service Type	Source Name	Source Type	Latitude	Longitude	Population Serviced
M AND H TRAILER PARK	Community	WELL #1	Groundwater	47.49265	-115.96420	45
EAST SHOSHONE COUNTY WATER DIST WALLACE	Community	PLACER CREEK	Surface Water	47.44570	-115.93537	2,040
USFS AVERY RANGER STATION	Community	WELL #1	Groundwater	47.25265	-115.91911	60
MURRAY WATER WORKS	Community	WELL	Groundwater	47.62755	-115.85875	34
MURRAY WATER WORKS	Community	ALDER CREEK	Surface Water	47.63650	-115.85191	34
AVERY SCHOOL 394	Non-community Non-transient	WELL #1	Groundwater	47.25015	-115.81321	50
AVERY WATER AND SEWER DIST	Community	WELL #1	Groundwater	47.25005	-115.80585	100
USFS AVERY WORK CENTER	Non-community Transient	WELL #1	Groundwater	47.25167	-115.80448	60
E SHOSHONE COUNTY WATER DIST MULLAN	Community	MILL CREEK	Surface Water	47.48584	-115.79985	821
E SHOSHONE COUNTY WATER DIST MULLAN	Community	BOULDER CREEK	Surface Water	47.46004	-115.79563	821
E SHOSHONE COUNTY WATER DIST BURKE	Community	SAWMILL CREEK	Surface Water	47.52679	-115.79412	100
HECLA MINING COMPANY LUCKY FRIDAY	Non-community Non-transient	DEADMAN CR MF	Surface Water	47.48337	-115.76935	170
HECLA MINING COMPANY LUCKY FRIDAY	Non-community Non-transient	DEADMAN CR WF	Surface Water	47.48911	-115.76681	170
HECLA MINING COMPANY LUCKY FRIDAY	Non-community Non-transient	NATIONAL TUNNEL	Surface Water	47.49029	-115.76323	170
USFS SHOSHONE PARK PICNIC AREA	Non-community Transient	WELL #1	Groundwater	47.46488	-115.72493	80

3.9. Summary of Superfund Status in the Silver Valley

The Bunker Hill Mining and Metallurgical Complex is a Superfund Site located in the Coeur d'Alene River Basin situated in approximately the center of Shoshone County and includes three Operable Units (OU). A century of releases from mining and smelting activities left several thousand acres contaminated with heavy metals. The most significant contaminants are antimony, arsenic, cadmium, copper, lead, mercury, and zinc. The principal sources of unconfined metal contamination were emissions from smelting operations and discharge of mine/mill tailings and waste rock to the South Fork Coeur d'Alene River and its tributaries. Several million tons of tailings were confined in large waste piles on-site or used as aggregate and fill in widespread construction activities. Tailings discharged to local streams have heavily contaminated approximately 1,100 acres of the floodplain. These wastes were subsequently transported throughout the area by flooding, erosion, wind, and anthropogenic activities. Decades of sulfur oxide emissions from smelter operations and extensive logging denuded the adjacent hillsides resulting in severe erosion.

This site was added to the National Priority List in 1983 due to the widespread heavy metal contamination and consequent excess blood lead levels identified in area children. An approximate 21 square mile area, commonly referred to as the Bunker Hill Box (the Box), contains the original OUs 1 and 2. The greater Coeur d'Alene River Basin surrounding the Box is OU3. The Populated Areas (i.e., OU1) Record of Decision (ROD) was adopted in 1991 and the Non-Populated Areas ROD (OU2) was adopted in 1992 (USEPA 1991 and 1992). The Basin (OU3) ROD was signed a decade later in 2002 (USEPA 2002).

The risk management strategy adopted in the RODs was to achieve exposure reductions through replacement and/or cover of contaminated soil, dust, and waste piles with clean soils. In residential and common use areas such as parks and schools, this meant 6 to 12 inches of contaminated soils were removed, placed in repositories on-site, and capped with clean soils. The Institutional Controls Program (ICP) was adopted to ensure the long-term integrity of these clean material barriers, and the Lead Health Intervention Program (LHIP) was implemented to minimize exposure through targeted intervention efforts in the interim (PHD 1999). The Panhandle Health District (PHD) adopted the ICP in 1995 and currently administers the ICP for the Bunker Hill Superfund site. The ICP was expanded into the Basin in July 2007. Under ICP rules, PHD is directed to require homeowners to repair their own barrier, once established, in order to control contaminant migration and exposure. Numerous documents have been prepared that describe the Bunker Hill Superfund site in more detail, particularly related to its location, background and history: the Five Year Reviews (USEPA 2000 and 2005), the RODs (USEPA 1991, 1992, and 2002), and the NAS review of mining megasites (NAS 2005) only name a few.

The extent and nature of the cleanup that has occurred and is currently ongoing at the Bunker Hill Superfund Site present special considerations for Shoshone County. Hazard mitigation, especially flood control, must be considered in the context of protecting the environmental cleanup actions taken under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as well as mitigating traditional flooding impacts to homes, businesses, and infrastructure.

3.9.1. CERCLA Remedies in the Context of Flooding

This section has been summarized, to a great extent, from the report jointly prepared by Shoshone County and the Basin Environmental Improvement Project Commission (BEIPC) and its contractor, TerraGraphics, titled “Upper Coeur d’Alene River Basin Framework for a Flood Control Program”, dated February 13, 2008. Additional information has been provided by Terry Harwood, Executive Director of the BEIPC for inclusion with this planning effort.

The environmental cleanup dictated by the CERCLA actions in the upper Basin (or eastern half of the site) relies to a great extent on in-situ control and containment of contaminated soils within the communities, gulches, hillsides, and river floodplain. Clean soil barriers have been and are being constructed over contaminated materials throughout the area. This work has been done without much regard to floodplain location or risk of flood damage resulting from recontamination due to deposition of contaminated sediments from receding floods or erosion of the barriers. An ICP has been implemented to ensure that soil excavation activities associated with normal community property activities and infrastructure development and management are regulated in a manner to protect the remedies and control contaminant release.

The long-term success of the ICP and CERCLA cleanup approach is dependent upon protecting these barriers and other remedies that are at risk from flood damage and recontamination. The BEIPC prepared a cursory estimate of roughly $80,000,000 to re-remediate this area. This number is expected to increase several-fold as i) the area of remediated property within the floodplain increases as construction progresses, and ii) the reevaluation of the floodplain (released with the September 2008 FEMA maps) has increased the projected flood inundation areas.

The impact of a catastrophic flooding event to the remedies was illustrated by the 1997 event in Milo Creek (flowing from Wardner to Kellogg), a tributary to the South Fork Coeur d’Alene River. The flooding and failure of the drainage control system directly caused recontamination of 50 remediated properties and road shoulders, incremental elevation of blood lead levels in children, and initiated a $16,000,000 project that required the complete reconstruction of infrastructure, flood control facilities, and community reconfiguration to implement additional remedial actions (detailed more in section 3.9.4.).

3.9.2. Flooding and Drainage Under CERCLA Actions

The focus of CERCLA actions is to implement remedies to protect human health and the environment. Funds allocated for this purpose are not available for the construction or rehabilitation of flood control facilities. Some consideration for storm water drainage can be made during remedial actions, but major construction of flood control facilities during remedial activities is currently not funded. To a great extent, the storm water drainage and flooding problems in the upper Basin exist in spite of the Superfund actions, but these actions have influenced the overall development of the area. As some contaminated areas are remediated, they become available for development and new land uses. But more importantly, the difficult aspects of surface water connectivity are influencing both individual remedies and whole segments of the Superfund site.

An illustration is Grouse Creek, a tributary to the South Fork Coeur d'Alene River with a confluence near Smelterville. During primary remediation activities, this drainage was considered minor with only a small mine site and hillside cleanup. Yet, there was flooding in this minor drainage in 1986 resulted in significant damage and deposition of contaminated materials in Smelterville.

Another example is Bunker Creek, a conveyance channel through a major portion of the industrial and community cleanup area in the Superfund site. During site remediation this channel was designed for a condition that is no longer valid. Hillside development was always anticipated in the distant future, but never included in the analysis because remedial design did not recognize infrastructure or development components. Two massive hillside resort developments are now scheduled and in progress in the area that drains to Bunker Creek. The City of Kellogg is working towards improved storm water collection, both to manage storm water and to protect remediated properties. Runoff from this improved storm water collection system will be conveyed to Bunker Creek. Another critical issue is FEMA's recent determination that the South Fork levee system through Kellogg is insufficient and would result in a failure during a 100-year flood event. If this occurs, the river will split and travel down the Bunker Creek channel. This would completely eclipse any capacity to convey drainage from the remediated industrial areas in Kellogg and its storm water drainage system, and would threaten the Superfund remedies along Bunker Creek including the Trail of the Coeur d'Alenes, the Central Impoundment Area (the largest contaminated waste repository in the upper Basin), lower Government Gulch, the City of Smelterville, remediated property south of Interstate 90, the Page Waste Repository, and the West Page Swamp.

Storm water management and flood control are inseparable in terms of their management and relationship to the CERCLA remedies. The planning and implementation of a flood control program is necessary to protect these remedies. A National Academy of Sciences report bluntly states "…the long-term effectiveness of the selected remedy in the Coeur d'Alene River basin is questionable because of the possibility, even likelihood, of recontamination from floods and damage to protective barriers used in residential remediation." It continues with "Every flood distributes these wastes further, and the contaminants undergo chemical changes- which can increase or decrease the risk they pose – as they travel through the river basin" (NAS 2005).

3.9.3. Municipal Drainage and Flood Control

Local drainage problems within the communities pose a second, chronic type of risk for recontamination. Municipal drainage issues threaten the integrity of the barriers every time it rains and with every snowmelt. In 2006-2007, the BEIPC conducted drainage assessments for the cities of Mullan, Wallace, Silverton and Osburn. The assessments describe the infrastructure that is in place to manage local drainage as either old or nonexistent in many cases. Side drainages from hillsides are a flood risk to all populated areas. The flood control program does not have to solve community drainage issues, but it must recognize the connection between managing storm water in the communities and larger flood control efforts.

3.9.4. Milo Creek Flooding in May 1997

On May 15, 1997, the cities of Wardner and Kellogg experienced a severe flood event when Milo Creek (a tributary to the South Fork Coeur d'Alene River), overran its banks and destroyed existing infrastructure at several aboveground and underground locations within both cities. Cool overnight temperatures had kept the snow accumulation in the area persistent into May. A warm-weather system moved into the region on the evening of May 14, 1997, triggering snowpack melt in combination with a rain-on-snow event. In response, Milo Creek's velocity increased and streamside debris was transported downstream in a sustained debris flow. The in-stream structures used to filter debris from the channel were overtopped when they clogged, sending Milo Creek out of its channel and down city streets. Eventually, underground stream conveyance structures were also clogged and the stream continued its exodus from its channel.

Over 50 homes and approximately 5 miles of public rights-of-way were damaged from the flood waters. In addition to common problems associated with flooding, such as sinkhole formation, washouts, and the destruction of personal property, the May flood deposited lead contaminated sediments along its path. Sample results from these sediments ranged from 1,668 to 14,113 ppm of lead. The Superfund action level for lead contamination is triggered at 1,000 ppm lead.

Shortly after that flood event, Kellogg and Wardner were designated as a "Disaster Site" by both the State of Idaho and the Federal Government. Emergency assistance and funding to repair damages were supplied through FEMA with assistance from the State of Idaho Bureau of Disaster Services (now Idaho Bureau of Homeland Security).

Kellogg and Wardner residents were faced with the need to repair sediment contaminated barriers and clean up the re-deposited contaminated soils. The spread of the lead contaminated soils throughout the communities represented a very real public health hazard to local residents, especially young children. The 1997 Blood Lead Screening Program identified lead exposure in young children associated with the flood. Initial results indicated that as many as 50% of the children who tested high in blood lead levels during these the 1997 tests lived in close proximity to Milo Creek.

There were approximately 142 properties, rights-of-way, and streets affected by the Milo Creek flooding of 1997. The response to this series of events was an integrated effort to cleanup the contaminated soils exposed and moved by the flood waters, re-create contaminated soil barriers, and to rebuild the infrastructure of Milo Creek to confine the stream to an underground impoundment on its course through Wardner and Kellogg to its confluence with the South Fork Coeur d'Alene River.

3.9.5. Sediment Deposition in Spring 2008

The higher than normal snow pack and subsequent spring and early summer runoff in the Coeur d'Alene Basin during the Spring of 2008, resulted in the migration of bed-load and stream-bank sediments containing heavy metal mine wastes. The remobilization of these contaminants is a normal spring runoff event each year in the Basin, but the 2008 recontamination resulted in a significant sediment deposition event. The beds and banks of the South Fork Coeur d'Alene River contain millions of cubic yards of mine and mining related wastes that were deposited for over a century in the River and its tributaries by mining activities. The sediments containing these contaminants continue to wash downstream to Coeur d'Alene Lake especially during high flow events. This process is expected to continue for many years to come. Some remedies for this situation are noted in the ROD for OU3 of the Superfund Site (USEPA 2002), but most of these remedies have not been implemented as yet because of the emphasis on cleanup of populated areas for human health reasons.

The impact of recontamination from flood re-deposition of contaminated soils during the 2008 flood event is seen in the sample of sediment testing presented in Table 3.10 and in the included photos (Figure VII) from 2008 showing contaminated sediment deposition (Harwood

2008). All test results exceed action levels for Superfund cleanup of 1,000 ppm lead at residential and commercial sites.

IDEQ submitted the samples to the SVL Analytical for lead and arsenic analysis. The samples were not sieved prior to analysis in order to represent the total sediment deposition, not the finer fractions typically analyzed as part of the residential cleanups.

Table 3.10. Sample results of sediment re-deposition from the May 2008 floods along the South Fork Coeur d'Alene River (Harwood 2008).

Sample Number	Arsenic mg/kg	Lead mg/kg	Sample Location
SED052308-001	48.5	2800	Sediments deposited upriver of the bicycle trailhead for the Trail of the Coeur d'Alenes, upriver of the confluence of the South Fork Coeur d'Alene River with Pine Creek. Upstream of East Mission Flats Repository on the South Fork Coeur d'Alene River.
SED052308-002	52.3	1630	Sediments deposited on Riverview Road west of State Highway 9. The road had been covered with flood waters that subsequently receded. The sediments had just been washed to the shoulder, with the water truck still working. Location is upstream of East Mission Flats Repository.
SED0523081-003	44.1	1650	Sediments collected off the road east of the Cataldo Campground and south of I-90. Located along the river downstream of the East Mission Flats Repository.
SED052308-004	67.9	5620	Sediments taken from the upper portion of the paved parking area at the Rose Lake boat ramp, downstream of the East Mission Flats Repository.

Figure VII. Photographs of contaminated sediment from 2008 floods (Harwood 2008).

Contaminated Sediment at East Rose Lake Boat Ramp

Sediment Deposition at Rainy Hill Boat Ramp

Contaminated Sediment at Anderson Boat Ramp Harrison

Typical CDA River Bank Deposition of Contaminated Sediments

3.9.6. Contaminant Management Rule

Shoshone County and all of the Silver Valley located municipalities (includes all municipalities in Shoshone County), will continue to work with PHD and its Contaminant Management Rule within the Bunker Hill Superfund Site. Action items include: storm water management, site disturbance, excavation, grading and certain interior projects that may disturb protective barriers placed over contamination remaining site wide. These activities will also include disposal of ICP waste and response to catastrophic events such as flooding.

3.10. Valuation of Real Property

Shoshone County assets at-risk to damage from a variety of natural disasters have been evaluated for this Multi-Jurisdictional Hazards Mitigation Plan. In order to derive as holistic a picture of risk exposure as possible, a variety of data sources were utilized. These data sources include the Shoshone County Assessor records of property valuation assessments and information on insured values for public structures that are otherwise not assessed by the County Assessor.

3.10.1. Private Property

The valuation of private properties and improvements on those properties was gathered by TerraGraphics from the Shoshone County Assessor's Office and used in combination with geospatial data managed by TerraGraphics in the completion of other projects in Shoshone County. The parcel location and valuation information was summarized in a GIS cadastral data layer, initially developed by the Shoshone County Assessor's Office, the BLM, and State of Idaho Department of Lands, and then augmented by TerraGraphics into a single, continuous layer. This layer displays parcel lines and includes data attributes for parcel number, detailed owner information, property assessed value, and the assessed value of improvements on the property.

For the purposes of this effort, the term "improvement value" (Table 3.11) is being used to describe the assessed value of property augmentations generally seen through the placement of a structure. These assessed improvement values can also include non-structural additions such as a paved driveway, walking path, or even a gondola. Every effort was made to limit the consideration of improvement values to those attributable to a structure.

The cadastral (parcel) layer is used in combination with a GIS based "structure layer" developed for use in this project by TerraGraphics. The GIS based "structure layer" is a collection of points representing individual structures derived from aerial photography. Geospatial Analysts made manual determinations of these locations by scanning the entire 1.6 million acres of Shoshone County and placing points at each identified structure. The aerial imagery used during this effort was created by SURDEX Corporation in 2006, and reveals a full color image at 1 meter resolution.

The combination of these two data sources (parcels and structures) allowed geospatial analyses to combine structure location over risk components (such as a structure's location in a flood zone, exposure to landslide risk, or exposure to wildfire risk). Once the structure's location was identified in these risk profiles, the accompanying parcel was selected for valuation information.

This avoids the misapplication of a risk exposure that can occur if only a parcel's outline is used to determine placement in a flood zone (for instance). Very often, a portion of a parcel is included within a flood zone but is not completely covered by that flood zone. When developments on those parcels are located outside of the flood zone the structures are not considered at-risk to flooding. This same logic can be applied to the other natural hazards equally.

In total, approximately 13,870 parcels and 11,600 individual structures were identified for this effort. It is important to note that the 11,600 structure locations identified in this analysis include all identifiable structures, not just homes and businesses. This collection includes garages, barns, equipment sheds and other structures in addition to homes or businesses. The determination of structure type from aerial photography is not consistently accurate, so all identified structures were mapped.

The total valuation of assessed property and improvements on property in Shoshone County, as of 2008, and determined by the Shoshone County Assessor, was approximately $1.1 billion. The value of the improvements only approximately $642.7 million in Shoshone County (Table 3.11).

Table 3.11. Assessment values organized by community and incorporated city.

Community	Assessed Value Total	Improvement Value
Avery	$2,741,212	$1,947,219
Bear Creek	$2,369,350	$686,550
Big Creek – SF CdA River	$9,810,734	$6,880,771

Table 3.11. Assessment values organized by community and incorporated city.

Community	Assessed Value Total	Improvement Value
Big Creek – St. Joe River	$5,161,467	$1,869,047
Burke Canyon	$15,849,076	$11,812,193
Calder	$6,270,850	$1,857,259
Cataldo	$7,565,344	$4,222,514
Clarkia	$6,100,797	$1,741,920
Eagle	$1,703,850	$732,390
Emerald Creek	$2,030,937	$537,738
Enaville	$11,838,051	$3,844,733
Hoyt	$980,950	$74,660
Kellogg - City	$223,276,633	$156,142,150
Kellogg - Rural	$18,473,030	$13,389,260
Kingston	$58,767,536	$35,112,556
Larson	$1,866,031	$1,086,311
Lower CdA River Rural Area	$32,976,113	$9,494,092
Marble Creek	$4,332,378	$2,128,459
Montgomery Gulch	$8,126,721	$5,824,281
Moon Creek Gulch	$8,710,922	$5,950,151
Mountain Meadows	$5,343,617	$2,929,865
Mullan - City	$36,203,184	$30,811,844
Mullan - Rural	$3,336,323	$1,615,963
Murray	$3,000,364	$1,962,880
Nine Mile Gulch	$6,073,666	$4,353,866
Osburn - City	$92,034,461	$71,267,743
Osburn - Rural	$21,867,179	$13,829,549
Page	$21,999,303	$7,331,110
Pine Creek & Pinehurst Rural	$39,504,469	$25,183,502
Pinehurst - City	$101,062,311	$73,284,691
Prichard	$30,089,646	$10,199,782
Silverton	$36,053,422	$28,530,275
Smelterville - City	$26,666,269	$19,511,917
Smelterville - Rural	$14,526,942	$8,525,564
Trout Creek	$2,549,210	$1,003,310
Wallace - City	$59,654,088	$51,387,467
Wallace - Placer Creek	$2,315,898	$1,797,418
Wallace - Rural	$1,414,980	$809,441
Wardner - City	$23,829,900	$12,601,454
Other Rural	$138,534,719	$10,392,147
All Shoshone County	$1,095,011,933	$642,664,042

This definition of communities and cities has been consistently applied throughout the document when estimating the exposure of improvement values to various risks.

3.10.2. Public Buildings

While the Shoshone County Assessor's Office conducts property valuations for private and commercial property, the office does not complete this assessment on public property or structures. These public structures include county or municipality owned properties (City Halls, County Courthouse), state or federal properties, fire protection property, public works property, public health property (hospitals, clinics), non-profit organizations (churches), or public schools. While some of the public agencies and organizations operate from a rented or leased property, others own the buildings where they conduct business. The former category of property is included on the Assessor's valuation if the property is owned privately and rented to the public entity. In the latter case, the Assessor's valuation does not include these property improvement values.

In order to collect valuation information on these public properties, the Multi-Jurisdictional Hazards Mitigation Plan committee members, representing virtually all of the public service entities in Shoshone County, provided detailed insurance valuations for the properties where they conduct business. In general, the County Assessor's assessed value is not generally considered equal to an insurance policy valuation. However, these insured values were used as a representation of the relative value of improvements on publically owned properties.

Each public property improvement was mapped in similar fashion to the structure layer described in the last sub-section and provided attributes. A total of $129.2 million of property improvements were reported by public entities in Shoshone County (Table 3.12).

Table 3.12. Detailed insurance values for publically owned structures by city or community area.

COMMUNITY	STRUCTURE FUNCTION	OWNER	INSURED VALUE
AVERY	AVERY SCHOOL	SCHOOL DISTRICT #394	$1,120,118
AVERY	USFS AVERY RANGER STATION	USFS	$2,454,531
CALDER	CALDER SCHOOL	SCHOOL DISTRICT #394	$403,559
CALDER	COUNTY SHOP ROAD DISTRICT 4	SHOSHONE COUNTY	$222,916
CALDER	FIRE AND EMS BUILDING	SHOSHONE COUNTY	$164,419
CALDER	FIRE DIST 4 BUILDING ONE	FIRE DISTRICT #4	$30,000
CATALDO	IDL CATALDO SUPERVISORY AREA	STATE OF IDAHO	$1,047,538
CLARKIA	CLARKIA FREE LIBRARY	CLARKIA FREE LIBRARY DISTRICT	$120,000
CLARKIA	CLARKIA WORK CENTER	USFS	$5,159,941
CLARKIA	WATER & SEWER TREATMENT	CLARKIA WATER & SEWER DISTRICT	$198,000
HOYT	HOYT FLAT	USFS	$4,999,808
KELLOGG	CITY HALL / FIRE DIST #2	CITY OF KELLOGG	$2,071,750
KELLOGG	COMMUNITY WELLNESS CENTER	WEST SHOSHONE HOSPITAL DISTRICT	$1,177,190
KELLOGG	COUNTY WASTE TRANSFER STATION	SHOSHONE COUNTY	$171,446
KELLOGG	KELLOGG GRADE SCHOOL	SCHOOL DISTRICT #391	$5,200,000
KELLOGG	KELLOGG HIGH SCHOOL	SCHOOL DISTRICT #391	$15,224,463
KELLOGG	KELLOGG MIDDLE SCHOOL	SCHOOL DISTRICT #391	$11,244,297
KELLOGG	PANHANDLE HEALTH DISTRICT	HEALTH DISTRICT	$931,000
KELLOGG	SHOSHONE MEDICAL CENTER	WEST SHOSHONE HOSPITAL DISTRICT	$20,477,000
KELLOGG	SUNNYSIDE FIRE STATION	FIRE DISTRICT #2	$96,000
MARBLE CREEK	FIRE DIST 4 BUILDING TWO AT MARBLE CREEK	FIRE DISTRICT #4	$15,000

Table 3.12. Detailed insurance values for publically owned structures by city or community area.

COMMUNITY	STRUCTURE FUNCTION	OWNER	INSURED VALUE
MULLAN	ATHLETIC PAVILION	MULLAN SCHOOL DISTRICT #392	$4,274,091
MULLAN	CITY HALL & MULLAN VOLUNTEER FIRE	CITY OF MULLAN	$538,700
MULLAN	FIRE DISTRICT 3 FACILITY	FIRE DISTRICT #3	$255,286
MULLAN	MAINTENANCE SHED	CITY OF MULLAN	$250,000
MULLAN	MULLAN ELEMENTARY SCHOOL	MULLAN SCHOOL DISTRICT #392	$2,115,710
MULLAN	MULLAN HIGH SCHOOL	MULLAN SCHOOL DISTRICT #392	$4,699,848
MULLAN	MULLAN TREATMENT PLANT	SFCDAR SEWER DISTRICT	$4,468,495
MULLAN	MULLAN VOLUNTEER FIRE	CITY OF MULLAN	$1,500,000
MULLAN	SAND SHED	STATE OF IDAHO	$405,100
MURRAY	COUNTY SHOP ROAD DISTRICT 1	SHOSHONE COUNTY	$291,435
OSBURN	COUNTY SHOP ROAD DISTRICT 3	SHOSHONE COUNTY	$886,389
OSBURN	DOG POUND	CITY OF OSBURN	$13,700
OSBURN	OFFICE/SHOP	SFCDAR SEWER DISTRICT	$317,329
OSBURN	OSBURN CITY HALL / FIRE STATION DIST #1	CITY OF OSBURN	$865,461
OSBURN	OSBURN POLICE GARAGE	CITY OF OSBURN	$33,966
OSBURN	OSBURN STREET GARAGE & SHOP	CITY OF OSBURN	$123,582
OSBURN	SILVER HILLS MIDDLE SCHOOL	SCHOOL DISTRICT #393	$6,983,671
OTHER	DUNN PEAK REPEATER SITE	USFS	$60,000
OTHER	GOOSE HUMP REPEATER SITE	USFS	$66,000
OTHER	KELLOGG PEAK REPEATER SITE	USFS	$28,000
OTHER	LITTLE GUARD LOOKOUT	USFS	$65,000
OTHER	MAGEE REMOTE AUTOMATED WEATHER STATION	USFS	$30,000
OTHER	MAGEE WORK CENTER AND CABIN	USFS	$40,000
OTHER	NUCKOLS REMOTE AUTOMATED WEATHER STATION	USFS	$30,000
OTHER	SHOSHONE PARK	USFS	$30,000
PAGE	PAGE TREATMENT PLANT CONTROLS	SFCDAR SEWER DISTRICT	$750,000
PAGE	PAGE TREATMENT PLANT PUMPS	SFCDAR SEWER DISTRICT	$750,000
PINEHURST	PINEHURST CITY HALL	CITY OF PINEHURST	$160,801
PINEHURST	PINEHURST CLINIC	WEST SHOSHONE HOSPITAL DISTRICT	$427,551
PINEHURST	PINEHURST ELEMENTARY SCHOOL	SCHOOL DISTRICT 391	$6,344,297
PINEHURST	PINEHURST FIRE STATION	FIRE DISTRICT #2	$105,000
PINEHURST	PINEHURST LIFT STATION	SFCDAR SEWER DISTRICT	$300,642
PRICHARD	PRICHARD VOLUNTEER FIRE BUILDING	PRICHARD VOLUNTEER FIRE DIST	$90,760
SMELTERVILLE	CITY HALL	CITY OF SMELTERVILLE	$250,000
SMELTERVILLE	COUNTY SHOP ROAD DISTRICT 2	SHOSHONE COUNTY	$833,470
SMELTERVILLE	FOREST SERVICE OFFICE	USFS	$620,050
SMELTERVILLE	SHOSHONE COUNTY AIRPORT	SHOSHONE COUNTY	$190,761
WALLACE	CHAMBER OF COMMERCE	CITY OF WALLACE	$530,675
WALLACE	CITY HALL/ FIRE STATION	CITY OF WALLACE	$662,410

Table 3.12. Detailed insurance values for publically owned structures by city or community area.			
COMMUNITY	STRUCTURE FUNCTION	OWNER	INSURED VALUE
WALLACE	CIVIC AUDITORIUM	SCHOOL DISTRICT #393	$551,000
WALLACE	COUNTY PUBLIC SAFETY BUILDING	SHOSHONE COUNTY	$2,835,000
WALLACE	GARAGE / SHOP	CITY OF WALLACE	$67,147
WALLACE	LIBRARY	CITY OF WALLACE	$602,869
WALLACE	NP DEPOT MUSEUM	CITY OF WALLACE	$366,062
WALLACE	SHOSHONE COUNTY COURTHOUSE	SHOSHONE COUNTY	$4,502,389
WALLACE	SWIMMING POOL	CITY OF WALLACE	$123,961
WALLACE	WALKING BRIDGE	CITY OF WALLACE	$24,595
WALLACE	WALLACE HIGH SCHOOL/JR HIGH	SCHOOL DISTRICT #393	$7,047,635
WARDNER	CITY GARAGE	CITY OF WARDNER	$79,883
WARDNER	CITY HALL	CITY OF WARDNER	$49,107

These structure values (Table 3.12) were generated by the owner representatives. All of these are current to December 2008 values. The summation of each community and city area is provided in Table 3.13 to detail the value of public structure improvements in each listed area. These summaries of community areas and valuations are used in subsequent sections of this report to quantify the risk exposures for several of the natural hazards discussed.

Table 3.13. Community and city area insured value summary of public buildings.

Community	Insured Value
Avery	$3,574,649
Calder	$820,894
Cataldo	$1,047,538
Clarkia	$5,477,941
Hoyt	$4,999,808
Kellogg	$56,593,146
Marble Creek	$15,000
Mullan	$18,507,230
Murray	$291,435
Osburn	$9,224,098
Other	$349,000
Page	$1,500,000
Pinehurst	$7,338,291
Prichard	$90,760
Smelterville	$1,894,281
Wallace	$17,313,743
Wardner	$128,990
Total	$129,166,804

3.10.3. Other Improvement Values

While the summaries of property valuations in Shoshone County would appear to be expansive and comprehensive, they are not complete. Several categories of real estate improvements are not included in either the Shoshone County Assessor’s valuations or the summary of public structure improvement insurance values provided by the listed organizations.

For example, privately owned and recognized places of worship are not assessed a tax valuation. A cursory search of the total number of religious organizations in Shoshone County with real estate holdings reveals over 50 unique contacts. Another search of landowner names in the Shoshone County Assessor file lists owners from religious organizations located outside of the county, who use property in Shoshone County for retreats, summer camps, and other purposes. Most of these sites possess permanent improvements. However, it was determined that searching for insurance values from these scattered organizations would be problematic and extremely time consuming. Anecdotal evidence suggests that many of these organizations may be resistant to sharing these values for open public review in this document.

Another category of permanent real estate improvements not quantified in this effort is the cost to replace the hundreds of miles of roads, and hundreds of bridge and culvert crossings in the county if they become damaged or destroyed during a natural disaster event. A valuation of 76 Shoshone County Bridges within the County's inventory totals an estimated $98,226,000 (Table 3.14). Estimates for those in the inventory of the State or the US Government was unavailable.

Other categories of missing valuations can be surmised by the astute reader. The planning committee feels that the valuations for permanent real estate improvements incorporating the assessed valuations from the Shoshone County Assessor and the insured values of public structures represent a significant and extensive summary of the values at risk to natural hazards in Shoshone County. Combined, these two major categories of valuation represent $771.8 million of improvement values exposed to risk from damage or destruction from natural disasters (Table 3.11 and Table 3.13).

During the discussion concerning the estimation of flood risks and exposure to loss an additional component of valuation will be further introduced as the estimated cost of re-establishing the Superfund Site remediation efforts placed to-date. As will be demonstrated in later sections, the estimated value of these remediation efforts totals over $182.5 million in the Silver Valley (the Shoshone County portion of the Superfund Site).

Table 3.14. Additional resources in Shoshone County that have not been mapped, but are at-risk to natural hazards.

Table 3.14. Additional resources at-risk in Shoshone County to natural hazards.

Utility: Electric Substations	Burke Sub and Transmission Lines	In total, value is $40.0 million
	Wallace Sub (Woodland Park)	
	Osburn Sub – 13th & Mullan Ave	
	Lucky Friday Sub - Mullan	
	Big Creek Sub and Transmission	
	Bunker Sub (McKinley Ave, Kellogg)	
	PineCreek Sub and 6 Transmission	
	Mission Sub (Canyon Rd, Cataldo)	
	St. Maries Sub – feeds Avery	
	120 N Hill St, Kellogg – Avista Office	
Utility: Gas Reg Stations and Gas Lines	Mullan	In total, value is $3.7 million
	Wallace	
	Lake Gulch Rd, Silverton	
	Osburn – KWAL & Polaris	
	Kellogg	
	Smelterville	
	Page	
	Pinehurst (also feeds to Cataldo)	
Water & Sewer	SFCRSD Treatment Plants and Collection Systems	$36,871,950
	Clarkia Water and Sewer Dist	$140,000

Table 3.14. Additional resources at-risk in Shoshone County to natural hazards.

Bridges	Shoshone County Bridges (76) Inventory At Public Works	$98,226,038
Transportation Networks	Interstate-90, 4 lanes @ 33.5 miles per lane, 8 bridges	Undetermined value
	State Highway 4, 2 lanes @ 6.2 miles per lane, plus 4 bridges	Undetermined value

4. Shoshone County Natural Hazard Assessments

Shoshone County has witnessed some monumental disasters throughout history. Among the most notable of these was the August 1910 Wildfire (The Big Blowup), which charred over 3.0 million acres. Shoshone County suffered the brunt of this historic fire resulting in many communities being burnt, including a portion of Wallace (Pyne 2001). An estimated 24 people were killed in Wallace alone during this inferno that resulted in over $1.0 million in damages at the time. The total death toll has been estimated at over 300 lives. Although well known as “The 1910 Fire” and “The Big Blowup”, Shoshone County suffered a previous wildfire disaster in 1890 which ignited from a house fire on Wallace’s Sixth Street and destroyed all but three houses in Wallace (GenDisasters 2008).

Flooding along the South and Main Forks of the Coeur d’Alene River, and the St. Joe River has long been evident, but the most recent, in 2008, was notable and disastrous. Severe winter storms are routine in this region of the Rocky Mountains but the county’s location on the western side of the range increases the snowfall caused by storms pushing clouds up and over the mountain ranges as they move from the Pacific Ocean onto the continent, causing snowfall to be deep and often rapid. Some of the most severe flood events in the region are a combination of large snow accumulations in the higher elevations joined with either a spring warm-front carrying heavy rains or an unseasonably warm-weather system in the middle of winter carrying heavy rains. These rain-on-snow events can deliver high volumes of water into the main river drainages of the region.

Another disaster category (not natural disaster related) affecting Shoshone County is centered around mining activities, including the 1972 Sunshine Mine Disaster (fire in the mine) killing nearly 100 miners, and the Bunker Hill baghouse fire of September 1973 which burned two of seven sections of the Bunker Hill baghouse and part of its roof. Bunker Hill’s decision to continue operations after this 1973 disaster meant that lead emissions from the plant tripled in the months that followed. The company tried to use the other five sections to control emissions while making repairs, but there were construction delays and a shortage of the necessary cloth bags needed to repair it. Final repairs were not completed for six months, although the mine continued full operations.

These baghouses were the main pollution-collection apparatus of the lead and silver smelter; they were installed in 1923 to catch the emissions of dust and smoke and allow some of it to be reprocessed (Aiken 1998). Concerns over lead poisoning from production preceded the baghouse fire and prompted studies from the State and Federal Government as well as the mine’s owner. Within 18 months of the baghouse fire, the smelter's stacks had spewed 20 years' worth of lead, cadmium, zinc and other heavy metals across the landscape, into yards and houses, and across forestlands and watersheds (Aiken 1998). Natural hazard events are exacerbated by these man-caused disasters to create an unique and catastrophic combination of threats to people in Shoshone County and neighboring (downstream) counties.

The Idaho Bureau of Homeland Security maintains a database of natural hazard events in Idaho. Table 4.1 summarizes events in that database that have impacted Shoshone County.

Year	Time Period	Event	Disaster Number*	Extent
2008	May	Flooding	1781	Counties (Kootenai and Shoshone)
1997	Spring	Flooding		Spring flooding in Southeastern and Northern counties.
1997	March 6	Landslide		Counties -(Benewah, Bonner, Boundary, Kootenai, Shoshone)
1997	March 20	Flooding	1177	Rain showers led to flooding in North Idaho counties.
1996-97	November – January	Landslide		Counties - Adams, Benewah, Boise, Bonner, Boundary, Clearwater, Elmore, Gem, Idaho, Kootenai, Latah, Nez Perce, Owyhee, Payette, Shoshone, Valley, Washington
1996-97	Winter	Winter Storm	1154	Heavy snow, landslides, and floods from winter storms. North Idaho
1996	February	Winter Storm	1102	Counties – Benewah, Bonner, Boundary, Clearwater, Idaho, Kootenai, Latah, Lewis, Nez Perce, Shoshone
1996	Spring	Flooding		Flooding throughout Northern Idaho.
1996	February	Severe Storm		The worst flooding in 30 years forced thousands to flee. "*One week deep freeze, the next deep water*". The deluge was triggered from fast-melting snow and days of heavy rains. $5 million worth of damage occurred to highways from Bonners Ferry to Grangeville. North Idaho was declared a disaster area. Interstate 90 in Wallace was closed due to water over the road. The town of Kingston was flooded. Most cities' water supplies were contaminated. Approximately $7 million damage to roads occurred because of this storm.
1986	March 12	Rockbursts		A rockburst at the 4,900-foot level of the Lucky Friday silver mine, killed one miner and injured two others.
1983	November 18	Earthquake	694	Borah Peak earthquake (M7.3) centered in central Idaho with shocks felt in Shoshone County.
1982	February 15	Flooding		A warm, damp weekend weather system caused spotty erosion in farm fields and converted north central Idaho's deep snow pack into a serious flood hazard. Maries Creek, a tributary of St. Maries River, with headwaters in the Clarkia area, flooded the logging communities between Bovill and Fernwood. Many buildings had up to 10 inches of water in them. A mudslide occurred near Orofino due to the large amounts of rain.
1980	May 18 Eruption May 19 Fallout	Volcanic Eruption	624	Mount St. Helens erupted from Washington spewing volcanic ash over several states. Dust covered cities and contaminated drinking water. The fallout prompted Governor Evans to declare a state of emergency. The counties in the panhandle received from 1 inch to 3-inches of an ash blanket. Costs for increased unemployment, destruction of vehicles and other equipment, damage to crops, livestock and timber, and lost tax revenues was about $13.7 million. This does not include loss to residents, local businesses and government.
1974	January 15	Flooding	415	Flood waters isolated much of the Coeur d'Alene mining district. The waters burst dams, blocked major roadways and forced evacuation of at least 1,000 persons. About $65 million in damages was attributed to this flood event. Shoshone and Benewah Counties were hardest hit. About $9.5 million in damage to road systems, $51.4 million in damage to private property. Governor Andrus declared the counties disaster areas. More than 30 bridges were destroyed in 3 counties. Nearly 800 people were without telephone service near Pinehurst. A bridge collapsed over the Coeur d'Alene River's South Fork isolating hundreds. The Sunshine mine was shut down after power was lost and a dam burst. The Red Cross helped about 700 families.

Table 4.1. Hazard Profile for events in Shoshone County (IBHS 2008a, IBHS 2008b, FEMA 2009).				
Year	**Time Period**	**Event**	**Disaster Number***	**Extent**
1964	December 21-23	Flooding	186	During the end of December 1964, warm weather combined with heavy rains and melting snow, causing flooding along the Payette, Big Wood, Little Wood, Portneuf, Clearwater and Boise River drainages. Hwy 21 and 15, US 95N and 30E were closed. Over 100 homes were damaged, numerous bridges were washed out, and thousands of acres of farmlands were flooded. Two deaths were attributed to the flood. A state of emergency was declared. The Wallace-Kellogg area was the hardest hit in northern Idaho. Communities were isolated by small mountain streams that had become torrents. Approximately 200 hundred people were evacuated from the Veterans Village in Wallace, which was located at the conflux of Placer Creek and the South Fork of the Coeur d'Alene River. Four housing units were swept away when floodwaters washed out the bank underneath them. Emergency water supplies were sent to Wallace and Kellogg when their water systems were contaminated by floodwaters.
1963	February 14	Flooding	143	Cold weather created ice jams and cloudbursts created flooding throughout several counties in the Panhandle including Shoshone County. President Kennedy authorized $250,000 in flood relief loans. $4.7 million in damage throughout the state this year. Ice jam was about 2 miles in length from Lost Creek to Jupiter Creek. A giant ice jam occurred on the North Fork of the Coeur d'Alene River that threatened residents near Prichard
1957	February 5	Avalanche		Man died in Wardner Slide, four more were hurt.
1957	December 18	Earthquake		Damage to the Galena Silver Mine in the Silver Valley, and frightened miners working 3,400 feet underground.
1956	March 3	Avalanche		Boy killed in Burke Canyon slide, 20 homes damaged
1948	May 23-June 5	Flood Emergency Declared		Shoshone County: The 1948 flood was caused by abnormal snowmelt augmented by rainstorms the latter part of May and in June. The floods caused contamination of the water system, which left residents without drinking water. Over $3,700,000 damage to roads and highways. $30 Million damage to crops.
1938	April 18	Flooding		Heavy rains lead to flooding of Shoshone county. The St. Joe's River flooded. Mullan, Wallace, and Kellogg sustained approximately $100,000 in damage. The Avery CCC Camp was washed out.
1934	March 27-29	Flooding		Heavy rains lead to flooding in all of North Idaho.
1933	December 21-23	Flooding		A sudden thaw in December accompanied by heavy rains (over 20 inches in 23 days) caused landslides and flooding. Coeur d'Alene Lake reached an all time high level. The South Fork of the Coeur d'Alene River and Placer Creek went over their banks inundating the eastern and western sections of Wallace; then Nine Mile Creek overflowed its banks, adding to the already extensive flood damage. Thousands of people fled their homes and 11 were reported dead. Rock and land slides also occurred at Wallace and Kellogg. Kellogg was virtually washed away. Lake Coeur d'Alene reached 100-year flood levels. Nearly $1.0 million in property damage was reported in Wallace alone. Shoshone County reported over $3.5 million in damages.

Table 4.1. Hazard Profile for events in Shoshone County (IBHS 2008a, IBHS 2008b, FEMA 2009).				
Year	**Time Period**	**Event**	**Disaster Number***	**Extent**
1910**	August 21-22	Wildfire		In a brief 48-hour span, fires carried by hurricane-force winds burned more than 3 million acres, killed over 300 persons, devastated the eastern portion of Wallace and destroyed between 7 and 8 billion board-feet of timber. The winds, which gave The Big Blowup its horror, came up from the southwest in the Nez Perce National Forest near Elk City. Damage to Wallace, in 1910 dollars, was listed at $1 million; losses to railroads was set at $3 million; damage suffered by mining companies and settlers added another $1 million; and lost timber was valued at $15 million. The government paid $5.4 million in claims of fire-related injuries alone. This $25.4 million in 1910 losses would equate to approximately $697 million in 2008 dollars.

* Major Disaster Declarations issued by FEMA. See text below.

** Only the 1910 Wildfire was included in this summary in terms of wildfire history. A complete summary of wildfires is presented in Section 4.6.

Local emergency and public works personnel, volunteers, humanitarian organizations, and other private interest groups provide emergency assistance required to protect the public's health and safety and to meet immediate human needs. If necessary, a governor can declare a state of emergency and invoke the state's emergency plan to augment individual and public resources as required (FEMA 2009).

A governor may determine, after consulting with local government officials, that the recovery appears to be beyond the combined resources of both the state and local governments and that federal assistance may be needed. In requesting supplemental Federal assistance under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. §§ 5121-5206 (Stafford Act), the Governor must certify that the severity and magnitude of the disaster exceed state and local capabilities; certify that Federal assistance is necessary to supplement the efforts and available resources of the state and local governments, disaster relief organizations, and compensation by insurance for disaster related losses; confirm execution of the state's emergency plan; and certify adherence to cost sharing requirements (FEMA 2009).

Under the declaration process and to assist a governor to determine if a request for assistance should be made, a preliminary damage assessment is conducted. These assessments are conducted in counties affected by the disaster event. FEMA works with the State's emergency management agency to accomplish these assessments (FEMA 2009).

The Disaster Number data presented in Table 4.1 are inclusive of declared disasters that proceeded through the process described above to become a federally declared disaster.

SHELDUS is a county-level hazard data set for the U.S. for 18 different natural hazard event types such thunderstorms, hurricanes, floods, wildfires, and tornados. For each event the database includes the beginning date, location (county and state), property losses, crop losses, injuries, and fatalities that affected, or were attributed to, each county. SHELDUS Hazard Profile for Shoshone County, Idaho, 1960-2007 is presented in Table 4.2. Some of these events were also reported in Table 4.1.

Table 4.2. SHELDUS Hazard Profile for Shoshone County, Idaho (SHELDUS 2008).

HAZARD BEGIN DATE	HAZARD END DATE	HAZARD TYPE(S)	INJURIES	FATALITIES	PROPERTY DAMAGE	CROP DAMAGE	REMARKS	PROPERTY DAMAGE ADJUSTED 2007	CROP DAMAGE ADJUSTED 2007
9/3/1960	9/4/1960	Lightning - Wind	0.05	0.00	$ 1,136	$ -	WINDSTORM AND LIGHTNING	$ 8,117	$ -
12/17/1961	12/19/1961	Winter Weather	1.00	0.00	$ 5,000	$ -	HEAVY SNOW	$ 35,714	$ -
4/19/1962	4/20/1962	Wind	0.39	0.00	$ 114	$ 114	WIND AND DUST	$ 758	$ 758
11/19/1962	11/20/1962	Wind	0.00	0.00	$ 10,000	$ -	Wind	$ 66,667	$ -
12/16/1962	12/21/1962	Fog - Winter Weather	0.16	0.00	$ -	$ -	Fog, rime ice	$ -	$ -
12/20/1964	12/24/1964	Severe Storm/Thunder Storm - Wind - Winter Weather	0.00	0.00	$ 111,111	$ -	Snow, rain, and wind	$ 740,741	$ -
7/8/1965	7/8/1965	Hail - Severe Storm/Thunder Storm	0.00	0.00	$ -	$ 1,136	HAIL & RAIN	$ -	$ 7,576
8/19/1965	8/19/1965	Severe Storm/Thunder Storm - Wind	0.00	0.50	$ 250	$ -	Thunderstorm, wind, and rain	$ 1,667	$ -
8/24/1965	8/24/1965	Flooding - Hail	0.00	0.00	$ -	$ 50,000	HAIL AND FLASH FLOODING	$ -	$ 333,333
8/26/1967	8/26/1967	Wildfire	0.00	0.00	$ 2,255,455	$ -	Idaho wide	$ 14,096,591	$ -
7/19/1968	7/20/1968	Wind	0.00	0.00	$ 1,136	$ 114	Wind	$ 6,684	$ 668
8/10/1968	8/23/1968	Severe Storm/Thunder Storm	0.00	0.00	$ -	$ 11,364	Rain	$ -	$ 66,845
1/6/1969	1/7/1969	Winter Weather	0.00	0.00	$ 11,628	$ -	SNOW STORM	$ 64,600	$ -
1/26/1969	1/26/1969	Winter Weather	0.00	0.00	$ 11,628	$ -	SNOW STORM	$ 64,600	$ -
7/16/1970	7/16/1970	Hail - Lightning - Wind	0.00	0.00	$ 278	$ 27,778	HAIL, LIGHTNING, WIND	$ 1,462	$ 146,199
1/9/1972	1/12/1972	Wind - Winter Weather	0.07	0.00	$ 113,636	$ -	WIND AND SNOW	$ 568,182	$ -
1/14/1974	1/18/1974	Severe Storm/Thunder Storm - Wind	0.00	0.00	$ 3,571,429	$ -	WIND/RAIN	$ 14,880,952	$ -

Table 4.2. SHELDUS Hazard Profile for Shoshone County, Idaho (SHELDUS 2008).

HAZARD BEGIN DATE	HAZARD END DATE	HAZARD TYPE(S)	INJURIES	FATALITIES	PROPERTY DAMAGE	CROP DAMAGE	REMARKS	PROPERTY DAMAGE ADJUSTED 2007	CROP DAMAGE ADJUSTED 2007
1/7/1975	1/7/1975	Severe Storm/Thunder Storm - Winter Weather	0.00	0.02	$ 1,136	$ -	Heavy Rain, Snow	$ 4,371	$ -
2/9/1975	2/13/1975	Winter Weather	0.00	1.00	$ 114	$ -	heavy snow	$ 437	$ -
11/10/1975	11/10/1975	Wind - Winter Weather	0.00	0.00	$ 1,136	$ -	Wind, SNOW	$ 4,371	$ -
2/16/1976	2/17/1976	Wind - Winter Weather	0.00	0.00	$ 1,136	$ -	Snow and Wind	$ 4,209	$ -
5/10/1976	5/10/1976	Lightning - Severe Storm/Thunder Storm - Wind	0.00	0.00	$ 7,143	$ -	Wind, Lightning and Rain	$ 26,455	$ -
8/12/1978	8/31/1978	Severe Storm/Thunder Storm	0.00	0.00	$ -	$ 62,500	Rain	$ -	$ 195,313
11/4/1978	11/4/1978	Wind	0.00	0.00	$ 12,500	$ -	Wind	$ 39,063	$ -
1/1/1979	1/31/1979	Winter Weather	0.00	1.00	$ 11,364	$ -	Extreme Cold	$ 32,467	$ -
2/1/1979	2/13/1979	Winter Weather	1.00	0.00	$ 1,136	$ -	Extreme Cold	$ 3,247	$ -
7/5/1979	7/5/1979	Lightning - Wind	0.00	0.00	$ 16,667	$ -	wind, lightning	$ 47,619	$ -
12/24/1980	12/27/1980	Flooding	0.00	0.00	$ 500,000	$ -	Flood	$ 1,250,000	$ -
2/15/1982	2/15/1982	Flooding	0.00	0.00	$ 1,000,000	$ -	Flooding	$ 2,127,660	$ -
4/23/1985	4/23/1985	Wind	0.00	0.00	$ 7,143	$ -	Wind	$ 13,736	$ -
4/30/1987	4/30/1987	Severe Storm/Thunder Storm - Wind	0.00	0.00	$ 50,000	$ -	Thunderstorm Wind	$ 90,909	$ -
6/14/1987	6/14/1987	Lightning	0.00	0.00	$ 3,846	$ 385	Lightning	$ 6,993	$ 699
6/15/1987	6/15/1987	Severe Storm/Thunder Storm - Wind	0.00	0.00	$ 50,000	$ -	Thunderstorm Winds	$ 90,909	$ -
7/21/1987	7/21/1987	Flooding	0.00	0.00	$ 50,000	$ 500	Flash Flood	$ 90,909	$ 909
7/21/1987	7/21/1987	Severe Storm/Thunder Storm - Wind	0.00	2.00	$ 5,000	$ -	thunderstorm wind	$ 9,091	$ -
12/9/1987	12/9/1987	Wind	0.00	0.00	$ 7,143	$ -	High Winds	$ 12,987	$ -
12/20/1987	12/21/1987	Winter Weather	0.00	0.00	$ 7,143	$ -	Heavy Snow	$ 12,987	$ -
12/22/1987	12/22/1987	Winter Weather	0.61	0.00	$ 1,136	$ -	Heavy Snow	$ 2,066	$ -
8/1/1988	8/31/1988	Drought	0.00	0.00	$ -	$ 11,364	Drought	$ -	$ 19,936
10/1/1988	10/31/1988	Drought	0.00	0.00	$ 11,364	$ 11,364	Drought	$ 19,936	$ 19,936
12/12/1988	12/13/1988	Wind	0.00	0.00	$ 10,000	$ -	Wind	$ 17,544	$ -

Table 4.2. SHELDUS Hazard Profile for Shoshone County, Idaho (SHELDUS 2008).									
HAZARD BEGIN DATE	HAZARD END DATE	HAZARD TYPE(S)	INJURIES	FATALITIES	PROPERTY DAMAGE	CROP DAMAGE	REMARKS	PROPERTY DAMAGE ADJUSTED 2007	CROP DAMAGE ADJUSTED 2007
12/30/1988	12/30/1988	Winter Weather	0.00	0.00	$ 7,143	$ -	Extreme Cold	$ 12,531	$ -
12/30/1988	12/30/1988	Severe Storm/Thunder Storm - Winter Weather	0.00	0.00	$ 2,381	$ -	Severe Storm-Snow	$ 4,177	$ -
1/31/1989	1/31/1989	Winter Weather	0.29	0.00	$ 71,429	$ 7,143	BLIZZARD	$ 119,048	$ 11,905
3/2/1989	3/2/1989	Flooding	0.00	0.00	$ 7,143	$ -	Flood	$ 11,905	$ -
8/12/1989	8/12/1989	Severe Storm/Thunder Storm - Wind	0.00	1.00	$ 5,000	$ -	thunderstorm wind	$ 8,333	$ -
8/20/1990	8/20/1990	Severe Storm/Thunder Storm	0.00	0.00	$ 50,000	$ -	Heavy Rain	$ 79,365	$ -
11/20/1990	11/21/1990	Winter Weather	0.00	0.00	$ 4,167	$ -	Heavy Snow	$ 6,614	$ -
11/23/1990	11/23/1990	Wind	0.00	0.00	$ 100,000	$ -	High Winds	$ 158,730	$ -
11/24/1990	11/26/1990	Flooding	0.00	0.00	$ 10,000	$ -	Flooding	$ 15,873	$ -
12/4/1990	12/4/1990	Wind	0.13	0.00	$ 6,250	$ -	High Winds	$ 9,921	$ -
12/18/1990	12/19/1990	Winter Weather	0.00	0.00	$ 6,250	$ -	Blizzard	$ 9,921	$ -
12/18/1990	12/31/1990	Winter Weather	0.68	0.02	$ 11,364	$ 113,636	Extreme Cold	$ 18,038	$ 180,375
12/30/1990	12/31/1990	Winter Weather	0.00	0.00	$ 2,500	$ -	Blizzard	$ 3,968	$ -
2/28/1991	2/28/1991	Winter Weather	0.29	0.00	$ 7,143	$ -	Snow	$ 10,823	$ -
3/3/1991	3/3/1991	Wind	0.00	0.00	$ 1,136	$ -	High Wind	$ 1,722	$ -
6/20/1991	6/20/1991	Flooding	0.00	0.00	$ 50,000	$ 500	Flash Flood	$ 75,758	$ 758
10/16/1991	10/16/1991	Wind	1.14	0.14	$ 71,429	$ 7,143	Wind	$ 108,225	$ 10,823
4/9/1992	4/9/1992	Wind	0.00	0.00	$ 1,724	$ -	Dust Storm	$ 2,536	$ -
4/17/1992	4/17/1992	Wind	0.00	0.00	$ 11,364	$ 11,364	Wind	$ 16,711	$ 16,711
6/1/1992	6/30/1992	Drought	0.00	0.00	$ -	$ 1,136,364	Drought	$ -	$ 1,671,123
7/1/1992	7/31/1992	Drought	0.00	0.00	$ -	$ 1,136,364	Drought	$ -	$ 1,671,123
8/1/1992	8/31/1992	Drought	0.00	0.00	$ -	$ 1,136,364	Drought	$ -	$ 1,671,123
8/11/1992	8/15/1992	Lightning	0.00	0.00	$ 1,136	$ 114	Dry Lightning	$ 1,671	$ 167
8/24/1992	8/26/1992	Winter Weather	0.00	0.00	$ 139	$ 13,889	Freeze	$ 204	$ 20,425
9/1/1992	9/30/1992	Drought	0.00	0.00	$ -	$ 1,136,364	Drought	$ -	$ 1,671,123
10/1/1992	10/31/1992	Drought	0.00	0.00	$ 113,636	$ 1,136,364	Drought	$ 167,112	$ 1,671,123
11/19/1992	11/20/1992	Winter Weather	0.00	0.15	$ 2,500	$ -	Heavy Snow	$ 3,676	$ -
11/21/1992	11/21/1992	Winter Weather	0.00	0.00	$ 12,500	$ 125,000	Heavy Snow	$ 18,382	$ 183,824
1/1/1993	3/15/1993	Winter Weather	0.00	0.00	$ -	$ 7,143	Weather Stress	$ -	$ 10,204
1/7/1993	1/7/1993	Winter Weather	0.00	0.00	$ 10,000	$ -	Snow	$ 14,286	$ -
1/20/1993	1/20/1993	Wind	0.25	0.00	$ 125	$ -	Wind	$ 179	$ -

Table 4.2. SHELDUS Hazard Profile for Shoshone County, Idaho (SHELDUS 2008).

HAZARD BEGIN DATE	HAZARD END DATE	HAZARD TYPE(S)	INJURIES	FATALITIES	PROPERTY DAMAGE	CROP DAMAGE	REMARKS	PROPERTY DAMAGE ADJUSTED 2007	CROP DAMAGE ADJUSTED 2007
9/1/1993	9/30/1993	Winter Weather	0.00	0.00	$ -	$ 11,364	Cool and Wet Growing Season	$ -	$ 16,234
11/12/1993	11/12/1993	Wind	0.00	0.00	$ 12,500	$ -	High Winds	$ 17,857	$ -
12/1/1994	12/1/1994	Severe Storm/Thunder Storm - Winter Weather	0.00	0.00	$ 1,136	$ -	HEAVY RAIN/SNOW	$ 1,578	$ -
2/19/1995	2/20/1995	Flooding	0.00	0.00	$ 25,000	$ -	FLOODS	$ 33,784	$ -
7/6/1995	7/6/1995	Severe Storm/Thunder Storm - Wind	0.00	0.00	$ 50,000	$ -	THUNDERSTORM WIND	$ 67,568	$ -
1/23/1996	1/23/1996	Winter Weather	0.00	0.00	$ 3,600	$ -	WINTER STORM	$ 4,737	$ -
2/8/1996	2/8/1996	Flooding	0.17	0.00	$ 12,000,000	$ -	FLOODS	$ 15,789,474	$ -
4/24/1996	4/26/1996	Flooding	0.00	0.00	$ 16,667	$ -	FLOODS	$ 21,930	$ -
5/1/1997	5/31/1997	Flooding	0.00	0.00	$ 571,429	$ -	FLOODS	$ 732,601	$ -
6/1/1997	6/15/1997	Flooding	0.00	0.00	$ 666,667	$ -	FLOODS	$ 854,701	$ -
3/4/1998	3/5/1998	Winter Weather	0.00	0.00	$ 3,571	$ -	HEAVY SNOW	$ 4,521	$ -
7/30/1998	7/30/1998	Flooding	0.00	0.00	$ 100,000	$ -	FLOOD	$ 126,582	$ -
7/30/1998	7/30/1998	Hail - Severe Storm/Thunder Storm - Wind	0.00	0.00	$ 5,000	$ -	TSTM WIND/HAIL	$ 6,329	$ -
9/14/1998	9/15/1998	Wildfire	0.00	0.00	$ 20,000	$ -	WILD/FOREST FIRE	$ 25,316	$ -
1/12/1999	1/12/1999	Flooding	0.00	0.00	$ 12,000	$ -	FLOODS	$ 15,000	$ -
2/2/1999	2/2/1999	Wind	0.00	0.00	$ 600,000	$ -	HIGH WIND	$ 750,000	$ -
2/25/1999	2/25/1999	Avalanche	0.00	0.00	$ 5,000	$ -	AVALANCHE	$ 6,250	$ -
4/14/2000	4/16/2000	Flooding	0.00	0.00	$ 13,333	$ -	FLOOD	$ 16,064	$ -
3/13/2001	3/13/2001	Wind	0.00	0.00	$ 2,333	$ -		$ 2,713	$ -
6/1/2001	6/1/2001	Severe Storm/Thunder Storm - Wind	0.00	0.00	$ 5,000	$ -		$ 5,814	$ -
6/1/2001	6/1/2001	Severe Storm/Thunder Storm - Wind	0.00	0.00	$ 5,000	$ -		$ 5,814	$ -
10/22/2001	10/23/2001	Wind	0.00	0.00	$ 15,000	$ -		$ 17,442	$ -
12/1/2001	12/1/2001	Winter Weather	0.00	0.00	$ 16,667	$ -		$ 19,380	$ -
5/19/2002	5/19/2002	Severe Storm/Thunder Storm - Wind	0.00	0.00	$ 10,000	$ -		$ 11,494	$ -
8/21/2002	8/21/2002	Flooding	0.00	0.00	$ 15,000	$ -		$ 17,241	$ -

Table 4.2. SHELDUS Hazard Profile for Shoshone County, Idaho (SHELDUS 2008).

HAZARD BEGIN DATE	HAZARD END DATE	HAZARD TYPE(S)	INJURIES	FATALITIES	PROPERTY DAMAGE	CROP DAMAGE	REMARKS	PROPERTY DAMAGE ADJUSTED 2007	CROP DAMAGE ADJUSTED 2007
2/17/2003	2/17/2003	Severe Storm/Thunder Storm - Wind	0.00	0.00	$ 100,000	$ -		$ 112,360	$ -
1/15/2005	1/18/2005	Winter Weather	0.00	2.00	$ -	$ -	Heavy Snow	$ -	$ -
1/15/2006	1/20/2006	Landslide	0.00	0.00	$ 7,500	$ -	Landslide	$ 7,732	$ -
5/22/2006	5/22/2006	Severe Storm/Thunder Storm - Wind	0.00	0.00	$ 20,000	$ -	Thunderstorm Wind (G65)	$ 20,619	$ -
5/22/2006	5/22/2006	Severe Storm/Thunder Storm - Wind	0.00	0.00	$ 2,000	$ -	Thunderstorm Wind (G50)	$ 2,062	$ -
12/14/2006	12/15/2006	Wind	0.43	0.00	$ 68,000	$ -	High Wind (G76)	$ 70,103	$ -
1/6/2007	1/6/2007	Wind	0.00	0.00	$ 250	$ -	Strong Wind	$ 250	$ -
							TOTAL	$ 54,091,721	$ 9,599,212
								Grand Total	*$ 63,690,933*
								Average Annual Losses	*$ 1,355,126*

(SHELDUS 2008)

<u>Does not include losses from 2008</u>

4.1. Phase I Hazard Profile

During the first Shoshone County Multi-Jurisdictional Hazards Mitigation Plan Committee meeting, the attendees participated in a scoping exercise to subjectively place all relevant hazards into a matrix used to compare various hazard importance levels based on the potential for the hazard to occur and its capacity to negatively affect people, structures, infrastructure, and the economy of Shoshone County. This exercise helped to spark discussions about relative risks and the types of impacts commonly experienced. Resources for this discussion included the tabular risk analysis data presented in Tables 4.1 and 4.2 augmented with the extensive personal experiences of the combined planning committee membership.

For the purposes of the planning committee discussion while creating the data found within Table 4.3, the relative categories of Low, Medium, and High were considered as follows:

- Probability of Occurrence
  - Low – historically, the listed hazard has been observed with a frequency of one or fewer notable events within a ten year period. This category also includes infrequent hazard events that may occur only once a century.
  - Medium – the occurrence of the listed hazard has been observed more frequently than once in a ten year period, but less frequently than twice every five year period, on average.
  - High – the listed hazard has occurred more than twice every five years, and includes annual event hazards, and even multiple times per year hazards. To be considered for this ranking, the hazard does not necessarily occur every year, but when considered over a five year period, the hazard is witnessed three or more times per five year period.
- Potential to Impact People, Structures, Infrastructure, and the Economy
  - Low – the occurrence of the listed hazard has the low potential to negatively impact the listed resources based on the exposure to developments and population centers, coupled with considerations for available resources to respond to these threats. The risk exposure potentially impacts no lives and less than 25 structures when it is witnessed.
  - Medium – the occurrence of the listed hazard has moderate potential to negatively impact the listed resources based on the exposure to developments and population centers, coupled with considerations for available resources to respond to these threats. The risk exposure potentially impacts fewer than 5 lives or less than 50 structures when it is witnessed.
  - High – the occurrence of the listed hazard has high potential to negatively impact the listed resources based on the exposure to developments and population centers, coupled with considerations for available resources to respond to these threats. The risk exposure potentially impacts more than 5 lives or more than 50 structures with each occurrence.

The findings of the planning committee are summarized in Table 4.3.

Table 4.3. Phase I Hazard Assessment of Shoshone County.

Probability of Occurrence		Low	Medium	High
	High	Drought	Avalanche	Wildland Fire Severe Winter Weather Flood
	Medium	Insect & Disease	Wind Storms	Landslide
	Low	Epidemics Civil Unrest / Terrorism	Earthquake / Seismic Shaking	Hazardous Materials
		Low	**Medium**	**High**
		Potential to Impact People, Structures, Infrastructure, and the Economy		

These data presented the basis for evaluation in the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan with the determination that the hazards to be considered in this effort would include:

1. Flood
2. Wildland Fire
3. Earthquakes & Seismic Shaking Hazards
4. Landslides
5. Severe Winter Weather

The planning committee widely recognized the existence of additional potential risks, but felt that the inclusion of additional hazards could be addressed at a later time, after the basic model of mitigating the negative impacts of these natural hazards has been concluded.

4.2. Flood

Flooding is a natural process of nature that occurs when water leaves river channels, lakes, ponds, and other bodies where water is normally confined and expected to stay. It is also a serious and costly natural hazard affecting Idaho when it occurs around human development. Floods damage roads, farmlands, and structures, often disrupting lives and businesses. Flood-related disasters occur when human property and lives are impacted by the flooding water. An understanding of the role of weather, runoff, landscape, and human development in the floodplain is therefore the key to understanding and controlling flood-related disasters.

Natural flood events in Shoshone County are grouped into five general categories:

1. **Riverine Flooding:** a rise in the volume of a stream until that stream exceeds its normal channel and spills onto adjacent lands.
    a. **Slow kinds:** Runoff from sustained rainfall or rapid snowmelt exceeding the capacity of a river's bank-full width. Causes include heavy rains from monsoons, hurricanes and tropical depressions, warm winds and, more commonly in Shoshone County, warm rainfall landing on a deep and frozen snow pack (rain-on-snow events).
    b. **Fast kinds:** Runoff causes a flash flood as a result of an intense and often prolonged thunderstorm or a rain-on-snow event coupled with high rainfall in lower altitudes.
2. **Flash Flooding:** Flash flooding results from high water velocity in a small area but may recede relatively quickly. These floods are generally fed by low-order streams and occur in headwater areas. Streams prone to flash flooding do not possess the expansive floodwater storage area that higher order streams typically possess. Flood storage areas

are identified by wide and flat valley bottoms where flood waters decrease flow velocity, drop sediment load, and then reenter the main stream channel. Low-order streams, especially in north Idaho, are typically confined to steep “V” shape valley bottom lands where channel widening does not occur. The only path for water to follow is the main stream channel where volume increases with heavy rain and snowmelt causing water velocity to increase accordingly. Flash flooding is the combination of high water volume with high water velocity. When a topographic widening of the valley is found, a flash flood is the result. The joining of two or more low order streams into a floodplain, or a floodplain with high order streams can accelerate into a riverine flood type, often of the “fast kind”.

3. **Ice/Debris Jam Flooding:** Floating debris or ice accumulates at a natural or man-made obstruction in rivers and restricts the flow of water, causing it to leave the bank-full width of the river and spill onto the flood plain and beyond.
4. **Mud Floods or Muddy Floods:** These flood types result from super-saturated soils on moderate to steep slopes that are generally destabilized by types of development (road building, structure construction) or other disturbance (landslides, or drastic changes in vegetation cover). The flow of these super-saturated soils can follow the same path as water down ravines, and in the process displace flood zones with heavy concentrations of mud and debris. While these are most common on croplands, they can also occur on harvested forestlands, and in high-impact housing developments. Muddy floods are a hillside process and not the same as mudflows, which are a mass-wasting process discussed in the Landslides Section of this document. Muddy floods primarily lead to damage of road infrastructure (leaving a mud blanket or clogging sewage networks) and private property.
5. **Catastrophic Flooding:** These floods are caused by a significant and unexpected event such as a dam breakage or levee failure. Sometimes these floods are triggered by other natural or man-caused hazards such as an earthquake, landslide, volcanic eruption, or dam failure.

Flood damages are assessed in three related categories including:

1. **Primary Effects:**
   a. Physical damage: These damages include harm to bridges, cars, buildings, sewer systems, roadways, canals, and any other type of structures,
   b. Casualties: Described as the number of people and livestock that die due to drowning. This can also lead to epidemics and diseases.
2. **Secondary Effects:**
   a. Water supplies: Causes the contamination of water. Clean drinking water becomes scarce.
   b. Diseases: Unhygienic conditions are present. Spread of water-borne diseases occurs.
   c. Crops and food supplies: Shortage of food crops can be caused due to loss of an entire harvest.
   d. Trees: Tree species not tolerant to prolonged subsurface water saturation can die from suffocation.
   e. Redistribution of potentially contaminated soils from past soil contamination by lead and other heavy metals (specific to the Silver Valley situation).

3. **Tertiary and Other Long-Term Effects:**
    a. Economic: economic hardship due to a temporary decline in tourism, rebuilding costs, and food shortage leading to price increase.

The most commonly observed flood type in Shoshone County is a Riverine Flood. A “base flood” is the magnitude of a flood having a one-percent chance of being equaled or exceeded in any given year. Although unlikely, “base floods” can occur in any year, even successive ones. This magnitude is also referred to as the “100-year Flood” or “Regulatory Flood” by state government (IBHS 2008b).

The low-relief areas adjacent to the channel which normally carries water is referred to as the floodplain. In practical terms, the floodplain is the area that is inundated by floodwaters. In regulatory terms, the floodplain is the area that is under the control of floodplain regulations and programs (such as the National Flood Insurance Program which publishes the FIRM maps). Idaho State Code (BHS 2008) defines the floodplain as:

> *“That land that has been or may be covered by floodwaters, or is surrounded by floodwater and inaccessible, during the occurrence of the regulatory flood.”*

This Multi-Jurisdictional Hazard Mitigation Plan has defined the flood plain for Shoshone County through the FIRM Map designations defined in September 2008 and shown on several maps referenced in this document.

4.2.1. Weather

Winter weather conditions are the main driving force in determining where and when riverine floods and base floods will occur. The type of precipitation that a winter storm produces is dependent on the vertical temperature profile of the atmosphere over a given area. Shoshone County experiences riverine flooding from two distinct types of meteorological events:

- spring runoff, and
- winter rain, rain-on-snow, and snowmelt events

The major source of floodwaters in Shoshone County is normal spring snowmelt with rain. As spring melt is a “natural” condition, the stream channel is defined by the features established during the average spring high flow (bank-full width). Section 3.6 summarizes the monthly temperature and precipitation regimes in Shoshone County and confirms the increased levels of cool to cold and moist weather systems that arrive in November and persist through March. Snowfall accumulations are warmed and rain-on-snow events can happen at any time of the winter, but are more disastrous in March, April, and May.

Section 3.7. presents several streamflow gauge reports by the USGS for select areas in Shoshone County. These peak streamflow reports are closely tied to spring runoff and rainfall events. A cursory review of these gauge reports reveals that the highest 10% of annual maximum peak streamflow (cubic feet per second) level measurements for each gauge station, correspond to extreme flood conditions on that river system. These extreme annual maximum streamflow rates are repeated irregularly but reoccur every ~7 to ~18 years on average. Sometimes, these events are repeated in consecutive years such as at the Enaville station on the North Fork Coeur d’Alene River in 1980 & 1981 (Section 3.7.1.). Several of the gauge stations in Shoshone County maintain irregular peak streamflow records.

Unusually heavy snow packs or unusual spring temperature regimes (e.g., prolonged warmth) may result in the generation of runoff volumes significantly greater than can be conveyed by the confines of the stream and river channels. Such floods are often the ones that lead to widespread damage and disasters. Floods caused by spring snowmelt tend to last for a period of several days to several weeks, longer than the floods caused by other meteorological sources.

Floods that result from rainfall on frozen ground in the winter, or rainfall associated with a warm, regional frontal system that rapidly melts snow at low and intermediate altitudes, or flows over a frozen snow pack (rain-on-snow), can be the most severe. These situations quickly introduce large quantities of water into the stream channel network, easily overloading its bank-full width capacity.

In small drainages, the most severe floods are usually a result of rainfall on frozen ground but moderate quantities of warm rainfall on a snow pack, especially for one or more days, can also result in rapid runoff and flooding. Although meteorological conditions favorable for short-duration warm rainfall are common, conditions for long-duration warm rainfall in the winter are relatively rare. Occasionally, however, the polar front becomes situated along a line from Hawaii through Oregon, and warm, moist, unstable air moves into the region. Most winter floods develop under these conditions, as was the case with the northern Idaho floods of 1996 (IBHS 2008a).

In general, the meteorological factors leading to flooding are well understood. They are also out of human control, so flood mitigation must address the other contributing factors and hazard exposure dynamics.

4.2.2. Topography and Geographic Influences

The nature and extent of a flood event are the result of the hydrologic response of the landscape. Factors that affect this hydrologic response include soil texture and permeability, land cover and vegetation, land use and land management practices. Precipitation and snowmelt, known collectively as runoff, follow one of three paths, or a combination of these paths, from the point of origin to a stream or depression: overland flow, shallow subsurface flow, or deep subsurface ("ground water") flow. Each of these paths delivers water in differing quantities and rates. The character of the landscape will influence the relative allocation of the runoff and will, accordingly, affect the hydrologic response.

Unlike precipitation and ice formation, steps can be taken to mitigate flooding through manipulation or maintenance of the floodplain. Insufficient natural water storage capacity and changes to the floodplain landscape can be offset through water storage and conveyance systems that run the gamut from highly engineered structures to constructed wetlands.

Careful planning of land use can build on the natural strengths of the hydrologic response. Re-vegetation of burned slopes diverts overland flow (fast and flood producing) to subsurface flow (slower and flood moderating). Details on rehabilitating burned areas to reduce flash floods, debris flows and landslides can be found in the Landslide section of this document.

4.2.2.1. Understanding Stream Order as an Analysis Tool

Stream order classification is an analysis tool for understanding the mechanisms of stream channels and water conveyance through the network of river systems. Stream order numbers convey information about the number of streams converging as the network grows. The Shreve Stream Order is a specific variant of this tool. This method of stream ordering by magnitude was proposed by Shreve (1967) and is widely used today. All streams with no contributing tributaries are assigned a magnitude (order) of one. Magnitudes are additive down slope. When two streams intersect, their magnitudes are added and assigned to the down slope link.

Using this set of criteria, low order streams are typical of headwater streams. High order streams represent areas where potentially hundreds of "first order streams" have converged to create a large river system, such as the South Fork or the Main Fork Coeur d'Alene River. Shreve Stream Order values will be discussed in the flood analyses for each community in this document and will be used to express flood characteristics defined above.

Conceptually, the higher the Shreve stream order value, the higher the potential for that segment of the stream to exhibit characteristics consistent with riverine floods. Shreve stream order segments with low magnitude are consistent with a flash flood profile, normally because these segments of the system do not possess the flat valley bottom profile consistent with a broad flood zone.

4.2.3. History

Shoshone County has experienced a long history of high magnitude floods since first recorded in 1897, typically by “50-year” and “100-year” flood events. The diverse landscape and weather patterns within Shoshone County are the triggers for those high-magnitude floods. Rain-on-snow events and quickly rising, above normal high spring temperatures are typical antecedents to spring floods in Shoshone County. The combination of the above two events can be devastating and can cause extraordinary flooding events.

In 1894, records indicate the first serious recorded flooding of the Coeur d'Alene River system, leading to a rise in Lake Coeur d’Alene’s elevation to approximately 12 feet above “full pool”. On May 18, 1917, spring floods matched the 1894 levels, leading to a multiple day suspension of rail and highway transportation in the region. On December 18, 1917, flood waters again matched record levels, causing thousands of dollars in property damage (UI Libraries 1980).

In 1933, flood waters crested the previously set records of 1894 and 1917. Three days of torrential spring rains in early June sent the Coeur d'Alene River system and its tributaries over their banks. Later that same year, on December 21, an unseasonably warm weather system moved into the Idaho Panhandle causing a snow pack thaw and was again accompanied by heavy rains. This catastrophic combination caused landslides and flooding across the Coeur d’Alene River system. Coeur d'Alene Lake reached an all-time-high level of 14 feet above normal elevation (UI Libraries 1980).

In December 1933, both the South Fork of the Coeur d'Alene River and Placer Creek went over their banks, inundating the eastern and western sections of Wallace. On December 22, 1933, Nine Mile Creek (creating a confluence with the South Fork Coeur d’Alene River at Wallace) overflowed its banks, adding to the already extensive destruction. On December 23 the storm stopped, the weather turned cold and by the 26th the rivers were back in their confines, leaving behind nearly one million dollars (1933 dollars) worth of property damage in Wallace alone. It was estimated that property damage in Shoshone County reached three and a half million dollars (UI Libraries 1980).

During the same winter, during March 27-29, 1934, more heavy rains occurred, and consequently more flooding. The communities of Mullan, Wallace, and Kellogg sustained approximately $100,000 damage from the flooding (UI Libraries 1980).

Over the decades following these records of historic flood events, several weather patterns brought repeated flood waters to Shoshone County. Significant flood events occurred in 1938, 1948, 1963, 1964, 1974, 1982, 1996, and 1997 (Table 4.1). Flooding along Milo Creek in 1997 impacted Wardner and Kellogg and has been previously summarized in Section 3.9.4. of this document.

May of 2008 marked the most recent major flood event in Shoshone County (summarized in Section 3.9.5). The flood was triggered by warm weather and moderate rainfall causing rapid melting of an unusually high snowpack. News reports, state records and FEMA press releases document the progression of events that started as a sustained rainfall event and led to the region being declared a National Disaster Area by President Bush.

The flood potential was high in the spring of 2008 as the Silver Valley received more winter snow than in the winter of 1997 - the time of the previous big flood. Residents were encouraged through press releases to stock extra food, bottled water and medications in advance of a local emergency situation being declared.

By May 7, 2008, water a few inches deep started accumulating across Riverview Drive in Cataldo as a flood watch for the Coeur d'Alene River was issued by the National Weather Service in Spokane. According to the National Weather Service, water levels for the Coeur d'Alene River at Cataldo were 42.3 feet at the time of observation with expectations of rising to 43.04 feet before cresting mid morning on May 8. Shoshone County Emergency Services personnel were prepared to deal with the situation as it unfolded.

A week later, on May 14, Idaho State Governor, Butch Otter declared a disaster emergency for Shoshone County, paving the way for Idaho Bureau of Homeland Security assistance to aid in an anticipated flood situation. The declaration from the Governor's Office came on the coattails of similar declarations made by county commissioners and county disaster services on May 13, forecasting upcoming temperatures in the 80s that would cause unprecedented amounts of seasonal runoff to quickly escalate flood measures.

"This declaration allows for state assets, personnel and equipment to rapidly be deployed to areas of concern within Shoshone County," Governor Otter said. "We will help the citizens of Shoshone County help themselves in dealing with this challenge."

The National Weather Service predicted that Coeur d'Alene River water levels at Cataldo would reach the flood stage marker of 43 feet on May 17, while continuing to raise another foot before cresting late May 18. For context, the National Weather Service predicted that at 43 feet minor flooding of farmland from Cataldo to Harrison would be likely along with the Cataldo campground beginning to flood. At 44 feet, homes near the river may experience flooding in basements.

A Federal Disaster Declaration was approved for flood emergencies in Kootenai and Shoshone Counties on August 1, 2008 (IBHS 2008a). The following is an excerpt from the Disaster Declaration press release.

> Governor C.L. "Butch" Otter announced that his request for a Presidential Disaster Declaration was approved by President George W. Bush. Governor Otter made the request due to the extraordinary costs incurred by the State of Idaho as a result of this spring's major flooding in Kootenai and Shoshone counties. Damages are estimated at more than $1.84 million.
>
> Under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, the State of Idaho is considered eligible for federal assistance because this year's springtime flooding was of such severity and magnitude that the affected counties and the State of Idaho could not cover all the costs without depleting disaster funds needed for other emergencies this fiscal year.
>
> "Our own Bureau of Homeland Security joined county emergency folks and did a great job of initial response. But I asked for federal assistance because of the serious damage done to local roads, water control systems, parks and recreational facilities," Governor Otter said. "I am pleased and grateful the President agrees with me that federal aid is warranted and necessary. The people of Kootenai and Shoshone counties are counting on this help."
>
> Federal aid will be administered by the Federal Emergency Management Agency's Region 10, working alongside personnel from the Idaho Bureau of Homeland Security. "Our men and women have worked closely with all seven of the Idaho counties that declared flooding emergencies earlier this year," said Idaho Homeland Security Chief Maj. Gen. Larry Lafrenz, who also serves as the State of Idaho adjutant general. "We now look forward to working with our federal partners to fully repair infrastructure damage that was beyond the state's financial means, and I've asked Idaho BHS Director Col. Bill Shawver to manage this important state/federal partnership on behalf of Idaho."

> Col. Shawver and his staff at Idaho BHS will now work with FEMA officials to determine the best place to set up the joint state/federal field office for this federally declared disaster. "Idaho BHS personnel will continue to work closely with government officials in the affected counties, just as we've done every day throughout this flooding emergency," said Col. Shawver. "With the additional federal assistance coming as a result of this presidential emergency declaration, I'm confident we will now have the resources to make the needed repairs to damaged and destroyed infrastructure."

The Coeur d'Alene River stage at the Cataldo USGS station crested at approximately 3 feet above the designated flood stage, officially classifying it as only a "moderate" flood by the National Weather Service. However, the impacts of that event on communities throughout the county were significant. The drinking water source at Enaville, which supplies water to over half of the county's residents, was inundated by flood waters. The Central Shoshone County Water District was forced to issue a boil-order throughout its service area because of potential bacteria from the floodwaters influencing the water source. Several local roads were inundated and had to be closed, including Interstate-90 exits at Cataldo, CCC Road, and the Old River Road. In addition, many of the Coeur d'Alene River tributary streams also experienced high water. Sand bags were placed by Mullan High School students in areas along Canyon Creek near Gem Hill Road and upper Burke Canyon (both near Wallace) to help protect residences from flooding. The lower portion of Meyer Creek in Osburn overflowed the existing conveyance system and flowed across portions of North 6th Street near the Zanetti Gravel Yard. Maintenance personnel worked around the clock to remove debris from the overflow structure on Mill Creek in Mullan to prevent flooding along 2nd Street.

Section 3.9.5. details additional complications faced by Shoshone County residents, agencies, and organizations in dealing with the displacement of contaminated soils where flood waters surged. These complications were not erased when the floodwaters subsided. The contaminated sludge relocated downstream, and the scoured soils that were covering previously-remediated sites required rapid response and a sustained effort to contain the pollution and exposed tainted soils.

4.2.4. Development

Floods generally come with warnings, and floodwaters rarely go where they are totally unexpected by experts. Those warnings are not always heeded though, and despite the predictability, flood damage continues.

The failure to recognize or acknowledge the extent of the natural hydrologic forces in an area has led to development and occupation of areas that can clearly be expected to flood on a periodic basis. Despite this, communities are often surprised when the stream leaves its channel to occupy its ancestral floodplain. A past reliance on structural means to control floodwaters and "reclaim" portions of the floodplain has also contributed to risk-prone development and continued flood-related damages.

Unlike the weather and the landscape, this flood-contributing factor can be controlled. Development and occupation of the floodplain places individuals and property at risk. Such use can also increase the probability and severity of flood events (and consequent damage) downstream by reducing the water storage capacity of the floodplain, or by pushing the water further from the channel or in larger quantities downstream.

4.2.5. Shoshone County Flood Profile

All five types of flood events occur in Shoshone County. Riverine flooding occurs along all tributaries and in the main channels to the Coeur d'Alene River System and the St. Joe River. The mountainous terrain of the region creates a flood-prone environment. Rain-on-snow events can and do occur at almost all elevations across the county. These events often contain enough moisture to cause flooding on the Coeur d'Alene River System and the St. Joe River and most of their tributaries. The same holds true for the St. Maries River, although most of this damage is seen further downstream in neighboring Benewah County. In general, these flood events can be predicted 24 to 72 hours in advance of the rising waters. Emergency plans that are in place can be executed before floodwaters overtop the river banks, minimizing loss of life and business disruption. Plans for reducing structural damage need to be put into place and executed long before the rain begins to fall and the snow begins to melt.

Summer thunderstorms can result in flash flooding of specific smaller drainages. Often there is little time to react to the quickly rising waters. Due to the nature of the terrain, localized flooding from thunderstorms tend to be more of a storm water drainage problem for many smaller communities. Short-term blockage of roads is usually the biggest impact as drainage structures are overwhelmed by the amount of water.

Ice and debris flows can occur as part of riverine and flash flooding events, usually exacerbating the effects of those types of floods. In the case of a fire or heavy logging activity, flash flooding can result because of the loss of vegetation that would otherwise intercept some of the surface water flow velocity. Details on reducing the effects of these types of debris flows can be found in the Landslide section (4.4.).

Of course, the critical complication of flooding in Shoshone County is seen acutely along the South Fork Coeur d'Alene River system where soil contamination from a century of mining activities and mining related pollution opens the door to recontamination of previously mitigated properties and new contamination from floodwater dispersal. Flood mitigation and flood preparedness cannot be seriously considered without taking these conditions into account.

4.2.6. Resources at Risk

During the development of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan, TerraGraphics completed a large array of geospatial analyses to better understand and quantify the exposure to risks in the county, especially flooding. The FIRM maps supplied to Shoshone County by FEMA in September 2008, were used to define the flood prone areas for 100-year and 500-year flood events.

4.2.6.1. Private Property Improvement Values

TerraGraphics completed a full cadastral GIS layer of Shoshone County and used it in the analysis of this project for flood risk exposure. This layer allowed linking of the geospatial data with tabular data to overlay risk prone areas with ownership data to determine the value of resources-at-risk from various hazards.

This analysis was augmented with the structure layer in GIS. The analysis procedure began by selecting all structures within the 100-year flood zone, then cross-referencing this with the parcel layer to select all parcels that possessed a selected structure (a structure in the 100-year flood zone). These parcels were then selected by their location in an incorporated city, a recognized community area, or as "other rural lands".

This process was repeated for the structures in the 500-year floodplain, but parcels which were already selected as occupying a structure in the 100-year floodplain were excluded. This procedure ensures that a double-counting of parcel improvement values would not be conducted. When completed, the analysis shows the value of the parcel and improvements in each flood-zone category.

For the purposes of this report, it is assumed that the improvement value of a parcel with a structure is completely attributed to the structure or structures on that parcel. There were cases of improvement values which represented a paved surface only, but the parcel evaluated did not include a structure, so that parcel's improvement value was not included in the summaries for flood zone improvements at-risk.

The results of this analysis are summarized in Table 4.4, and demonstrate that 30% of the value of improvements ($190.1 million) in Shoshone County is located within the 100-year flood zone. An additional 31% of all improvements in Shoshone County ($200.0 million) are located in the 500-year flood zone. Approximately 39% of all improvements in Shoshone County ($252.5 million) are located outside of the September 2008 FIRM map designations of a flood zone.

Table 4.4. Assessment results for private property parcel improvement values at-risk to flooding.

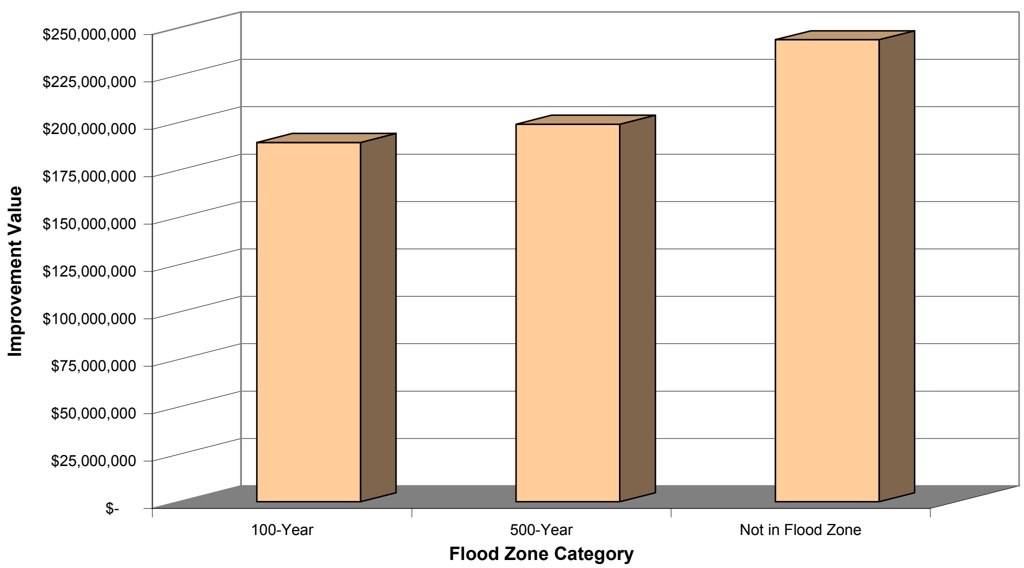
Community	Assessed Value Total	Improvement Value	100-Year	500-Year	Not in Flood Zone
Avery	$2,741,212	$1,947,219	$-	$-	$1,947,219
Bear Creek	$2,369,350	$686,550	$-	$-	$686,550
Big Creek (St. Joe River)	$5,161,467	$1,869,047	$964,722	$-	$904,325
Big Creek (SF CdA River)	$9,810,734	$6,880,771	$1,598,607	$1,770,914	$3,511,250
Burke Canyon	$15,849,076	$11,812,193	$662,879	$734,960	$10,414,354
Calder	$6,270,850	$1,857,259	$1,094,142	$-	$763,117
Cataldo	$7,565,344	$4,222,514	$1,283,174	$-	$2,939,340
Clarkia	$6,100,797	$1,741,920	$377,252	$-	$1,364,668
Eagle	$1,703,850	$732,390	$2,500	$80,800	$649,090
Emerald Creek	$2,030,937	$537,738	$-	$-	$537,738
Enaville	$11,838,051	$3,844,733	$1,879,039	$-	$1,965,694
Hoyt	$980,950	$74,660	$30,280	$-	$44,380
Kellogg - City	$223,276,633	$156,142,150	$74,432,458	$27,926,584	$53,783,108
Kellogg - Rural	$18,473,030	$13,389,260	$950,593	$2,831,261	$9,607,406
Kingston	$58,767,536	$35,112,556	$4,852,956	$-	$30,259,600
Larson	$1,866,031	$1,086,311	$-	$274,269	$812,042
Lower CdA River Rural Area	$32,976,113	$9,494,092	$3,243,322	$233,960	$6,016,810
Marble Creek	$4,332,378	$2,128,459	$939,205	$-	$1,189,254
Montgomery Gulch	$8,126,721	$5,824,281	$3,202,769	$-	$2,621,512
Moon Creek Gulch	$8,710,922	$5,950,151	$3,056,273	$-	$2,893,878
Mountain Meadows	$5,343,617	$2,929,865	$590,805	$-	$2,339,060
Mullan - City	$36,203,184	$30,811,844	$3,523,629	$3,642,402	$23,645,813
Mullan - Rural	$3,336,323	$1,615,963	$373,920	$145,905	$1,096,138
Murray	$3,000,364	$1,962,880	$-	$-	$1,962,880
Nine Mile Gulch	$6,073,666	$4,353,866	$104,201	$-	$4,249,665
Osburn - City	$92,034,461	$71,267,743	$4,960,325	$65,385,511	$921,907
Osburn - Rural	$21,867,179	$13,829,549	$2,299,082	$377,440	$11,153,027
Page	$21,999,303	$7,331,110	$868,843	$-	$6,462,267
Pine Creek & Pinehurst Rural	$39,504,469	$25,183,502	$5,425,166	$6,959,268	$12,799,068
Pinehurst - City	$101,062,311	$73,284,691	$21,930,399	$41,590,688	$9,763,604
Prichard	$30,089,646	$10,199,782	$3,947,064	$1,336,160	$4,916,558
Silverton	$36,053,422	$28,530,275	$2,515,578	$11,676,320	$14,338,377
Smelterville - City	$26,666,269	$19,511,917	$17,558,004	$216,921	$1,736,992
Smelterville - Rural	$14,526,942	$8,525,564	$6,903,574	$-	$1,621,990
Trout Creek	$2,549,210	$1,003,310	$73,554	$-	$929,756
Wallace - City	$59,654,088	$51,387,467	$19,509,161	$25,962,324	$5,915,982
Wallace - Placer Creek	$2,315,898	$1,797,418	$178,619	$1,439,263	$179,536
Wallace - Rural	$1,414,980	$809,441	$144,428	$665,013	$-
Wardner - City	$23,829,900	$12,601,454	$-	$5,891,406	$6,710,048
Other Rural Areas	$138,534,719	$10,392,147	$645,859	$873,768	$8,872,520
All Shoshone County	$1,095,011,933	$642,664,042	$190,122,382	$200,015,137	$252,526,523
Percent of total			30%	31%	39%

The column in Table 4.4 labeled "Assessed Value Total" includes the assessed value of the parcel plus any improvement values assessed by the Shoshone County Assessor. The column labeled "Improvement Value" is the value of assessed improvements to the parcel, as determined by the Shoshone County Assessor, and includes structures and other permanent improvements.

Although some of the communities indicated in Table 4.4 appear to be centered in adjacent counties, such as Cataldo in Kootenai County, it is only those parcels located within the Shoshone County boundary that have been included in this analysis.

In an earlier section of this document, data were presented which stated that approximately 56% of all structures in Shoshone County were built within the current FEMA designated flood zones (100-year and 500-year flood zones combined). Table 4.4 demonstrates that approximately 61% of the value of improvements in Shoshone County are located within these same floodplain parameters. When taken in combination this indicates that on average, the improvements built within the 100-year and 500-year floodplains possess a higher average value than the structures built out of the floodplain zone. Figure VIII graphically displays the allocation of parcel improvement values in Shoshone County by flood zone category.

Figure VIII. Parcel improvement values by flood zone categories.



4.2.6.2. Government Resource Improvement Values

In addition to private property, there are several structures in Shoshone County which are not assessed by the County Assessor. These are the structures owned and operated by state and federal government agencies (such as an Idaho Department of Lands Office), and by the county or a city (such as the Shoshone County Courthouse or a City Hall building). Non-Assessed structures also include school buildings and fire departments. These structures are not assessed by the County Assessor primarily because they are not taxed by the County.

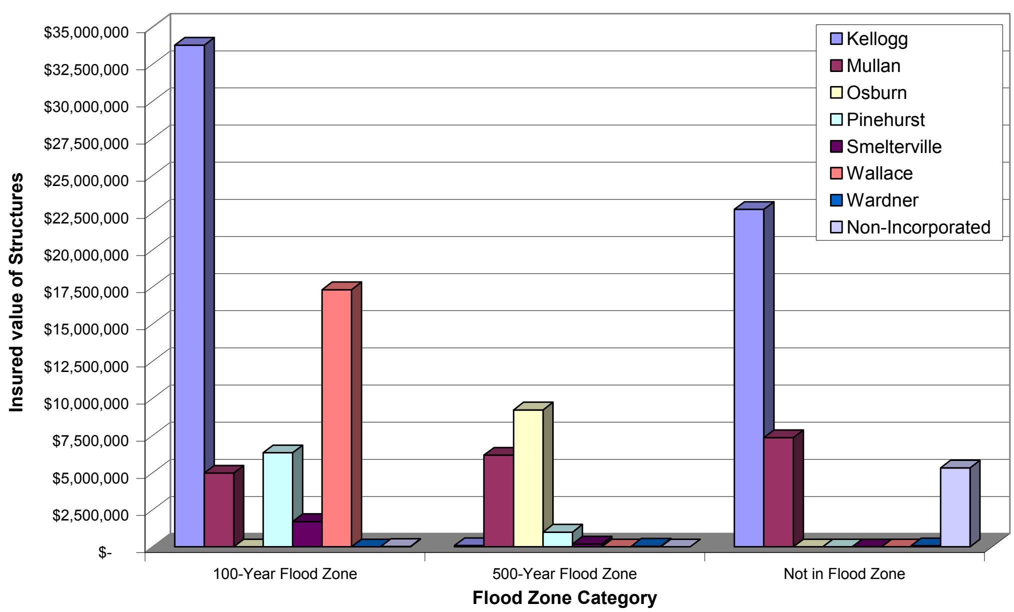
The Planning Committee members have provided the insured values of the structures owned by their respective agencies. This insured value will be used to represent the structure's value in comparison with the assessed value of private property. When considered together, they provide a holistic view of the resources at-risk to a hazard such as flooding.

Table 4.5 and Figure IX detail the facility values for these non-assessed structures and their location in the flood-zone categories defined by the FIRM Maps from September 2008.

Table 4.5. Insured values of public buildings in Shoshone County by flood zone designation.

Area	Insured Value	Value of Structures within each Flood Zone Category		
		100-Year Flood Zone	500-Year Flood Zone	Not in Flood Zone
Avery	$3,574,649	$-	$-	$3,574,649
Calder	$820,894	$432,335	$-	$388,559
Cataldo	$1,047,538	$-	$-	$1,047,538
Clarkia	$5,477,941	$198,000	$-	$5,279,941
Hoyt	$4,999,808	$-	$-	$4,999,808
Kellogg	$56,593,146	$33,776,950	$96,000	$22,720,196
Marble Creek	$15,000	$-	$-	$15,000
Mullan	$18,507,230	$4,973,781	$6,179,191	$7,354,258
Murray	$291,435	$-	$-	$291,435
Osburn	$9,224,098	$-	$9,224,098	$-
Other	$349,000	$30,000	$-	$319,000
Page	$1,500,000	$750,000	$-	$750,000
Pinehurst	$7,338,291	$6,344,297	$993,994	$-
Prichard	$90,760	$-	$90,760	$-
Smelterville	$1,894,281	$1,703,520	$190,761	$-
Wallace	$17,313,743	$17,313,743	$-	$-
Wardner	$128,990	$-	$49,107	$79,883
Total	$129,166,804	$65,522,626	$16,823,911	$46,820,267
	Percent of Total	51%	13%	36%

Figure IX. Insured values of non-Assessed structures in Shoshone County.



A complete review of these data reveals that over half of the public structures in Shoshone County are located within the 100-year flood zone. Another 13% are within the 500-year flood zone, and the remaining 36% are placed outside of the FEMA flood zones. This location of public structures within areas at-risk to flood damage and loss is significant.

This also identifies an unique opportunity for the County, Cities, and agencies to set a visible example of implementation of the flood tolerant structure enhancements.

4.2.6.3. Replacement Cost of Superfund Site Remediation

The Superfund Site located within the South Fork Coeur d'Alene River valley has received a tremendous effort from the EPA, the IDEQ, Shoshone County, local municipalities, private companies, organizations, and individuals to identify contaminated soils, develop and implement site remediation efforts, and dispose of contaminated soil in repositories. These efforts have been continuous for more than two decades.

The cost of designing, remediating, and managing this effort includes human resources and technology by all of the above listed organizations. The cost of replacing the remediation if recontamination occurred was projected for this effort. This estimate is useful for a valuation of what it would potentially cost to re-remediate those properties that have already been treated if the treatment were to be destroyed from a series of flood events. This comparison is useful in the context of structure values already conveyed in the previous section.

The location of properties receiving sampling and remediation efforts, within the Superfund Site and also within Shoshone County, has been evaluated against the September 2008 FEMA flood zones. The remedial status for all properties in each of several communities is summarized in Table 4.6. This community list is included within the list of communities detailed in Table 3.11, however, Table 4.6 includes only those communities located within the Superfund Site.

The properties counted in this portion of the report are grouped by specially assigned community areas designated by TerraGraphics in the execution of work for the IDEQ. These area groupings do not correspond to exact incorporated city boundaries. The purpose of these area definitions is to ensure that all properties in this largely rural area are accounted for, and that residential areas not included within an incorporated boundary can be organized. Factors for determining these community areas include a property's proximity to an incorporated city limits, the Shoshone County assessor's community designations, interviews with homeowners, and major geographic features, such as gulches and populated drainages.

The estimated cost of re-remediating what has been done was based on the current average cost per square foot to complete the process, with the exception of EPA costs (Stromberg pers comm. 2009). Four remedial statuses are summarized: 1) not yet sampled, 2) sampled and needs remediation, 3) sampled but does not need remediation, and 4) sampling and remediation work completed. The average cost per property per remedial status is based on a number of estimates: 1) not yet sampled is based on some effort of mapping the Basin to identify properties in the Superfund Site and collecting related data, 2) sampled and needs remediation is based on the rounded average cost per property to map, gain consent, sample, and report results, 3) sampled but does not need remediation is based on the same rounded average cost as 2, and 4) is based on the rounded average cost per square foot remediated and the average square feet remediated per property. This last remedial status includes all State, contractor, sampling, and waste disposal costs with the exception of EPA oversight costs. Note the values in Table 4.6 are rough estimates based on a number of available parameters and should not be used to represent the costs actually spent-to-date.

The values in Table 4.6 represent an estimate of what could be lost if floods were to disturb sites that are currently sampled or sampled and remediated. This is not an estimate of what it would cost to re-remediate in a flood zone because not only would re-remediation potentially occur on the properties currently remediated or sampled, but a flood may affect properties (or additional square footage on properties) previously considered as not contaminated. Additionally, the estimated costs for properties not yet sampled would likely remain unchanged.

Approximately 60% of the properties within the 100-year flood zone, 81% of the properties in the 500-year flood zone, and 38% of the properties outside the flood zone have been sampled and remediated or have been sampled but do not require remediation efforts. About 12% of the properties in the 100-year flood zone, 11% of the properties in the 500-year flood zone, and 12% of the properties outside the flood zone have been sampled and require remediation that has not yet been completed. These properties are in process for the final stages of remediation work. The remaining 28% of properties in the 100-year flood zone, 8% of the properties in the 500-year flood zone, and 50% of the properties outside the flood zone have not yet been sampled and their potential need for further treatment is undetermined, but may not need to be sampled under the Superfund Site criteria.

This estimated $129.8 million value fails to quantify the human health exposure linked to the mobilization of the remedy, deposition of contaminated soils downstream, or the exposure of contaminated soils currently overtopped by clean soils. Floodwaters in the Silver Valley of Shoshone County have the potential to damage human health, especially in children, from the mobilization of these contaminated soils.

Table 4.6. Estimated cost of re-establishing flood-damaged Superfund Site cleanup efforts to existing condition.

	100-Year Flood Zone				500-Year Flood Zone				Outside Flood Zone				
Area	Not Sampled	Sampled, Needs Action	Sampled, No Action Required	Sampled and Remediation Completed	Not Sampled	Sampled, Needs Action	Sampled, No Action Required	Sampled and Remediation Completed	Not Sampled	Sampled, Needs Action	Sampled, No Action Required	Sampled and Remediation Completed	Total Remediation Value by Community
Big Creek –CdA River	$300	$30,000	$12,000	$445,200	$20	$15,000	$-	$540,600	$2,020	$6,000	$-	$699,600	$1,750,740
Burke Canyon	$1,820	$123,000	$-	$1,494,600	$-	$-	$-	$254,400	$3,300	$165,000	$-	$5,374,200	$7,416,320
Cataldo	$540	$81,000	$3,000	$-	$-	$-	$-	$-	$6,120	$156,000	$42,000	$318,000	$606,660
Enaville	$460	$3,000	$-	$-	$-	$-	$-	$-	$340	$3,000	$-	$31,800	$38,600
Kellogg - City	$2,340	$9,000	$18,000	$19,175,400	$360	$-	$33,000	$15,295,800	$5,320	$18,000	$99,000	$14,946,000	$49,602,220
Kellogg - Rural	$340	$3,000	$45,000	$572,400	$-	$-	$-	$127,200	$260	$3,000	$57,000	$1,049,400	$1,857,600
Kingston	$3,240	$246,000	$33,000	$1,431,000	$20	$9,000	$-	$95,400	$6,960	$516,000	$198,000	$5,851,200	$8,389,820
Larson	$100	$3,000	$-	$63,600	$-	$-	$-	$-	$480	$-	$3,000	$127,200	$197,380
Montgomery Gulch	$1,080	$6,000	$-	$127,200	$20	$3,000	$-	$-	$920	$27,000	$-	$31,800	$197,020
Moon Creek Gulch	$680	$39,000	$-	$1,939,800	$-	$-	$-	$-	$360	$21,000	$6,000	$604,200	$2,611,040
Mullan - City	$220	$15,000	$3,000	$2,862,000	$400	$27,000	$6,000	$3,720,600	$1,520	$195,000	$42,000	$10,557,600	$17,430,340
Mullan - Rural	$600	$6,000	$-	$254,400	$-	$-	$-	$31,800	$1,940	$15,000	$-	$349,800	$659,540
Nine Mile Gulch	$100	$3,000	$-	$31,800	$-	$-	$-	$-	$1,680	$90,000	$6,000	$222,600	$355,180
Osburn - City	$720	$81,000	$39,000	$4,738,200	$840	$513,000	$192,000	$15,073,200	$100	$-	$-	$-	$20,638,060
Osburn - Rural	$680	$111,000	$6,000	$540,600	$100	$12,000	$3,000	$-	$3,380	$147,000	$66,000	$1,780,800	$2,670,560
Page	$140	$3,000	$12,000	$1,017,600	$20	$-	$-	$-	$2,980	$3,000	$54,000	$1,272,000	$2,364,740
Pine Creek & Pinehurst Rural	$1,400	$219,000	$27,000	$190,800	$300	$96,000	$21,000	$349,800	$3,280	$57,000	$33,000	$-	$998,580
Pinehurst - City	$1,560	$21,000	$318,000	$11,225,400	$960	$9,000	$447,000	$10,589,400	$820	$6,000	$123,000	$985,800	$23,727,940
Silverton	$300	$27,000	$-	$1,844,400	$300	$30,000	$3,000	$3,434,400	$620	$147,000	$21,000	$1,749,000	$7,257,020
Smelterville - City	$880	$-	$3,000	$12,561,000	$20	$-	$-	$63,600	$440	$-	$3,000	$1,017,600	$13,649,540
Smelterville - Rural	$40	$-	$-	$63,600	$-	$-	$-	$-	$400	$-	$-	$-	$64,040
Wallace - City	$2,860	$237,000	$36,000	$2,893,800	$500	$135,000	$-	$7,886,400	$2,520	$216,000	$6,000	$795,000	$12,211,080
Wallace - Placer Creek	$80	$12,000	$-	$-	$140	$12,000	$3,000	$254,400	$360	$3,000	$-	$-	$284,980
Wallace - Rural	$80	$6,000	$-	$-	$100	$57,000	$-	$636,000	$480	$9,000	$-	$31,800	$740,460
Wardner	$-	$-	$-	$-	$420	$3,000	$30,000	$4,452,000	$1,520	$6,000	$54,000	$2,194,200	$6,741,140
Total	$20,560	$1,284,000	$555,000	$63,472,800	$4,520	$921,000	$738,000	$62,805,000	$48,120	$1,809,000	$813,000	$49,989,600	$182,460,600

4.2.7. FEMA Programs Dealing with Flooding

4.2.7.1. National Flood Insurance Program

Shoshone County and all municipalities participate in the NFIP (Table 4.7).

Table 4.7. Shoshone County Communities Participating in NFIP as of 09/26/2008 (DFIRM 2008).

CID#	Jurisdiction	Address	Zip	Date of Entry	Original FIRM Date	Current FIRM Date
160114	SHOSHONE COUNTY	700 BANK STREET	83837	7/5/1977	9/5/1979	9/26/2008
160131	KELLOGG	1007 MCKINLEY STREET	83837	1/9/1974	7/2/1979	9/26/2008
160115	MULLAN	112 TERRILL LOOP	83846	12/28/1973	8/1/1979	9/26/2008
160116	OSBURN	921 EAST MULLAN AVENUE	83894	1/23/1974	9/5/1979	9/26/2008
160200	PINEHURST	106 NORTH DIVISION STREET	83850	1/31/1975	7/2/1979	9/26/2008
160117	SMELTERVILLE	501 MAIN STREET	83868	6/14/1974	12/18/1979	9/26/2008
160118	WALLACE	703 CEDAR STREET	83873	6/7/1974	7/2/1979	9/26/2008
162130	WARDNER	649 MAIN STREET	83837	9/6/1974	6/19/1985	9/26/2008

An important part of being an NFIP community is the availability of low-cost flood insurance for those homes and businesses within designated flood plains, or in areas that are subject to flooding, but that are not designated as Special Flood Hazard Areas.

Participation by individuals and businesses within each community for 2008 is shown in Table 4.8.

Table 4.8. NFIP Policy Statistics As of 06/30/2007 in Shoshone County (DFIRM 2008).

Community Name	Policies In-Force in 2007	Insurance In-Force whole $
SHOSHONE COUNTY	164	$20,085,600
KELLOGG	471	$67,737,700
MULLAN	1	$1,355,100
OSBURN	29	$3,247,100
PINEHURST	58	$10,081,300
SMELTERVILLE	14	$1,505,000
WALLACE	36	$4,688,600
WARDNER	0	$0

4.2.7.2. Repetitive Flood Loss

Shoshone County has several properties that meet the Repetitive Flood Loss Property (RFLP) classification by suffering substantial losses at least twice in a ten year period. These disaster-prone flood properties can be purchased by the County, using a percent of the FEMA awarded mitigation money following a disaster; the flood buy-out program. The caveat is that the property cannot be used subsequently for structure development and is therefore removed form the County's tax base. Acceptable uses include wetland, parks, and even sporting fields. This option remains available to Shoshone County and the Municipalities as a mitigation measure.

RFLP are properties insured by the NFIP and have experienced a flood-related loss twice during a consecutive ten year period. There have been nine RFLP structures in Shoshone County between 1980 and 2008. All of them were single-family dwellings. One parcel experienced seven losses over the period from 1980 until 2007. A total of nearly $301,861 has been paid to offset RFLP damages to buildings and contents over this period. Two of these properties were listed as being located in Pinehurst and one in Wallace. The remaining six properties were located in unincorporated areas of Shoshone County. One of the Pinehurst properties was determined to be located outside of the city in the rural community of Kingston and is appropriately listed under the County's NFIP policy.

Three of the RFLP parcels (located in unincorporated areas) were mitigated in response to flood loss events impacting those parcels in 1980. The most recent recorded RFLP loss occurred in 1997. Two properties in this category were impacted in 1996, two in 1995, and one in 1990.

Because RFLP structures are recorded only for structures insured by the NFIP, this summary is not inclusive of all properties suffering from repetitive losses in a general sense. It includes only those structures insured by NFIP that suffered these repetitive loss events. Other losses by homeowners not insured by the NFIP are not recorded in these statistics.

The Shoshone County Floodplain Administrator has provided a complete review of these properties to FEMA and determined that through a series of activities, only one parcel, located along the St. Joe River floodplain, still contains a structure. This structure is a garage attached to a private residence.

RFLP parcels located in Shoshone County

RFLP# 0049257

- Location: Enaville, CID# 160114
- This property is no longer considered a RFLP property.
- Updated as no building on property – on 01/28/2005.

RFLP# 0033016

- Location: Enaville, CID# 160114
- This property is no longer considered a RFLP property.
- Updated as "unable to locate" - on 03/24/1999.

RFLP# 0117740

- Location: Enaville, CID# 160114
- No building or floodplain development permits have been issued to this parcel since last claim.
- Per site inspection by Community Floodplain Administrator, no structures exist on this property.

RFLP# 0080642

- Location: Big Eddy on the St. Joe River, CID#160114
- Update cosmetic changes to the address: RP-49N02E-31-3140 A
- After review of the site conditions of the subject and surrounding property it appears that the past loss claims are a direct result of the residence structure design. The residence is a typical Ranch style with a daylight garage. The garage floor elevation is below the locally determined BFE.
- Potential mitigation measures and various sources of information and floodplain education have been explored and discussed with the property owner(s). To the knowledge of the County, no structural modifications or improvements have been completed. However, the Berm/levee area has been elevated over the years by the adjacent property owners.

- Most of the adjacent properties are predominately used by recreational vehicles, however, there are six (6) permanent (Assessable) structures potentially at risk of flood damage. No new structure(s) will be allowed within this area without meeting FEMA Floodway/Floodplain construction requirements.

RFLP# 0016498

- Location: Enaville, CID# 160114
- Update Cosmetic changes to the address
- Duplicate listing with RFLP # 0016497
- Previously updated- this property is no longer considered a RFLP property – Updated as flood protection provided – on 04/21/1999 Structure was raised to BFE.

RFLP# 0016497

- Location: Enaville, CID# 160114
- Update Cosmetic changes to the address
- Duplicate listing with RFLP # 0016498
- Previously updated- this property is no longer considered a RFLP property – Updated as flood protection provided – on 04/21/1999 Structure was raised to BFE.
- SEE RFLP# 0016498.

RFLP parcels located in a municipality

RFLP# 0085259

- Location: Pinehurst, CID # 160200
- Pcl # G-0100-002-002-0
- Country Club Lane
- Udated as- Property located with the 0.2 % chance flood hazard area (500-year flood zone) per September 28, 2008 FIRM. No further mitigation is known.

RFLP# 0078381

- Location: Pinehurst, CID # 160200 (Currently, See update notes below)
- Pcl# 49N02E-08-0800
- Palo Road
- Kingston is actual location of this parcel placing the parcel in the Shoshone County CID # 160114
- Actually located outside of incorporated limits of the City of Pinehurst -Community # 160200. Residence was constructed within Floodway designated portion of the FIRM. Residence built to BFE as required at the time of construction and remodel after last claim.

RFLP# 011303

- Location: Wallace, CID # 160118
- Cedar St., Wallace
- Property located with the 0.2 % chance flood hazard area per September 28, 2008 FIRM. No further mitigation is known.

4.2.7.3. Flood Property Buy-Out Program

An approach that is supported by the US Federal Government through FEMA, is the process of buying out flood-prone properties. For instance, the Federal Government offered to buy out flood-prone properties in order to prevent repeated disasters after the 1993 flood across the Midwest. Several communities accepted and the government, in partnership with the state, bought 25,000 properties that they converted into wetlands. These wetlands act as a sponge in storms, and in 1995, when the floods returned, the government did not have to expend financial resources for recovery in those areas.

In Shoshone County, several flood buyout properties have been transacted between FEMA, Shoshone County, and willing sellers. These flooded property buyouts were in response to flood activities in 1998, 1999, 2001, and 2002. A complete summary of property buyout actions in Shoshone County includes:

Disaster 1102 X ID

- Project 0002, Completed 08/27/1998. One parcel.
  - 130 Palo Road, Kingston, ID 83839. Parcel 49NO2E-08-0760
- Project 0007, Completed 08/27/1998. One parcel.
  - 2472A CDA River Road, Kingston, ID 83839. Parcel 49NO2E-19-8700.
- Project 0008, Completed 08/27/1998. Seven parcels.
  - 42928 Kingston, Kingston ID 83839. Parcel 49NO16-36-1540.
  - 42942 Riverview Drive, Kingston ID 83839. Parcel 49NO1E-36-1560.
  - 42988 Riverview Drive, Kingston ID 83839. Parcel 49NO166-36-1900.
  - 43000 Riverview Drive, Kingston ID 83839. Parcel 49NO1E-36-1620.
  - 43092 Riverview Drive, Kingston ID 83839. Parcel 49NO1E-36-1880.
  - 42948 Riverview Drive, Kingston ID 83839. Parcel 49NO1E-36-1580.
  - 43036 Riverview Drive, Kingston ID 83839. Parcel 49NO1E-36-1680
- Project 0009, Completed 08/27/1998. Three parcels.
  - 5438 CDA River Road, Kingston, ID 83839. Parcel 49NO26E-08-1530
  - 5482 CDA River Road, Kingston, ID 83839. Parcel 49NO2E-08-1540
  - 5580 CDA River Road, Kingston, ID 83839. Parcel 49NO2E-08-1570
- Project 0027, Completed 08/27/1998. Five parcels
  - 2000 CDA River Road, Kingston, ID 83839. Parcel 0-1550-007-003-A
  - 2020 CDA River Road, Kingston, ID 83839. Parcel 0-1550-007-001-0
  - 1831 CDA River Road, Kingston, ID 83839. Parcel 49NO2E-30-8100
  - 27 Enaville Street Kingston, ID 83839. Parcel 49NO1E-30-1275
  - 41 Enaville Street Kingston, ID 83839. Parcel 49NO1E-30-1300
- Project 0028, Completed 01/31/1999. One parcel.
  - 0000 Corner of Main & Division, Kellogg, ID 83835. Parcel D-0100-010-000-015-0.

Disaster 1177 X ID

- Project 0012, Completed 01/29/2002. Three parcels.
  - 0583 Riverview Drive, Cataldo, ID 83810. Parcel 0-0925-000-004-0
  - 40586 Riverview Drive, Cataldo, ID 83810. Parcel 0-1180-001-007
  - 13584 S Cataldo Road, Cataldo, ID 83810. Parcel 49NO1E-34-4150
- Project 0013, Completed 02/02/2001. One Parcel.
  - 42892 Riverview Drive, Kingston, ID 83873. Parcel 49NO1E-36-1500

It is important to note that the eighteen parcels listed above include only residential property acquisitions in Shoshone County affected as a result of specific disasters. This is not a comprehensive summary of properties suffering from repeated flood losses in Shoshone County. As a matter of current municipality and County policies, flooded property buy-out options are reviewed in response to declared disasters. At the time the option for purchasing these parcels becomes available, the property buy-out program is considered and implemented.

4.2.7.4. Community Rating System

The Community Rating System (CRS) is a profile system intended to provide information to the State NFIP Coordinator and others as general information and for those who may wish to increase community participation in the CRS or to improve the CRS classifications of communities that are already participating. The CRS classification category can lead to a discount in flood insurance premiums to property owners in participating communities. CRS credit points are given for a wide range of floodplain management activities, and the total of these points determines the amount of the discount.

The following is a brief description of the 18 activities that receive credit under the CRS. Only the activity numbers appear in the Table 4.9.

1. 300 Series - Public information

    310 - Elevation Certificates

    320 - Map Information Service

    330 - Outreach Projects

    340 - Hazard Disclosure

    350 - Flood Protection Information

    360 - Flood Protection Assistance

- 400 Series - Mapping and Regulations

    410 - Additional Flood Data

    420 - Open Space Preservation

    430 - Higher Regulatory Standards

    440 - Flood Data Maintenance

    450 - Storm Water Management

- 500 Series - Flood Damage Reduction

    510 - Floodplain Management Planning

    520 - Acquisition and Relocation

    530 - Flood Protection

    540 - Drainage System Maintenance

- 600 Series - Flood Preparedness

    610 - Flood Warning

    620 - Levee Safety

    630 - Dam Safety

Table 4.9. CRS Activity Descriptions.

C310	C320	C330	C340	C350	C360	C410	C420	C430	C440	C450	C510	C520	C530	C540	C610	C620	C630	**TOTAL**
Kellogg, City of (Rating as of 09/11/2008 is a Community Classification Class 8)																		
56	0	0	0	25	8	0	558	50	20	94	0	0	0	0	0	0	71	**882**
Shoshone County (Rating as of 1/22/2009 is a Community Classification Class 8)																		
70	140	44	0	15	63	0	642	106	55	55	0	20	4	0	6	0	71	**722**
Idaho Average Credit																		
77	133	37	7	27	22	18	224	335	78	88	14	5	0	121	17	0	71	**1,273**
National Average Credit																		
69	138	91	17	30	53	87	194	235	102	122	120	200	97	220	95	135	66	**1,310**

Table 4.10. CRS Policy Summary in Shoshone County.

Community Name	NFIP Policies	Annual Premium	CRS Reduction
Kellogg, City	467	$188,137	$9,405
Shoshone County	124	$64,791	$2,937

Additional benefits a community realizes from participation in the CRS include:

1. The CRS floodplain management activities provide enhanced public safety, a reduction in damage to property and public infrastructure, avoidance of economic disruption and losses, reduction of human suffering, and protection of the environment.
2. A community can evaluate the effectiveness of its flood program against a nationally recognized benchmark.
3. Technical assistance in designing/implementing some activities is available at no charge.
4. A CRS community's flood program benefits from having an added incentive to maintain its flood programs over the years. The fact that the community's CRS status could be affected by the elimination of a flood-related activity, or a weakening of the regulatory requirements for new development, should be taken into account by the governing board when considering such actions. A similar system used in fire insurance rating has had a strong impact on the level of support local governments give to their fire protection programs.
5. Implementing some CRS activities, such as floodplain management planning, can help a community qualify for certain federal assistance programs.

4.2.8. Potential Mitigation Measures

In many western countries, rivers prone to floods are often carefully managed. Water management structures such as levees, reservoirs, and weirs are used to prevent rivers from bursting over their banks. However, these structures only influence flood properties and do not alter the actual floodplain. The floodplain is a natural storage area used by the river to store the high water levels as it drains downstream. When a levee is placed along a river, the effect is to remove this temporal storage area and displace the needed storage to other stream storage areas immediately upstream (backflow) and adjacent to the levee protected area, and then downstream of the protected area. These displacements often mean increased flooding impacts in areas other than those that are protected.

The potential exception to this flood displacement problem occurs when a levee is placed upstream of a managed reservoir. When managed well, the reservoir can be lowered in advance of seasonal floodwater accumulation and used to receive the increased flood storage needs if required. In Shoshone County this is not a realistic option as the flow point for the county is Lake Coeur d'Alene, which is not a managed reservoir and it is located in Kootenai County, several miles downstream from Shoshone County communities.

Although a levee can be part of a managed flood management system, the catastrophic failure of the levee in New Orleans in 2005 (53 levee breaches) led to over 1,500 deaths. This levee failure was made possible by Hurricane Katrina, but as it stands now, there are few Federal Agencies, including the US Army Corps of Engineers (USACE) and FEMA, inclined to support new levee construction as a sole means of mitigating flood damages.

4.2.8.1. Flood Cleanup Safety

Cleanup activities following floods often pose hazards to workers and volunteers involved in the effort. Potential dangers include electrical hazards, carbon monoxide exposure, musculoskeletal hazards, heat or cold stress, motor-vehicle-related dangers, fire, drowning, and exposure to hazardous materials or contaminated soils and sediment. Because flooded disaster sites are unstable, cleanup workers might encounter sharp jagged debris, biological hazards in the floodwater, exposed electrical lines, blood or other body fluids, and animal and human remains.

A flood response program has not been instigated by Shoshone County or any of the municipalities. This response package has been considered and implemented by PHD because of the complications of soil contamination in the Silver Valley. This agency could provide a key leadership role with the municipalities to formulate a cleanup strategy.

4.2.8.2. Benefits of Flooding

There are many disruptive effects of flooding on human settlements and economic activities. However, flooding can bring benefits, such as making soil more fertile and providing nutrients in which it is deficient. Periodic flooding was essential to aboriginal peoples of the region who relied on a productive river ecosystem for food supplies.

4.2.8.3. Recommended Activities

The National Flood Insurance Program (NFIP – Administered by FEMA) is a Federal Program that helps communities reduce flood risks and enables property owners and renters to buy flood insurance. Although the NFIP offers flood insurance to homeowners and renters, this insurance coverage does not reduce the occurrence of flooding. All Incorporated Cities in Shoshone County, as well as the County itself, have NFIP policies (Tables 4.7 and 4.8) leading to a 100% coverage potential for Shoshone County located homes. The County and Cities participate in the NFIP by enacting and enforcing measures to reduce future flood risks (Table 4.7). At a minimum, these regulations govern construction in the Special Flood Hazard Areas (SFHAs) shown on FIRM maps. Participation by homeowners in the insurance program is optional, but adherence to City and County Building Codes is not, and these codes reflect NFIP guidelines in Shoshone County. In addition, many mortgage companies require NFIP coverage for homes in the SFHA when purchased through a mortgage loan.

These NFIP management regulations apply to new construction and substantial improvements to structures in the flood zone. Structural improvements which lead to improved protection during flood events include a variety of techniques to elevate structures so that the ground floor is above the base flood elevation (so called flood proofing; see example in Figure X). Small-scale levee construction is not a recognized flood mitigation technique for the NFIP program.

Figure X. A home in the St. Joe River Valley (west end) with the ground floor elevated above the Regulatory Flood level.

Other potential mitigation measures are effective at reducing the negative impacts caused by flooding.

4.2.8.4. Flood Mitigation Related Activity Summary

In Shoshone County, and each Incorporated City, a series of integrated action items have been identified through the planning process to develop this Multi-Jurisdictional Hazards Mitigation Plan to increase preparedness and resilience against flood water damages. This Multi-Jurisdictional Hazards Mitigation Plan includes several action items in Tables 7.4 through 7.7. These action items include activities designed to increase preparedness for future flood events, continue compliance with the NFIP for all communities, maintain or strengthen existing flood ordinance regulations, and development of new and strengthening of existing enforcement and permitting, and activities that will maintain and improve Community Rating Systems status in certain municipalities and in the County.

Each Municipality and Shoshone County has made the commitment, through the development of this plan, and its adoption, to maintain and enforce city and county policies to strengthen resilience against flood damages. These mitigation measures include strengthening Comprehensive Plan verbiage and enforcement within each City (Table 7.4, measures KEL-1001 through WAR-1007).

NFIP program participation as evidenced through policies in each municipality is highly variable in Shoshone County (Table 4.8). Efforts to increase participation in the NFIP can often be facilitated through the sharing of information about the benefits of this insurance policy to individual homeowners and businesses. Including NFIP brochures prepared by FEMA in City or County scheduled mailings are often sufficient to spur interest by recipients. Other efforts such as public information meetings and notices to the general public can facilitate increased participation. Potential mitigation activities (Table 7.4, measures SHO-1077 through WAL-1083) are identified for each municipality and the County to share pre-developed information about the NFIP to local citizens in an effort to increase the voluntary participation in the NFIP.

Planning and Zoning Ordinances within each City and the County are designed to manage development within areas identified as hazard prone to a wide array of potential hazards, including flooding. The Cities and the County have identified several opportunities to continue the management of the floodplain through planning and zoning ordinances (Table 7.4, measures SHO-1008 through WAL-1014). This strengthening of planning efforts includes location-based references to allow regulating to the DFIRM maps in terms of identifying flood risk areas. Further, enforcement of these policies has been identified as a means of achieving the goal of improved floodplain management (Table 7.4, measures SHO-1008 through WAL-1014).

The DFIRM maps released in September 2008, and utilized in this plan, represent a significant shift in the location of the outer boundary of the floodplain in several locations in Shoshone County as compared to the preceding DFIRM maps of Shoshone County.

The Shoshone County Floodplain Manager will continue to work with the Cities in the identification of structures and infrastructure located within this newly updated floodplain zone (DFIRM Maps released Sept. 2008). In order to improve awareness of the floodplain (and other hazards) with the Cities, other County Departments, and the general public, Shoshone County is seeking approval and funding for a multi-jurisdictional (Shoshone County & Benewah County) technical services grant facilitated by the Panhandle Area Council and TerraGraphics for a Geospatial Database and Mapping Project that will significantly upgrade geospatial management capabilities for Floodplain Management duties as well as Emergency Operations functions (Table 7.4, measure SHO-1024). When completed, this project will be provided over the internet for wide distribution to the general public and the Cities (Table 7.4, measure SHO-1058). This awareness will be advertised to the general public with leadership provided by the Shoshone County Floodplain Administrator, the Shoshone County Emergency Services Manager, and each municipality.

Shoshone County and each municipality is dedicated to continued participation in the National Flood Insurance Program and implementing activities and practices that will decrease risk exposure to flooding. Shoshone County and each municipality will strive to implement activities and policies that improve the NFIP rating score while reducing the risk exposure to flooding. This effort includes, but is not limited to, participation in community assistance visits by the State Floodplain Administrator, flood mapping priorities or update needs, potential changes to flood ordinance regulations, enforcement, or permitting, and actions that will support CRS rating improvements (Table 7.4, measures KEL-1050 through WAL-1055).

Outreach and information sharing will be developed jointly by the Shoshone County Floodplain Administrator and the Planning and Zoning Administrators of each municipality within Shoshone County (Table 7.4, measure SHO-1060). As part of this effort and to increase local capabilities in relation to floodplain management issues, both the Shoshone County Floodplain Administrator and the City of Kellogg Floodplain Administrator will seek increased training for floodplain management within Shoshone County and the City of Kellogg (respectively) through the FEMA operated ***Emergency Management Institute***. These training opportunities will include continued activities to maintain the Shoshone County and City of Kellogg CRS rating scores (both currently at 8) and the identification of implementation measures to improve that score where practicable (Table 7.4, measures SHO-1061, & KEL-1084). Both the Shoshone County Floodplain Administrator and the City of Kellogg Floodplain Administrator will seek to complete the Building Code Effectiveness Grading Scale Evaluation training (Table 7.4, measure SHO-1061 & KEL-1084). The Building Code Effectiveness Grading Schedule (BCEGS) assesses the building codes in effect in a particular community and how the community enforces its building codes, with special emphasis on mitigation of losses from natural hazards. The concept is that municipalities with well-enforced, up-to-date codes should demonstrate better loss experience, and insurance rates can reflect that. The prospect of lessening catastrophe-related damage and ultimately lowering insurance costs provides an incentive for communities to enforce their building codes rigorously, especially as they relate to flood, windstorm, and earthquake damage. The anticipated upshot is safer buildings, less damage, and lower insured losses from catastrophes.

Additional training opportunities for the Shoshone County Floodplain Administrator (who is also the Planning and Zoning Administrator), and the City of Kellogg Floodplain Administrator (who is also the City Planning Director) by the Emergency Management Institute include:

- Continue advancement of National Incident Management System (NIMS) training,
- Continue advancement in Emergency Management & Operation training,
- Complete training course E-273- Managing Floodplain Development, through the NFIP,
- Complete training course E-278- NFIP, Community Rating System,
- Complete training and certification to become a Federally Certified Floodplain Administrator by FEMA.

These measures are included in Table 7.4, measures SHO-1062 through SHO-1065 for the Shoshone County Floodplain Administrator, and measures KEL-1085 through KEL-1088 for the City of Kellogg Floodplain Administrator.

As these measures to increase the capabilities of Shoshone County, and the City of Kellogg, to implement improved floodplain management through policies, education, information sharing, and enforcement are put in place, the Shoshone County Floodplain Administrator (also the Shoshone County Planning and Zoning Administrator) will work with each municipality to identify improved policies and programs to extend and integrate these services to the local municipalities (Table 7.4, measure KEL-1066 through WAR-1072).

In concert with the County's efforts, the City of Kellogg Floodplain Administrator will continue to set the example of floodplain stewardship for the remainder of the municipalities in Shoshone County. The City of Kellogg has been a participant in the CRS program for about a decade already and is one of only a few municipalities in northern Idaho that has maintained the CRS policy for this duration of time. The current rating of 8, for the City of Kellogg, reflects these efforts and the score's reduction is a goal of the City Council to be realized through the implementation of the floodplain related mitigation measures identified in this plan. The City of Kellogg Floodplain Administrator will coordinate efforts with the Shoshone County Floodplain Administrator to work within the City of Kellogg and with the other municipalities and unincorporated areas to identify improved policies, programs, and practices to extend and integrate these improvements (Table 7.4, measure KEL-1066 through WAR-1072).

Education, information sharing, and implementation through existing programs and improved policies are required in order to maintain and improve hazard mitigation programs, especially in terms of flooding in Shoshone County. The focus should be the implementation of the recommendations developed in this Multi-Jurisdictional Hazards Mitigation Plan and subsequently acquired by the people and departments implementing these activities. It is with this idea, that the recommendation has been made for Shoshone County and the municipalities to establish a Hazard Advisory Commission composed of representatives of the Local Emergency Planning Committee, all cities, fire protection districts, agencies, and organizations in Shoshone County. Purview of this commission is to ensure a consolidated approach to the implementation of this Multi-Jurisdictional Hazards Mitigation Plan (Table 7.4, measure SHO-1057). This commission can serve as a spring-board for the broad recognition and acceptance of proposed mitigation measures, especially in terms of flooding in Shoshone County.

As Shoshone County and the municipalities advance these activities of flood preparedness, NFIP compliance, and CRS rating score improvements, it is recommended that Shoshone County Floodplain Administrator, the Idaho State Floodplain Coordinator (Idaho Department of

Water), and a representative from the Idaho Bureau of Homeland Security, coordinate an informational meeting for the County and all City Departments to discuss potential and detailed NFIP and CRS program requirements (Table 7.4, measure SHO-1073). This seminar and discussion will be designed to detail specific implementation activities for each jurisdiction to develop and implement in a holistic approach to floodplain management activities in Shoshone County. Further, this seminar will facilitate the potential application for certain cities not already in the CRS program to join through concentrated efforts to be identified with the Shoshone County Floodplain Administrator (Table 7.4, measures OSB-1068, PIN-1069, WAL-1071).

Additional dissemination of information to the general public will be made by the Cities and the County through a series of public meetings, brochures, and the proposed internet web site already discussed, to share information about the location, management, and administration of the floodplain in Shoshone County and each city. These public meetings and information sharing opportunities will be coordinated by the Shoshone County Floodplain Administrator and the Shoshone County Emergency Manager in cooperation with each city, especially the City of Kellogg Floodplain Administrator. Materials will utilize data already developed by FEMA, Idaho BHS, and the Idaho Department of Water, to educate the public about managing and living in or near the floodplain. These data will be augmented with detailed local information (much of it developed in this plan) to give examples and situations applicable to the local citizenry (Table 7.4, measure SHO-1060).

Since the release of the September 2008 DFIRM maps by FEMA to Shoshone County, thoughtful considerations to the accuracy of the flood zones has occurred by the County and the Cities. Data for these maps are continually being developed by federal and state organizations. For instance, FEMA and the Idaho Bureau of Homeland Security, working with the Idaho Department of Environmental Quality have acquired new data collected by a LiDAR (Light Detection and Ranging) flight of the Silver Valley. LiDAR is an optical remote sensing technology that measures properties of scattered light to find range and/or other information of a distant target. In this case it was used to develop a highly accurate and precise elevation model of the South Fork Coeur d'Alene River system in Shoshone County. These data will allow for an increased accuracy and precision of floodplain mapping in this area. Although neither the County nor the Cities have control of this data, and it is being collected and processed in cooperation with Idaho Bureau of Homeland Security and FEMA Region X, the Cities and County will urge these agencies to use these data in the development of the floodplain after the data are developed and finalized (Table 7.4, measure SHO-1074). At the same time, the Cities and the County have historical information on past flood events and flood extents, and past mitigation measures that have modified flood impacts. These data must be, and will be, collected into a single hazard database (Table 7.4, measure SHO-1059) and provided the Idaho Bureau of Homeland Security and FEMA Region X for use in updating the DFIRM maps for Shoshone County. This same hazard database will serve to expand the understanding of other hazard events in Shoshone County. Shoshone County and all of the Cities take the role as an active participant in the identification and mapping of the County's floodplain maps (DFIRM) as they are revised and maintained (Table 7.4, measure SHO-1075). This active role includes the support of the development and the enforcement of policies relating to those current and revised DFIRM zones for all city and county planning and zoning ordinances.

New construction within each City and within Shoshone County is controlled through the process of obtaining a building permit from the appropriate jurisdiction. These building permits are written in respect to floodplain management requirements in place in each jurisdiction. All of the Cities and the County have adopted the current DFIRM maps (September 2008) and implement development through existing programs and policies (Table 2.2). This includes regulations on new construction in Special Flood Hazard Areas (SFHAs).

Shoshone County and all municipalities accept the role as an active participant to the floodplain identification and mapping efforts by FEMA, including local requests for map updates as evidenced in this section of the plan, and the map modernization initiative by FEMA.

Community assistance and monitoring activities will be provided by the Shoshone County Floodplain Administrator and identified staff from each municipality to disseminate information, educate the public, and strive to improve preparedness against flooding through thoughtful and planned administration of the floodplain. This will extend to homeowners seeking building permits to conduct “significant improvements” to structures built in locations where current flood zones are identified but that were not in effect when the structure was initially built (the so-called grandfathered properties). Planning and Zoning Administrators from the County and Cities will jointly identify building permit for upgrade (improvements) requests at a pre-determined percent of total value threshold that will trigger a substantial improvement requirement to the structure’s flood risk exposure (Table 7.4, measure SHO-1076).

4.2.8.5. Potential Mitigation Measures by Flood Hazard Type

Riverine Floods: The mitigation of riverine flooding is mostly effective through the development of an early warning system designed to warn and evacuate people located at-risk-to-rising waters. While family members, pets, and valuables can often be evacuated from homes and businesses, the structures rarely can be moved in an emergency. Equally at risk are the infrastructure components of the region, such as roads, bridges, water supply systems, power supply systems, and sewage treatment plants.

Another partially effective means of mitigating losses from riverine floods is the “flood proofing” of structures discussed in this section.

Flash Flooding: Because the nature of flash flooding precludes advanced warnings, these flood types often cause substantial damage and loss of life. Certain areas of Shoshone County are more prone to these types of floods than others (such as Prichard, Murray, Eagle, and Larson), where stream locations often posses small-scale flood water storage areas located on lower order streams. Larger order streams generally have a substantially larger storage area and can accept these increased volumes on a short-term basis (such as the Main and South forks of the Coeur d’Alene River system).

Caution and respect of these flash-flood-prone areas is the best defense against losses from these flood types. Development of structures and infrastructure in these locations is not recommended. As an example, flash flooding in Grouse Creek near Smelterville in 1986 deposited 6”-12” of mud over 30% of the town (Figure XI).

Figure XI. Grouse Creek flood in 1986 showing deposition of mud in Smelterville.

Ice and Debris Jam Flooding: These floods will impact areas where excessive debris is available for the floodwaters to recruit and transport from the point of origination to downstream locations. Often debris dams are created where the channel is narrowed due to a road crossing (under a bridge or through a culvert) or because of a natural narrowing of the waterway from topographic relief. Debris carried by the river creates a dam that restricts water flow and increases flooding around the entrapment. In cases of ice jams, debris is not obligatory in order for transient dams to be created by breaking ice. Ice jam formations generally occur at the same pinch points as debris dams.

While natural topographic restrictions are difficult to moderate, ice and debris dams against bridges and culverts are possible to avert. Countermeasures proposed by the US Department of Transportation (2008) are applicable for bridges and culverts alike, although a few are better applied to one situation than to another.

Culverts:

- **Debris Deflectors** are structures placed at the culvert inlet to deflect the major portion of the debris away from the culvert entrance. They are normally "V"-shaped in plan with the apex upstream.
- **Debris Racks** are structures placed across the stream channel to collect the debris before it reaches the culvert entrance. Debris racks are usually vertical and at right angles to the stream flow, but they may be skewed with the flow or inclined with the vertical.
- **Debris Risers** are a closed-type structure placed directly over the culvert inlet to cause deposition of flowing debris and fine detritus before it reaches the culvert inlet. Risers are usually built of metal pipe. Risers can also be used as relief devices in the event the entrance becomes completely blocked with debris (Figure XII).
- **Debris Cribs** are open crib-type structures placed vertically over the culvert inlet in log-cabin fashion to prevent inflow of coarse bed load and light floating debris.
- **Debris Fins** are walls built in the stream channel upstream of the culvert. Their purpose is to align the debris with the culvert so that the debris would pass through the culvert without accumulating at the inlet. This type of measure can also be used at a bridge.
- **Debris Dams and Basins** are structures placed across well-defined channels to form basins that impede the stream flow and provide storage space for deposits of detritus and floating debris.
- **Combination Devices** are a combination of two or more of the preceding debris-control structures at one site to handle more than one type of debris and to provide additional insurance against the culvert inlet becoming clogged.

Figure XII. Culvert debris riser located in Nine Mile Creek, near the entrance to Wallace.

The only type of non-structural measures available for culvert structures is to provide emergency and annual maintenance. Although not always feasible for remote culverts or culverts with small drainage areas, maintenance could be a viable option for larger culverts with fairly large drainage basins. Emergency maintenance could involve removing debris from the culvert entrance and/or an existing debris-control structure. Annual maintenance could involve removing debris from within the culvert, at the culvert entrance, and/or immediately upstream of the culvert, or repairing any existing structural measures.

Bridges:

Various types of structural measures are also available for bridge structures. Some of the measures discussed above for the culvert structures can also be utilized at bridges. The various types include:

- **Debris Fins** are walls built in the stream channel upstream of the bridge to align large floating trees so that their length is parallel to the flow, enabling them to pass under the bridge without incident. This type of measure is also referred to as a "pier nose extension".
- **In-channel Debris Basins** are structures placed across well-defined channels to form basins that impede the stream flow and provide storage space for deposits of detritus and floating debris. These structures can be expensive to construct and maintain.
- **River-Training Structures** are structures placed in the river flow to create counter-rotating streamwise vortices in their wakes, thus modifying the near-bed flow pattern to redistribute flow and sediment transport within the channel cross-section. Examples of this type of structure include Iowa vanes, and impermeable and permeable spurs.
- **Crib Structures** are walls built between open-pile bents to prevent debris lodging between the bents. The walls are typically constructed of timber or metal material.
- **Flood Relief Sections** are overtopping or flow through structures that divert excess flow and floating debris away from the bridge structure and through the structure.

- **Debris Deflectors** are structures placed upstream of the bridge piers to deflect and guide debris through the bridge opening. They are normally "V"-shaped in plan with the apex upstream. A special type of debris deflector is a hydrofoil. Hydrofoils are submerged structures placed immediately upstream of bridge piers that create counter-rotating streamwise vortices in their wakes to deflect and divert floating debris around the piers and through the bridge opening.
- **Debris Sweeper** is a polyethylene device that is attached to a vertical stainless steel cable or column affixed to the upstream side of the bridge pier. The polyethylene device travels vertically along the pier as the water surface rises and falls. It is also rotated by the flow, causing the debris to be deflected away from the pier and through the bridge opening.
- **Booms** are logs or timbers that float on the water surface to collect floating drift. Drift booms require guides or stays to hold them in place laterally. Booms are very limited in use and their application is not widely used in urban areas, but may be used in remote forestland areas.
- **Design Features** are structural features that can be implemented in the design of a proposed bridge structure. The first feature is freeboard, which is a safety precaution of providing additional space between the maximum water surface elevation and the low chord elevation of the bridge. The second feature is related to the type of piers and the location and spacing of the piers. Ideally, the piers should be a solid wall-type pier aligned with the approaching flow. They should also be located and spaced so that the potential for debris accumulation is minimized. The third feature involves the use of special superstructure design, such as thin decks, to prevent or reduce the debris accumulation on the structure when the flood stage rises above the deck. The last feature involves providing adequate access to the structure for emergency and annual maintenance.

There are generally two types of non-structural measures available for bridge structures. The first type of non-structural measure is emergency and annual maintenance. Emergency maintenance could involve removing debris from the bridge piers and/or abutments; placing riprap near the piers and abutments, or where erosion is occurring due to flow impingement created by the debris accumulation; and/or dredging of the channel bottom. Annual maintenance could involve debris removal and repair to any existing structural measures.

The second type of non-structural measure is management of the upstream watershed. The purpose of this measure is to reduce the amount of debris delivered to the structure by reducing the sources of debris, preventing the debris from being introduced into the streams, and clearing debris from the stream channels. The type of management system implemented varies depending on the type of debris. For organic floating debris, the management system could involve removing dead and decayed trees, and/or debris jams; providing buffer zones for areas where logging practices exist (such as provided for by the Idaho Forest Practices Act); implementing a cable-assisted felling of trees system; and stabilizing hillside slopes and stream banks.

Muddy Floods: Preventive or curative measures can be implemented to control muddy floods. Preventive measures include limiting runoff generation and sediment production at the source. For instance, farmers can implement alternative farming practices (e.g. reduced tillage) to increase runoff infiltration and limit erosion in their fields. Curative measures generally consist of installing retention ponds at the boundary between cropland and inhabited areas.

An alternative is to apply other measures than can be referred to as intermediate measures. Grass buffer strips along or within fields, a grassed waterway (in the thalwegs of dry valleys) or earthen dams are good examples of this type of measure. They act as a buffer within the landscape, detaining runoff temporarily and trapping sediments.

Implementation of these measures is best coordinated at the catchment scale. However, since there are few acres of farmland in the headwater areas of Shoshone County, these mitigation practices are not very practical here.

Catastrophic Flooding: In Idaho, examples of catastrophic flooding have included engineering blunders and earthquake-induced water reservoir failure and dam failure. For example, the Teton Dam was a federally built earthen dam on the Teton River in southeastern Idaho that suffered a catastrophic failure when filling for the first time. At 7:30 a.m. on Saturday, June 5, 1976, a muddy leak appeared, suggesting sediment was in the water. At 11:55 a.m., the top of the dam collapsed; two minutes later the remainder disintegrated. By 8:00 p.m. that evening, the reservoir had completely emptied (GenDisasters 2008). The communities immediately downstream, Rexburg, Wilford, Sugar City, Salem, and Hibbard, suffered horribly. Thousands of homes and businesses were destroyed. The small community of Sugar City was literally wiped from the river bank. The city of Idaho Falls, further downstream, had time to prepare. At the old and unstable American Falls Dam, engineers released a significant volume of water before the flood arrived. That dam held, and the flood was over, but tens of thousands of acres of land near the river were stripped of topsoil (Reisner 1993). Cleaning up took the rest of the summer. The collapse of the dam resulted in the deaths of 11 people and 13,000 head of cattle (Cantor 2008). The dam was built by the US Bureau of Reclamation and cost about $100 million to build, and the federal government paid over $300 million in claims related to the dam failure (GenDisasters 2008). Total damage estimates have ranged up to $2 billion. The dam was never rebuilt.

There are neither hydroelectric dam sites nor flood control dams in Shoshone County. There are several small water reservoirs used for municipal water supplies, but the volume of water retained by these structures is minimal. A small number of diversion structures and underground conveyance systems on small tributaries (such as Meyer Creek in Osburn, and Milo Creek in Wardner-Kellogg) could do a fair amount of property damage if they were to fail.

4.2.9. Levee System Certification and Accreditation

TerraGraphics prepared a summary report for the BEIPC on February 6, 2009, to describe the actions and level-of-effort required to obtain certification and accreditation of the Silver Valley levee systems. This report also included steps that must be taken by the communities for accreditation and subsequent revision of the FIRM maps revised in 2008. The action and level of effort required was determined by superimposing the information that is known about the existing levees over the rules for levee certification and FEMA accreditation.

The levee systems for the communities and unincorporated areas of Kellogg, Pinehurst, Cataldo and Osburn were effectively de-accredited by FEMA during the FIRM update in 2008. The de-accreditation resulted in a tremendous expansion of the mapped 100-year floodplain. The task of getting the levees accredited is the responsibility of the local communities; however, the process and burden to the communities is not clearly defined. Kellogg and Pinehurst participate in the USACE PL84-99 Program, however this program targets operational and post-disaster response efforts and does not change the accreditation status for FEMA FIRM mapping. The criteria for levee certification are extensive and would require a large-scale investigation and analysis effort.

Key findings of the report included:

1. There is almost no existing information available to demonstrate to FEMA that the levees meet any of the criteria for certification. The task of obtaining certification would involve starting from scratch for all the levee segments except as discussed in the report.
2. A planning level budget estimate to conduct the up-front engineering and plan development to determine what levee modifications are necessary for certification is $350,000. One mechanism for completing this effort is through the USACE General

Investigation New Start Program. The cost to construct the levee improvements would be determined as part of the up-front work.

3. FEMA does not certify levees. It is the levee owner's or community's responsibility to provide data and documentation to demonstrate that a levee system meets NFIP requirements.
4. The levee owner or community would need to submit data that is certified by a Professional Engineer or by a Federal Agency such as the USACE.

FEMA does not certify levees. Levee certification must be done by either a registered Professional Engineer or a Federal Agency with levee design and construction qualifications such as the USACE. The responsibility for seeking levee certification is that of the levee owner or local agency with jurisdiction over the floodplain in question. The local agency may perform the certification analysis with staff or consultants, or may request such technical determination by others. The criteria that must be met in order to achieve certification are stipulated by Federal Regulation 44 CFR 65.10.

Discussions from this report include some important conclusions about specific communities in the Silver Valley based on the concept and definition of freeboard. Freeboard is the difference between the top of the levee and the elevation of the water surface during the 100-year flood, or the Base Flood Elevation (BFE). Minimum freeboard required is 3 feet along length of the levee, and an additional 1 foot within 100 feet of structures (such as bridges) or wherever the flow is restricted. An additional 0.5 foot of freeboard is required at the upstream end of a levee. Conclusions about specific communities in the Silver Valley are summarized below.

Cataldo: The USACE determined in 2001 that the Cataldo levee does not have adequate freeboard. In its current configuration, the levee in Cataldo can not be certified.

Pinehurst: Part of the levee meets the FEMA freeboard criteria. FEMA determined the Pine Creek levee system from I-90 near the downstream limits of the City of Pinehurst upstream to the first bridge crossing Pine Creek above the City of Pinehurst city limits provided enough capacity to fulfill freeboard requirements during the 100-year flood. All other areas would either be overtopped or would fail based on freeboard requirements for levee design. Since part of the levee does not meet the freeboard criteria it will not meet the certification requirement. If the levee was raised, the additional investigation and analysis efforts need to be completed to determine what modifications to the levee would be necessary for certification.

Osburn: There is no information available regarding freeboard for the Osburn levees. Discussion with the USACE and FEMA indicate the earthen impoundments that exist along the South Fork Coeur d'Alene River in and around Osburn would not constitute levees because of two reasons, (1) the Interstate can not count as a levee and (2) the earthen impoundments are not engineered structures.

Kellogg: Detailed modeling of the Kellogg levee system in 2002 determined that freeboard requirements are not met in this reach. Therefore, in their current configurations, the levees in Kellogg can not be certified as meeting the FEMA freeboard criteria.

Mullan: There is no information available regarding freeboard for the Mullan levees. No modeling has been done in this region.

Additional and substantial qualification criteria were presented in the report to BEIPC concerning the status of the levee structures in the Silver Valley. For each criterion several examples of deficiencies were detailed across the entire river system.

Although levee systems can become a critical part of the flood control system along the South Fork Coeur d'Alene River, the existing configuration requires substantial redesign and reconstruction. This effort would have multifaceted benefits to the residents of the South Fork Coeur d'Alene River system from both a structural protection standpoint, and the viewpoint of protecting the remedial actions taken to protect human health in the Superfund Site.

4.2.10. Stream Routing Issues

Several tributaries flowing into the major, and even minor, river systems in Shoshone County were historically rerouted from their natural channel in an effort to facilitate development, mining activities, transportation networks, and other needs. Often, these modifications led to complications from excess flooding, erosion, and damages to the human habitation that followed the development.

A comprehensive summary has not been exhaustively tallied. Most of the problem areas are identified within the South Fork Coeur d'Alene River tributaries. A couple have been located on the St. Joe River and the St. Maries River. Some of these stream stretches have been artificially turned 90º in order to re-locate stream beds as they enter communities. Others have insufficient culverts or have been routed through road ditches as opposed to normal functioning stream channels.

Corrective actions are currently indeterminate. A complete engineering assessment of each at-risk stream segment is needed to establish an action plan and costs to take the corrective actions to protect people, structures, infrastructure, and the economy. These corrective actions will lead to the reduction of storm water runoff problems and flood activity.

Below is a list of identified stream segments that require additional corrective evaluation.

On the South Fork Coeur d'Alene River System

Community, **Watershed Name**

- Elizabeth Park, Elk Creek
- Montgomery Gulch, Montgomery Creek
- Kellogg, Italian Gulch
- Kellogg, Jacobs Gulch
- Kellogg, Bunker Creek
- Kingston, French Gulch
- Kingston, Hunt Gulch
- Mullan, Gold Hunter Creek
- Mullan, Boulder Creek
- Osburn, Terror Gulch
- Osburn, Rosebud Gulch
- Osburn, Meyer Creek
- Osburn, McFarren Gulch
- Osburn, Twomile Creek
- Osburn, Nuckols Gulch
- Osburn, Shields Gulch
- Pinehurst, Pine Creek
- Silverton, Revenue Gulch
- Smelterville, Grouse Creek
- Wallace, Nine Mile Creek
- Woodland Park, Canyon Creek
- Wallace, Printers Creek
- Osburn, Paradise Gulch

On the St. Joe River System

Community, **Watershed Name**

- Calder, Bear Creek

On the St. Maries River System

Community, **Watershed Name**

- Clarkia, St. Maries River at Confluence of East Fork and Main Fork

4.3. Earthquakes

Geological and seismological studies show that earthquakes are likely to happen in any of several active zones in Idaho and adjacent states. Idaho is ranked fifth highest in the nation for earthquake hazard. Only California, Nevada, Utah, and Alaska have a greater overall hazard. Idaho has experienced two substantial earthquakes in the last fifty years—the 1959 Hebgen Lake earthquake (M7.5) and the 1983 Borah Peak earthquake (M7.3). Both tremors caused fatalities and millions of dollars in damage.

The crust or surface of our planet is broken into large, irregularly shaped pieces called plates. The plates tend to pull apart or push together slowly, but with great force. Stresses build along edges of the plates until part of the crust suddenly gives way in a violent movement. This shaking of the crust is called an earthquake.

The crust breaks along uneven lines called faults. Geologists locate these faults and determine which are active and inactive. This helps identify where the greatest earthquake potential exists. Many faults mapped by geologists are inactive and have little earthquake induced risk-potential; others are active and have a higher earthquake induced risk-potential.

When the crust moves abruptly, the sudden release of stored force in the crust sends waves of energy radiating outward from the fault. Internal waves quickly form surface waves, and these surface waves cause the ground to shake. Buildings may sway, tilt, or collapse as the surface waves pass. Fault line information used in this report was adopted from research completed by the Idaho Geological Survey (IGS), a research agency of the University of Idaho (Breckenridge *et al.* 2003).

The constant interaction of crustal plates in western North America creates severe earthquakes. Idaho is situated where the Basin and Range and Rocky Mountain geomorphic provinces meet. Most of Idaho has undergone the effects of tremendous crustal stretching. Central Idaho's high mountain ranges are striking evidence of these powerful earth movements over millions of years. The Borah Peak earthquake of 1983 lifted the elevation of Borah Peak upward 7 feet in that single event to its current elevation of 12,662 feet (Idaho’s highest point). Borah Peak is only 250 air miles from Wallace (Shoshone County Seat).

An earthquake at Hoyt Mountain (in Shoshone County near the St. Joe River) in 1994 was situated on a thrust-type fault, the only fault line of this type in the area of the earthquake.

Earthquakes from the crustal movements in the adjoining states of Montana, Utah, and Nevada also cause severe ground shaking in Idaho.

Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations, are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths and injuries and extensive property damage.

Aftershocks are smaller earthquakes that follow the main shock and can cause further damage to weakened buildings. Aftershocks can occur in the first hours, days, weeks, or even months after the quake. Some earthquakes are actually foreshocks, and a larger earthquake might subsequently occur.

Ground movement during an earthquake is seldom the direct cause of death or injury. Most earthquake-related injuries result from collapsing walls, flying glass, and falling objects as a result of the ground shaking, or people trying to move more than a few feet during the shaking (FEMA 2009).

4.3.1. Measuring an earthquake

Earthquakes are measured in two ways. One determines the power; the other describes the physical effects. Magnitude is calculated by seismologists from the relative size of seismograph tracings. This measurement has been named the Richter scale, a logarithmic-numerical gauge of earthquake energy ranging from 1.0 (very weak) to 9.0 (very strong). A Richter scale earthquake of 5.0 is ten times stronger than a 4.0 earthquake. The Richter scale is most useful to scientists who compare the power in earthquakes. Magnitude is less useful to disaster planners and citizens, because power does not describe and classify the damage an earthquake can cause. The damage we see from earthquake shaking is due to several factors like distance from the epicenter and local rock types. Intensity defines a more useful measure of earthquake shaking for any one location. It is represented by the modified Mercalli scale (Table 4.11). On the Mercalli scale, a value of I is the least intense motion and XII is the greatest ground shaking. Unlike magnitude, intensity can vary from place to place. In addition, intensity is not measured by machines. It is evaluated and categorized from people's reactions to events and the visible damage to man-made structures. Intensity is more useful to planners and communities because it can reasonably predict the effects of violent shaking for a local area.

Table 4.11. Modified Mercalli Earthquake Intensity Scale (IGS 2008).

Intensity	Description
I.	Only instruments detect the earthquake
II.	A few people notice the shaking
III.	Many people indoors feel the shaking. Hanging objects swing.
IV.	People outdoors may feel ground shaking. Dishes, windows, and doors rattle.
V.	Sleeping people are awakened. Doors swing, objects fall from shelves.
VI.	People have trouble walking. Damage is slight in poorly built buildings.
VII.	People have difficulty standing. Damage is considerable in poorly built buildings.
VIII.	Drivers have trouble steering. Poorly built structures suffer severe damage, chimneys may fall.
IX.	Well-built buildings suffer considerable damage. Some underground pipes are broken.
X.	Mast buildings are destroyed. Dams are seriously damaged. Large landslides occur.
XI.	Structures collapse. Underground utilities are destroyed.
XII.	Almost everything is destroyed. Objects are thrown into the air.

4.3.2. Shoshone County Geology

The St. Joe Valley and the Coeur d'Alene River Valley share geologic histories, although some differences between the two are seen, especially in terms of the age of exposed geologic formations. With the exception of the small, granitic stock in the southwest corner of the county (around Clarkia) called the Herrick Stock, the area is underlain by pre-Cambrian sediments generally known as the Belt Series. Near the Herrick Stock, however, they are so metamorphosed that positive correlation is impossible (Wagner 1949).

Igneous activity is represented by rocks of four different ages. The oldest are dioritic sills and dikes of a probable pre-Cambrian age. Next younger is the St. Joe Stock considered late Cretaceous in age, which is closely followed by aplite and lamprophyre dikes. The youngest igneous rocks are small, unconnected remnants of basalt flows found near the west margin of the region. These are considered to be part of the Columbia River basalts of Miocene age (Wagner 1949).

In general terms, the entire county is characterized by parallel and occasionally crossing fault lines. The area possesses a fault structure consisting of northwest-southeast-trending, multiple-faulted anticlines and synclines (Wagner 1949).

The Coeur d'Alene River system's mountains are underlain by a Mesoproterozoic Belt Supergroup, with the metamorphic rocks of the middle-Belt Wallace Formation. Sedimentary rocks of the county are mainly from the Belt Series of pre-Cambrian age. They are a group of shales, sandstones, impure limestones, and impure quartzites with abundant shallow water markings such as mud cracks and ripple marks. In several locations where metamorphism has been intense, some of the rocks have changed to slates, phylite, or schists.

In addition to these consolidated sediments, there are a few terrace gravels of Tertiary age and the larger stream valleys contain some recent alluvium (Wagner 1949). Miocene Columbia River basalts cover the low valley bottoms and up the St. Maries River near Clarkia. Lacustrine and river sediments were deposited in valleys that had been dammed up by basalt lava flows. The world famous Clarkia fossil locality formed this way. The St. Joe fault, an Eocene feature related to continental extension and development of metamorphic core complexes, runs eastward through the southwest corner of the county.

4.3.3. Seismic Shaking Hazards

The USGS has gathered data and produced maps of the nation, depicting earthquake shaking hazards. This information is essential for creating and updating seismic design provisions of building codes. The USGS Shaking hazard maps for the United States are based on current information about the rate at which earthquakes occur in different areas and on how far strong-shaking extends from quake sources. These analyses estimate the level of horizontal shaking that have a 1 in 10 chance of being exceeded in a 50-year period. Shaking is expressed as a percentage of "g" (g is the acceleration of a falling object due to gravity). This analysis is based on seismic activity and fault-slip rates and takes into account the frequency of occurrence of earthquakes of various magnitudes. Locally, risk may be greater than that shown, because site geology may amplify ground motions.

Studies of ground shaking in Idaho during previous earthquakes have led to better interpretations of the seismic threat to buildings. In areas of severe seismic shaking hazard, older buildings are especially vulnerable to damage. Older buildings are at risk even if their foundations are on solid bedrock, but are at greater risk if their foundations are not stable. Areas with high seismic shaking hazard can experience earthquakes with high intensity where weaker soils exist. Most populated areas in Shoshone County are located on or near alluvial deposits that provide poorer building site conditions during earthquakes. Older buildings may suffer damage even in areas of moderate ground shaking hazards (IGS 2008).

4.3.4. Earthquake Profile

Many of Idaho's cities are at risk to earthquakes, even small ones, because they were built on unconsolidated sediments that move easily in response to seismic waves. Seismic waves are the form of energy that ripples through Earth when an earthquake occurs. When seismic waves propagate through unconsolidated sediments the sediments re-organize and move chaotically (sort of shaking like a bowl of gelatin). The danger in Shoshone County is really two-fold because cities often contain structures built near rivers below the foothills and mountains, and then cities were expanded into the foothills with new structures. Mountain foothills contain erosional remnants called alluvial fans. The alluvial fans may either slide down into the valley or simply shake about creating new topography due to internal settling.

As discussed previously, approximately 56% of all structures in Shoshone County were built within the FEMA Flood Zone and 81% were built within 500 feet of these flood zones. These zones typically are found on unconsolidated sediments. The overwhelming majority of structures in Shoshone County are located on unconsolidated sediments which respond poorly to seismic shaking. For this reason, Shoshone County's earthquake hazards are more pronounced.

Ground motion is the shaking of the ground that causes buildings to vibrate. Large structures such as office buildings, dams, and bridges may collapse. Broken gas lines and fallen electrical wires may cause fires, while broken water lines can hinder the capability of controlling fires. Landslides are commonly caused by earthquakes.

Geological and seismological studies in combination with local fault lines indicate that earthquakes are likely to happen in Shoshone County.

The 1991 Uniform Building Code (UBC), a nationwide industry standard, sets construction standards for different seismic zones in the nation. UBC seismic zone rankings for Idaho are among the highest in the nation. When buildings are built to these standards they have a better chance to withstand earthquakes. In 2002 the International Building Code (IBC) adopted the 1991 UBC earthquake standards. Shoshone County and all of the cities within the county operate under the UBC and IBC. Given the county's risk level, this is adequate protection for all new construction.

4.3.4.1. Hoyt Mountain Earthquakes March 7 and June 3, 1994

On March 7, 1994, an earthquake, M3.5, occurred along the St. Joe River Valley, near Hoyt Mountain, and the community of Avery. On June 3, a M2.9 aftershock occurred at the same location. The main shock, centered very close to Hoyt Mountain about 6 miles southwest of Avery, was the largest earthquake in the northern Idaho region since a 1988 M4.1 Copper Pass event, and one of only a few natural earthquakes in the region since a 1942 M4.6 Sandpoint event. The Hoyt Mountain shock reached a "V" intensity and was felt locally at Marble Creek and Avery and as far north as Wallace. There were no after shocks until the M2.9 event almost three months later. Except for a lower magnitude, the aftershock was identical to the main shock in location and focal mechanism. The fault-plane solution indicates either (1) reverse slip, or (2) a low-angle thrust faulting on a plane striking north-northwest and dipping gently northeast. The faults in the area are part of the Lewis and Clark line of fractures that extends from near Coeur d'Alene over 240 miles eastward to Helena, Montana (Sprenke *et al.* 1994).

The Hoyt Mountain earthquake was felt strongly in Hoyt, Marble Creek, and Avery where houses shook, dishes rattled, a lamp "walked on a table", and an outside basketball upright swayed. In Shoshone County, the event was felt as far north as Osburn, Silverton, and Wallace, and as far west as Big Creek (on the St. Joe River). There were no reports from Calder. There were no reported structures damaged or lives lost from this event (Sprenke *et al.* 1994).

The M3.5 main shock, though small by most seismology standards, is certainly significant in the historic seismicity of northern Idaho and Shoshone County in particular.

4.3.4.2. Cooper Pass Earthquake 1988 (near Mullan)

No more than four documented natural earthquakes in northern Idaho have exceeded the Hoyt Mountain Earthquake magnitude in historic time. The most recent one was a M4.1 earthquake in 1988 on the Montana-Idaho border at Cooper Pass, 7 miles northeast of Mullan. The largest one was the M4.6 Sandpoint event in 1942. The 1988 event was felt over 3,000 square miles with an intensity of IV at Trout Creek, Montana, and Mullan.

Other natural seismicity in north Idaho includes a cluster of small events in the Priest Lake, Sandpoint, and Coeur d'Alene areas. The seismicity in the Kellogg-Wallace area, with the exception of the Cooper Pass event, does not represent natural earthquakes, but rather rockbursts related to deep mining in the Silver Valley (IGS 2008).

4.3.4.3. Rockbursts

Because of over a century of deep mining activities in Shoshone County, rockbursts are an important risk exposure consideration. Rockbursts are the result of brittle fracturing of rock, causing it to collapse rapidly with violent expulsion of rock that can be 100 to 200 tons or more. This release of energy reduces the potential energy of the rock around the excavation. Further explanation gives rationalization that the changes brought about by the mine's redistribution of stress triggers latent seismic events (Marshak 2001).

The likelihood of rockbursts occurring increases as depth of the mine increases. Rockbursts are also affected by the size of the excavation, becoming more likely as the excavation size increases. Induced seismicity such as faulty mining engineering methods can trigger rockbursts. Other causes of rockbursts are the presence of faults, dykes, or joints in conjunction with mining activity that are common occurrences across the county (Monroe and Wicander 1997).

4.3.5. Unreinforced Masonry Buildings

Masonry boasts an impressive compressive strength (vertical loads) but is much lower in tensile strength (twisting or stretching) unless reinforced. The tensile strength of masonry walls can be strengthened by thickening the wall, or by building masonry "piers" (vertical columns or ribs) at intervals. Where practical, steel reinforcement also can be introduced vertically and/or horizontally to greatly increase tensile strength, though this is most commonly done with poured walls.

Early 20th century masonry construction techniques did not use the technology of reinforcement as is used today. Unreinforced masonry buildings are a type of building where load bearing walls, non-load bearing walls, or other structures such as chimneys are made of brick, cinderblock, tiles, adobe, or other masonry material that is not braced by reinforcing beams (CSSC 2005). The term is used as a classification of certain structures for earthquake safety purposes, and is subject to some variation from place to place (ABAG 2003).

Unreinforced masonry buildings were constructed in an era when reinforcing was generally not used. Anchorage to floor and roof was generally missing and the use of low strength lime mortar was common. Construction of reinforced masonry became common sometime between 1933 and 1955, depending on local codes and stringency of code enforcement. In Shoshone County Unreinforced masonry buildings may have been built as recently at 1970.

Unreinforced masonry structures are vulnerable to collapse in an earthquake. One problem is that most mortar used to hold bricks together is not strong enough (CSSC 2005). Additionally, masonry elements may "peel" from the building and fall onto occupants in the building or pedestrians outside (Perkins 2004).

Retrofits of existing buildings are relatively expensive, and may include tying the building to its foundation, tying building elements (such as roof and walls) to each other so the building moves as a single unit rather than creating internal shear during an earthquake, attaching walls more security to underlying supports so they do not buckle and collapse, and bracing or removing parapets and other unsecured decorative elements (Perkins 2004, CSD 2008). Retrofits are generally intended to prevent injury and death to people, not to preserve the building itself (Perkins 2004).

Shoshone County has many buildings constructed from masonry materials that may or may not have been reinforced during or after initial construction. Many of the structures in Wallace, for example, were built early in the 20th century after wildfires burned the city to the ground in 1890 and again in 1910. Today many of these structures in Wallace, declared Historic Sites (on the National Register), are from an era that used materials and construction techniques which place them at extremely high risk to seismic shaking hazard destruction (Figures XIII & XIV).

Hundreds of homes in Shoshone County are built with wood frame construction techniques. These are typically considered resistant to seismic shaking hazards. However, many of these homes have incorporated a brick chimney appendage. Chimneys placed internally to the frame of the home (such as the blue house on the left side of Figure XIII), are considered more resistant to loss from shaking hazards. Those that append the chimney to the side of the home (the red roof home in the center of Figure XIII) are more at risk to falling bricks from earthquake induced shaking.

Figure XIII. Many examples of brick and masonry chimney structures are found in the county, like these in Wallace. The red roofed home's chimney is more at-risk to collapse from earthquakes and seismic shaking hazards than the chimney of the blue house to the left.

When coupled with fault lines of the region, rockbursts the Silver Valley area is prone to, and the periodic earthquakes of north Idaho and the region, much of the county is at risk to shaking losses. These losses could be greatly mitigated by reinforcing buildings that lack this reinforcement. The goal of reinforcement is not to save the buildings, but to reduce the risk of damaging people in the structure and next to it when a shaking disaster strikes (ABAG 2003).

Earthquake damage to unreinforced masonry structures can be severe and hazardous. The lack of reinforcement coupled with poor mortar and inadequate roof-to-wall ties can result in substantial damage to the building as a whole as well as to specific sections of it. Severely cracked or leaning walls are some of the most common earthquake damages. Also hazardous, but slightly less noticeable, is the damage that may occur between the walls, and roof and floor diaphragms. Separation between the framing and the walls can jeopardize the vertical support of roof and floor systems that could lead to the collapse of the structure (ABAG 2003).

Figure XIV. Example of a building in Wallace that is at-risk from seismic shaking hazards because of construction materials (brick), construction techniques, and age.

How to Identify unreinforced masonry buildings (CSSC 2005):

- Bricks or stone can be seen from the outside (unless the walls are covered with stucco).
- Brick walls have "header courses" of bricks turned endways every five or six rows.
- Structure is known to be built before 1933.

If visual inspection cannot determine these components from the outside, investigations behind electrical cover plates and electrical outlet boxes on an outside wall may reveal brick or other masonry materials. If the wall is concrete or concrete block, it is very difficult to find out if reinforcing steel was added during construction.

Other sources of verification:

- Look for copies of the structural plans, which may be on file with the Building Department, or
- Consult a licensed engineer to make the determination.

Suggestions:

- It is very expensive to shore up a house, remove damaged walls, and put in new walls.
- Consult a licensed architect or engineer to fix this problem.
- Another solution might involve
  - Tying the walls to the floor and roof.
  - Installing a steel frame and bolting the wall to it.

4.3.6. Resources at Risk

The exposure of resources in Shoshone County to earthquake damage is not localized to only small areas. Literally, all of Shoshone County is exposed to losses potentially resulting from seismic shaking hazards and fault line tremors. Analyses have estimated the seismic shaking hazards for the southwestern one-third of the county in the range of low risk to seismic shaking hazards encompassing most of the populated places along the St. Joe River Valley and the community of Clarkia. A moderate seismic shaking hazard is present for the remainder of Shoshone County including all of the most populated places in the county. Only a very small area located northeast of Murray (and surrounding the abandoned area named Duthie along the Montana state line) exhibits the high risk seismic shaking hazard category characteristics.

These risk exposures are moderated by the relatively low occurrence of earthquakes of large scale in the region.

While all structures are potentially at risk to damage from earthquakes in Shoshone County, a special category of structures are at increased risk. These are the previously discussed brick and masonry buildings and chimney structures found throughout Shoshone County.

In some communities, wood frame construction dominates the architectural scene. These areas are generally considered at lower risk to earthquake damage. Still different locations exhibit a high number of brick and masonry construction structures. The Silver Valley is especially exposed to losses from this factor. Communities including Mullan, Wallace, Silverton, Osburn, Kellogg, Wardner, Smelterville, and Pinehurst all possess examples of risk exposure to loss from seismic shaking hazards.

A complete structure level inventory of masonry building construction date, reinforcement condition, or chimney stability has not been completed. A recommendation of this planning effort is to begin the process at the city level and county level to address risk exposure.

4.3.7. Lessons Learned From Around the World

1. Bam, Iran (2003). Many of the 26,200 who perished were crushed by poorly constructed buildings doomed to collapse in a seismic hot spot like Iran. Lesson learned: Develop and enforce building codes in areas where earthquakes are common.
2. Molise, Italy (2002). Of the 29 victims, 26 were children at school. Lesson learned: Take special precautions to safeguard schools and other public buildings.
3. Gujarat, India (2001). After 20,000 died in one of the most devastating earthquakes in India’s history, the nation overhauled its disaster-management strategy, reorganizing responsibility so that some was given to officials at the local level. Lesson learned: When local authorities are better prepared, public safety improves.
4. Kobe, Japan (1995). The disaster claimed more than 5,500 lives and caused a stunning $100 billion in economic losses. Lesson learned: Even wealthy nations suffer dramatically when a deadly quake hits.
5. Mexico City, Mexico (1985). After this earthquake that killed at least 9,500 people, the government created an agency for disaster-preparedness that brought together scientists, engineers, and government officials. Lesson learned: Nations need to plan for quakes ahead of time, instead of waiting until disaster strikes to respond.
6. Tangshan, China (1976). Recovery from the earthquake and its staggering death toll (255,000) was delayed by political power struggles and the death of Mao. Lesson learned: Competing priorities can divert attention from disasters.

4.3.8. Potential Mitigation Activities in Shoshone County

A Shoshone County comprehensive plan and strategy for preparing for earthquakes should include:

- Assessment of seismic hazards to quantify and understand the threat;
- Adoption and enforcement of seismic building code provisions;
- Implementation of land-use and development policy to reduce exposure to earthquake hazards;
- Implementation of retrofit, redevelopment, and abatement programs to strengthen existing structures, especially the unreinforced masonry buildings;
- Implementation of reinforcement to extended brick and masonry chimney structures prone to collapse during seismic events;
- Support of ongoing public-education efforts to raise awareness and build constituent support; and
- Development and continuation of collaborative public/private partnerships to build a prepared and resilient community.

The media can raise awareness about earthquakes by providing important information to the community. Here are some suggestions:

- Publish a special section in the local newspaper with emergency information on earthquakes. Localize the information by printing the phone numbers of local emergency services offices, the American Red Cross, and hospitals.
- Conduct a week-long series on locating earthquake hazards in the home.
- Work with local emergency services and American Red Cross officials to prepare special reports for people with mobility impairments on what to do during an earthquake.
- Provide tips on conducting earthquake drills in the home, schools, and public buildings.
- Interview representatives of the gas, electric, and water companies about shutting off utilities.

(FEMA 2009)

4.4. Landslides

A landslide is a geological phenomenon that includes a wide range of ground movement such as rock falls, deep failure of slopes, and shallow debris flows. Although the action of gravity is the primary driving force for a landslide to occur, there are other contributing factors affecting the original slope stability. Typically, pre-conditional factors build up specific sub-surface conditions that make a slope prone to failure, whereas the actual landslide often requires a trigger before being released.

The term “landslide” covers a variety of processes and landforms known as rockslide, rockfall, debris flow, liquefaction, slump, earthflow, and mudflow. The IGS has identified and plotted over 3,000 landslides in the state for the USGS's national landslide appraisal. Landslides are a recurrent menace to waterways and highways and a threat to homes, schools, businesses, and other facilities.

Landslides may be triggered by other geologic hazards such as earthquakes and floods. Weather and climate factors such as melting snow and rain that increase the water content of earth materials may fuel slope instability. The activities of urban and rural living with excavations, roads, drainage ways, landscape watering, logging, and agricultural irrigation may also disturb the solidity of landforms. Late spring-early summer is slide season, particularly after days and weeks of greater than normal precipitation.

Landslides are costly. One nightmare for Idaho is maintaining major travel routes. Redirecting local and through traffic around a landslide is not an option in many places. Alternate routes often do not exist, and detours in steep terrain are difficult or impossible to construct. The unimpeded movement over roads—whether for commerce, public utilities, school, emergencies, police, recreation, or tourism—is essential to a normally functioning society. The disruption and dislocation caused by landslides can quickly jeopardize that freedom and vital services.

US Interstate-90 has been reconstructed over the past 20 years, as it passes through Shoshone County, to stabilize it against landslides and even avalanches; however, this reconstruction has not made it immune to landslide disruptions. This is especially true in the eastern-most reaches of Shoshone County from Mullan to Lookout Pass, where the Interstate climbs to over 4,700' and the adjacent hills reach elevations of 5,470'.

The St. Joe River Road (National Forest Development Road 50) faces more extreme landslide risks (Figure XV). This two-lane road is the primary access route for travel between St. Maries (Benewah County) and St. Regis, Montana. Several Shoshone County communities along this route host year-round residents while ranching and logging activities use this route as a primary access corridor. Falling rocks, mudslides, and earthflows are common during most of the year when facilitated by triggering events such as freeze-thaw sessions over night-day cycles, heavy rains or snowfall, or uphill site disruptions.

Figure XV. A common sign on the St. Joe River road (Hwy 50) warns of slide areas.

The deep canyons draining toward the network of river systems cut through the basalt flows that underlie Shoshone County. These flows are interbedded with loose, unstable sedimentary layers that are exposed in the deeply incised canyons. Exposure of this unconsolidated sedimentary layer increases landslide potential wherever these deposits are present on steep slopes. Weathering and climatic events lead to landslide activity, with the scale of the event largely dependent on the environmental conditions leading up to the event. Roads and structures in any area within the county where logging roads or other roads have cut through steep basalt fields are also at increased risk.

A detailed and comprehensive record of landslides in Shoshone County is not available. Most of the landslides recalled in memory by local government officials and planning committee members have occurred along County or Forest Service roads and may in some cases be a result of road construction or maintenance activities. There are a few re-occurring slide areas that cause damage to the paved road surface and require cleanup of slide debris on a fairly regular basis – even annually or twice every three years.

The first location is about 3 miles upstream form Prichard, Idaho, along Forest Road 208. It is referred to locally as the Miller Way Slide and Shoshone County and the US Forest Service are working toward implementing a long term mitigation solution. The last major slide at that site was May 2008, as a result of heavy rain and water runoff that also caused extensive flooding in the Silver Valley during the same storm system. Estimated cleanup of that site was in excess of $10,000.

Another area of continuing landslides is at Falls Creek along Forest Highway 50 between St. Maries and Calder, Idaho. That slide initiates about 150 feet in elevation above the highway and frequently sloughs debris onto the road following rain and snowmelt events. Shoshone County and the Federal Highways Administration are working on long term mitigation solution for that area.

The largest landslide event that local inhabitants can recall happened in the mid 1990s along Forest Highway 50 near Bullet Creek about 20 miles upstream (easterly) from Avery. That slide event caused a swath of debris approximately 300 feet long with an initiation point approximately 200 feet above the road. The event sent debris across Highway 50, completely blocking it and depositing vegetation, debris, and mud into the St. Joe River. This event was caused by a rain-on-snow event and caused the highway to be closed for several months. The total clean-up costs are indeterminate.

4.4.1. Types of Landslides

Debris flow

Slope material that becomes saturated with water may develop into a debris flow or mud flow. The resulting slurry of rock and mud may pick up trees, houses, and cars, thus blocking bridges and tributaries causing flooding along its path. Debris flow is often mistaken for flash flood, but they are entirely different processes.

Muddy-debris flows in alpine areas cause severe damage to structures and infrastructure and often claim human lives. Muddy-debris flows can start as a result of slope-related factors, and shallow landslides can dam streambeds, provoking temporary water blockage. As the impoundments fail, a "domino effect" may be created, with a remarkable growth in the volume of the flowing mass, which takes up the debris in the stream channel. The solid-liquid mixture can reach densities of up to 3,350 pounds per cubic yard and velocities of up to 46 feet per second (Luino 2004; Arattano and Marchi 2005).

These processes normally cause the first severe road interruptions, due not only to deposits accumulated on the road, but in some cases to the complete removal of bridges, roadways, or railways crossing the stream channel. Damage usually derives from a common underestimation of mud-debris flows. In high elevation valleys, for example, bridges are frequently destroyed by the impact force of the flow because their span is generally calculated to accommodate water discharge.

Earth flow

Earthflows are down slope, viscous flows of saturated, fine-grained materials, which move at any speed from slow to fast. Typically, they can move at speeds from 500 feet per hour to 15 miles per hour. Though these are a lot like mudflows, overall they are slower moving and are covered with solid material carried along by flow from within. Clay, fine sand and silt, and fine-grained, pyroclastic material are all susceptible to earthflows. The velocity of the earthflow is all dependent on how much water content is in the flow itself. The more water content there is in the flow, the higher the velocity will be (Arattano and Marchi 2005).

These flows usually begin when the pore pressures in a fine-grained mass increase until enough of the weight of the material is supported by pore water to significantly decrease the internal shearing strength of the material. This thereby creates a bulging lobe that advances with a slow, rolling motion. As these lobes spread out, drainage of the mass increases and the margins dry out, thereby lowering the overall velocity of the flow. This process causes the flow to thicken. The bulbous variety of earthflows is not that spectacular, but they are much more common than their rapid counterparts. They develop a sag at their heads and are usually derived from slumping at the source.

Earthflows in Shoshone County occur much more during periods of high precipitation, which saturates the ground and adds water to the slope content. Fissures that develop during the movement of clay-like material create the intrusion of water into the earthflows. Water then increases the pore-water pressure and reduces the shearing strength of the material (Easterbrook 1999).

Debris avalanche and debris slide

A debris avalanche is a type of slide characterized by the chaotic movement of rocks, soil and debris mixed with water or ice (or both). They are usually triggered by the saturation of thickly vegetated slopes, resulting in an incoherent mixture of broken timber, smaller vegetation and other debris (Easterbrook 1999). Debris avalanches differ from debris slides because their movement is much more rapid. This is usually a cause of lower cohesion or higher water content and commonly steeper slopes.

Debris slides generally begin with large blocks that slump at the head of the slide and then break apart as they move towards the toe. This process is much slower than that of a debris avalanche. In a debris avalanche this progressive failure is very rapid and the entire mass seems to somewhat liquefy as it moves down the slope. This is caused by the combination of the excessive saturation of the material, and very steep slopes. As the mass moves down the slope it generally follows stream channels, leaving behind a V-shaped scar that spreads out downhill. This differs from the more U-shaped scar of a slump. Debris avalanches can also travel well past the foot of the slope due to their tremendous speed (Schuster and Krizek 1978).

Sturzstrom

A sturzstrom is a rare, poorly understood type of landslide, typically with a long run-out. Often very large, these slides are unusually mobile, flowing very far over a low angle, flat, or even slightly uphill terrain. They are suspected of "riding" on a blanket of pressurized air, thus reducing friction with the current underlying surface.

Shallow landslide

A shallow landslide is common where the sliding surface is located within the soil mantle or on weathered bedrock (typically to a depth from a few feet to many yards). They usually include debris slides, debris flow, and failures of road-cut slopes. Landslides occurring as single large blocks of rock moving slowly down slope are sometimes called block glides.

Shallow landslides can often happen in areas that have slopes with high permeable soils on top of low permeable bottom soils or hardpan. The low permeable, bottom soils trap the water in the shallower, high permeable soils creating high water pressure in the top soils. As the top soils are filled with water and become heavy, slopes can become very unstable and slide over the low permeable bottom soils. This can happen in our region where a slope with silt and sand as its top soil sits on top of bedrock. During an intense rainstorm, the bedrock will keep the rain trapped in the top soils of silt and sand. As the topsoil becomes saturated and heavy, it can start to slide over the bedrock and become a shallow landslide.

Deep-seated landslide

In deep-seated landslides the sliding surface is mostly deeply located below the maximum rooting depth of trees (typically to depths greater than thirty feet). Deep-seated landslides usually involve deep regolith, weathered rock, and/or bedrock and include large scale slope failure associated with translational, rotational, or complex movement.

4.4.2. Shoshone County Landslide Prone Landscapes

All of these landslide types can occur in Shoshone County, although the sturzstrom variant is unlikely. The materials may move by falling, toppling, sliding, spreading, or flowing. Some landslides are rapid, occurring in seconds, whereas others may take hours, weeks, or even longer to develop. Although landslides usually occur on steep slopes, they also can occur in areas of low relief. Landslides can occur as ground failure of river bluffs, cut-and-fill failures that may accompany road construction and building excavations, collapse of mine-waste piles, and slope failures associated with quarries and open-pit mines.

The primary factors that increase landslide risk in Shoshone County are slope and certain soil characteristics. In general, the potential for landslide occurrence intensifies as slope increases on all soil types and across a wide range of geological formations.

Soil factors that increase the potential for landslide are soils developed from parent materials high in schist and granite, and soils that are less permeable, containing a resistive or hardpan layer. These soils tend to exhibit higher landslide potential under saturated conditions than do well-drained soils. To identify the high-risk soils in Shoshone County, the NRCS State Soils Geographic Database (STATSGO) layer was used to identify the location and characteristics of all soils in the county. Unfortunately, this data layer is limited in extent and does not include many of the highest risk populated sites. The specific characteristics of each major soil type within the county was reviewed and extrapolated to unmapped areas in Shoshone County.

Soils with very low permeability that characteristically have developed a hardpan layer or have developed from schist and granite parent material were selected as soils with potentially high landslide risk potential. High-risk soils magnify the effect slope has on landslide potential. Soils identified as having high potential landslide risk are further identified with increasing slopes corresponding to increasing landslide risk.

These factors were combined with vegetation characteristics (type of land cover) and canopy cover (vegetation density). Through this analysis, it was determined that while an evergreen forest is a relatively stable site against landslides, it is less stable when on steep slopes and even more unstable where all vegetation has been removed (from logging or a wildfire, for example).

To portray areas of probable landslide risk due to elevation, slope, vegetative cover, and canopy coverage a predictive model was developed to combine them into one model called Landslide Prone Landscapes. This model shows the relative landslide risk in Shoshone County and is based on the technique developed by Schlosser (2003), and mapped in the referenced map sets to this document. A Landslide Prone Landscapes assessment was completed for this Shoshone County Multi-Jurisdictional Hazards Mitigation Plan analysis.

From the Landslide Prone Landscape profile created, it is possible to depict areas of risk and their proximity to development and human activity. With additional field reconnaissance the areas of high risk were further defined by overlaying additional data points identifying actual slide locations (although these data were extremely limited), thus improving the resolution by specifically identifying the highest risk areas. This method of analysis builds on a method developed by the Clearwater National Forest in north-central Idaho (McClelland *et al.* 1997).

Under this risk rating a score of zero is no relative risk and a score of one hundred is considered extreme risk. In practice, very few areas of the highest risk category (100) are found, as theoretically these sites would be in an active process of mass wasting. This rating scale should be considered as nominal data producing values which can be ordered sequentially, but the actual values are not multiplicative. This means that a site ranking 20 on this scale is not "twice as risky" as a site ranking 10. The scale provides relative comparisons between sites.

Further extrapolation of these data can be made in order to create a probability of future landslide events in Shoshone County. If the site is left undisturbed, the risk of future landslide events for each area of evaluation can be estimated as the risk rating score expressed in a percent (rating score of 15, expressed as 15%). This modified score can then be treated as an expression of the likelihood of that area experiencing a landslide event within the next 10 year period. Of course, certain areas that were modified for developments or road building (such as Highway 50 near Bullet Creek) will experience increased periodicity of landslides in response to the modification. Offsite modifications, such as developments, logging or wildfires can also modify this risk rating scale to cause increased landslide occurrence down slope of the activity. In the same light, mitigation measures can be expected to decrease the likelihood of continued landslide events. This expression of potential probability of occurrence is based on anecdotal information and should be used for general reference only. A comprehensive landslide database should be created and maintained in Shoshone County to better understand the conditions leading to major wasting events.

The analysis of all areas in Shoshone County (1.6 million acres) reveals that the vast majority of lands in Shoshone County are not subject to landslide risks without surface disturbances. Table 4.12 provides insights into the landslide exposure in Shoshone County. Approximately 79% of the land area in Shoshone County is at no definable risk of landslides (rating of zero). The remaining 21% of the county is relatively low on the risk scale, with a very low percent of the total acres posing greater than 50 on the risk scale. Fewer than 200 acres rate greater than 70 on the risk scale presented.

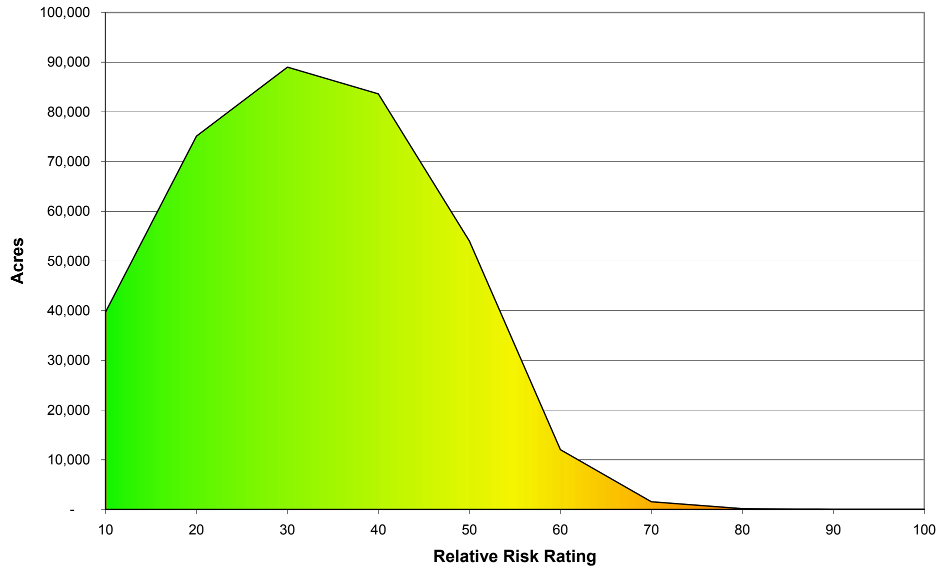
Table 4.12. Landslide Prone Landscapes Analysis for all of Shoshone County.

Risk Category	Acres	Percent
0	1,327,142	79%
1-10	39,680	2%
11-20	75,129	4%
21-30	89,031	5%
31-40	83,609	5%
41-50	53,997	3%
51-60	12,018	1%
61-70	1,554	0%
71-80	157	0%
81-90	14	0%
91-100	2	0%
Total	1,682,334	100%

Figure XVI repeats the findings of Table 4.12 by showing only those acres rating greater than zero (1-99) on the Landslide Prone Landscapes scale. While these findings would seem to indicate that there is little or no risk of landslides in Shoshone County that would be an incorrect interpretation. This assessment concludes that most slopes in the county are stable until they are disturbed by some activity. These activities could include road building, development, or settlement. These activities may also involve a combination of several forces such as logging or wildfire followed by heavy rains, or other natural disasters on steep slopes. Once disrupted, sites can become unstable with little or no warning.

An illustrative example is the relatively stable slopes of the St. Joe River Valley which seasonally drop rocks onto the road surface because of freeze-thaw transitions between day and night. The slopes are stable, but the ice-wedging along cracks releases rocks to fall.

Figure XVI. Shoshone County Landslide Prone Landscapes Assessment; scores greater than zero.



Landslides may occur on slopes steepened by humans during construction, or on natural ground never disturbed. However, most slides occur in areas that have had sliding in the past. All landslides are initiated by factors such as weaknesses in the rock and soil, earthquake activity, the occurrence of heavy snow or rainfall, or construction activity that changes a critical factor involved with maintaining stability of the soil or geology of the area. A prime example of this includes previously stable slopes where home construction utilizing independent septic systems is added. The increased moisture in the ground, when coupled with an impermeable layer below the septic systems leads to surface soil movements and mass wasting.

Stream and riverbank erosion, road building, or other excavation can remove the toe or lateral slope and exacerbate landslides. Seismic or volcanic activity often triggers landslides as well. Urban and rural living with excavations, roads, drainage ways, landscape watering, logging, and agricultural irrigation may also disturb the solidity of landforms, triggering landslides. In general, any land use change that affects drainage patterns, increases erosion, or changes ground-water levels can augment the potential for landslide activity.

Landslides are a recurrent menace to waterways and highways and a threat to homes, schools, businesses, and other facilities. The unimpeded movement over roads—whether for commerce, public utilities, school, emergencies, police, recreation, or tourism—is essential to a normally functioning Shoshone County. The steep walls of the St. Joe River drainage pose special problems to NFD Road 50. The disruption and dislocation of this or any other routes caused by landslides and rock fall can quickly jeopardize travel and vital services.

4.4.3. Resources at Risk

4.4.3.1. Private Property Improvement Values

TerraGraphics completed a full cadastral GIS layer of Shoshone County. This parcel layer in GIS combined with the Landslide Prone Landscapes assessment was used to evaluate the exposure of structures to wildfire risks based on location. The assessed value given by the Shoshone County Assessor was used to determine structure values. This follows the same approach used in this Multi-Jurisdictional Hazards Mitigation Plan for assessing the exposure of risk from flooding events.

The analysis procedure began by selecting all parcels containing structures within Shoshone County, then creating a mosaic of risk scores within that particular parcel, assigned by pixel (10 meters by 10 meters square). The modal score (value of the dataset mode – analogous to the mean) for these values was determined for each parcel in Shoshone County. These "risk scores" for each parcel were grouped into consolidated risk categories in units arranged for every tenth score. Thus, the consolidated risk score of 5 is the lowest risk category, and is followed by consolidated risk category 15, then 25, and so forth. The higher the consolidated risk category, the higher the comparative risk to the parcels and the values on those parcels.

Next, community boundaries were applied to each parcel, placing it in only one of each incorporated city, city rural area, or community area based on location. These private parcel risk values were summed by community area to record the value of assessed improvements linked with the Landslide Prone Landscapes modal score. The resulting tabular summary provides insights to where risks are elevated (high Landslide Prone Landscapes scores) and where improvements are concentrated (assessed improvement values).

For the purposes of this report, it is assumed that the improvement value of a parcel with a structure is completely attributed to the structure or structures on that parcel. There were cases of improvement values which represented a paved surface only, but the parcel evaluated did not include a structure, so that parcel's improvement value was not included in the summaries for Landslide Prone Landscapes improvements at-risk. This utilizes the same methodology used in assessing flood risk exposure (Table 4.4).

It is important to understand that the risk assessment is not considering the structure to be at-risk. The risk analysis is considering the risk on the parcel where the structure is located.

The results of this analysis are summarized in Table 4.13, and demonstrate that 92.5% of the value of improvements ($594.7 million) in Shoshone County are located within the lowest ranked Landslide Prone Landscapes areas. As the relative landslide risk scores increase, the value of improvements located on parcels at-risk decreases when considered across the entire county (last lines Table 4.13 and Figure XVII).

Figure XVII. Private Property Improvement Values at risk from landslide.

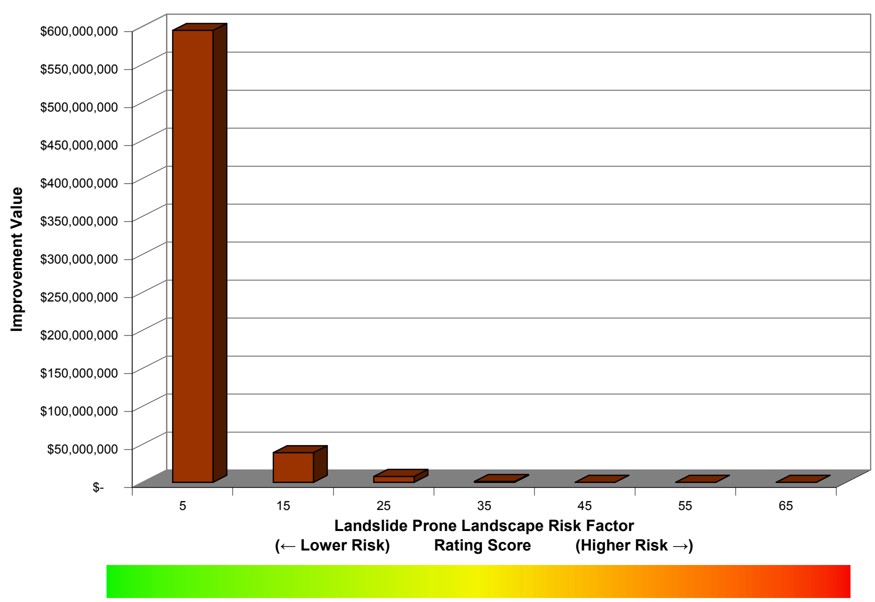


Table 4.13. Analysis of relative landslide risk to improvement values on private property in Shoshone County, by community.

Community	Assessed Value Total	Improvement Value	Landslide Prone Landscapes Rating Score 5	15	25	35	45
Avery	$2,741,212	$1,947,219	$1,454,315	$313,409	$163,619	$15,876	$-
Bear Creek	$2,369,350	$686,550	$546,230	$123,610	$16,710	$-	$-
Big Creek (St. Joe River)	$5,161,467	$1,869,047	$1,649,305	$172,421	$47,321	$-	$-
Big Creek (SF CdA River)	$9,810,734	$6,880,771	$5,815,783	$1,064,988	$-	$-	$-
Burke Canyon	$15,849,076	$11,812,193	$10,553,554	$567,346	$541,004	$125,535	$24,754
Calder	$6,270,850	$1,857,259	$1,546,802	$265,163	$45,294	$-	$-
Cataldo	$7,565,344	$4,222,514	$3,549,170	$408,372	$264,972	$-	$-
Clarkia	$6,100,797	$1,741,920	$1,741,920	$-	$-	$-	$-
Eagle	$1,703,850	$732,390	$732,390	$-	$-	$-	$-
Emerald Creek	$2,030,937	$537,738	$537,738	$-	$-	$-	$-
Enaville	$11,838,051	$3,844,733	$2,832,093	$922,980	$89,660	$-	$-
Hoyt	$980,950	$74,660	$56,490	$-	$18,170	$-	$-
Kellogg - City	$223,276,633	$156,142,150	$151,175,004	$3,555,440	$1,147,613	$264,093	$-
Kellogg - Rural	$18,473,030	$13,389,260	$8,603,192	$3,882,519	$903,549	$-	$-
Kingston	$58,767,536	$35,112,556	$28,341,154	$6,574,324	$197,078	$-	$-
Larson	$1,866,031	$1,086,311	$933,585	$152,726	$-	$-	$-
Lower CdA River Rural Area	$32,976,113	$9,494,092	$7,987,108	$1,312,014	$194,970	$-	$-
Marble Creek	$4,332,378	$2,128,459	$1,858,700	$154,672	$-	$115,087	$-
Montgomery Gulch	$8,126,721	$5,824,281	$5,538,644	$187,332	$98,305	$-	$-
Moon Creek Gulch	$8,710,922	$5,950,151	$3,729,155	$1,335,784	$714,966	$170,246	$-
Mountain Meadows	$5,343,617	$2,929,865	$792,545	$1,412,940	$724,380	$-	$-
Mullan - City	$36,203,184	$30,811,844	$28,854,120	$1,704,053	$253,671	$-	$-
Mullan - Rural	$3,336,323	$1,615,963	$1,582,973	$32,990	$-	$-	$-
Murray	$3,000,364	$1,962,880	$1,484,550	$380,030	$90,100	$8,200	$-
Nine Mile Gulch	$6,073,666	$4,353,866	$3,512,316	$726,740	$114,810	$-	$-
Osburn - City	$92,034,461	$71,267,743	$70,663,770	$603,973	$-	$-	$-
Osburn - Rural	$21,867,179	$13,829,549	$12,134,038	$1,361,049	$334,462	$-	$-
Page	$21,999,303	$7,331,110	$6,566,112	$764,998	$-	$-	$-
Pine Creek & Pinehurst Rural	$39,504,469	$25,183,502	$22,164,249	$2,745,060	$274,193	$-	$-
Pinehurst - City	$101,062,311	$73,284,691	$72,884,564	$400,127	$-	$-	$-

Table 4.13. Analysis of relative landslide risk to improvement values on private property in Shoshone County, by community.

Community	Assessed Value Total	Improvement Value	Landslide Prone Landscapes Rating Score				
			5	15	25	35	45
Prichard	$30,089,646	$10,199,782	$10,199,782	$-	$-	$-	$-
Silverton	$36,053,422	$28,530,275	$26,495,237	$1,975,591	$59,447	$-	$-
Smelterville - City	$26,666,269	$19,511,917	$19,228,659	$283,258	$-	$-	$-
Smelterville - Rural	$14,526,942	$8,525,564	$7,919,649	$319,865	$286,050	$-	$-
Trout Creek	$2,549,210	$1,003,310	$901,776	$32,575	$68,959	$-	$-
Wallace - City	$59,654,088	$51,387,467	$48,961,235	$1,938,266	$487,966	$-	$-
Wallace - Placer Creek	$2,315,898	$1,797,418	$1,184,657	$475,207	$137,554	$-	$-
Wallace - Rural	$1,414,980	$809,441	$809,441	$-	$-	$-	$-
Wardner - City	$23,829,900	$12,601,454	$9,977,951	$2,047,861	$274,727	$286,761	$14,154
Other Rural Areas	$138,534,719	$10,392,147	$9,222,768	$928,303	$127,634	$113,442	$-
All Shoshone County	$1,095,011,933	$642,664,042	$594,722,724	$39,125,986	$7,677,184	$1,099,240	$38,908
			92.5%	6.1%	1.2%	0.2%	0.0%

4.4.3.2. Public Property Improvement Values

Using the same analysis approach employed in Section 4.4.3.1 of this document, the location of public structures was evaluated for the presence of Landslide Prone Landscapes. The parcel encompassing each structure was selected to represent the characteristics of risk to which the structure is exposed. The modal Landslide Prone Landscapes score for each parcel was calculated to represent this risk exposure to each structure. Actual scores were consolidated to the categories of 5, 10, 15, 25, and 35. Results indicate that none of the public structures rated higher than a score of 35 during this analysis (Table 4.14).

The outcome of this analysis revealed that a great majority of the value of public structure insured value (97.6%) in Shoshone County is located in the lowest ranked risk categories of Landslide Prone Landscapes (Table 4.14). Only 2.4% of insured structure value is located in the category 15 score. One public structure, located in Wardner and insured for $79,883, ranked in the 35 score range (Table 4.14). This particular structure is the City of Wardner Garage situated on the eastern side of Haystack Peak. The structure is located on completely flat ground adjacent to Milo Creek, but the City owned parcel it is located on, is steep and potentially landslide prone. Thus, the risk immediately surrounding the structure is low, while the potential for landslides uphill from the structure is higher. Because the risk category is determined by the parcel, not just the area immediately surrounding the structure, the score appears to be high.

Table 4.14. Analysis of relative landslide risk to insured values on public property in Shoshone County, by community.

Community	Insured Value	Landslide Prone Landscape Score 5	15	25	35
AVERY	$3,574,649	$1,120,118	$2,454,531	$-	$-
CALDER	$820,894	$417,335	$403,559	$-	$-
CATALDO	$1,047,538	$1,047,538	$-	$-	$-
CLARKIA	$5,477,941	$5,477,941	$-	$-	$-
KELLOGG	$56,593,146	$56,593,146	$-	$-	$-
MARBLE CREEK	$15,000	$15,000	$-	$-	$-
MULLAN	$18,507,230	$18,507,230	$-	$-	$-
MURRAY	$291,435	$291,435	$-	$-	$-
OSBURN	$9,224,098	$9,224,098	$-	$-	$-
OTHER	$5,348,808	$5,260,808	$88,000	$-	$-
PAGE	$1,500,000	$1,500,000	$-	$-	$-
PINEHURST	$7,338,291	$7,338,291	$-	$-	$-
PRICHARD	$90,760	$-	$90,760	$-	$-
SMELTERVILLE	$1,894,281	$1,894,281	$-	$-	$-
WALLACE	$17,313,743	$17,313,743	$-	$-	$-
WARDNER	$128,990	$49,107	$-	$-	$79,883
TOTAL	**$129,166,804**	**$126,050,071**	**$3,036,850**	**$-**	**$79,883**
	Percent of Total	**97.6%**	**2.4%**	**0.0%**	**0.1%**

4.4.4. General Landslide Hazards Mitigation Strategies

A number of techniques and practices are available to reduce and cope with losses from landslide hazards. Careful land development can reduce losses by avoiding the hazards or by reducing the damage potential. Following a number of approaches used individually or in combination to mitigate or eliminate losses can reduce landslide risk.

Establish a Countywide landslide hazard identification program

Document all landslides, bank failures, "washouts", and manmade embankment failures. Each failure should be located on a map with notations about time of failure, repair (if made), and descriptions of the damaged area. Recording this could become a County directive to the road and bridge crews, and entering this mapping data into the County's Geospatial Library of Disaster related information [proposed to be created] would aid future disaster assessments.

Restricting development in Landslide Prone Landscapes

Land-use planning is one of the most effective and economical ways to reduce landslide losses by avoiding the hazard and minimizing the risk. This is accomplished by removing or converting existing development or discouraging or regulating new development in unstable areas. Buildings should be located away from known landslides, debris flows, steep slopes, streams and rivers, intermittent-stream channels, and the mouths of mountain channels. In Shoshone County, restrictions on land use should be imposed and enforced by the Shoshone County Planning and Zoning Department, and by analogous departments in each municipality.

Standardizing codes for excavation, construction, and grading

Excavation, construction, and grading codes have been developed for construction in landslide-prone areas; however, there is no nationwide standardization. Instead, State and local government agencies apply design and construction criteria that fit their specific needs. The Federal Government has developed codes for use on Federal projects. Federal standards for excavation and grading often are used by other organizations in both the public and private sectors.

Protecting existing development

Control of surface-water and ground-water drainage is the most widely used and generally the most successful slope-stabilization method. Stability of a slope can be increased by removing all or part of a landslide mass or by adding earth buttresses placed at the toes of potential slope failures. Restraining walls, piles, caissons, or rock anchors are commonly used to prevent or control slope movement. In most cases, combinations of these measures are used.

Post warnings of potentially hazardous areas and educate the public about areas to avoid

Such areas may include (a) existing / old landslides, (b) on or at the base of a slope, (c) in or at the base of a minor drainage hollow, (d) at the base or top of an old fill or steep cut slope, and (e) on developed hillsides where leach field septic systems are used. In addition to identifying these at-risk landscapes, it will also serve to begin an educational dialog with landowners in Shoshone County, enlightening residents and visitors to the risks associated with landslides.

Utilizing monitoring and warning systems

Monitoring and warning systems are utilized to protect lives and property, not to prevent landslides. However, these systems often provide warning of slope movement in time to allow the construction of physical measures that will reduce the immediate or long-term hazard. Site-specific monitoring techniques include field observation and the use of various ground motion instruments, trip wires, radar, laser beams, and vibration meters. Data from these devices can be sent via telemetry for real-time warning. Development of regional real-time landslide warning systems is one of the more significant areas of landslide research (Fragaszy 2002).

Public Education

Residents can increase their personal awareness by becoming familiar with the land around their home and community. People can learn about slopes where landslides or debris flows have occurred in the past or are likely to occur in the future.

Educate the public about telltale signs that a landslide is imminent so that personal safety measures may be taken. Some of these signs include:

- Springs, seeps, or saturated ground in areas that have not typically been wet before.
- New cracks or unusual bulges in the ground, street pavements or sidewalks.
- Soil moving away from foundations, and ancillary structures such as deck-sand patios tilting and/or moving relative to the house.
- Sticking doors and windows, and visible open spaces indicating jams and frames out of plumb.
- Broken water lines and other underground utilities.
- Leaning telephone poles, trees, retaining walls or fences.
- Sunken or dropped-down roadbeds.
- Rapid increase in a stream or creek water levels, possibly accompanied by increased turbidity (soil content).
- Sudden decrease in creek water levels even though rain is still falling or just recently stopped.

Residents or county representatives who live and work in landslide prone areas should follow these recommendations prior to a storm event:

- Watch the patterns of storm-water drainage on slopes and note places were runoff water converges, increasing flow over soil-covered slopes. Watch the hillsides around your home and community for any signs of land movement, such as small landslides or debris flows or progressively tilting trees.
- Develop emergency response and evacuation plans for individual communities and for travel routes. Individual homeowners and business owners should be encouraged to develop their own evacuation plan.

4.5. Severe Weather

Severe weather is any destructive weather phenomenon. The most common severe weather activity in Shoshone County is isolated or combined events of hail, downbursts, heat waves, snowstorms, thunderstorms, ice storms, blizzards, flooding, and high winds. In its broadest sense, the term "severe weather" is defined as any aspect of the weather that can "pose a threat to life and property".

Severe weather is always defined locally based on historic norms of seasonal changes in weather. An average snowstorm in Shoshone County would be considered a catastrophe in Texas. At the same time, normal high temperatures in southern California could be considered an extreme heat wave in Shoshone County. Thus, our discussions of Severe Weather are concentrated on what is at the “extreme edge” of a normal weather pattern defined by expected seasonal variations. The occurrence of flooding is addressed in a separate section of this document and will not be discussed here.

In absolute terms, temperatures in excess of 100º F for prolonged periods of time (three or more consecutive days) can cause problematic situations for Shoshone County communities. However, the greatest complications for extreme temperatures in this region are not directly from the temperature on people, but on the influence these temperatures have on wildfire ignitions and subsequent control efforts. This level of elevated temperatures for three or more days in a row can be expected to occur once in a year approximately every five years. Elevated temperatures of this level or higher, for a greater duration or higher maximum daily temperature, can be expected to happen once every ten years, on average.

In contrast, severe weather events of high winds are often witnessed with sustained gusts in excess of 35 MPH. Several storms in recent memory (within the past five years) have even recorded gusts over 60 MPH. When wind gusts exceed 45 MPH the impact is seen in terms of trees-near-homes breaking and roofs being ripped away from structures. Further exacerbation of the wind factor is seen when either heavy snowfall or ice-rain has accumulated on trees and structures prior to the wind storm. This increased weight and surface area of the tree limbs and roofing materials causes an amplification of the breakage during wind events where the wind speed is only 20 MPH or greater. Sustained gusts of winds greater than 45 MPH (swirling or straight-line winds) can be expected in Shoshone County approximately once every three years, with higher sustained winds greater than 60 MPH once every five years.

Snowfall accumulations in the County are highly variable, with most of the population centers located within the Silver Valley where average monthly snowfall in January is "only" 5-16 inches (Table 3.4- 3.6). On the other hand, several communities are located in areas of the county where average January snowfall is in excess of 25 inches (Mullan Table 3.6), 30 inches (Avery Table 3.7), and 37 inches (Clarkia Table 3.8). Daily accumulations of one to seven inches are not considered abnormal during snow storm events. However, when accumulations are continuous over a period of many days, accumulations reaching one foot to three feet or more can cause roofs to collapse on structures, especially if the storm system delivers snow with a high moisture content. Severe storms in the region have even accumulated a record one day total as high as 20 inches. These storms stress the capacity of the cities, the County, and the State to deal with the snow loads. At the same time, private citizens, companies, and municipalities face a difficulty in managing the snow removal from streets, driveways, and roofs.

Witnessing an extreme daily snowfall amount of six inches or greater in a one day period is expected annually, while accumulations of up to two feet from a single storm event within a one week period is considered just as common. Greater snowfall amounts within a day, up to one foot, or five feet in a week can be expected approximately once every five to seven years. Of course, back-to-back snow storms can impact the county through consecutive storms over a period of an entire month dropping from two feet of snow in Kellogg to five feet in Clarkia.

Only three storm-related Presidential Disaster declarations were made in Idaho during the period 1976 to 2008. Damaging storms do occur, however, and casualties and extensive property damage result throughout the entire state. Two types of severe storms are of concern in Idaho:

- Winter storms with accumulations of snow and ice, extreme cold, and reduced visibility.
- Thunderstorms with hail, lightning, and high winds.

Other severe weather events occur in Idaho, but are less common in Shoshone County. Because of the climatic conditions in Shoshone County, drought that has affected the southern portion of Idaho is less of a hindrance in north Idaho.

Based on the data collected through the public mail survey, summarized in Section 2.10.2., the financial impact resulting from severe weather events in Shoshone County, including wind storms and winter storms was evaluated. Table 2.10 demonstrates an estimated loss of $3.1 million in the most recent decade to private citizens. Only the losses attributable to floods exceed this amount in Shoshone County.

4.5.1. Winter Storms

Winter storms are a normal part of life in northern Idaho. They vary in degree and intensity and can occur during any time from September to May. These storms can be localized or can affect the entire region. They could last a matter of minutes (downbursts) or matter of days (blizzards). Typically, winter storms are measured by the amounts of snow accumulated during any given storm. Additionally, these storms could be measured by the accompanied wind or temperatures associated with each storm.

In any discussion about winter storms, terminology and the general characteristics of the causes and impacts of winter storms need to be defined.

Natural winter storm events are grouped into the following categories:

Flurries – Light snow falling for short durations. No accumulation or light dusting is all that is expected.

Showers – Snow falling at varying intensities for brief periods of time. Some accumulation is possible.

Squalls – Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant. Snow squalls are best known in the Great Lakes Region.

Blowing Snow – Wind-driven snow that reduces visibility and causes significant drifting. Blowing snow may be snow that is falling and/or loose snow on the ground picked up by the wind.

Sleet – Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects. However, it can accumulate like snow and cause a hazard to motorists.

Freezing Rain – Rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces, such as trees, cars, and roads, forming a coat or glaze of ice. Even small accumulations of ice can cause a significant hazard.

Severe Winter Storm – defined as one that drops four or more inches of snow during a twelve hour period, or six or more inches during a twenty-four hour period.

Blizzard – a winter storm with winds exceeding 35 miles per hour and temperatures of 20 degrees F.

Ice storm – occurs when cold rain freezes immediately on contact with the ground, structures, and vegetation.

4.5.2. Thunderstorms

A thunderstorm, also known as an electrical storm or a lightning storm, is a form of weather characterized by the presence of lightning and its effect: thunder. It is usually accompanied by heavy rain and sometimes snow, hail, or no precipitation at all. Thunderstorms may line up in a series, and strong or severe thunderstorms may rotate.

Frequently, thunderstorms can roll through north Idaho in summer, late summer, and early fall when the region's forests are dry from summer heat. When these thunderstorms hit, one single event series can last from an hour to a few days, and strike thousands of times. Many of these lightning strikes hit trees and the ground, and can cause wildfires to ignite.

Sometimes, these hits immediately start to grow a wildfire, while others smolder in a tree or other vegetation only to "wake up" days later. Firefighting efforts in the region track these thunderstorms with advanced lightning tracking equipment and dispatch firefighters to areas of high activity in order to locate and extinguish fires before they grow. These thunderstorms are a leading cause of wildfires in this region, and in Shoshone County specifically. The incidence of summer thunderstorms is greatest in mountainous areas, where lightning often causes serious forest fires.

4.5.3. Windstorms

Windstorms are not uncommon in Idaho, but the state has no destructive storms such as hurricanes, and an extremely small incidence of tornados. Windstorms associated with cyclonic systems, and their cold fronts, damage trees each year in Shoshone County, often causing temporary disruption of power and communication facilities, and inflict damage to structures in most instances. The damage most commonly seen is roof materials torn from the houses they cover, and falling trees crushing adjacent homes and outbuildings.

Storms of this type may occur at any time from October into July, while during the summer months strong winds almost invariably come with thunderstorms. Hail damage in Shoshone County is very small in comparison with damage in areas of the central part of the United States. Often the hail that occurs does not grow to a size larger than one-half inch in diameter, and the areas affected are usually small. Quite often, hail comes during early spring storms, when it is mostly of the small, soft variety with a limited damaging effect.

4.5.4. History

Idaho has not had a significant number of severe storm-related Presidential Disaster Declarations in the past 30 years. The majority of the storms that affect Idaho are on a lower scale that is not recognized as a “Disaster” due to the number of less intense storms that occur every year. Idaho, due to its complex landscape, will always have to deal with winter conditions that occur every year. People and communities have learned to adapt to the winter storms and deal with them as they come.

Damages experienced in Shoshone County in recent history include the floods discussed in another section of this document, heavy snow accumulations, high winds, and the wildfires ignited by thunderstorms. The following sub-sections detail recent and some current severe weather events.

4.5.4.1. December 1996 Executive Order

Due to severe flooding in parts of the State of Idaho, the Governor declared that states of extreme and disaster emergencies existed in the counties of Benewah, Clearwater, Kootenai, Latah, Nez Perce, Boundary, Bonner, Lewis, **Shoshone** and Idaho, including the Nez Perce Indian Reservation. The weather situation that impacted all of north Idaho came about from a rapid snow pack accumulation and blizzard conditions exacerbated by a following warm-front carrying high rainfall and extreme winds. Landslides were seen across the region and ice dams plugged area rivers and streams. Transportation was thwarted as major highways were closed and surface streets were flooded. Structures were damaged from high water while high winds broke trees to fall over power lines and ripped roofing from homes and businesses.

4.5.4.2. Silver King School collapses, January 2008

On January 11, 2008, the old Silver King School building gave way to heavy snow; a portion where the gymnasium once was collapsed to the ground. The condemned building was located along Government Gulch, adjacent to the Kellogg School District’s bus barn and transportation office. In the collapse, parts of the building crashed into the single-wide office, injuring Kellogg School District personnel and a family member.

After the Bunker Hill Mine shutdown, the school was closed. The school district still owned the building but had not used it for years other than the parking area for buses (Shoshone News Press Jan 12, 2008).

4.5.4.3. School Bus Barn and Commercial Building Collapse

On February 1, 2008, a severe snow storm hit the Silver Valley, dropping several inches of heavy snow on top of an already impressive snowpack. The Wallace School District bus barn was one of its causalities when its roof collapsed on top of a full bus barn (Shoshone News Press Feb 2, 2008). Two school buses were totaled and four more suffered only minor damage in the collapse. No people were present or injured from the disaster.

Early morning, on February 1, the Wallace School District bus barn's south end of the roof caved in from heavy snow loads. The building not only served as the parking spot for the district's different buses but as the home of the "Slippery Gulch" Festival and a set for Dante's Peak during filming.

School bus routes were covered by neighboring school districts by the next Monday morning. The district moved bus storage into the Shoshone County Transportation Shed in Osburn.

At about 2 p.m. the same day, the roof of the former Furniture Exchange building on Division and Mullan streets in Kellogg collapsed. The privately owned building housed an apartment which was empty at the time.

On February 3, 2008, two storage units collapsed in Osburn and the Tomlinson Black Kellogg location lost a car port when it collapsed under the snow's pressure (Shoshone News Press Feb 2, 2008).

Photographs in this section, courtesy Idaho Bureau of Homeland Security, Boise.

4.5.4.4. Severe Weather Warnings December 2008

December 2008, was greeted by several National Weather Service warnings for severe winter weather. These warnings informed people of heavy snowfall bringing low temperatures and high winds. Blizzard conditions were observed in locations across north Idaho and eastern Washington. In nearby Spokane, Washington, a record 24 hour period snowfall was recorded on December 18, 2008, with 23.3 inches, shattering the previous record of 13 inches in one 24 hour period in 1950.

By the end of December, between Christmas and New Years, a warm system brought rains to the lower elevations of Shoshone County making a deep snowpack heavy with added rain. High winds gusting to over 40 MPH rocked the region and made conditions hazardous. Snow plows worked throughout the storm to keep local and regional transportation routes open.

4.5.5. Resources at Risk

Because severe weather events are rarely localized to only occur in certain areas, the extent of severe weather events must be considered for all resource values in Shoshone County. Weather related events such as wind damage and winter snow accumulation damage can be considered as applicable to all structures and infrastructure.

Wind storms typically represent two main causal mechanisms of damage in Shoshone County: 1) roof damage to structures, and 2) trees falling on structures. Winter snow accumulation damages are generally observed through 1) structural damage resulting from the weight of snow on a structure, and 2) limited power supply delivery and ingress and egress limitations because of excessive snow accumulations. Often both severe weather events are experienced together, or in combination with other severe weather events such as lightning storms, or extreme freezing temperatures.

In order to better understand the exposure of these risk profiles to individual structures, a complete inventory of hazard trees, roof pitch (identify especially flat top roofs), and related factors should be developed. To date, this has not occurred. Opportunities to accomplish this task would involve a coordinated effort of city, county, and fire department personnel to inventory all populated places to identify risk components that can be altered (such as hazard tree removal). Dealing with flat roofs, which do not shed snow loads well, is another opportunity in this inventory process.

The precise exposure of risks to severe weather has not been articulated in this plan. Alternatively, general summaries are presented for individual communities. Conceptually, severe weather risk exposure is to all structures and infrastructure in Shoshone County.

4.5.6. County Wide Potential Mitigation Activities

There is no way to prevent severe storms. The weather forces and topography of Shoshone County will always dictate when and where severe storms will occur.

There are three areas where action can be taken to reduce the loss of life, property, infrastructure, and business disruption due to severe weather.

- Mitigation
- Readiness/Education
- Building Codes

Mitigation

Some types of mitigation measures have been addressed in all communities within the county since the major state disasters in 1996 and 1997.

Mitigation efforts should address the following:

- Readiness of snow removal equipment and schedule within the community.
- The availability of traction sand.
- School bus schedule or delays.
- Communication centers.
- Back-up power supplies.
- Water availability.
- Abundance of emergency equipment or shelters to the public.

At the individual home level:

- Shovel roofs burdened by snow.
- Insulate walls and attic.
- Caulk and weather-strip doors and windows.
- Install storm windows or cover windows with plastic from the inside.
- Have emergency heating equipment available.
- Fireplace with ample supply of wood.
- Small, well-vented, wood, coal, or camp stove with fuel.
- Portable space heaters or kerosene heaters.
- Install smoke detectors.
- Keep pipes from freezing.
- Have disaster supplies on hand in case power goes out.
- Develop an emergency communication plan.
- Make sure that all family members know how to respond during a severe winter storm.
- Stay indoors and dress warmly.
- Conserve fuel.

Readiness/Education

Continued periodic public education measures should be undertaken. When extended periods of time pass between major weather events, both emergency response units and the public tend to forget to review plans and take necessary precautions. Some media and public communication ideas are:

- Publish a special section in the local newspaper with emergency information on severe weather patterns. Localize the information by printing the phone numbers of local emergency services offices, the American Red Cross chapter, and the nearest hospitals.
- Ask the local paper to interview local officials about land use management and building codes in the area.
- Periodically inform your community of local public warning systems. Explain differences between winter weather warnings and watches. Let them know where to turn for emergency broadcast information should they hear a warning on their radio or television.
- Assist hospitals and other operations that are critically affected by power failure by arranging for auxiliary power supplies; this would include city water and sewer systems, emergency services (including electric dependant phone systems), police and fire departments.
- Publish emergency evacuation routes for areas prone to severe weather.
- Have a ready source of shovels, candles, or other emergency equipment.
- Provide local-level weather pattern information to people moving into the area.
- Provide information on traction devices for winter-time travel.

Requiring building permits and compliance with building codes is a good educational tool. Builders and future homeowners are made aware of the potential risk of building in a severe weather area. Periodic publication of the highlights of these building codes can help to keep up public awareness.

Building Codes

The adoption of the International Building Codes, or more stringent local building codes, provides basic guidelines to communities on how to regulate development. Careful localized management of development in severe weather areas or rural areas results in construction practices that can reduce losses and the high costs associated with disasters that impact all levels of government.

Building codes do address the following:

- Snow load requirements for roofing materials.

- Localized wind storms or prevailing winds.
- Manufactured home tie downs and placement of blocking.
- Sign codes for billboards in high wind-prone areas.

Future building codes should address the following issues:

- Parking lot construction to handle snow removal or piling of snow.
- Width of driveways for snow removal equipment or piling of snow

4.6. Wildfire

A wildfire, also known as a wildland fire, forest fire, brush fire, or vegetation fire, is an uncontrolled fire often occurring in wildland areas, but also with the potential to consume houses and agricultural resources. Common causes are numerous and can include lightning, human carelessness, slash-and-burn farming, arson, volcanic activity, pyroclastic clouds, and underground coal fire. Heat waves, droughts, and cyclical climate changes such as El Niño can also dramatically increase the risk of wildfires (NWCG 1998).

Wildfires are common in climates that are sufficiently moist to allow the growth of trees but feature extended dry, hot periods, such as can be found in most of Idaho in late summer months. Wildfires can be particularly intense during days of strong winds and periods of drought. Fire prevalence is also high during the summer and autumn months, when fallen branches, leaves, grasses, and scrub dry out and become more flammable (NWCG 1998).

Wildfires are considered a natural part of the ecosystem of numerous forestlands, where some plants have evolved to tolerate fires through a variety of strategies such as fire-resistant seeds and reserve shoots that sprout after a fire (Agee 1993). Smoke, charred wood, and heat are common fire cues that stimulate the germination of seeds (Agee 1998). Exposure to smoke from burning plants can even promote germination in some types of plants (Barrett 1979).

Natural fire ignition from lightning, or human carelessness or arson, causes most wildfires in north Idaho. These fires threaten homes located within the Wildland-Urban Interface (WUI), a zone of transition between developed areas and undeveloped wildland. However, structure fires can also threaten wildlands when these homes are located without a vegetation buffer, allowing the structure fire to spread to forestland vegetation, then back to other homes in the area.

4.6.1. Wildfire Threats in Shoshone County

Fires can be categorized by their fuel type as follows:

- **Smoldering:** involves the slow combustion of surface fuels without generating flame, spreading slowly and steadily.
- **Crawling:** surface fires that consume low-lying vegetation such as grass, leaf litter, and debris.
- **Ladder:** fires that consume material between low-level vegetation and tree canopies, such as small trees, low branches, vines, and invasive plants.
- **Crown:** fires that consume low level surface fuels, transition to ladder fuels, and also consume suspended materials at the canopy level. These fires can spread at an incredible pace through the top of a forest canopy, burning entire trees and can be extremely dangerous (sometimes called a Firestorm).

Smoldering fires involve the slow combustion of surface fuels without generating flame, while spreading slowly and steadily. They can linger for days or weeks after flaming has ceased, resulting in potential large quantities of fuel consumed. They heat the duff and mineral layers, affecting the roots, seeds and plant stems in the ground. These are most common in peat bogs, but not exclusive to that vegetation.

Wildfires may spread by jumping or spotting, as burning materials are carried by wind or firestorm conditions. Burning materials can jump over roads, rivers, or even firebreaks and start distant fires. The powerful updraft caused by a large wildfire will draw in air from the surrounding area. These self-generated winds can also lead to the phenomenon known as a firestorm.

4.6.2. History

Wildland fire management in the interior west over the past hundred years has created a modified role for wildland fire. Because cities like Wallace and many others were twice mostly burned to the ground (1890 and 1910), forest managers increased protective measures to stop wildfires as soon as they were discovered.

Pre-European wildland fires of this region were allowed to burn unchecked with a fire return interval ranging from as few as five years to as many as a couple hundred years between fires (Brown 1995, IFPC 2005). In those locations where fires were a frequent “visitor” the fire intensity was commonly low, and supported by surface fuels such as grasses, forest litter and debris. Occasionally, the fires would torch into single trees (via ladder fuels) or small groups of trees, but rarely were they sustained in the tree crowns (crown fire). Fire intensities created a mosaic of burned and un-burned areas located relatively close to each other.

In less frequent fire-return interval sites, the natural condition wildfires would burn with more intensity but a lower periodicity. The tree species occupying these sites would often be tolerant of some level of fire activity and sometimes regenerated by fire activity (such as lodgepole pine). These sites experienced wide-scale fires on a return interval of 60 to 120 years between wildfire events.

Other forestland sites witnessed fire reoccurrence very infrequently (as much as 200 years between fire returns), where trees and other vegetation would thrive in the inter-fire period only to be destroyed by the next large event, commonly called a “Stand Replacing Fire” (Brown 1995).

Prior to about 1920, the lack of a well-developed road system in most of north Idaho generally, and Shoshone County specifically, hindered fire protection services from accessing fires while they were still small enough to logistically control. As the road system of the region was better developed through increased timber harvesting activities, fire response time was greatly aided. After World War II, wildland firefighting agencies added two more features to their anti-incendiary tool belt - air attack and smoke jumpers.

Both of these tools increased the effectiveness of the wildland firefighters, mainly employed by the USFS, Idaho Department of Lands, forest products companies, and others, to control fires while still small. Fire suppression efforts were so successful that the number of acres burning annually in north Idaho was only a small fraction of the region’s historical average. For instance, the Idaho Panhandle National Forest area averaged 31,000 acres burned each year from 1542 to 1931. The average number of acres burned between 1969 and 1998 was only 665 (IFPC 2005).

A parallel sequence of events occurred with this scenario. Technology to track lightning strikes as they occur improved critical quick response time. This technology was developed in North America in the late 1960s (Brookhouse 1999). Lightning detection systems are able to record various characteristics of lightning strikes, including the type of strike (cloud-to-ground, cloud-to-cloud), polarity, intensity, and approximate location of the discharge. Each lightning strike emanates a radio signal that has a unique signature. USFS and BLM research has been instrumental in establishing lightning detection systems all across the Inland Northwest and all of the United States. The first lightning detectors in our region came into operation in 1968, with the location of ground strikes plotted manually. This manual form of triangulation was replaced by linking detectors to computers. This system is called "Automated Lightning Detection System" (ALDS).

This synergistic combination of resources and technology greatly reduced the average wildland fire size and therefore reduced risks to both the forests and the rural and urban populations living in or near forestlands (such as all communities in Shoshone County).

However, this break in the natural fire cycle introduced by large scale and effective firefighting, led to the accumulation of forest fuels on sites where fire previously had re-occurred on a semi-predictable cycle. Other disruptions to the natural fire cycle included the introduction of exotic plant diseases, such as the white pine blister rust in 1910, which decimated millions of acres of western white pine in Idaho and other states (Worrall 2007). By 1940 the rust was epidemic in Idaho, infecting over 95% of the standing western white pine. Today, the amount of western white pine growing in north Idaho is approximately 93% less than it was just 40 years ago (IFPC 2005).

While wildland fire spread in the region has been drastically reduced, debris and normal forest fuels continue to accumulate in the forest. When fire does occur, it can burn hotter and longer than it did historically. These "out of natural historic range of variability" fires are common each summer across the nation, in Idaho, and in Shoshone County.

With extensive urbanization of forestlands, these fires often involve destruction of homes located in the WUI. On many occasions, wildfires have caused large-scale damage to private and public property, destroying many homes and causing deaths, particularly when they have reached urban fringe communities.

4.6.3. Idaho State Wildland Fire History

Statewide, wildfires have been observed on a continuous and frequent cycle in all forested and rangeland ecosystems. Many homes have been built within the WUI leading to losses of private and public structures from wildfires. The reverse is also true, as homes have ignited and then spread to surrounding forests causing the loss of adjacent homes and natural ecosystems.

Wildfire events in Idaho, which have impacted Shoshone County and surrounding areas are summarized in Table 4.15.

Table 4.15. Significant Idaho wildland fires recorded in and near Shoshone County (IBHS 2007).

Year	Disaster Declarations (1976-2000)	WUI Impact	Comments
1910	-	X	Eighty-five lives lost; fire consumes 1/6 of north Idaho forests, destroying many communities.
1967	-		Ten counties in Panhandle affected; 50,000 acres burned in nine hours.
1985	State (2)		Two State-wide declarations (July and August).
1986	State		State-wide declaration.
1989	State	X	The worst fires since 1910 burn thousands of acres in south central Idaho, partially destroying the town of Lowman and leading to State-wide declaration.
1992	State (2)	X	One life lost in the worst fire season in Idaho history to date; one of two State-wide declarations was for an unusual spring event (April).
1994	State	X	One life lost and one home lost; summer wildfires burn a total of over 750,000 acres resulting in a State-wide declaration.
2000	State, Federal	X	More than 1500 individual fires.
2007	State	X	1,394 Fires, 1,972,643 acres

4.6.4. Shoshone County Wildfire Hazard Profile

Table 4.16 details wildfire history in Shoshone County. Table 4.16 data are based on fire events including legacy data from 1885 through 1965 provided by the USFS and the BLM.

Table 4.16. USFS Large Fire Summary of Shoshone County.

Fire Name	Year	Cost	Acres Burned in Shoshone County
Legacy Data: Fire years pre-1886	1885	$ -	44,176
Legacy Data: Fire years c1889	1889	$ -	320,373
Legacy Data: Fires for year 1894	1894	$ -	78,858
Legacy Data: Fires for year 1900	1900	$ -	61,300
Legacy Data: Fire years 1908-1909	1908	$ -	20,261
Legacy Data: Fires for year 1910	1910	$ -	945,371
Legacy Data: Fire years 1911-1913	1911	$ -	3,264
Legacy Data: Fire years 1914-1915	1914	$ -	28,221
Legacy Data: Fires for year 1917	1917	$ -	25,721
Legacy Data: Fires for year 1918	1918	$ -	10,039
Legacy Data: Fires for year 1919	1919	$ -	133,375
Legacy Data: Fire years 1920-1921	1920	$ -	39,464
Legacy Data: Fire years 1922-1923	1922	$ -	61,115
Legacy Data: Fires for year 1924	1924	$ -	28,304
Legacy Data: Fires for year 1925	1925	$ -	39,035
Legacy Data: Fires for year 1926	1926	$ -	292,226
Legacy Data: Fire years 1927-1928	1927	$ -	31,908
Legacy Data: Fires for year 1929	1929	$ -	107,726
Legacy Data: Fires for year 1931	1931	$ -	84,822
Legacy Data: Fire years 1932-1933	1932	$ -	3,027
Legacy Data: Fires for year 1934	1934	$ -	39,658
Legacy Data: Fire years 1935-1939	1937	$ -	18,528
Legacy Data: Fire years 1940-1949	1945	$ -	14,069
Legacy Data: Fire years 1950-1959	1955	$ -	4,194
Legacy Data: Fire years 1960-1969	1965	$ -	79,843
CABIN CREEK	1979	$ -	728
CABIN CREEK	1988	$ 200,000	90
SUBURBAN	1992	$ 120,000	31
1956 NORTH	1994	$ 125,000	223
fire not named	1994	$ 75,000	28
CASPER	1994	$ 70,000	23
MURRAY PEAK	1994	$ 46,000	34
BERGE PEAK #4	2000	$ 263,036	47
TAYLOR SADDLE 8	2000	$ 15,000	13
CLINTON	2000	$ 20,000	13
TANK CREEK	2001	$ 14,800	26
LARCH MOUNTAIN 24	2003	$ 13,069	90
ULM	2003	$ 3,000	26
BOBTAIL 1	2003	$ 2,320	41
MILE POST 17	2003	$ 6,589	5
BARRYMORE	2003	$ 25,141	4
HAYSTACK 3	2003	$ 27,573	2
TOBOGGAN	2003	$1,575,000	302
GOLD CHEST	2003	$ 509,000	92
ULM PEAK	2006	$4,253,000	4,985

Table 4.16. USFS Large Fire Summary of Shoshone County.			
Fire Name	Year	Cost	Acres Burned in Shoshone County
REVETT	2006	$ 111,000	164
COLLINS TOOTH	2006	$ 99,700	377
FIRST FIRE	2007	$ 51,500	9
ELM STREET	2007	$ 600,000	75
ROUNDTOP	2007	$ 100,000	24

There have been no years of record in which Shoshone County has not seen a wildfire ignite within its borders. The USFS, the BLM, and the Idaho Department of Lands all maintain resources to combat wildfire ignitions and maintain records of wildfire ignitions in north Idaho. Primary wildfire protection in Shoshone County is provided by the USFS and the Idaho Department of Lands. The Idaho Department of Lands is responsible for wildfire protection in the Silver Valley and along the western side of the county from Clarkia north to the Silver Valley. The Clearwater-Potlatch Timber Protective Area, a division of the Idaho Department of Lands, is responsible for wildfire protection in an area slightly east of Clarkia and in neighboring Clearwater and Latah Counties. The remainder of the county is protected by the USFS. BLM resources are available from Coeur d'Alene on a mutual aid basis with the State and USFS.

4.6.4.1. Wildfire Ignition and Extent Profile

Detailed records of wildfire ignitions and extents from the USFS, BLM, and Idaho Department of Lands have been analyzed for this report. Table 4.17 details annual wildfire ignitions and fire extents from 1970 through 2007 in Shoshone County from the USFS and BLM databases.

Table 4.17. Shoshone County Ignition and Extent Profile 1970-2007.

Year	Number of Wildfire Ignitions	Acres Burned
1970	163	21
1971	58	12
1972	74	7
1973	63	23
1974	129	37
1975	47	20
1976	55	14
1977	60	12
1978	36	3
1979	147	32
1980	23	1
1981	65	15
1982	48	11
1983	36	2
1984	94	21
1985	41	17
1986	63	1,464
1987	45	136
1988	52	92
1989	42	16
1990	33	113
1991	29	14
1992	64	111
1993	14	2
1994	373	632

Table 4.17. Shoshone County Ignition and Extent Profile 1970-2007.		
Year	Number of Wildfire Ignitions	Acres Burned
1995	58	33
1996	54	19
1997	44	3
1998	99	29
1999	78	12
2000	72	141
2001	54	24
2002	59	21
2003	72	472
2004	84	56
2005	25	32
2006	88	5,213
2007	58	114

During this period, the USFS encountered an average of 71 wildfire ignitions per year which created an average total burn area of 237 acres per year. The highest number of ignitions was witnessed in 1994 with 373 unique ignitions. The largest acreage burned in this protection area during this time period in one year was in 2006 at 5,213 acres. During 2006 the largest single fire was the Ulm Peak fire which grew to 4,985 acres. The Ulm Peak fire ignited on August 8, 2006, and was centered in northern Shoshone County near the Montana state line approximately 16 miles north of Prichard. The USFS estimated that fire suppression costs were approximately $425,000. The Ulm Peak fire was ignited by lightning.

Another large fire in this time period was the Mary Mountain II fire, ignited on August 19, 1986. The Mary Mountain II fire grew to 1,430 acres and was ignited by a campfire. This particular fire was centered approximately 13 miles east of Clarkia and cost an estimated $19,000 to suppress.

Table 4.18 includes a similar summary (1983-2008) for the Idaho Department of Lands Cataldo protection area located along the Silver Valley (including all incorporated cities in Shoshone County).

Table 4.18. Idaho Department of Lands wildfire extent profile for the Cataldo Fire Protection District.

Year	Acres Burned	Costs to the State of Idaho	Number of Incidents
1983	1	$ 3,506	4
1984	2	$ 4,996	11
1985	30	$ 46,323	40
1986	1,460	$ 342,919	30
1987	37	$ 63,234	23
1988	21	$ 22,756	27
1989	12	$ 17,308	20
1990	3	$ 16,100	17
1991	10	$ 31,226	27
1992	10	$ 29,964	29
1993	1	$ 2,574	9
1994	153	$ 315,887	95
1995	65	$ 70,085	11
1996	9	$ 14,702	13

Table 4.18. Idaho Department of Lands wildfire extent profile for the Cataldo Fire Protection District.

Year	Acres Burned	Costs to the State of Idaho	Number of Incidents
1997	1	$ 23,994	11
1998	30	$ 74,785	32
1999	16	$ 59,683	27
2000	3	$ 20,755	10
2001	15	$ 53,235	14
2002	1	$ 10,293	5
2003	23	$ 285,942	37
2004	6	$ 51,167	22
2005	-	$ 8,312	4
2006	27	$ 231,207	35
2007	52	$ 195,796	28
2008	8	$ 158,503	12

Based on these data (Table 4.18) the Idaho Department of Lands experiences an average of 77 acres of wildfire on 23 separate events annually. Only one "large fire" event has been summarized in the Idaho Department of Lands fire occurrence database from 1983 through 2008. In this dataset, the Mary Mix II fire in 1986 charred approximately 1,438 acres and was ignited from equipment use.

During the period from 1970 through 2007 wildland fire protection agencies recorded ignition causes and tracked them for each fire in the database. Table 4.19 summarizes the ignition types and the percent of total ignitions by classification.

Table 4.19. Summary of wildfire ignitions in Shoshone County from the USFS, BLM, and IDL databases.

General Cause	Number of Ignitions	Percent of Total Ignitions
Lightning	2,445	75%
Campfire	77	2%
Smoking	111	3%
Debris Burning	224	7%
Arson	99	3%
Equipment Use	50	2%
Railroad	52	2%
Children	40	1%
Miscellaneous	163	5%
Total	3,261	

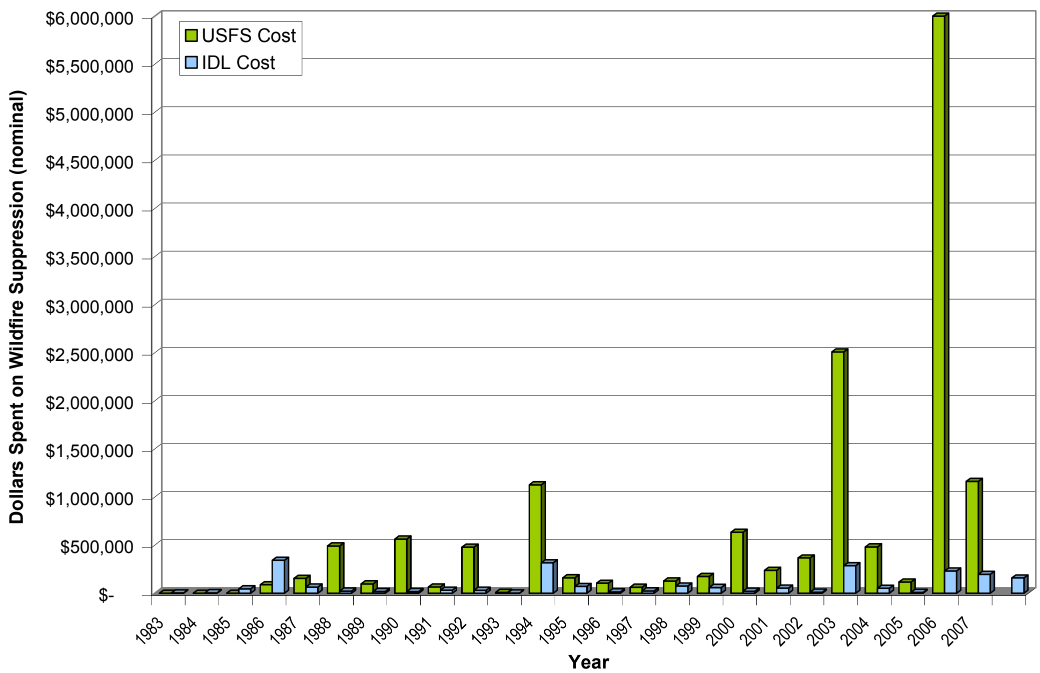
During this time period, approximately 75% of all ignitions were caused by lightning. In a wide area profile, a 75% natural causes wildfire ignition profile is relatively good. In some areas of Idaho and the inland western US, this percentage drops to rates around 50%. This does not mean that the lightning is less of a problem, but instead that human causes are a larger problem in relation to the number of total ignitions. Based on this ignition profile a reasonable supposition is that wildfire education programs such as Smoky Bear and regional sign posting telling folks to be careful with fire is working in Shoshone County.

Both the USFS and Idaho Department of Lands datasets included information on the costs of wildfire control during these periods. The average annual expenditure by the USFS was

$435,000 and ranged from no costs allocated during some years, to $6.0 million (2006) in one year (Figure XVIII).

The average cost (unadjusted for inflation) to the Idaho Department of Lands is $83,000 for direct control efforts alone (Table 4.18). These costs to the state hit their maximum in 1986 at $343,000. Figure XVIII summarizes the diversity of expenditures experienced in the county.

Figure XVIII. Wildfire suppression costs by the US Forest Service and Idaho Department of Lands in Shoshone County.



4.6.5. Analysis Tools to Assess Wildfire Risk Exposure

Analysis tools to assess the risk exposure to wildland fires in Shoshone County are numerous. Each analysis tool has specific applications to unique needs and can be considered in light of the site being addressed; none of them will replace professional expertise of fire behavior analysts on the ground. These techniques are presented for consideration of the risk exposure to Shoshone County residents. Wildland fire is arguably one of the most widespread hazards affecting Shoshone County.

4.6.5.1. Fire Prone Landscapes

Schlosser *et al.* 2002, developed a methodology to assess the location of fire prone landscapes on forested and non-forested ecosystems in the western US. This assessment technique has been completed for county and tribal level fire mitigation plans and FEMA hazard mitigation plans, for Bureau of Indian Affairs and BLM Fire Management Plans and Environmental Assessments on over 40 project areas in Idaho, Montana, Nevada, Oregon, and Washington to determine fire prone landscape characteristics. For the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan analysis a Fire Prone Landscapes assessment was completed by TerraGraphics.

The goal of developing the Fire Prone Landscapes analysis is to make inferences about relative risk factors across large geographical regions (multiple counties) for wildfire spread. This analysis uses the extent and occurrence of past fires as an indicator of characteristics for a specific area and its propensity to burn in the future. Concisely, if a certain combination of vegetation cover type, canopy closure, aspect, slope, and position on the hillside, have burned with a high occurrence and frequently in the past, then it is reasonable to extrapolate that they will have the same tendency in the future, unless mitigation activities are conducted to reduce this potential.

The basis of the analysis technique is to bring all of these factors together in a geospatial model (GIS layers) which determines how much area of each combination of input variables were available to burn, and then determines how much of this area actually burned in past fire events. For this analysis, the areas of Shoshone County, Benewah County, Latah County, and Kootenai County were considered in order to guarantee a robust sample area.

Past fire extents represent those locations on the landscape that have previously burned during a wildfire. Past fire extent maps were obtained from a variety of sources for the north Idaho area including the USFS Panhandle National Forest and the USFS Clearwater National Forest, the Idaho Department of Lands, and the BLM.

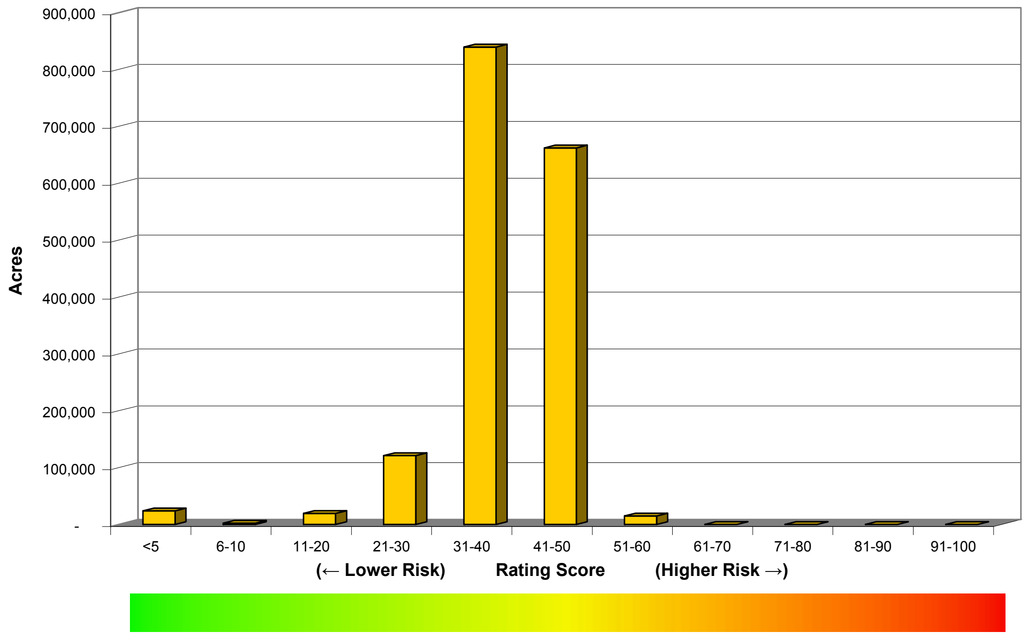
The maximum derived Fire Prone Landscapes rating score for Shoshone County was 64 with a low of 0 (these zero scores include areas under water). Table 4.20 details the distribution of these categories while Figure XVIII graphically displays this analysis. The highest proportion of Shoshone County (89%) is ranked between scores of 31 and 50, with a median in the 31-40 scale range.

The Fire Prone Landscapes analysis is an appropriate tool for assessing the risk in the WUI to people, structures, and infrastructure. This analysis tool geographically shows where landscape components combine to create conditions where past fires have burned. It does not show predicted rate of spread or burn intensity, but it does show where resources are potentially at-risk to wildfire loss. Thus, Fire Prone Landscapes data are useful for community protection prioritization and WUI home defensibility precedence.

Table 4.20. Fire Prone Landscapes Analysis for Shoshone County.

Risk Category	Acres	Percent
0-5	24,079	1%
6-10	2,192	0%
11-20	19,335	1%
21-30	120,899	7%
31-40	839,155	50%
41-50	661,895	39%
51-60	14,776	1%
61-70	2	0%
71-80	0	0%
81-90	0	0%
91-100	0	0%
Total	1,682,334	100%

Figure XIX. Fire Prone Landscapes assessment Results in Shoshone County.



The risk values developed in this analysis should be considered **ordinal data**, that is, while the values presented have a meaningful ranking, they do not have consistent scale between numbers. Rating in the "40" range is not necessarily twice as "risky" as rating in the "20" range. These category values also do not correspond to a rate of fire spread, a fuel loading indicator, or measurable potential fire intensity. Each of those scales is greatly influenced by weather, seasonal and daily variations in moisture (relative humidity), solar radiation, and other factors. The risk rating presented here serves to identify where certain constant variables are present, aiding in identifying where fires typically spread into the largest fires across the landscape.

4.6.5.2. Historic Fire Regime

The USFS, Northern Fire Plan Cohesive Strategy Team, in Kalispell, Montana, completed an analysis of Historic Fire Regime in 2002 and revised it again in 2005 for distribution to land managers and analysts. This report uses those data and GIS layers to represent historic fire regimes (NFPCST 2005).

In the fire-adapted ecosystems of Idaho, fire is undoubtedly the dominant process in terrestrial systems that constrains vegetation patterns, habitats, and ultimately, species composition. Land managers need to understand historic fire regimes (that is, fire frequency and fire severity prior to settlement by Euro-Americans) to be able to define ecologically appropriate goals and objectives for an area. Moreover, managers need spatially explicit knowledge of how historic fire regimes vary across the landscape.

Many ecological assessments are enhanced by the characterization of the historical range of variability which helps managers understand: (1) how the driving ecosystem processes vary from site to site; (2) how these processes affected ecosystems in the past; and (3) how these processes might affect the ecosystems of today and the future. Obviously, historic fire regimes are a critical component for characterizing the historical range of variability in the fire-adapted ecosystems of Idaho. Furthermore, understanding ecosystem departures provides the necessary context for managing sustainable ecosystems. Land managers need to understand how ecosystem processes and functions have changed prior to developing strategies to maintain or restore sustainable systems. In addition, the concept of departure is a key factor for assessing risks to ecosystem components. For example, the departure from historic fire regimes may serve as a useful proxy for the potential of severe fire effects from an ecological perspective.

A database of fire history studies in the region was used to develop modeling rules for predicting historic fire regimes (HFRs). Tabular fire-history data and spatial data were stratified into ecoregions, potential natural vegetation types (PNVs), slope classes, and aspect classes to derive rule sets which were then modeled spatially. Expert opinion was substituted for a stratum when empirical data were not available.

Fire is the dominant disturbance process that manipulates vegetation patterns in Idaho. The HFR data were prepared to supplement other data necessary to assess integrated risks and opportunities at regional and subregional scales. The HFR theme was derived specifically to estimate an index of the relative change of a disturbance process, and the subsequent patterns of vegetation composition and structure.

A historical (natural) fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse scale definitions for natural (historical) fire regimes have been developed by Hardy *et al.* (2001) and Schmidt *et al.* (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. These five regimes include:

> I – 0-35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced);
>
> II – 0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced);
>
> III – 35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced);
>
> IV – 35-100+ year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced); and
>
> V – 200+ year frequency and high (stand replacement) severity.

As scale of application becomes finer these five classes may be defined with more detail, or any one class may be split into finer classes, but the hierarchy to the coarse scale definitions should be retained.

General Limitations

These data were derived using fire history data from a variety of different sources. These data were designed to characterize broad scale patterns of historic fire regimes for use in regional and subregional assessments. Any decisions based on these data should be supported with field verification, especially at scales finer than 1:100,000. Although the resolution of the HFR theme is 90 meter cell size, the expected accuracy does not warrant their use for analyses of areas smaller than about 10,000 acres (for example, assessments that typically require 1:24,000 data).

The historic fire regimes identified in Shoshone County are presented in Table 4.21 and these data labels should be considered nominal data (they are not measurements).

Table 4.21. Historic Fire Regime Analysis or Shoshone County.

REGIME	Acres	Percent of Total	Details
I	44,781	3%	Mixed Severity-Short Interval
II	26,400	2%	Stand Replacement-Short Interval, Non-forest
III	207,749	12%	Mixed Severity-Long Interval
III	258	0%	Mixed Severity-High Elevation
III	88	0%	Mixed Severity-Moderate Interval, Non-forest
IV	370,021	22%	Stand Replacement-Short Interval
IV	26,709	2%	Stand Replacement-Moderate Interval, Non-forest
V	968,320	58%	Stand Replacement-Long Interval
V	5,158	0%	Stand Replacement-Long Interval, Non-forest
Agriculture	821	0%	Agriculture
Rock/barren	26	0%	Rock/barren
Other	31,917	2%	Non-Lethal Fires
Total	1,682,248	100%	

The most commonly represented historic fire regime in Shoshone County is Regime V, which is characterized by long intervals between wildfire events (Table 4.21). However, when wildfire events occurred on lands with this Regime, they were typically stand-replacing events, generally of a large scale. This fire regime is characterized in the high elevation and deep river valley systems of Shoshone County. The next most represented historic fire regime is Regime IV, characterized by stand replacing fires of a short interval (Table 4.21). Maps of these areas are prepared and included in separate documents to accompany this planning document.

4.6.5.3. Fire Regime Condition Class

The USFS, Northern Fire Plan Cohesive Strategy Team, in Kalispell, Montana, completed an analysis of Fire Regime Condition Class in 2002 and revised it again in 2005 for distribution to land managers and analysts. This report uses those data and GIS layers to represent fire regime condition class (NFPCST 2005).

A fire regime condition class (FRCC) is a classification of the amount of departure from the natural regime (Hann and Bunnell 2001). Coarse-scale FRCC classes have been defined and mapped by Hardy *et al.* (2001) and Schmidt *et al.* (2001) (FRCC). They include three condition classes for each fire regime. The classification is based on a relative measure describing the degree of departure from the historical natural fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g. insect and diseased mortality, grazing, and drought). All wildland vegetation and fuel conditions or wildland fire situations fit within one of the three classes.

The three classes (nominal data) are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the central tendency of the natural (historical) fire regime (Hann and Bunnell 2001, Hardy *et al.* 2001, Schmidt *et al.* 2002). The central tendency is a composite estimate of vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated natural disturbances. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside (Table 4.22).

Characteristic vegetation and fuel conditions are considered to be those that occurred within the natural (historical) fire regime. Uncharacteristic conditions are considered to be those that did not occur within the natural (historical) fire regime, such as invasive species (e.g. weeds, insects, and diseases), “high graded” forest composition and structure (e.g. large trees removed in a frequent surface fire regime), or repeated annual grazing that maintains grassy fuels across relatively large areas at levels that will not carry a surface fire. Determination of the amount of departure is based on comparison of a composite measure of fire regime attributes (vegetation characteristics; fuel composition; fire frequency, severity and pattern) to the central tendency of the natural (historical) fire regime. The amount of departure is then classified to determine the FRCC. A simplified description of the FRCC and associated potential risks are presented in Table 4.22. Maps depicting Fire Regime and Condition Class are presented in map documents accompanying this report.

Table 4.22. Fire Regime Condition Class Definitions.

Fire Regime Condition Class	Description	Potential Risks
FRCC 1	Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics. Composition and structure of vegetation and fuels are similar to the natural (historical) regime. Risk of loss of key ecosystem components (e.g. native species, large trees, and soil) is low.
FRCC 2	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe). Composition and structure of vegetation and fuel are moderately altered. Uncharacteristic conditions range from low to moderate. Risk of loss of key ecosystem components is moderate.
FRCC 3	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Fire behavior, effects, and other associated disturbances are highly departed (more or less severe). Composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high. Risk of loss of key ecosystem components is high.

An analysis of FRCC in Shoshone County shows that approximately 50% of the County is in FRCC 1 (low departure from historic), just about 22% is in FRCC 2 (moderate departure), with 26% of the area in FRCC 3 (Table 4.23).

Table 4.23. FRCC by Area in Shoshone County.

Fire Regime Condition Class		Acres	Percent of Area
1	Low Departure from Historic	836,920	50%
2	Moderate Departure from Historic	376,100	22%
3	High Departure from Historic	436,052	26%
4	Agriculture	98	0%
5	Rock/barren	26,589	2%
6	Snow/ice	26	0%
7	Urban	5,160	0%
8	Open Water	829	0%

4.6.5.4. Historic Fire Regime by Condition Class

The preceding data provide insights into the natural role of fire in Shoshone County while also delivering a general overview of how current conditions compare to historical conditions. However, further analyses describe in more detail about where departures from the historic fire regime are concentrated. Table 4.24 provides an accounting by acres in each combination of historic fire regime by condition classes 1, 2, and 3 (upper portion). The lower portion of Table 4.24 provides the same accounting by percent of the total area.

Table 4.24. Historic Fire Regime by Current Condition Class in Shoshone County.

Acres	Fire Regime Condition Class		
Historic Fire Regime	1	2	3
I	15,080	14,351	15,092
II	20,200	4,397	1,319
III	95,032	60,317	51,650
IV	195,632	93,296	86,749
V	499,338	193,086	271,509
Percent	Fire Regime Condition Class		
Historic Fire Regime	1	2	3
I	1%	1%	1%
II	1%	0%	0%
III	6%	4%	3%
IV	12%	6%	5%
V	31%	12%	17%

A review of these results summarized in Table 4.24 reveals that the highest departure from historic (condition class 3) is to be found primarily in Historic Fire Regime V lands. These sites represent over 271,500 acres in Shoshone County. Historic Fire Regime V is characterized by long fire return intervals with stand replacing fire intensity. At Fire Regime Condition Class of 3, these stands are significantly out of their natural range of variability, in the direction of delayed fire return intervals. This can be interpreted as areas where ignitions are expected to rapidly ignite vegetation and turn into large catastrophic fire events. Additionally, Historic Fire Regime V, and Condition Class 2 lands (12% of total) are found in Shoshone County, indicating moderate departure from historical norms. Another 31% of the total area in Shoshone County is also categorized by Historic Fire Regime V with a low departure from historic range of natural variability (Condition Class 1).

The dispersion of this vegetative and topographic classification (HFR V and FRCC 2 and 3) is scattered across all of Shoshone County, including areas surrounding populated places.

4.6.5.5. Application of Assessment Tools Presented

The introduction of this section included a statement that each wildfire analysis tool has an appropriate application for illuminating different wildfire management questions. Historic Fire Regime and Current Condition Class were developed by the federal land management agencies in order to quantify vegetation characteristic departures from historical conditions. This becomes an extremely valuable tool in ecosystem restoration efforts when attempting to return the natural cycle of vegetation, fire, wildlife, soil and water processes, and other ecosystem management questions. Neither Historic Fire Regime or Current Condition Class can be taken independently from the other; they are an integrated set of analysis tools.

The Fire Prone Landscapes assessment tool was developed specifically to address WUI wildfire risk challenges. This tool is not intended to illuminate the departure from historic conditions. This tool sheds a light on fire risk based on topographic and vegetative conditions. Where areas possess a high risk rating and those high risk ratings are continuous over large areas (seen as a large “splash of red” on the maps) surrounding or adjacent to homes and infrastructure, a wildfire risk is interpreted.

4.6.6. Resources at Risk

4.6.6.1. Private Property Improvement Values

TerraGraphics completed a full cadastral GIS layer of Shoshone County. This parcel layer in GIS combined with the Fire Prone Landscapes assessment was used to evaluate the exposure of structures to wildfire risks based on location. The assessed value given by the Shoshone County Assessor was used to determine structure values. This follows the same approach used in this Multi-Jurisdictional Hazards Mitigation Plan for assessing the exposure of risk from potential landslide events (Section 4.4.2.).

The analysis procedure began by selecting all parcels containing structures within Shoshone County, then creating a mosaic of risk scores within that particular parcel, assigned by pixel (10 meters by 10 meters square). The modal score for these values was determined for each parcel in Shoshone County.

Next, community boundaries were applied to each parcel, placing it in only one of each incorporated city, city rural area, or community area based on location. These private parcels were summed by community area to record the value of assessed improvements linked with the Fire Prone Landscapes modal score. The resulting tabular summary provides insights to where risks are elevated (Fire Prone Landscapes) and improvements are concentrated (assessed improvement values).

For the purposes of this report, it is assumed that the improvement value of a parcel with a structure is completely attributed to the structure or structures on that parcel.

The results of this analysis are summarized in Table 4.25, and demonstrate that 60% of the value of improvements ($386.5 million) in Shoshone County is located within the lowest ranked Fire Prone Landscapes areas. As the relative fire risk scores increase, the value of improvements located at risk decreases when considered across the entire county (last lines Table 4.25 and Figure XX).

Table 4.25. Comparison of relative wildfire risk to improvement values on private property in Shoshone County, by community.

Community	Assessed Value Total	Improvement Value	Fire Prone Landscapes Rating Score				
			5	15	25	35	45
Avery	$2,741,212	$1,947,219	$103,549	$726,535	$749,045	$368,090	$-
Bear Creek	$2,369,350	$686,550	$-	$62,380	$393,050	$231,120	$-
Big Creek (St. Joe River)	$5,161,467	$1,869,047	$-	$995,298	$600,773	$271,989	$987
Big Creek (SF CdA River)	$9,810,734	$6,880,771	$2,350,762	$2,487,780	$1,710,548	$271,982	$59,699
Burke Canyon	$15,849,076	$11,812,193	$3,461,891	$3,805,978	$2,475,052	$1,999,958	$69,314
Calder	$6,270,850	$1,857,259	$345,794	$881,721	$520,946	$108,798	$-
Cataldo	$7,565,344	$4,222,514	$674,540	$934,806	$1,558,020	$1,055,148	$-
Clarkia	$6,100,797	$1,741,920	$377,211	$620,893	$689,076	$54,740	$-
Eagle	$1,703,850	$732,390	$-	$418,140	$297,450	$16,800	$-
Emerald Creek	$2,030,937	$537,738	$-	$94,192	$443,546	$-	$-
Enaville	$11,838,051	$3,844,733	$94,270	$1,620,028	$1,773,185	$357,250	$-
Hoyt	$980,950	$74,660	$-	$26,210	$28,030	$20,420	$-
Kellogg - City	$223,276,633	$156,142,150	$141,533,220	$10,939,646	$1,993,049	$1,676,235	$-
Kellogg - Rural	$18,473,030	$13,389,260	$2,022,158	$6,984,233	$3,011,797	$1,371,072	$-
Kingston	$58,767,536	$35,112,556	$6,223,019	$16,475,051	$9,559,684	$2,780,198	$74,604
Larson	$1,866,031	$1,086,311	$-	$-	$828,432	$257,879	$-
Lower CdA River Rural Area	$32,976,113	$9,494,092	$125,980	$4,133,852	$3,638,500	$1,595,760	$-
Marble Creek	$4,332,378	$2,128,459	$25,176	$292,765	$1,504,456	$306,062	$-
Montgomery Gulch	$8,126,721	$5,824,281	$1,283,014	$937,957	$2,906,305	$697,005	$-
Moon Creek Gulch	$8,710,922	$5,950,151	$1,124,582	$2,348,622	$1,968,468	$508,479	$-
Mountain Meadows	$5,343,617	$2,929,865	$384,158	$426,010	$2,025,707	$93,990	$-
Mullan - City	$36,203,184	$30,811,844	$16,436,173	$7,946,581	$4,000,984	$2,198,504	$229,602
Mullan - Rural	$3,336,323	$1,615,963	$-	$267,526	$942,642	$275,296	$130,499
Murray	$3,000,364	$1,962,880	$-	$481,400	$1,138,230	$343,250	$-
Nine Mile Gulch	$6,073,666	$4,353,866	$136,951	$630,160	$1,266,870	$2,319,885	$-
Osburn - City	$92,034,461	$71,267,743	$57,303,345	$12,463,868	$1,078,010	$422,520	$-
Osburn - Rural	$21,867,179	$13,829,549	$3,075,050	$6,562,018	$2,936,695	$1,255,786	$-
Page	$21,999,303	$7,331,110	$-	$2,362,836	$4,171,560	$796,714	$-
Pine Creek & Pinehurst Rural	$39,504,469	$25,183,502	$4,679,344	$7,685,835	$8,946,576	$3,871,747	$-

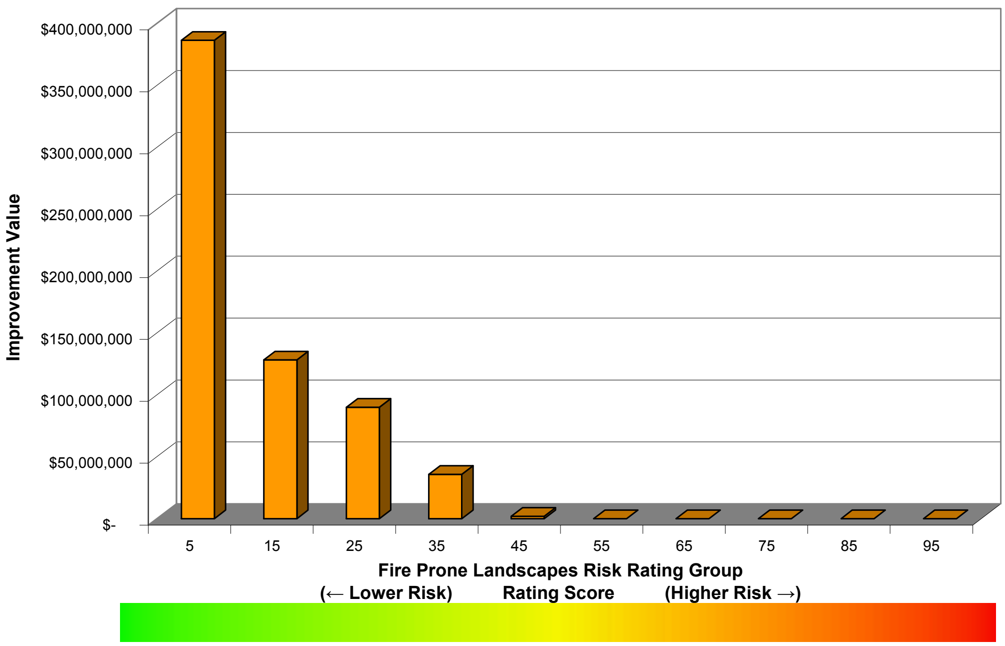
Table 4.25. Comparison of relative wildfire risk to improvement values on private property in Shoshone County, by community.

			Fire Prone Landscapes Rating Score				
Community	Assessed Value Total	Improvement Value	5	15	25	35	45
Pinehurst - City	$101,062,311	$73,284,691	$59,901,088	$7,082,238	$4,561,761	$1,739,604	$-
Prichard	$30,089,646	$10,199,782	$129,630	$3,114,089	$6,298,363	$657,700	$-
Silverton	$36,053,422	$28,530,275	$15,157,254	$10,153,536	$1,975,894	$1,087,118	$156,473
Smelterville - City	$26,666,269	$19,511,917	$18,174,904	$1,148,790	$186,254	$1,969	$-
Smelterville - Rural	$14,526,942	$8,525,564	$7,735,599	$319,865	$329,390	$140,710	$-
Trout Creek	$2,549,210	$1,003,310	$18,791	$606,469	$13,875	$364,175	$-
Wallace - City	$59,654,088	$51,387,467	$38,798,006	$4,476,003	$6,905,224	$1,184,768	$23,466
Wallace - Placer Creek	$2,315,898	$1,797,418	$-	$178,619	$801,996	$816,803	$-
Wallace - Rural	$1,414,980	$809,441	$-	$414,900	$156,216	$238,325	$-
Wardner - City	$23,829,900	$12,601,454	$4,404,135	$5,546,247	$1,510,139	$1,140,933	$-
Other Rural Areas	$138,534,719	$10,392,147	$394,873	$1,605,643	$4,121,165	$3,035,062	$1,235,404
All Shoshone County	$1,095,011,933	$642,664,042	$386,474,467	$128,258,720	$90,016,963	$35,933,844	$1,980,048
			60%	20%	14%	6%	0.3%

An in depth review of the data presented in Table 4.25 reveals that most of the communities follow the general pattern of decreasing risk exposure as fire prone landscape scores decrease (Figure XX). Notable exceptions to this tendency are observed, especially in the rural areas that have become popular home sites during the past many decades, such as Nine Mile Gulch, Silverton, Trout Creek, and other very remote and rural areas.

Although this tendency is positive and informative, the analyst must recognize the need to give special attention to properties with home sites at-risk to wildfire losses. A reasonable approach would be to start by prioritizing those community areas that show the highest risk exposure and values at-risk to wildfire loss as a place to begin wildfire mitigation activities such as home defensibility activities (e.g., fuel mitigation).

Figure XX. Private property parcel improvement values by fire risk categories.



4.6.6.2. Public Property Improvement Values

Using the same analysis approach employed in previous sections of this document, the location of public structures was evaluated for the presence of Fire Prone Landscapes. The parcel encompassing each structure was selected to represent the characteristics of risk the structure is exposed to. The modal Fire Prone Landscapes score for each parcel was calculated to represent this risk exposure to each structure. Actual scores were rounded to the nearest category of 5, 10, 15, 25, 35, and 45. Results indicate that none of the public structures rated higher than a score of 45 during this analysis (Table 4.26).

These analysis results reveal that about half of the value of public structures in Shoshone County is exposed to the lowest level of estimated wildfire risk exposure (Table 4.26). An almost equal amount of value is exposed to the risk categories of 15 and 25, at 23% and 22% respectively. Only a fraction of the insured value of public structures in the community category of “Other” is exposed to higher levels of wildfire risks (Table 4.26). These “Other” community area resources encompass the radio repeaters and weather stations placed in remote and wildland locations. The exposure to wildfire risk in these categories should not be surprising.

Table 4.26. Analysis of relative fire risk to insured values on public property in Shoshone County, by community.

		Fire Prone Landscapes Rating Score				
Community	**Insured Value**	**5**	**15**	**25**	**35**	**45**
AVERY	$3,574,649	$-	$1,120,118	$2,454,531	$-	$-
CALDER	$820,894	$30,000	$387,335	$403,559	$-	$-
CATALDO	$1,047,538	$1,047,538	$-	$-	$-	$-
CLARKIA	$5,477,941	$-	$120,000	$5,357,941	$-	$-
KELLOGG	$56,593,146	$20,720,237	$20,648,446	$15,224,463	$-	$-
MARBLE CREEK	$15,000	$-	$-	$15,000	$-	$-
MULLAN	$18,507,230	$12,839,649	$1,199,086	$4,468,495	$-	$-
MURRAY	$291,435	$-	$-	$291,435	$-	$-
OSBURN	$9,224,098	$9,224,098	$-	$-	$-	$-
OTHER	$5,348,808	$-	$4,999,808	$30,000	$183,000	$136,000
PAGE	$1,500,000	$750,000	$750,000	$-	$-	$-
PINEHURST	$7,338,291	$7,338,291	$-	$-	$-	$-
PRICHARD	$90,760	$-	$90,760	$-	$-	$-
SMELTERVILLE	$1,894,281	$1,894,281	$-	$-	$-	$-
WALLACE	$17,313,743	$17,313,743	$-	$-	$-	$-
WARDNER	$128,990	$49,107	$-	$79,883	$-	$-
TOTAL	**$129,166,804**	**$71,206,944**	**$29,315,553**	**$28,325,307**	**$183,000**	**$136,000**
	Percent of total	55.1%	22.7%	21.9%	0.1%	0.1%

While these results may seem to indicate very low exposure to wildfire risks, the reader is encouraged to recognize that these scores represent a composite rating score of wildfire risk using the Fire Prone Landscapes analysis tool. On many of the parcels considered, the maximum Fire Prone Landscapes score was substantially higher than the modal rating score. For instance, the Fire District #4, building two at Marble Creek appears in the risk category group of 25, but the maximum score observed on the parcel where the structure is located is 49. Overall, the structure is considered in the 25 risk rating group, but there may be localized areas exhibiting higher risk factors.

This same application of logic applies to almost all of the structures considered, both in the public structures list and the privately owned structure categories.

4.6.7. Shoshone County Potential Mitigation Activities

For many decades in the 20th century the policy of the USFS and other agencies was to suppress all wildfires. This policy was epitomized by the mascot Smokey Bear and was also the basis of parts of the Disney produced Bambi movie. The previous policy of absolute fire suppression in the United States has resulted in the higher than historical buildup of fuel in some ecosystems such as dry ponderosa pine forests. In acute cases, forest species composition has transitioned from a fire tolerant species mix of ponderosa pine, lodgepole pine, Douglas-fir, and western larch, to a mixture of these species plus a substantial component of grand fir. When fire is suppressed long enough, grand fir forests can dominate these sites. Grand fir has a significantly different fire response profile than the species it replaces and also provides substantially altered ecosystem mechanisms for wildlife, watersheds, fisheries, and biodiversity. This example provides only a small insight to the forest ecosystem changes across north Idaho brought about by 20th century fire management policies.

In addition to the loss of human life from direct firefighting activities, homes designed without consideration of the fire prone environment in which they are built have been a significant reason for the catastrophic losses of property and life experienced in wildfires.

The risk of major wildfires can be reduced partly by a reduction or alteration of fuels present. In wildland areas, reduction can be accomplished by two main methods: first, conducting controlled burns (prescribed burning), and second, the alteration of fuel mechanics, which involves reducing the structure of fuel ladders. Fuel alteration can be accomplished by hand crews with chain saws or by large mastication equipment that shreds trees and vegetation to a mulch. Such techniques are effective within the WUI.

People living in fire prone areas can take a variety of precautions, including building their homes out of flame-resistant materials, reducing the amount of combustible fuel near the home or property (including firebreaks, effectively their own miniature control lines), and investing in their own firefighting tools (hand tools, water tanks, pumps, and fire-hose). Rural farming communities are also often threatened directly by wildfire. Expanding urban fringes have spread into forested areas, and communities have literally built themselves in the middle of highly flammable forests.

In 2002, Shoshone County completed and adopted a Wildfire Mitigation Plan (Schlosser *et al.* 2002). This plan was the first of its kind in Idaho, and one of the first in the United States. That plan identified several potential mitigation activities to reduce the risk of loss of life, destruction of homes and other structures, the disruption of the local economy, and to facilitate the maintenance of a healthy forestland environment.

A major emphasis in this plan was the creation of defensible spaces around homes and neighborhoods to increase the success potential of fire fighters in the case of wildfire emergency. This reduction of the “resistance to control” focused primarily on removing vegetation immediately adjacent to homes, improving ingress and egress, and replacing flammable structure materials with fire-resistant materials (e.g., decks and roofing). In addition, the 2002 plan identified several opportunities to bolster the response ability of the fire districts in the county to effectively respond with appropriate equipment, staff, and volunteers to save homes and people from wildfire threat.

Since that plan’s adoption, implementation has been targeted and effective. Homes have been “protected” and activities such as rural home addressing has been implemented. A complete analysis of which measures were implemented and which were not is presented in a subsequent section of this plan.

4.6.8. Wildfire Risks Associated with The Superfund Site

While flooding risks may take center stage in the consideration of the Bunker Hill Superfund Site’s stability, unique risks resulting from wildfire must also be considered. During the operations of the smelter located at Smelterville, an enormous volume of pollutants were expelled into the atmosphere. This atmospheric toxic waste was distributed downwind during decades of operations.

This fine particulate matter settled on the surrounding hills and forestlands during this time of aerial deposition. Some of this contaminated exhaust, after it settled on vegetation and the soil, was washed downstream during and after precipitation events. Additional fallout settled on the forest floor and became a part of the duff layer through the normal process of decomposition of leaves, twigs, and decaying wood. Today, these contaminated particles are incorporated into the upper many inches of the forest floor layer.

These contaminated particles are encapsulated in this identifiable layer of soil duff, then overtopped by new, recent detritus material. This occurs through the normal process of forest soil formation.

The risks associated in the forestlands surrounding the location of the now closed smelter site is related to increased erosion. This erosion can be created either from forest harvesting that exposes broad expanses of bare soil, or from intense wildfire activity that produces similar results. The exposed soil is not directly the vector of contamination, instead it is mobilized when rains intercept the exposed soil layers, erode it to move down slope, and then it enters the stream channel. By these means, the contaminants are introduced into the streams, storm water runoff, and other itinerant transportation modes. This mobilization from sub-surface particulate in the soil into the stream channel represents an introduction of particulate contamination that will ultimately be relocated to storm water and flood water sludge deposits, or ultimately into Lake Coeur d'Alene.

The majority of the forestlands situated downwind of Smelterville are managed by forest industry, State of Idaho Department of Lands, the BLM, the USFS, and several private forestland owners. Historical evidence suggests that aerial contamination was measured as far downwind as Osburn and even Silverton. Given this 10 mile downwind radius, the contamination can be considered as an at-risk soil erosion complication.

The means of protecting this barrier to erosion begins with using low impact harvesting equipment during timber harvest activities. This harvesting equipment generally combines hand-felling trees with log yarding using a track-mounted machine. Some small amount of logging slash is generally allowed to remain on-site as this can assist in reducing surface erosion during and after logging operations.

Forest regeneration systems favoring mature tree residuals are recommended over clearcut harvesting techniques. Rapid reforestation efforts will also insure limited erosion potential. Site specific silvicultural systems are recommended for all impact area timber harvesting operations. The goal must be to maintain the existing barrier to erosion on these sites.

The State of Idaho Forest Practices Act regulates certain conditions of timber harvesting including slash disposal and reforestation targets. However, the Idaho State Forest Practices Act does not regulate operations to the level necessary to insure the safeguards needed to limit exposure from logging related erosion in this Superfund Site. The Shoshone Board of County Commissioners may consider if a site specific Shoshone County Forest Practices Act is appropriate when considering forest management options within this impact zone.

Fire impacted areas would receive the same priority as any other WUI impacted areas during a wildfire. Immediate suppression is expected within this zone. The post-fire considerations must address site-specific remediation efforts to immediately intercept surface erosion. This can be accomplished using straw bales anchored to the site and arranged perpendicular to the slope of the site, by using small rubber dams arranged mid-slope in the bottom of the gorges to intercept overland flow, or other tactics.

If large fires occur on state or federal lands, then interagency agreements to plan for, and implement these controls can be made ahead of the fires. If a wildfire occurs on forest industry or private lands, then some form of incentive may need to be considered to insure urgent erosion control measures.

In either event, it behooves Shoshone County to work with area forestland owners (private, state, federal), the Idaho DEQ, BEIPC, PHD, and others to develop a pre-disaster response protocol on wildfire impacted forestlands. In this way, a comprehensive response can be developed before a wildfire occurs.

4.6.9. Protection

A key component in meeting the underlying wildfire control need is the protection and treatment of fire hazard in the WUI. These WUI areas encompass not only the interface (areas immediately adjacent to urban development), but also the continuous slopes and fuels that lead directly to a risk to urban developments. Reducing the fire hazard in the WUI requires the efforts of federal, state, and local agencies and private individuals (Norton 2002). "The role of [most] federal agencies in the WUI includes wildland fire fighting, hazard fuels reduction, cooperative prevention and education, and technical experience. Structural fire protection [during a wildfire] in the WUI is [largely] the responsibility of Tribal, state, and local governments" (Norton 2002).

Property owners share a responsibility to protect their residences and businesses and minimize fire danger by creating defensible areas around them and taking other measures to minimize the fire risks to their structures. With treatment, a WUI area can provide firefighters a defensible area from which to suppress wildland fires or defend communities. In addition, a WUI that is properly thinned will be less likely to sustain a crown fire that enters or originates within it (Norton 2002).

By reducing hazardous fuel loads, ladder fuels, and tree densities, creating new defensible space, and reinforcing existing defensible space, landowners would protect the WUI, the biological resources of the management area, and adjacent property owners by:

- Minimizing the potential of high-severity surface, ladder, and crown fires entering or leaving the area around homes.
- Reducing the potential for firebrands (embers carried by the wind in front of the wildfire) impacting the WUI. Research indicates that flying sparks and embers (firebrands) from a crown fire can ignite additional wildfires as far as 1¼ miles away during periods of extreme fire weather and fire behavior (Norton 2002);
- Improving defensible space in the immediate areas for suppression efforts in the event of wildland fire.

5. Populated Places Risk Assessments

Most of the populated places in Shoshone County are located near the major waterways of the county, including the Coeur d'Alene River system, the St. Joe River, and the St. Maries River. As such, many of the communities share a common risk exposure to flooding and severe weather. At the same time, these communities are cradled by picturesque forestlands which have the tendency to burn when conditions warrant. At the other extreme, Shoshone County is the western frontline of the Rocky Mountains, providing this region with the brunt of storms, cold weather, heavy snowfall, and severe conditions. These scenarios combine to expose every community, all homes, and businesses to risk from natural disasters.

The following sections will evaluate each populated place in the county (listed alphabetically) for each hazard risk exposure and discuss potential mitigation activities to reduce the potential loss of life and damage to structures, infrastructure, and the economy.

5.1. Incorporated Cities

5.1.1. Kellogg / Wardner

Located along the banks of the South Fork Coeur d'Alene River, Kellogg rests where the valley broadens from prehistoric geologic processes that created the flood plain so attractive to current day settlements and development. Kellogg is home to the base of the Silver Mountain Ski area gondola, carrying passengers to the heights of Kellogg Peak and Wardner Peak. The community is concentrated on both sides of I-90 and up the slopes to the south in the area of Wardner, along Milo Creek. Other home sites are scattered up gulches in this region.

In 2007, the population of Kellogg was estimated at 2,227 (Census 2008). During the 2000 census, the city had a total population of 2,395, down by 14% from its population in 1990, and down about one-third from population totals in 1980 (Figure V).

Wardner had a population of approximately 215 in the 2000 Census and was approximately 200 in 2007, making it the least populated incorporated city in Shoshone County (Figure V). City provided information suggests that the current (2009) statistics on the community consists of 160 residents, and 111 homes, of which 38 are lived in year-round. Wardner is located immediately adjacent to the Kellogg city limits, to the south.

Kellogg is named after a prospector named Noah Kellogg. Legend has it that his donkey wandered off during the morning of September 4, 1885; Kellogg found the animal at a large outcropping of galena, which became the site of the Bunker Hill and Sullivan Mines. Those mines led to the founding of Kellogg, where a local sign reads "*This is the town founded by a jackass and inhabited by his descendants*." Noah Kellogg is buried in the city's cemetery.

After nearly a century of bustling activity in the mines, including a history of disputes between union miners and mine owners, the Bunker Hill Mine (& smelter) closed in 1981, leaving thousands out of work, a legacy of lead contaminated soils, and impacts to other mining-related operations and businesses as well. Since the mines closed, Kellogg has been economically moving more towards a diversified economy, including home of the "World's Largest Chrysler, Dodge, GM, and Jeep Dealer", and as a resort town through the development of new condos, hotels, restaurants, shops, a water park and a new golf course at the base of the Silver Mountain Gondola. Kellogg was recently featured in the New York Times travel section as an up-and-coming ski resort.

The Silver Mountain Resort is a ski resort including Kellogg Peak (6,300 ft/1,920 m) and Wardner Peak (6,200 ft/1,890 m) and is accessed by taking the world's longest single-stage passenger gondola 3.1 miles from the town of Kellogg to the lodge at Kellogg Mountain.

Sunshine Mine: In May 1972, the Sunshine Mine of Kellogg was the site of one of the worst U.S. mining accidents, resulting in the deaths of 91 miners. As a result, every miner in the U.S. now carries a "self-rescuer" (a breathing apparatus made with hopcalite that is much simpler than a SCBA), which gives the miner a chance to avoid death due to carbon monoxide poisoning. Eight days after the fire started, two men emerged from the mine. They were found on the 4,800 foot (1,463 m) level of the mine near a fresh air source. All others trapped in the mine had died.

The disaster is the subject of The Sunshine Mine Disaster (ISBN 0-89301-181-9), a book of "witness poetry" and nonfiction published in 1995. The disaster is also the subject of The Deep Dark: Disaster and Redemption in America's Richest Silver Mine by Gregg Olsen (ISBN 0-609-61016-3), published in 2005.

Sunshine Mine remained open until February 16, 2001, after producing 360 million troy ounces (11,000,000 kg) of silver. Sterling Mining Company is currently exploring and developing the Sunshine Mine as part of an ongoing strategy to restore the primary silver mine in the Silver Valley to sustainable production. The Company acquired the rights to the Sunshine Mine and related assets in mid-2003 and began initial production in late 2007. Operations were suspended in mid-September of 2008 in order to complete additional underground development and to maximize the value of this strategic asset.

5.1.1.1. Flood

The City of Kellogg downtown area is located primarily in the broad, flat, flood plain of the South Fork Coeur d'Alene River. This area is at high risk to flooding. Homes, businesses, and a significant amount of the city's infrastructure are included in the September 2008 FEMA FIRM maps for both the 100-year flood and the 500-year flood. Even I-90 is placed along this river corridor. The City of Wardner is located along Milo Creek immediately south of Kellogg.

Between 1997 and 2002, the Milo Creek Flood Control Project was initiated to address flooding and sediment contamination of the cities of Kellogg and Wardner, as part of a cooperative effort between several federal and state agencies. This action was a FEMA response to a 25-year flood event in May 1997 along Milo Creek and other waterways in the region. Five planning level documents were developed to assess existing conditions, conduct benefit/cost and feasibility analyses, and develop engineering design of selected alternatives. A sophisticated flood control system was installed for three miles through Kellogg and Wardner; incorporating site drainage controls and diversions. The State of Idaho working with Shoshone County and the Cities formed the Milo Creek Watershed District to assume Operations and Management responsibilities for the project.

The "Historic Part of Kellogg" is located to the south of the river flood zone above the valley bottom and is not directly impacted by flood waters from the South Fork Coeur d'Alene River. Instead, this part of the city is impacted by Milo Creek (now flowing underground in the controlled flood management system), and by all access routes in and out of the city. While structures are not at direct risk in these elevated areas, all infrastructure to this part of town hinges on the flood zone.

The Shreve Stream Order of the South Fork Coeur d'Alene River where it enters the eastern city limits of Kellogg is 430 (see Section 4.2.2.1.). By the time this river system exits Kellogg's western flank the Shreve Stream Order has increased to 463 (just downstream of the confluence with Bunker Creek). Several significant tributaries flow into the South Fork Coeur d'Alene River in Kellogg. Tributary names and Shreve Stream Orders for these tributaries are as follows (from east to west): Montgomery Gulch – 16, Elk Creek – 4, Ross Gulch – 1, Milo Creek – 8, Italian Gulch – 7, Jackass Creek – 7, Sweeney Creek – 1, Caldwell Gulch – 1, Bunker Creek – 3, and Government Gulch – 6.

Kellogg is primarily susceptible to riverine flooding, from both categories of the fast and slow kinds. The South Fork Coeur d'Alene River drains a very large watershed of high elevation mountains that accumulate snow all winter long. When the warm spring rains fall on the region, or when warm weather systems blow in during the winter, water levels can increase steadily until flood stages are reached. Flash flooding from the ten low order streams and from storm-water discharge in the cities of Wardner and Kellogg add to this floodwater distribution challenge.

The community of Kellogg has been working on and has completed construction on some very well planned street water management techniques and equipment. This effort has greatly reduced the risk of large water runoff from surrounding streams and snowmelt affecting the regular activities of the community. Similar work on the northern, narrower parts of town can ensure even better protection from large spring runoff and storm events.

Several stream crossings of the South Fork Coeur d'Alene River provide the only access to homes located in the canyons surrounding Kellogg and Wardner. Past flood events have eroded some of these approaches from high water and high velocity flows accompanied by debris flows in the river. Redesign and fortification of these supports will increase the probability these structures will continue to serve the region.

A lengthy levee structure is located along the banks of the South Fork Coeur d'Alene River from the eastern edge of the city limits near I-90 and Fir Street, to the western edge of the city near I-90 and Cameron Street. This levee structure is basically a river embankment fortified with rip-rap and debris catchment devices. On the western edge of Kellogg City limits, a levee structure straddles the Government Gulch stream downstream (north) of McKinley Avenue. This short segment parallels a segment of Commerce Drive as water is conveyed to its confluence with the South Fork Coeur d'Alene River.

None of these levee structures are certified as qualified levee structures by FEMA or the USACE. Any utility from these structures to abate flood damages in the future will require substantial reconstruction and redesign. These efforts are strongly recommended along the South Fork Coeur d'Alene River within Kellogg, and within this entire river network.

Just to the east of Kellogg City limits there are a couple of drainage systems installed under I-90, one on Montgomery Creek and the other on Park Road, both are designed to convey a 100-year flood event. The risk of flooding at these locations is generally minor provided the culverts are maintained and kept free from debris.

On the west side of Kellogg, the Bunker Creek stream has been rerouted from its historic path in response to the creation of the Central Impoundment Area on the western side of Kellogg. This stream makes an artificial turn westward on its way to the South Fork Coeur d'Alene River, and its volume is enhanced by the sewage treatment facility effluent in Kellogg. The result is an under-designed surface water transport system that is unable to convey high water flows into the major river drainage when combined with water flow from Government Gulch.

The Milo Creek flood management project in Wardner was recently constructed and is home to an underground water conveyance system capable of withstanding a 100-year flood event. The risk of flooding along the Milo Creek corridor is generally minor provided the Milo Creek system is maintained and kept free from debris. This flood control structure requires continued maintenance including pipe inspections, cleaning sediment basins, and keeping the gates that prevent sediment from moving through the system closed.

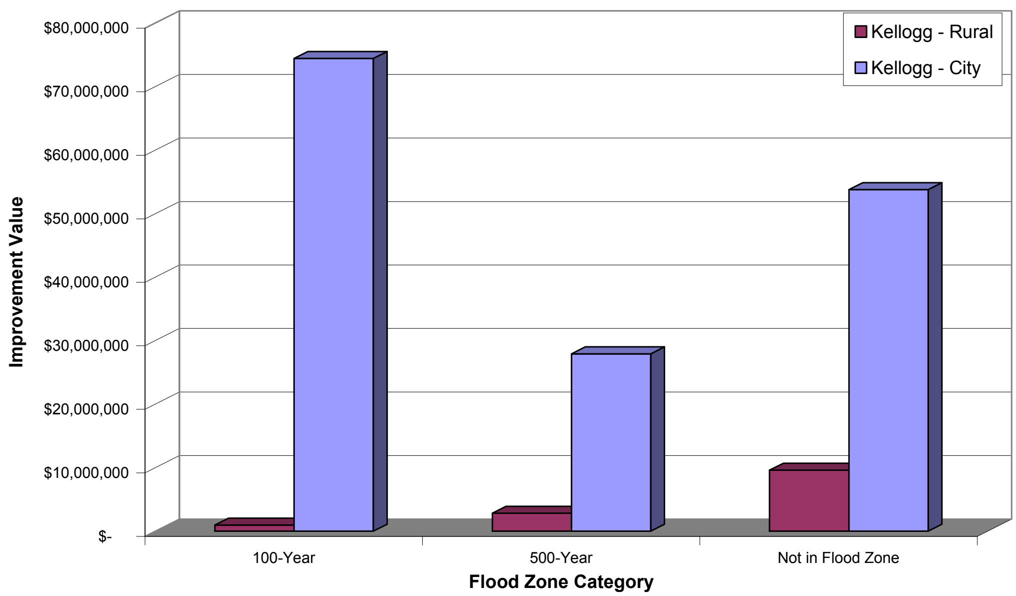
Potential Loss of Private Property Improvements Due to Flood

Consult Section 4.2.5. for a detailed explanation of how improvement values at-risk to flooding were determined for this section of the analysis.

Properties within the city limits of Kellogg have been assessed by the Shoshone County Assessor and was used for flood risk exposure analysis in combination with FEMA FIRM maps released September 2008. While the total value of private land and improvements within the Kellogg City limits is $223.3 million, the value of private improvements on the land, in the 100-year flood zone, is approximately $74.4 million. An additional $28.0 million of private improvement value is located within the 500-year flood zone. Approximately $53.8 million of private improvement value in Kellogg City is located outside of flood zones (Table 4.4, Figure XXI).

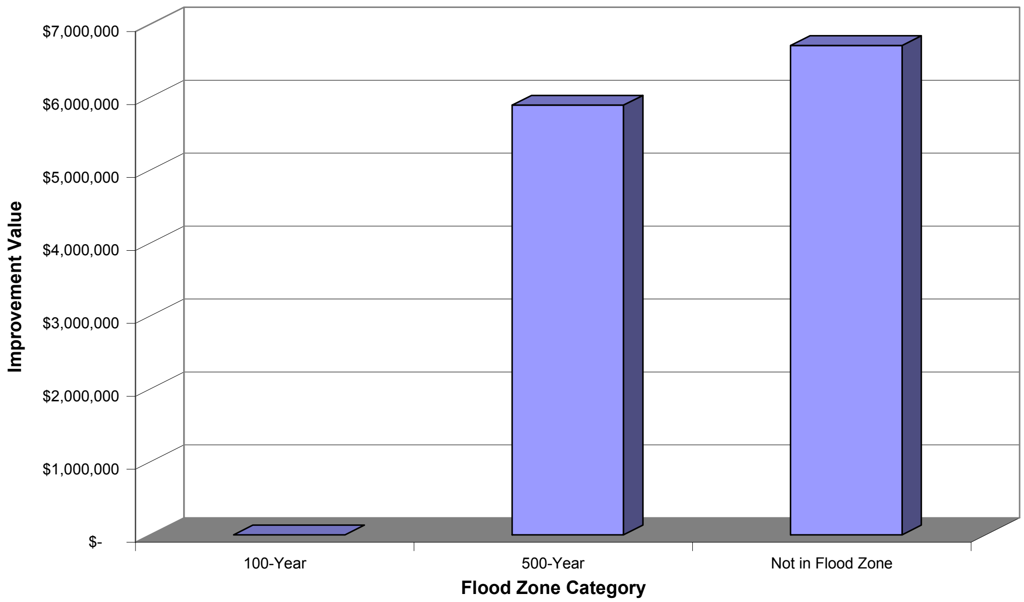
Rural properties, located outside the City of Kellogg, but in close proximity to the city limits were also evaluated for risk exposure. These neighborhoods include properties in Jacobs Gulch (Jackass Creek), Italian Gulch, and Elizabeth Park. The total land and improvements value of these areas is $18.5 million. Approximately $950,600 of improvements are located within the 100-year flood zone, while an additional $2.8 million of improvements are located in the 500-year flood zone. The remaining $9.6 million in improvement value is located outside of the flood zone (Table 4.4, Figure XXI).

Figure XXI. Kellogg City and rural private improvement value flood risk exposure.



The total value of land and improvements within Wardner City limits exceeds $23.8 million (Table 4.4). There are no 100-year flood zone designations in Wardner (on Milo Creek). There are approximately $5.9 million of private improvements located within the 500-year flood zone in the Wardner City limits. Approximately $6.7 million of private improvement value in Wardner City is located outside of flood zones (Table 4.4, Figure XXII). There are no rural areas adjacent to Wardner City limits.

Figure XXII. Wardner City private improvement value flood risk exposure.



Potential Loss of Public Property Improvements Due to Flood

Publically owned structures located in Kellogg and Wardner have also been assessed for their exposure to risk from floodwaters (Table 4.5). Approximately $33.8 million of publically owned structural improvement insured value is located in the 100-year flood zone within the Kellogg City limits. Within the 500-year flood zone, the City of Kellogg is home to approximately $96,000 of insured public structure value, while Wardner is home to another $49,000 of public structure insured value. The remaining $22.7 million in Kellogg, and $80,000 in Wardner, of insured public structure value, is located outside the FEMA flood zone areas (Table 4.5).

Potential Loss of Superfund Site Remedial Actions Due to Flood

Superfund Remediation efforts within the areas of Kellogg and Wardner are detailed in Table 4.6. Estimates of the remedial action value in Kellogg include $19.2 million in the 100-year flood zone, and $15.3 million in the 500-year flood zone. The rural areas of Kellogg possess approximately $621,000 of value within the 100-year flood zone, and $127,000 within the 500-year flood zone.

Within the Wardner City limits the value of the Superfund Site remediation efforts totals approximately $4.5 million within the 500-year flood zone. There is no mapped 100-year flood zone in Wardner (owing to the Milo Creek stream impoundment structures).

All of the Superfund Site remedial action values within the FEMA flood zones are subject to damage from floodwaters in these communities. Maintaining the barrier between the cleaned top-surface of soil and the contamination buried below is critical to sustaining public health in this region.

5.1.1.2. Earthquakes

A large number of multi-story structures utilizing masonry construction are found in the Kellogg community. Most of these structures appear to have been built around the 1910 – 1955 period. Some appear to have been upgraded and reinforced but many others have not. Some of these masonry-built structures are public buildings and may require regular maintenance to ensure long-term public safety. Other structures may need to be assessed for consideration of reinforcement or demolition if their construction materials are found to be unstable.

The old Lincoln School is located above the City Park in Kellogg. This three-story brick building appears to be vacant, and unsuitable for habitation. Loose bricks, cracked foundation, and missing windows all point to a dilapidated structure. Unfortunately, this unreinforced masonry building presents a public threat during an earthquake due to its location and potential to collapse on adjacent structures and even onto the park below. This is a case where demolition may be the only viable alternative to ensure public safety in the event of an earthquake. There are several buildings in Kellogg that present a similar hazard, including many in the old-town area (along McKinley Ave.).

Wardner does not appear to have any structures at-risk to earthquake damage from unreinforced masonry construction of structures.

Both Kellogg and Wardner homes utilize brick chimney construction. About half of the homes have chimney columns internal to the structure's construction, and the other half utilize an external mounting of the brick structure. Of these homes most at potential risk from the collapse of an external chimney construction, it appears that approximately 75% were built after 1965 and presumably these are reinforced due to building standards. The other 25%, representing around 12.5% of all homes, look to be built prior to 1965 and presumably support unreinforced masonry construction for the chimney only. These are the structures that would benefit from analysis for need, and from potential reinforcement. These homes are located throughout the residential areas of the two cities.

5.1.1.3. Landslides

Both Kellogg and Wardner are at low to intermediate risk to landslide activity, primarily in those areas that have been developed within the steep canyons and gulches surrounding the valley. The overall topography adjacent to these urban structures allows the possibility of repeated landslide activities to impact homes and businesses throughout the communities. The probability of these events occurring during normal weather conditions is quite low. However, during large precipitation events, especially rain-on-snow events, residents and county representatives should monitor these areas for mass wasting, debris flows, and rock fall.

Potential Loss of Private Property Improvements Due to Landslide

Within the City of Kellogg, most private structures are located within areas considered at low to moderate categories of potential landslide risk (Table 4.13). While over 92% of the structures in Shoshone County are classified in the lowest risk category (Landslide Prone Landscapes aggregated score of 5), approximately $3.6 million of private property improvements in Kellogg are ranked in the risk category of 15, and $1.1 million of private property improvements are in the risk category of 25. About $264,000 is ranked in the next highest risk category of 35. A similar risk profile for the Kellogg rural areas is seen, with a substantial amount of private structures located within elevated landslide prone landscapes areas (Table 4.13).

Within the City of Wardner, Landslide Prone Landscapes analysis reveals exposure of an increased relative scale. Private structure value within Wardner City exceeds $12.6 million. Almost 80% of this value is located in the lowest landslide risk category (5). Approximately 16% of these total private improvement values are located in risk category 15, with the additional 4% of private property improvement investment located in increasing landslide prone areas up to the risk category rating of 45, the highest consolidated ranking in Shoshone County for parcels (Table 4.13).

Potential Loss of Public Property Improvements Due to Landslide

The profile for public property improvements (insured value) in Kellogg reveals that all of the publically owned structure value ($56.6 million) is located within the lowest landslide prone landscape consolidated category 5 (Table 4.14).

The publically owned structures in Wardner include two structures owned by the city (Table 4.14). City Hall is located in an area not considered at-risk to landslides. The City Garage is located on a parcel at increased risk to landslides. This situation was previously discussed in Section 4.4.3.2.

This increased Landslide Prone Landscapes risk rating is reflective of the presence of Haystack Peak and Slaughterhouse Gulch surrounding Wardner, and the numerous other gulches and peaks surrounding Kellogg City and the connected rural areas.

To reduce the effects of these landslide risks, new construction needs to be monitored in order to moderate the risk where excavation or road building can weaken slope stability. Additional efforts to reduce rock fall from the steep slopes onto critical infrastructure can be monitored with dry-land catchments mounted where rocks typically drop onto the road surface. These catchments consist of a post-mounted, 6-foot high fence attached to roadway dividers (made from concrete) and placed parallel and adjacent to the road where debris can fall, be intercepted, and held away from the road surface. Although they need periodic cleaning, these structures may serve local access in locations like Montgomery Gulch Road and Jacobs Gulch Road.

As additional construction progresses up the hillsides around Kellogg and Wardner to accommodate medium-scale developments, attention should be given to the potential effects of shallow landslides. These landslides are triggered by increased moisture in the shallow surface soils, where a hardpan base is present. Medium scale developments may or may not be located within city limits. Whether or not they are governed by city building codes, a public sewer system will help to ensure public safety from self-induced landslide hazards by directing waste water away from the local soils.

5.1.1.4. Severe Weather

Severe weather is one of the broadest risks to the communities located within Shoshone County and in Kellogg and Wardner specifically. Snow storms and strong winds are hazards that may cause homes and businesses to have long-term loss of power or access to safe roads in and out of town.

Snow removal equipment and strategies for snow storage and snow evacuation have served this area well. Priority plowing of I-90 during snowfall events for interstate commerce keeps local ingress and egress functioning, even during the most complicated weather patterns in the winter. Access to the Silver Mountain Ski Resort in the winter is important to the local economy, as is access for other businesses in the area.

The risk presented by trees overtopping homes and other structures in the Kellogg and Wardner area is rather low. The same comparison applies to trees overtopping power lines. While examples of potential problems can be found, they are relatively few, and appear to be stable. During the next five year period, this condition should be re-evaluated to verify if it continues.

Additional risks from severe weather exist with the presence of aluminum or unsecured roof tops. Strong winds sweep up canyons in the winter and spring and can leverage roofs from their structures. Not only does this cause substantial damage to the structure it is taken from, but it can introduce injury to the inhabitants and others who may be in the path of the falling house-part. All analysis of roof stability must be made at the single structure level and focus on roofing material stability even when exposed to high winds. Several structures in these communities will benefit from analysis and stabilization.

5.1.1.5. Wildfire

Around Kellogg and Wardner, young trees (mainly western white pine) less than 30 feet tall dominate the scenery. To the east, Montgomery Gulch has a couple dozen homes located on either side of the river. The west side of the gulch is dominated by brush fields with scattered ponderosa pine trees while the east side of the gulch has young trees and little underbrush. Access is provided by the Interstate to the south and by a forest access road 2.3 miles north of the Interstate that leads into National Forest lands and towards Prichard and other points. Further to the east, north of I-90, Moon Gulch has wildfire exposure conditions similar to Montgomery Gulch.

The downtown area of Kellogg is not considered to be at-risk to wildfire loss.

Further risk exposure to wildland fire is posed in this region by the increased use of Kellogg Peak and Wardner Peak by visitors using the gondola. This gondola route climbs from Kellogg and traverses the hillsides up to the peak where visitors recreate. There is concern about the possibility of a visitor dropping a lit cigarette (or other incendiary device) from the gondola window onto the forests below. Fire spotters have been stationed under the gondola during periods of high wildfire risk.

Potential Loss of Private Property Improvements Due to Wildfire

The structures located beyond the city center exhibit low to moderate wildfire risks (Table 4.25). In these areas, especially along the perimeter of the city, wildfire fuels are adjacent to structures. Approximately $141.5 million of private property improvements in Kellogg are in the lowest Fire Prone Landscapes risk rating (5), $10.9 million are in risk category 15, $2.0 million in category 25, and $1.7 million of private property improvements are in risk category 35 (Table 4.25).

The City of Wardner holds an incremental increased risk exposure to improvements from wildfire over Kellogg (Table 4.25). This increased risk profile owes mainly to the city's position located higher in Slaughterhouse Gulch, the encompassing wildland fuels surrounding three sides of the city, and the steeper slopes on which these wildland fuels are found. The highest Fire Prone Landscapes consolidated score encompassing private structures in Wardner is 35, where about $1.1 million of private improvement value is located. In risk category 25, the exposure is approximately $1.5 million, at risk category 15 the risk exposure is $5.5 million, and at risk category 5 the risk exposure is $4.4 million of private property improvement values (Table 4.25).

The rural areas surrounding Kellogg City show an increased exposure to wildfire risks over the incorporated cities. A higher proportion of the private structure value is located in higher ratings of consolidated Fire Prone Landscapes scores (Table 4.25). Parcels encompassing consolidated risk scores as high as 35 are found in these areas with approximately $1.4 million in private property improvements considered at-risk. As the consolidated risk scores decrease the private property values found there increase, with approximately $3.0 million in risk category 25, $7.0 million in risk category 15, and $2.0 million in the lowest consolidated risk category at 5 (Table 4.25).

Potential Loss of Public Property Improvements Due to Wildfire

In terms of the public structures located in Kellogg City, a similar risk profile is seen as for the private structures (Table 4.26). Approximately 37% of the insured value of these public structures is located in the lowest risk categories to wildfire risk. An almost identical value of improvements is located in the next higher risk category (15), with the final 27% ($15.2 million) located in Fire Prone Landscapes consolidated risk category 25 (Table 4.26).

An analysis of the public structures in Wardner reveals a similar profile to the private structure risk exposure with $49,000 of value in the risk category 5 and about $80,000 in risk category 25 (Table 4.26).

This entire area has rural fire protection provided by Shoshone County Fire District №2 with a station in Kellogg. Wildland fire protection is provided by the Idaho Department of Lands in Cataldo.

In order for Kellogg and Wardner to maintain and improve the exposure to wildfire risks, it is recommended to develop defensible space around single homes located along the buffer between the communities and wildland fuels. Currently, McKinley Ave., Portland Ave., Main Wardner St., and even Sierra Nevada St. all provide a logical barrier against wildfire spread. By creating and maintaining low fuel loads and a low level of resistance to control, this natural hazard can be constrained.

5.1.2. Mullan / Larson

The Mullan population was 840 during the 2000 census (Figure V). The town is located at the east end of the Silver Valley mining district at an elevation of 3,250 feet. The Lucky Friday mine is several hundred yards east of the town center. The active mine (silver, lead, & zinc) descends more than 6,000 feet below the surface.

I-90 runs through the south side of town, and the Montana border at Lookout Pass is 4 miles east at 4,710 feet.

The town of Mullan was founded in 1885, progeny of the Gold Hunter and Morning silver mines. The town was named for West Point graduate John Mullan, who was in charge of selecting a wagon route (commonly called the Mullan Road) between Fort Benton (Montana) and Fort Walla Walla (Washington). Lieutenant Mullan, a topographical engineer, began gathering information in 1854. Delayed by the Indian War of 1858, construction began in 1859 from Fort Walla Walla. The highest elevation of the road was Mullan Pass at 5,168 feet, which is about 7 miles east of town on the Idaho-Montana border. After the strenuous project was completed in 1860, floods wiped out substantial stretches of the road, and the road was re-routed in 1861. Floods again damaged the road, and ultimately, no provision for maintenance was provided.

Larson is an unincorporated community located east of Mullan. Several farm sites and homes are located along arterials to the Larson Road. This route is also an often used access to remote forestlands located north of I-90. Much of this region receives lower traffic volumes than downstream communities, and much of that traffic is split between local access and commercial mining and logging equipment.

5.1.2.1. Flood

Despite the up-river location of Mullan and Larson, both communities contain a substantial FEMA Flood zone from the 100-year flood category and even the 500-year flood zone. Much of the critical infrastructure of this area is within the 100-year flood zone; several bridges and the Larson road are potentially impacted by rising waters.

Tributaries in this area also display flood characteristics, such as Willow Creek (east of Mullan and south of the South Fork Coeur d'Alene River – Shreve Stream Order 12), Boulder Creek (terminating in Mullan entering from the south, and the point of municipal water supply for Mullan – Shreve Stream Order 11), and Mill Creek (terminating in Mullan entering from the north – Shreve Stream Order 12). Because all of these tributaries are very low Shreve order streams, the flooding is typical of the flash flood type. Both Boulder Creek and Willow Creek lack a flood water storage profile that would allow gradual water accumulation during a flood; Mill Creek also possesses the same "V" shaped profile and lacks a flood water storage area. The flood storage area for all three tributaries begins in Mullan where the flood plain spreads out to a semi-flattened flood zone.

The South Fork of the Coeur d'Alene River flows through Larson and then Mullan on its way downstream to Wallace. At the eastern extent of the South Fork Coeur d'Alene River flood zone, the Shreve Stream Order is 18. By the time it leaves the western side of Mullan, the Shreve Stream Order has increased to 82.

Because of this combination of "headwater stream" classification and tributaries that first enter a larger river system at Mullan, the flood profile takes on a combined flood synopsis that is impacted by flash flood tendencies accompanied by riverine flooding of both the slow kind and the fast kind. Debris dams and ice dams also have potential to impact these communities and infrastructure, particularly with the close proximity of Lookout Pass and extreme winter conditions found all around these communities.

Mullan City and the Larson area were established on gravelly alluvial soils indicative of stream deposits. Homes built to withstand minor flooding are evidenced by elevated concrete foundations and local site build-up using dirt and gravel. Next to many of these structures stand homes of the same era with no elevation of the ground floor.

Local access routes are sometimes narrow and winding, while others are wider but scattered with potholes and a patchwork of surface repairs. Improved storm water management in Mullan would reduce the negative impacts of the flashflood component of the risk profile. When heavy rains fall in the region, the lowest order streams move their water load downstream quickly to the first stage of the flood plain. At the same time, surface water flows move off the hillsides around the community and deposit storm water on streets and sidewalks. The combination of these water sources can quickly overload city drainage systems, causing backup and flooding. An integrated storm water and flood water movement system for Mullan would improve flooding conditions in Mullan substantially.

Individual home reinforcement should be considered on a structure-by-structure basis. Only a few homes in the City of Mullan have been impacted by flood damage in the past 20 years. Infrastructure has taken the brunt of the negative force levied by flood waters. Road closures, bridge damage, and increased water and sewer treatment costs are common when severe storms bring flood waters to the head of the South Fork Coeur d'Alene River.

A levee-type structure is located on the western edge of Mullan city limits between Mill Road and Bingville Road, above the Sewer Treatment Plant and roughly above the 100-year flood zone. Another levee-type structure is located west of the tailings pond on the eastern side of Mullan, north of I-90, to the south of River Street along the South Fork Coeur d'Alene River.

In the Larson area, a lengthy levee structure is located south of Larson Road, between the road and the 100-year flood zone. This levee structure is disjointed with a shorter section west of the main section of levee located near Daisey Gulch confluence with the South Fork Coeur d'Alene River. None of these levee-type structures are certified by FEMA or the USACE.

Drainage Assessment Summary

The City of Mullan Drainage Assessment was published on October 24, 2007, and is intended for all entities involved with drainage, infrastructure, remediation, and the ICP in the Coeur d'Alene Basin. This assessment was prepared under the direction of the BEIPC. The assessment was part of a larger effort to develop a regional Basin Infrastructure Revitalization Plan (IRP) that identifies infrastructure deficiencies and assists communities in prioritizing work and pursuing funding. The assessment also addresses the relationship of drainage deficiencies relative to the remediation work. The report was prepared by TerraGraphics through a contract with the BEIPC. The remainder of this sub-section is summarized from that report (TerraGraphics 2007).

The City of Mullan is susceptible to flooding from the creeks that drain into the city. Within the community, the drainage infrastructure systems are generally deficient. Past flood events have spread contaminated material from surrounding mine sites into the community. A recent event was the Mill Creek flood in 1996. The town experiences frequent nuisance flooding due to inadequate drainage infrastructure. The problems created by the inadequate drainage infrastructure are multi dimensional and include nuisance flooding, erosion of Superfund remedy barriers, transport of contaminated soils, and storm water and heavy metals inflow to the sanitary sewer. Addressing the drainage problems will have multiple benefits to the community and other stakeholders.

Significant effort has been made over the last few years to remove contaminated material from the residential and commercial properties in the city. A clean soil cap was installed on these properties. The long term integrity of the clean cap is at risk because of the drainage problems. The City of Mullan remains vulnerable to recontamination by erosion and deposition of contaminated material during flood events.

This drainage assessment was conducted by field evaluations of the drainage systems in the city, and the drainages upstream or adjacent to the city. Significant drainage issues were observed. Drainage issues observed in multiple areas throughout town include:

- Improper surface grading to convey runoff to storm water collection systems,
- Erosion in gravel rights-of-way along paved streets,
- Lack of an outlet drain (inlets) to collect concentrated flows from curb and gutter,
- Insufficient maintenance of drainage ditches.

In addition to the general drainage issues listed above, there are five other specific issues within the study areas of Mullan. These issues are as follows:

- Mine waste impacts on the city's drinking water source,
- Erosion of contaminated material affecting surface water quality,
- Storm water (heavy metal) infiltration impacting groundwater quality,
- Storm water (heavy metal) inflow to sanitary sewer, and
- Deteriorated roads from uncontrolled drainage.

This assessment identified the potential for large-scale recontamination in the occurrence of a major flood event. Five large mine activity areas were specifically observed. Sixty-three historic mine sites are located in the watersheds that drain into the study area. All seven streams in the study area are diverted from their natural channel. Four of the seven are diverted underground or beneath buildings. In some cases, the final discharge outfall can not be determined. The recontamination potential that is associated with drainage problems can be mitigated with the construction of an adequate drainage system in the community.

Based on the assessment, there are specific issues that should be the highest priority for drainage improvement projects within the city. Addressing the drainage problems in the City of Mullan will have multiple benefits. The benefits include reducing nuisance flooding, reducing storm water inflow to the sanitary sewer, ensuring safe drinking water, and maintaining integrity of the Superfund Site remedial actions. The solutions to the drainage problems should be addressed starting with a storm water management plan. There are partnership opportunities between the franchise utilities, the City, FEMA, State and USEPA to solve the highest priority drainage problems that result in multiple benefits.

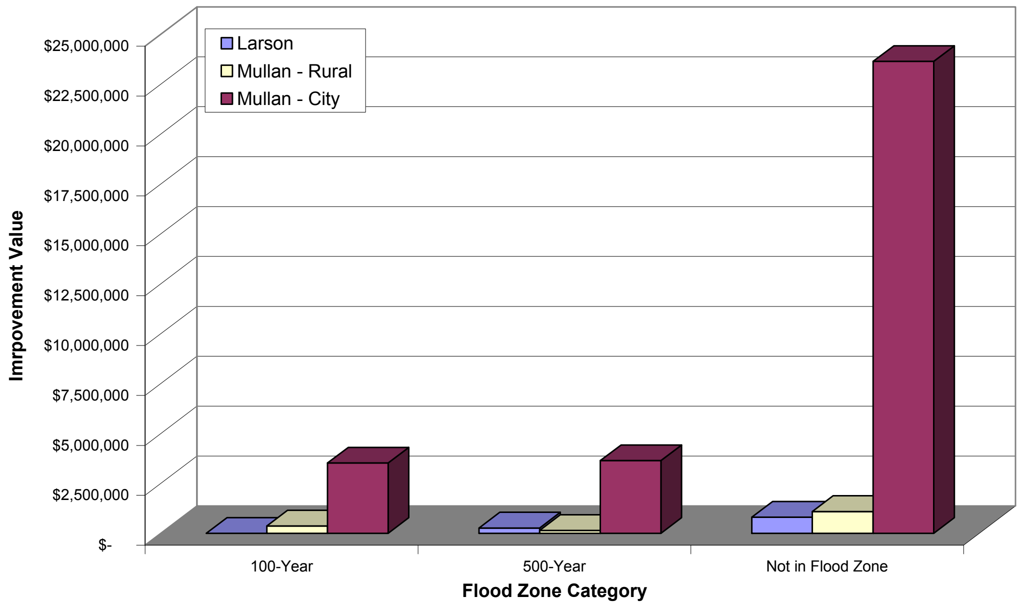
Potential Loss of Private Property Improvements Due to Flood

Consult Section 4.2.6. for a detailed explanation of how land and improvement values were determined for this section of the analysis.

Approximately $30.8 million in private improvements are located within the City of Mullan (Table 4.4). Of this total value, approximately $3.5 million of private property improvements are located in the 100-year flood zone, and $3.6 million of private property improvements are located in the 500-year flood zone. These combined values place approximately 25% of the city's private structures at risk to potential flood damage (Table 4.4). These figures fail to quantify the exposure to nuisance flooding derived from storm water conveyance within the city limits. While the insufficient storm water conveyance will tend to exacerbate the effects of flood zone flooding, it will also introduce flood damages in peripheral areas.

The rural areas surrounding Mullan (but not considered Larson) contain approximately $374,000 of private property improvements exposed to the 100-year flood zone, with $146,000 in the 500-year flood zone. Within the area of the community of Larson (located to the east of Mullan), approximately $274,000 of private property investment is located in the 500-year flood zone and no values are located within the 100-year flood zone (Table 4.4).

Figure XXIII. Mullan and Larson private improvement value to flood risk exposure.



Potential Loss of Public Property Improvements Due to Flood

Publically owned structures within the City of Mullan account for $18.5 million of insurance policy coverage (Table 4.5). Out of this total value, approximately $5.0 million is located within the 100-year flood zone. Another $6.2 million of insurance policy coverage is carried on public structures within the 500-year flood zone (Table 4.5). Taken together, these public structure values at risk to flooding damage ($11,152,972) are substantially greater than the appraised value of private structures in the City of Mullan located within the two flood zones combined ($7,166,031).

Potential Loss of Superfund Site Remedial Actions Due to Flood

The City of Mullan has received approximately $17.4 million of site activities to remediate contaminated soils (Table 4.6). Out of this total value, approximately $2.9 million has been spent to remediate properties in the 100-year flood zone. Another $3.8 million has been spent to remediate properties in the 500-year flood zone.

Within the rural areas surrounding Mullan another $660,000 has been invested on all properties. In the 100-year flood zone approximately $261,000 has been spent, with almost $32,000 in the 500-year flood zone (Table 4.6).

The properties within Larson have received the remediation activity value of approximately $197,000 with almost $67,000 spent remediating properties in the 100-year flood zone. None of the Larson based expenditures were for property in the 500-year flood zone (Table 4.6).

5.1.2.2. Earthquakes

The matrix of fault lines around Mullan and Larson follow a generally parallel route with I-90. The fault lines are numerous north of the valley, with several crossing and perpendicular faults. Seismic shaking hazards are rated as moderate in this area.

A high percent of the business structures in Mullan were built using masonry construction. It appears that many of these brick and mortar buildings were erected soon after the turn of the 20^{th} century. Other, newer brick and mortar construction examples appear to have been constructed around the middle of the 20^{th} century. Initial investigations reveal inconclusive determination of unreinforced masonry building status. While some of the structures appear to be "crumbling where they stand", others appear to be "as good as new". However, these visual quality assessments reveal nothing about structural reinforcement and stability in the case of an earthquake and ground shaking. Case by case investigations of all older, unreinforced masonry buildings is warranted. Most of these buildings-of-concern are located in the Mullan City center.

On the positive side of this consideration, few of the masonry and brick construction structures are greater than two stories tall. This height limitation places the structures at a lower collapse risk than if they were three or more stories tall.

Virtually all private homes in the area are wood frame, single- and double-story construction and ostensibly able to withstand ground shaking events of the magnitude historically witnessed in north Idaho. This assessment applies equally to all residential structures located in these communities.

5.1.2.3. Landslides

While the majority of structures in Mullan are located in the valley bottom, a significant number of structures have been built on the slopes climbing above the city. These slopes support forestlands on top of unconsolidated alluvial and river deposited sediments. Soil stability is less than optimal. This stability is even less optimal when homes are added to the burden of already steep slopes and cuts are made for the home site and access routes.

Several homeowners have built hillside reinforcements above and below their homes and access driveways. Trees have been favored and even encouraged as a means of stabilizing the hill against landslides (mainly rockslides).

The main type of landslide risk surrounding Mullan and Larson is the earthflow variant. Because much of the development has been near the toe of the slopes, super-saturation of the uphill profile (during heavy rains and snowmelt) can lead to mass wasting at the bottom. However, this potential is lessened slightly because of the added pore space common to stream deposited sedimentary material and river gravel found in this area. The two factors do not equally offset each other. Hillside failures will be seen where landslide probability exceeds toe of slope resilience.

Extreme care should be taken in locating new structure development on these steep hillsides. The carrying capacity of these foothills is limited and eventual overutilization could result in the failure to existing homes as well as the new ones.

Potential Loss of Private Property Improvements Due to Landslides

Private property improvement values within Mullan are located primarily within the lowest Landslide Prone Landscapes consolidated risk rating of 5 (Table 4.13). Substantially less private improvement value is located on increasing consolidated landslide risk groups, with $1.7 million in category 15, and $254,000 in category 25. The rural areas around Mullan are almost exclusively in the lowest risk categories (Table 4.13).

Larson private property improvement values are also located on the lowest Landslide Prone Landscapes group score of 5 and 15 (Table 4.13).

Potential Loss of Public Property Improvements Due to Landslides

All of the public property improvements located in the City of Mullan are located within the lowest Landslide Prone Landscapes consolidated score of 5 (Table 4.14).

5.1.2.4. Severe Weather

Because of the location of Mullan and Larson, seated deep in the South Fork Coeur d'Alene River valley near the headwaters, weather impacts are amplified. Winter storms drop deep snows, which melt oftentimes late in the spring because of a lack of direct solar radiation until the sun angle increases to clear the mountain ridgelines to the south.

Prevailing winds from the Pacific cross over Washington and Oregon carrying heavy loads of potential precipitation on warm and moist air currents. As the storm fronts move into the continent, cooling down in the process, moist air currents are forced to rise over the mountain ranges, leading to condensation of the moisture. In order to move over the mountain range, storms drop their moisture load in the form of rain or snow, or both. Although this leads to a rain shadow effect eastward in Montana, it results in heavy precipitation in eastern Shoshone County.

The challenge for Mullan and Larson is to be prepared for severe weather. The narrow streets and hilly aspect of the western side of Mullan make snow removal difficult. Downtown areas have more space to store plowed snow, although off-site staging of snow accumulations is common.

Roofs are almost exclusively steep angle metal materials that shed snow easier than other toppings. Several of the masonry buildings and some of the frame construction structures in Mullan have flat roofs or low angle roofing (including the Mullan Fire Department building). Seasonal snow removal is needed to ensure these structures do not collapse under the weight of snow loads. This becomes critical where building heat escapes through the roof because of less than optimal insulation. The warming of the snow from below (through the roof) causes the snow to partially melt, increasing the water content of the snow load. As more snow is added from continued snow fall, the weight increases substantially per foot of snow load on the roof. Eventually, structural failure can result. Numerous structures in Mullan must be prepared to avert this hazard before it happens. *The most economical solution is to buy a snow shovel!*

High winds are also a concern in these communities as wind patterns can come either as upstream or down-mountain currents. High winds are not uncommon and have the potential to blow over trees that can clip power lines or land directly on buildings. Several structures were observed in these communities with metal roofing lacking secured support. These loose fitting edges over the homes they cover represent a substantial risk to wind damage during high wind events.

Fortification of roof tops showing signs of potential wind damage, and hazard tree removal would serve the existing severe weather risk profile in Mullan and Larson well. Although retrofitting structures with low-angle and flat roofs may pose a financial challenge, this problem can be averted on new construction through the development of building codes requiring roofing design to shed heavy snow-loads common in this area.

5.1.2.5. Wildfire

Homes and businesses located in the main part of Mullan are at only a moderate risk to wildfire. All of the homes in the Larson area, plus the homes scattered along the perimeter of Mullan and along the gulches near these two locations are at a moderate to high risk from wildfire loss.

Forests surrounding Mullan and Larson extend into the borders of town and other populated places. Forest conditions with respect to wildfire exposure differ based on which side of the river is considered. To the north of the South Fork Coeur d'Alene River, the slopes are predominately south-facing and dominated by Douglas-fir, ponderosa pine, western white pine, and assorted other species. The south side of town is relatively flat converting to north facing and supports western red cedar, western white pine, western hemlock, grand fir, and lodgepole pine. Slopes in both locations range from fairly flat to over 40%. The south-facing slopes bear more risk exposure to wildfire.

North of Mullan, along the Mill Creek Drainage, a couple dozen homes are located along 2nd Street as it climbs along Mill Creek. As is the case with other home sites in the county, these homes would greatly benefit from the construction of defensible spaces; removal of trees immediately adjacent to homes, pruning, piling of debris, and prescribed pile burning of the slash. Past forest management activities have been conducted on the west side of the road (east-facing slope). The east side of the road (2nd street) presents a rather different picture of wildfire risk with high factors of wildfire spread.

South Mullan is divided into two distinct groups of homes separated by a stand of trees around Boulder Creek. This stand of trees is quite substantial and provides both a visual and a noise buffer from the Interstate adjoining the grove of trees. However, this dense thicket of conifers is also a wildfire risk for the residents of south Mullan, especially on the west side of Boulder Creek. Given the number of homes in the area and positive impact forest management activities would have to mitigating these potential losses, this area receives a high priority recommendation for fuels treatment.

The area of south Mullan was also targeted with these same recommendations in the 2002 Shoshone County Wildfire Mitigation Plan (Schlosser *et al.* 2002). The situation witnessed at that time has not substantially changed. A community focus to make homes “fire-safe” would benefit the entire city.

Shoshone County Fire District №3 and the Mullan Volunteer fire district both provide home site fire protection in this area. The Idaho Department of Lands in Cataldo provides wildland fire protection for the Mullan area.

Potential Loss of Private Property Improvements Due to Wildfires

The risk profile from wildfire in Mullan and Larson is pronounced in comparison to other communities in Shoshone County. While the total value of private property improvements in the Mullan and Larson area not as substantial as in other communities in the county, the percent of value in elevated risk categories is notable.

Within the City of Mullan, private property improvements (structures) are valued at approximately $30.8 million (Table 4.25). About $16.4 million (53%) of private property improvements are located in the lowest consolidated risk category of 5. As the risk category increases to 15, the value of improvements is $7.9 million (26%). At the risk category of 25 the improvement value is $4.0 million (13%), at category 35 the value at risk is $2.2 million (7%), and at risk category 45 the personal property valuation is $230,000 (Table 4.25).

In Mullan rural areas and Larson this scenario is repeated. In fact, the risk profile in the unincorporated and rural areas of Mullan witnesses the highest collection of private property value in risk category 25 with $943,000 (58%) of this groups total private assessed value of $1.6 million (Table 4.25).

In Larson the location of private property improvements is also generally located in elevated wildfire risk settings. Out of the total private improvement value of $1.1 million, approximately 76% ($828,000) is located in Fire Prone Landscapes consolidated score of 25, and 24% ($258,000) is located in an area considered at a score of 35 (Table 4.25).

All of the private property improvements in Mullan and Larson area located in increased risk areas would benefit from home defensibility efforts to reduce the fuels surrounding homes, change the characteristics of structure ignitability, and manage a community defensible buffer between groups of structures and wildland fuels.

Potential Loss of Public Property Improvements Due to Wildfires

The insured value of public structures within Mullan total approximately $18.5 million (Table 4.26). The value placement of these structures is unique in the view that most of the value ($12.8 million or 69%) is in the lowest Fie Prone Landscapes consolidated risk category of 5.

However, only $1.2 million (6%) of public insured value is in risk category 15, but $4.5 million (24%) is located in risk category 25 (Table 4.26). Most communities do not possess an increasing value exposure as the risk category increases.

The protection of these public structures from wildfire risks is congruent with the protection of the private structures in Mullan and Larson.

5.1.3. Osburn

As of the census of 2000, there were 1,545 people, 699 households, and 457 families residing in the City of Osburn (Figure V). The population density was 1,154.4 people per square mile (Census 2000). There were 786 housing units. The community was named for Bill Osborne, who established a trading post here.

Osburn is located along the banks of the South Fork Coeur d'Alene River between Silverton to the east and Kellogg to the west. The river makes its first, large broadening to an extended floodplain near Osburn, while human habitation has expanded to occupy low elevation and hillside locations.

5.1.3.1. Flood

The regulatory-flood profile along the banks of the South Fork Coeur d'Alene River impacts primarily the northern portions of Osburn where community infrastructure includes roads, sewage systems, and several homes. Large flood events, such as 500-year floods, impact virtually all of the populated places in Osburn.

Several of the gulches surrounding this community also flood profiles independent from the South Fork Coeur d'Alene River flood profile. These low-order tributary streams include Nuckols Gulch (Shreve Stream Order 5), Two Mile Creek (Shreve Stream Order 22), and Terror Gulch (Shreve Stream Order 12). The actual contributing watershed area to the South Fork Coeur d'Alene River entering Osburn is a Shreve Stream Order of 250. By the time the South Fork Coeur d'Alene River exits Osburn its Shreve Stream Order increases to 302.

These statistics place Osburn at risk to both riverene flooding, mainly the slow kind, and flash flooding from the several low-order streams flowing into this river network at and upstream of Osburn. The risks of flash flooding are generally moderated substantially because of the relatively large flood plain present along the banks of the South Fork Coeur d'Alene River. However, rising waters will have the tendency to fill the 100-year flood zone rather quickly and flush waters downstream to other holding areas, and eventually deepen into the 500-year floodplain.

At the same time, flash flooding from tributaries can impact the city before water reaches the South Fork Coeur d'Alene River system. These rapid flowing and flushing water events can impact Osburn from the south and the north quickly and with little warning. At the same time, storm water drainage is a challenge for Osburn.

Many homes in Osburn have ground floor protection integrated into their construction to protect against low level floods. These are typically in the form of concrete foundations that lift above the ground for several feet before wooden building materials begin.

The undulating topography of Osburn provides low-level protection for structures located slightly uphill from the flood zone. However, this topography also leads to surface water retention over saturated soils. Basement flooding and limited access can result from these conditions.

Roads, culverts, and bridges in this area may not be adequate to withstand repeated flooding events. This assessment applies to road crossings of the South Fork Coeur d'Alene River as well as tributaries such as McFarren Gulch, Nuckols Gulch, Two Mile Gulch, and Shields Gulch.

For instance, the Two Mile Gulch bridge supports have been eroded by high water flows of the South Fork Coeur d'Alene River combined with debris in the current. The result can be seen in the exposure of the base of vertical bridge supports. Additional stream bank reinforcement and pier protection may serve to extend the useful life of this infrastructure component.

Several culverts that serve to move stream and storm water runoff from headwater areas through Osburn could also benefit from increased sizing, and replacement. Evidence of stream and storm waters overflowing the existing culverts point to watercourse routing structures not able to transport sufficient volumes in the highest water flow times. By increasing flow volumes through these channels, the potential damage to homes and road surfaces could be reduced.

In addition, some of the culverts located immediately upstream of the city to the south, show signs of debris transport from uphill, through the stream networks, and into the culverts where water flow is restricted. A small-scale series of debris catchments would serve to intercept forest litter and increase surface water flow and storm water movement.

A series of small levee-type structures are apparent in the area of the South Fork Coeur d'Alene River. The eastern side of the city has a parallel levee structure near the South Fork Coeur d'Alene River. The other is along the northwestern reaches of the city and the river, placed south of the river to protect structures in this area from rising waters.

Drainage Assessment Summary

The City of Osburn Drainage Assessment was published on January 8, 2008, and is intended for all entities involved with drainage, infrastructure, remediation, and the ICP in the Coeur d'Alene Basin. This assessment was prepared under the direction of the BEIPC. The assessment was part of a larger effort to develop a regional Basin IRP that identifies infrastructure deficiencies and assists communities in prioritizing work and pursuing funding. The assessment also addresses the relationship of drainage deficiencies relative to the Superfund Site remediation work (TerraGraphics 2008a).

The report was prepared by TerraGraphics, through a contract with the BEIPC. The remainder of this sub-section is summarized from that report.

The assessment has two goals: 1) to identify drainage infrastructure deficiencies within the community and 2) to identify threats of flooding and recontamination from the surrounding natural drainages. Secondary issues associated with infrastructure and remediation that were identified during the preparation of this assessment are also included.

The results of the field evaluations revealed the existing municipal storm water collection and conveyance system appears adequate. However, the system is old, and does not geographically serve the entire city. The city should consider expanding the system into the areas that do not have a drainage system.

The assessment concludes that the city is especially susceptible to flooding from creeks that originate in the hillside drainages on the south side of the city. There are mine workings in these drainages. One of the creeks, Meyer Creek, flooded in the 1990s. Significant progress has been made over the last few years to remove contaminated material from the residential and commercial properties in the community. Superfund remedial barriers, composed of a clean soil cap, were installed on these properties. Past flood events occurred prior to the remedial actions. Subsequent flooding will likely contaminate the soil caps.

The South Fork Coeur d'Alene River is generally separated from the City of Osburn by I-90. The river has the potential to inundate the community during a flood event. The transport of contaminated material from mine activity areas on the north side of Osburn is a concern. There are 26 mine activity sites located in drainages that draining directly into the South Fork Coeur d'Alene River north of Osburn. The largest of these areas is the Osburn tailings ponds.

The city should continue to manage and maintain the existing storm water collection and conveyance system. Improvements provided in the 2005 Meyer Creek preliminary report should be designed and constructed to mitigate one of the largest flooding risks and potential for recontamination in the community.

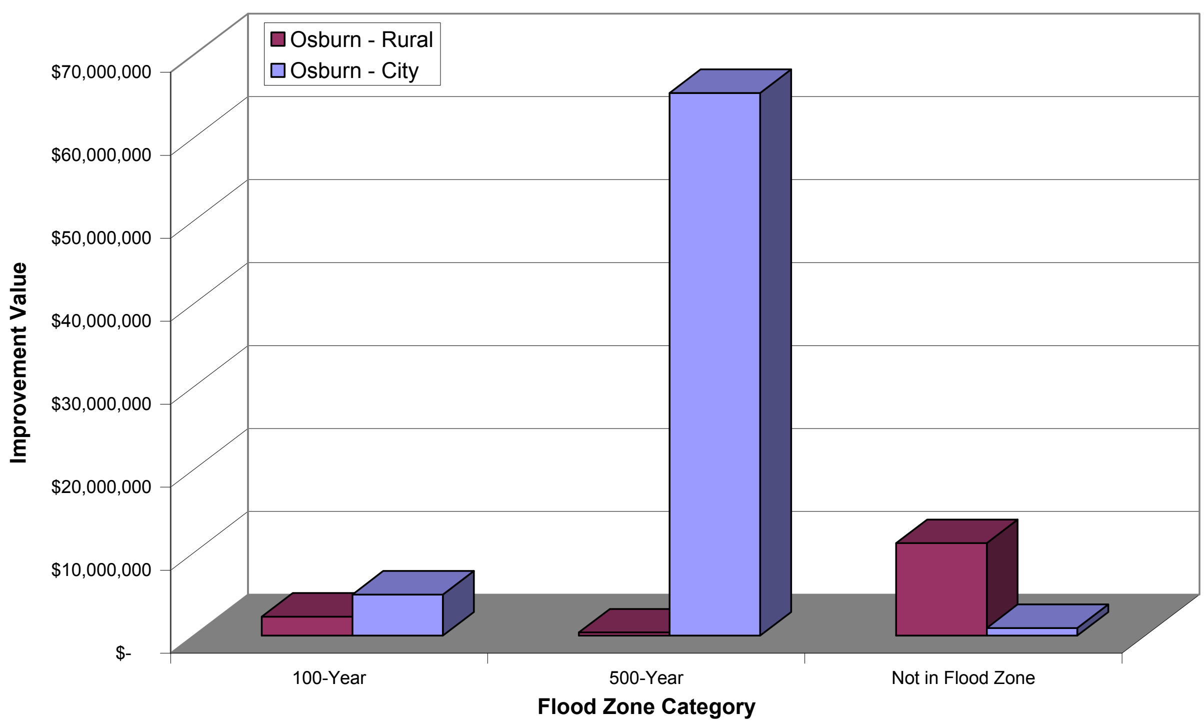
Potential Loss of Private Property Improvements Due to Flood

Consult Section 4.2.6. for a detailed explanation of how land and improvement values were determined for this section of the analysis.

Properties within the city limits of Osburn have been assessed by the Shoshone County Assessor and were used for flood risk exposure analysis in combination with FEMA FIRM maps released September 2008. The total value of private improvements within the City of Osburn exceeds $71.2 million (Table 4.4). The value of improvements within the 100-year flood zone, is approximately $5.0 million. An additional $65.4 million of improvements are located within the 500-year flood zone. Only $922,000 of private improvement value in Osburn City is located outside of flood zones (Table 4.4, Figure XXIV). These numbers illustrate how much of the private improvement value in Osburn (99% of the total improvement value) is at-risk to flood loss in Osburn City.

Rural properties, located outside the City of Osburn, but in close proximity to the city limits were also evaluated for risk exposure. These neighborhoods include properties in Terror Gulch, Sunny Slopes, and Nuckols Gulch. The total private improvements value of these areas is $13.8 million. Approximately $2.3 million of private improvement value is located within the 100-year flood zone, while an additional $377,000 of improvements are located in the 500-year flood zone. The remaining $11.2 million in private improvement value is located outside of the flood zone as evaluated here (Table 4.4, Figure XXIV).

Figure XXIV. Osburn City and Rural improvement value flood risk exposure.



Potential Loss of Public Property Improvements Due to Flood

Publically owned structures within the City of Osburn account for $9.2 million of insurance policy coverage (Table 4.5). Out of this total value, none of it is located within the 100-year flood zone. All of the public structure insurance value in Osburn City is located within the 500-year flood zone (Table 4.5).

Potential Loss of Superfund Site Remedial Actions Due to Flood

Properties located within the City of Osburn located properties have received approximately $20.6 million of site activities to remediate contaminated soils (Table 4.6). All of this value has been placed in the flood zones of Osburn. Approximately $4.9 million has been spent to remediate properties in the 100-year flood zone. Another $15.8 million has been spent to remediate properties in the 500-year flood zone.

Within the rural areas surrounding the City of Osburn another $2.7 million has been invested on all properties. In the 100-year flood zone approximately $658,000 has been spent, with just over $15,000 in the 500-year flood zone (Table 4.6).

5.1.3.2. Earthquakes

A substantial fault line structure runs through Osburn, roughly parallel to the South Fork Coeur d'Alene River channel. Two disjointed fault lines merge west of the city and then continue as one westward. Another fault line structure dissects the first fault line system, with one end running northwesterly then continuing to the southeast. Seismic shaking hazards in Osburn are rated as moderate. The presence of these fault lines and the seismic shaking hazards status place the area in and around Osburn at elevated risk when earthquakes occur, relative to the rest of Shoshone County.

Very few multi-story brick and mortar buildings in Osburn were built in the unreinforced masonry construction era prior to 1955. Several structures, including the school and city hall, are made from brick, or cinder block, but these appear to be built with reinforcement and appear to meet current building safety codes. Unreinforced masonry building construction is not widely observed in the Osburn community.

Chimney construction in Osburn extensively utilizes brick materials with outside wall placement. Many of these chimneys extend well above support wall heights. The age and apparent quality of these appendages puts in question their safety in the case of an earth shaking event. The risks include home damage and damage to pedestrians, assets, and power lines around the homes in the unfortunate event of a collapse of these structures. Reinforcement of these chimneys should be considered in order to reduce potential financial losses and prospective injury.

5.1.3.3. Landslides

While the downtown area of Osburn is at little risk from landslides of any kind, the steep hillsides surrounding the community face challenges from possible hillside movement. The gulches of this region were formed by stream channels that have cut through steep mountain sides. Roads along the gulch valley bottoms have cut into toe slopes, while the unconsolidated sedimentary deposits of the hillsides are held in place by brush and forest trees. Rock slides of a minor scale have occurred along these slopes, but little development, outside of mining, of these hillsides has historically been seen.

Existing developments located on and near Hill and Fur Avenues and in the southern part of Osburn are located along the interface between the valley bottom and the steep hillsides leading out of town. Risk in this area is mitigated by the vegetation in this locale, which serves to stabilize the soil layers between shallow and deeper horizons. If these forests were totally removed by logging, wildfire, or urban spread, this profile might change dramatically.

The Sunny Slopes Subdivision housing development was placed on one of these hillsides on the north side of the South Fork Coeur d'Alene River, with access provided from Terror Gulch. This entire subdivision is placed in a location where landslide risk is fairly low. However, the slopes immediately below this development and to the east and west exhibit an increased landslide risk from steep slopes and sedimentary base soil materials. Access through Terror Gulch traverses loosely consolidated soils prone to sliding and mass wasting. In point of fact, access to the homes in this subdivision has experienced slides and surface wasting since it was first built and is still evident today.

Subdivision developments like Sunny Slopes Subdivision, and others which may be located on these valley adjacent knobs, are at risk to shallow landslides. These shallow landslides may be evidenced by road-cut failures (as can be seen) and sliding surface materials. Extreme caution should be applied in consideration for public sewer systems, storm water drainage systems, and road placement with ample drainage structures.

Potential Loss of Private Property Improvements Due to Landslides

Private property improvement values within Osburn are located exclusively within the lowest Landslide Prone Landscapes consolidated risk rating of 5, with a small amount in 15 (Table 4.13). The surrounding rural areas of Osburn show a slightly higher landslide risk profile with $13.1 million of private property improvements in category 5, $1.3 million in category 15, and $334,000 in category 25 (Table 4.13).

Potential Loss of Public Property Improvements Due to Landslides

All of the public property improvements located in the City of Osburn ($9.2 million) are located within the lowest Landslide Prone Landscapes consolidated score of 5 (Table 4.14).

5.1.3.4. Severe Weather

As many of the residents of Shoshone County are aware, winters and other seasonal severe weather events are “normal” in this region of the world. Osburn, in general, was designed and subsequently developed in a way that minimizes much of the risk exposure from the main severe weather events the area is subjected to: winter snow storms and high winds.

Winter snow storms can drop many feet of snow on Osburn in a single event, with more added by each storm. However, city streets are, for the most part, wide enough to allow short-term snow storage before snow loads are staged to holding areas to wait out the spring thaw. Most roof tops are steep-angle metal roofing material that can shed snow well. Several flat roof structures face the challenge of shedding snow after heavy accumulations, frequently requiring manual removal techniques to ensure roof stability from heavy load weight. This caution applies to the Shoshone County Fire District №1 (also Osburn Fire Department) building connected to the City Hall building.

High winds funnel along the South Fork Coeur d’Alene River corridor in the fall, winter and spring. These winds have ripped Osburn roofs from their structures, throwing debris several yards downwind. Composite roofing tiles have also been torn off by high winds. The presence of unsecured aluminum roofs and unsecured roof shingles can be observed on several structures in the city. Strong winds in this area may cause damage to homes and businesses with these types of unpredictable edifices.

The tree canopy in the city presents only a minor risk from falling trees and broken tops. The main risks are against power lines, vehicles, and homes. However, on close inspection there do not appear to be a significant number of “tree-over-home” concern cases. Several trees overtop power lines, and personal vehicles are parked along city streets where damage could occur, but rarely will this risk be completely mitigated. Constant vigilance and response by each homeowner is encouraged to reduce this exposure.

5.1.3.5. Wildfire

Osburn homes and businesses are generally in a concentrated cluster near the Interstate. Scattered mining enterprises are located in the valleys surrounding Osburn, with dead-end gravel roads accessing a few hundred yards up each hill. Forests in these areas are characteristically north-facing habitat types dominated by many tree species including western red cedar, western white pine, Douglas-fir, ponderosa pine, and grand fir. Forest health is generally good, with a few pockets of dead or dying trees.

Activities on the hillslopes south of Osburn have thinned out the forestlands to leave healthy dominant and co-dominant trees with little underbrush. The slopes to the north of Osburn were not subjected to the same forest fires as those to the east, nor to the same environmental challenges as those to the west, resulting in a thriving forested hillside. This south facing aspect is dominated by ponderosa pine and Douglas-fir with scattered shrubs in the understory. Because of the hotter exposure to direct sunlight, the forest habitat is much drier than that across the valley on north facing aspects.

Both Shoshone County Fire District #1 (east side) and Shoshone County Fire District #2 (west side) provide rural fire protection for structures in this area. Wildland fire protection for this area is provided by the Idaho Department of Lands in Cataldo.

Unlike most communities in Shoshone County, homes and businesses are not densely concentrated along the forested slopes that rise from the valley floor. One exception to this is found at Sunny Slopes Subdivision, where the development has been cleared of most mature trees, but is surrounded by forests on all sides. For the most part, structures in Osburn are set back from the forest edge, providing a very defensible zone against a possible wildfire on this hillside.

Recent and prolonged defensible space activities along the southern edge of Osburn, south of homes located on Fir Ave., Hill Ave., and Larch Ave., have altered the surface fuels, and fuel ladder conditions to the benefit of homeowners and the entire city. These efforts were recommended in the 2002 Shoshone County Wildfire Mitigation Plan and apparently are being maintained. This practice is encouraged and will serve the entire community well. It is notable to mention that the forest was not harvested. Only the surface fuels and the ladder fuels that would lead a fire into the crowns of trees were removed.

Potential Loss of Private Property Improvements Due to Wildfires

Private property improvement values within Osburn are located to minimize the wildfire risk exposure. From the $71.3 million of private property improvements in Osburn, approximately $57.3 million has been placed in Fire Prone Landscapes consolidated risk category 5 (Table 4.25). About $12.5 million is placed in risk category 15, $1.1 million in risk category 25, and $423,000 in consolidated risk category 35.

The rural areas surrounding the City of Osburn possess an elevated risk profile to wildfires (over the private structures within city limits). From the $13.8 million in private structure assessed value in rural Osburn, about $3.1 million is in risk category 5, $6.5 million is in risk category 15, $2.9 million is in risk category 25, and 1.3 million is in risk category 35 (Table 4.25). This increased risk profile for the rural properties is characteristic of homes that have been built into the forests where wildland fuels are more concentrated.

Potential Loss of Public Property Improvements Due to Wildfires

All of the public property improvements located in the City of Osburn ($9.2 million) are located within the lowest Fire Prone Landscapes consolidated score of 5 (Table 4.26).

5.1.4. Pinehurst

Pinehurst's population was 1,661 at the 2000 census and is estimated at 1,556 in 2007 (Figure V). Pinehurst is located just four miles inside the western boundary of Shoshone County. Unlike most of the communities along the South Fork Coeur d'Alene River corridor, Pinehurst is located slightly away from the main South Fork Coeur d'Alene River channel. Unfortunately, it is not located out of the flood plain, nor is it located in a place that would minimize its exposure to other hazard events.

5.1.4.1. Flood

Pinehurst is located at the confluence of Little Pine Creek and Pine Creek, just slightly upstream from their confluence with the South Fork Coeur d'Alene River. This causes an increased flood risk for the community at both 500-year and 100-year flood levels. In fact, approximately half of the city would be covered in a 100-year flood event, while all of the city would feel the effects of a 500-year flood event.

Little Pine Creek is a low order stream (Shreve Stream Order 7) that drains forestlands located to the southeast of Pinehurst and is characterized by a flash flood profile. Pine Creek is substantially larger than its neighbor (Shreve Stream Order 185). Little Pine Creek has a modest 100-year classification flood zone area. Pine Creek carries a substantial flood zone area, which includes both regulatory floods and 500-year floods. Pine Creek creates riverine floods of the fast kind. Pine Creek flood zones extend as far south as the confluence of Calusa Creek and the West Fork Pine Creek, 10 miles south of the city's boundary.

Little Pine Creek subjects Pinehurst to flash flood profiles; however, the relatively small watershed contributing area and the moderate relief of this drainage, which is occupied by mature evergreen forests, leads to only moderate risks presented by this drainage alone. Unfortunately, this drainage cannot be considered in the absence of the other hydrologic factors involved in Pinehurst's flood profile.

Pine Creek carries the water from a substantial landscape area through a narrow river network that possesses very limited flood water storage area. The only substantial flood water storage area on Pine Creek is located above the confluence of Pine Creek and the East Fork Pine Creek. This storage area floods the private property along the West Fork Pine Creek Road in 100-year and 500-year events. Because this storage area is relatively small, flow velocities in the river channel of Pine Creek can be extremely elevated during high water times. This can lead to excessive erosion of riverbanks and provides challenges to culvert and bridge conveyances. Debris transport from flood waters is not uncommon in this river system.

During inspection of this area, field crews were at work with machinery to clean culverts, re-establish road bank stability, and place erosion resistant riprap over loose soils in an effort to reclaim erosion damage during the spring 2008 floods.

Once Pine Creek and Little Pine Creek enter the flood plain of Pinehurst water storage begins to accumulate. Additional low order streams join these two systems and create a substantial flood volume. This is exacerbated by the proximity of the South Fork Coeur d'Alene River flood profile immediately north of the city. Here, the South Fork Coeur d'Alene River boasts a Shreve Stream Order value of 690. Heavy flood water volumes in the South Fork Coeur d'Alene River system are generally matched with the Pine Creek system, which carries a Shreve Stream Order value of 200 at the confluence.

The result is a backup of flood waters into Pinehurst, which struggles to flush water downstream. Further complicating this issue is the downstream confluence of the South Fork Coeur d'Alene River system with the Coeur d'Alene River system to the north, just two miles from Pinehurst. This confluence creates a Shreve Stream Order of over 3,000 as the river system leaves Shoshone County.

A fairly long-standing levee-type system along Pine Creek is located along the western sides of Pinehurst. This levee-type system is earthen in design and has been breached in many locations. A number of smaller structures located upstream along Pine Creek are in evidence as well. The effectiveness of these structures appears to be marginal in storm water events. None of these levee-type systems are certified by FEMA or the USACE.

Damages to infrastructure, homes, and commerce because of flood water accumulation have been witnessed in Pinehurst. City streets have been closed, homes inundated by flood waters, and water drainage systems effectively drowned. Pine Creek routes around the community in a channel that circumvents the main areas of homes.

Despite these conditions, structures in this area do not seem to carry the level of integrated flood protection normally associated with this type of flood zone. Very few structures are elevated above the flood zone, few structures are supported on higher-than-ground-level foundations. There are a substantial number of pre-manufactured homes in the western side of this community.

Drainage Assessment Summary

The City of Pinehurst Storm water Conveyance System Improvement report was published on June 30, 2004, by TerraGraphics for the City of Pinehurst (TerraGraphics 2004). Due to the increased awareness of the Pinehurst storm water conveyance system's undersized nature and possible catastrophic failure during a peak event, representatives of the IDEQ and PHD, in cooperation with the State of Idaho Governor's Office, discussed the need for storm water conveyance system improvements for the City of Pinehurst. IDEQ authorized funds to conduct a preliminary engineering study to determine the possibility of building an appropriate and proper storm conveyance system. Finally, the study supported the solicitation of funds from various granting agencies to implement proposed infrastructure improvements.

The City of Pinehurst is located in the Bunker Hill Mining and Metallurgical Superfund Site OU1 (populated areas) in Shoshone County. Pinehurst has three aspects to its flooding impacts. First, Pine Creek passes along its western edge, bisecting some of the western neighborhoods. Historical flooding has resulted in significant distribution of contaminated materials, increased water pollution, and property damage to the city and Interstate-90. An emergency dike was constructed after the 1974 flood and repair work by the USACE and Shoshone County have, over time, improved portions of the dike to a more stable structure. The level of protection and comprehensive integrity of the dike system are uncertain. Second, Little Pine Creek passes through the eastern half of the community and has impacted residential property and the golf course with contaminated sediments. Little Pine Creek originates south of Pinehurst, passing by at least two mine sites including the Little General in the upper watershed. Man-made channels, culverts, and other restrictions exacerbate flooding problems and decrease water quality. Third, local drainage within the city has little control. Division Street has the only storm water pipe, which is undersized. Remaining runoff is directed to either dry wells or low areas until water infiltrates or evaporates. Dry wells have consistently under-performed in handling runoff. Runoff contaminated with heavy metal sediments degrades water quality in Little Pine Creek and Pine Creek.

The recommended improvement is a combination of proposed alternatives, each one addressing a specific element of the storm water problem within Pinehurst. The outlet problems at the confluence of Little Pine Creek and Pine Creek require upsizing the culverts under the Interstate interchange and establishing a defined flood zone, which would be mitigated with planning and zoning, building standards for new construction, berm protection and the establishment of a fund for cleanup of the area in the event of a flood. Additional storage would also benefit the system if possible. The problem of flooding along Little Pine Creek would be resolved with channel upgrades and a sedimentation pond. The viable alternative of diverting the floodwater to the storm drain system may also be considered. Storm water within the city would be controlled via a system of storm drains, including new pavement, curb and gutter along the storm drain routes.

Potential Loss of Private Property Improvements Due to Flood

Consult Section 4.2.6. for a detailed explanation of how improvement values were determined for this section of the analysis.

Private properties within the City of Pinehurst have been assessed by the Shoshone County Assessor and were used for flood risk exposure analysis in combination with FEMA FIRM maps released September 2008. While the total value of land and improvements within Pinehurst City limits exceeds $101.0 million, the value of private improvements on the land, in the 100-year flood zone, is approximately $21.9 million. An additional $41.6 million of private property improvements are located within the 500-year flood zone. The remaining $9.8 million of improvement value in Pinehurst City is located outside of flood zones (Table 4.4, Figure XXV). These numbers illustrate how much of the improvement value in Pinehurst (87% of the total improvement value) is at-risk to flood loss or damage in Pinehurst City.

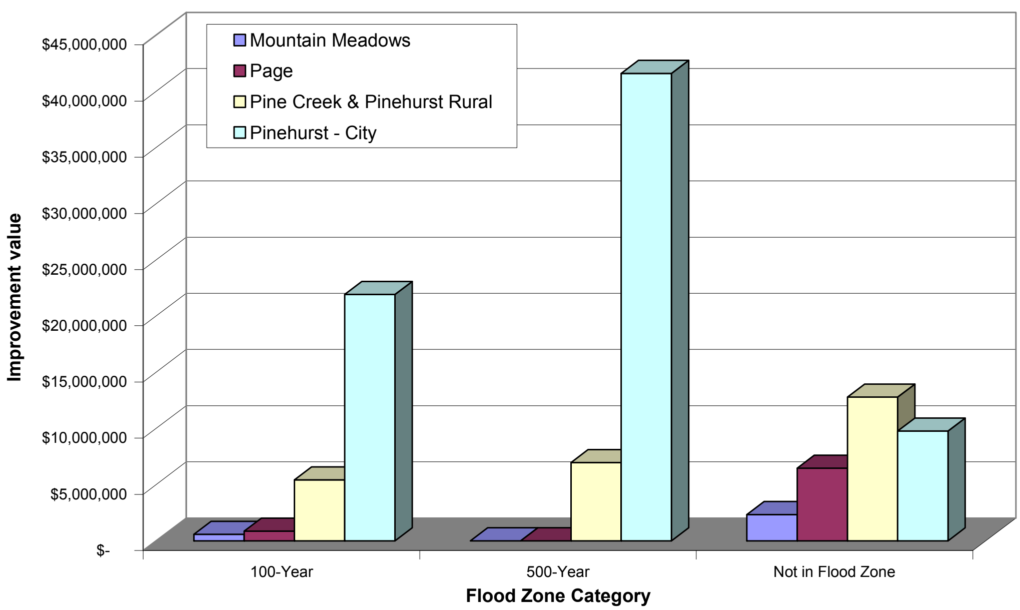
Rural properties, located outside the City of Pinehurst, but in close proximity to the city limits were also evaluated for risk exposure. These neighborhoods include properties adjacent to Pinehurst (Rural Pinehurst), along Pine Creek for several miles upstream, the neighborhood of Page (east of Pinehurst), and the neighborhood of Mountain Meadows (north of Pinehurst).

The Pine Creek area, combined with Pinehurst Rural area, has a total private property assessed value of land and improvements of $39.5 million. Total private improvements in this area are nearly $25.2 million. Approximately $5.4 million of improvements are located within the 100-year flood zone, with another $7.0 million in the 500-year flood zone. The remaining $12.8 million of improvement value is located outside the flood zone areas (Table 4.4, Figure XXV).

The Neighborhood of Page possesses total private land and improvement value of $22.0 million. The total private improvement value in this area exceeds $7.3 million, but only $869,000 of this value is located in the 100-year flood zone and no improvements are within a 500-year flood zone (Table 4.4, Figure XXV).

Similarly, the Mountain Meadows neighborhood has been assessed for $5.3 million of privately owned land and improvements. The private improvement value in this neighborhood exceeds $2.9 million, but only $591,000 of improvements is located in the 100-year flood zone, and none of it is located in the 500-year flood zone (Table 4.4, Figure XXV).

Figure XXV. Pinehurst City and Rural improvement value flood risk exposure.



Potential Loss of Public Property Improvements Due to Flood

Publically owned structures located within Pinehurst are exposed to the same profile of risk as the privately owned structures in this city. A total insured value of public structures has been identified at $7.3 million, and 86% ($6.3 million) is located within the 100-year flood zone. The remaining $994,000 of insured value of public structures is located in the 500-year flood zone (Table 4.5).

Within the community of Page additional public resources are located as part of the water and sewer treatment facility totaling $1.5 million. These structures are located within, and surrounded by, the 100-year flood zone (Table 4.5).

Potential Loss of Superfund Site Remedial Actions Due to Flood

Properties located in the City of Pinehurst located properties have received approximately $23.7 million of site activities to remediate contaminated soils (Table 4.6). Approximately $11.6 million of this value has been expended on properties within the 100-year flood zone. A nearly equal amount, $11.0 million has been placed within properties located in the 500-year flood zone.

The rural areas surrounding Pinehurst, including Pine Creek properties, have received the services from $438,000 of remedial actions in the 100-year flood zone, and $467,000 for properties in the 500-year flood zone. The neighborhood of Page has received remedial actions on properties located within the 100-year flood zone totaling $1.0 million (Table 4.6).

5.1.4.2. Earthquakes

One west to east running fault line crosses through Pinehurst with parallel fault lines to the north and south of the primary fault. These faults are a part of the larger system of fault lines nominally matching the direction of the South Fork Coeur d'Alene River valley. Seismic shaking hazards are moderate in this region of Shoshone County. The low river valleys of this area are formed from unconsolidated sedimentary rock over the top of basaltic substrate. Undulating hills surrounding the valley bottoms are more stable and composed of soils with a higher content of loam and silt. Forest vegetation in this region is abundant.

The number of unreinforced masonry buildings in Pinehurst is indeterminate. While several structures are made from the materials most at-risk from earthquake, construction dates are unknown; it is unspecified if these buildings have been reinforced, or even if they need reinforcement. A deeper investigation into the status of each masonry building in Pinehurst is warranted to determine its resilience against earthquake risks. Most of these structures-of-concern are located in the northeast quadrant of the city, to the south of the I-90 interchange normally considered the commercial area of Pinehurst.

As is the case with many other areas in the Silver Valley, chimneys are constructed using bricks and mounted to the outside wall of the wood frame structures. These chimney structures pose a risk to the structures they are mounted on as well as to the people and valuables located near the at-risk chimneys. Vertical reinforcement of the chimneys that extend six or more feet above the supporting wall of the structure is recommended. This situation is apparent in all of the residential areas of Pinehurst and in the commercial areas where private homes are located.

The foundations placed under the large number of pre-manufactured homes (AKA mobile homes) in Pinehurst should be evaluated for stability, anchoring of the foundation to the ground and between the foundation and the structure, and general ability of the system to withstand shaking. This category of structure is notorious for poor anchoring mechanisms. In many cases cinder blocks have even been loosely placed without anchoring to the building after its arrival. These homes can easily shake off their mounting during earthquakes, causing irreparable damage and injury. Many structures identified with this concern are located adjacent to the Pine Creek drainage.

5.1.4.3. Landslides

The landslide profile in the general Pinehurst area shows exposure to rockslides, rockfall, debris flow, slumps, and earthflow. Almost none of the actual city is directly exposed to these landslide hazards. The real exposure is along Pine Creek and Little Pine Creek, south and southeast of the city. The steep slopes along these watercourses, the alluvial deposited soils, and deep cutting stream profiles are transporting soil materials away from riverbanks during high water events.

These undercutting events reduce hillside stability, which often results in topographic adjustments to the hillside in the form of small or medium scale mass wasting. Mass wasting slides trees, brush, and other litter into the stream, which is then transported downstream to clog culverts, dam against bridges, and alter water flow. Often, these events occur during heavy rains when soils are saturated and riverbank undercutting is active.

Large-scale earth-flows are possible during extreme weather conditions in locations where slopes are weakened from excessive riverbank undercutting, or site disturbances have disrupted the hill slope stability balance (such as road building or site clearing). These conditions are potentially present along all of Pine Creek leading into Pinehurst. Mitigating factors include dense riparian vegetation and access by machinery to clear out plugged culverts and jammed bridges. Gaining access during flood and landslide events may pose a challenge to emergency workers.

Pine Creek has many crossings from Pine Creek Road to individual home sites. Some of these bridges are visually forbidding to cross without verification of the strength and abutment quality. Many of these crossings are over narrow stretches of Pine Creek and have been affected by debris flow in the stream during flooding events that transported woody debris down Pine Creek. A verification of the quality of crossings over Pine Creek should be conducted to ensure that public safety is maintained and that riverbank stability is preserved.

Potential Loss of Private Property Improvements Due to Landslides

Private property improvement values in the City of Pinehurst are located within the lowest ranked Landslide Prone Landscapes risk categories, with 99% of the total value in risk category 5 and the remaining 1% in category 15. There is little direct exposure to structures from landslides in Pinehurst (Table 4.13).

The rural areas of Pinehurst, including Pine Creek, show a slightly elevated risk exposure to landslides with about 90% of the total private property improvements located within the risk category 5, and 11% located within the consolidated Landslide Prone Landscapes risk category 15 (Table 4.13). About $274,000 of private property values is located within the risk category 25.

The community of Page exhibits a similar risk profile of private structure improvements to landslides. Approximately $6.6 million of private property improvements are located in the consolidated landslide risk category of 5, and $765,000 is located in risk category 15 (Table 4.13).

Potential Loss of Public Property Improvements Due to Landslides

Within Pinehurst City, the publically owned structures are all located within the lowest Landslide Prone Landscapes consolidated risk category of 5 (4.14.). The public structures in Page are also located in areas not predicted to be at landslide risks.

5.1.4.4. Severe Weather

Severe weather risks in the Pinehurst area include snow storms, high winds, and heavy rains, which lead to flooding and storm water accumulations. Also present is the risk from hot drought conditions leading to wildfires. Both flooding and wildfire are addressed in other sub-sections to this discussion of Pinehurst.

Severe winter weather is especially pronounced in this region due partly to the confluence of the South Fork Coeur d’Alene River system, the Coeur d’Alene River system, and the Pine Creek River network. Downstream along the Coeur d’Alene River system, the weather patterns are influenced by Lake Coeur d’Alene to the west, then upstream to the point of convergence of the two great river forks. Here, storms roll along the river valley, hammering the hillsides with strong winds, lightning, and heavy rainfall.

Storm water management in Pinehurst is challenging because of the city's low profile in juxtaposition to the large river network water drainage systems. Linking storm water movement to these river networks and out of the city will not only help to manage storm water flow, but also flash flooding from Little Pine Creek, Pine Creek, and other tributaries in the area.

High winds swirl and gust in this confluence-affected community. Several homes in Pinehurst support roofs that are not optimally secured to the structures they rest on. Evidence of wind damage is present on several structures scattered around the city, and at-risk fastening is apparent on many more. An effort to improve roof mounting against wind damage is recommended on several homes in Pinehurst.

Tall trees overtop homes and power lines throughout the community increasing the risk of breakage and fall-down over assets and people. Community arboriculture efforts to trim trees will greatly reduce loss potential in Pinehurst. This effort may also bolster wildfire prevention efforts in terms of controlling ladder fuels which can carry structural fires into tree crowns and then to other homes.

Snow storms in this region can also be severe. Because of the combination of the river network confluence, the proximity to Lake Coeur d'Alene, and being in the lowest elevation status along the Coeur d'Alene River system in Shoshone County, snow loads tend to be wetter than up-river deposits. These wet-snow deposits place a burden on snow removal equipment in a city where city streets do not support ample snow storage space along local travel routes.

In addition, roof weight loads from the snow accumulations can place a stress on structures. Roof materials are a mix of metal steep slope roofs, composite shingles, and mobile home flat tops. Each roofing category has an inherent challenge level for homeowners to deal with during and after snow storms.

All of these challenges are revealed in the light of infrastructure compromise potential ranging from the loss of power, treated water, or sewage treatment.

5.1.4.5. Wildfire

The forests in this area are a mixture of ponderosa pine, Douglas-fir, and western larch, with wetter site tree species scattered where the site has more moisture and is north or east facing. The continuous forest canopy cover around Pinehurst presents a wildfire risk exposure, holding at-risk vegetation on moderate slopes with decent access. Pinehurst and the forests immediately adjacent to the city support a low to moderate fire prone landscape rating.

The headwaters of Little Pine Creek are at more wildfire risk than most of the remainder of the region. Evaluation of the environment surrounding Pine Creek reveals steep slopes that also support fire prone landscapes at moderate to high risk. When fire risk is combined with unstable slopes (discussed in the landslide section), the potential for combined hazard impacts is significant. The worrisome combination is wildfires burning slopes on the east side of Pine Creek (5 miles south of Pinehurst), followed by heavy rains (even months later), leading to super-saturated soils no longer covered by forest vegetation, and mass wasting events depositing heavy sediment, debris, and litter in the streambed. The ability of Pine Creek to flush this added biomass through its system without damage to infrastructure and city resources is doubtful.

These forests experience fire spread risk primarily through the fine herbaceous surface fuels, either curing or dead. Ladder fuels carry the heat into crowns where single and group tree torching is common and fire has the ability to be carried crown-to-crown, even if only for short distances.

The urban homes in this community are concentrated around the downtown area, west and southwest of the golf course, and along Pine Creek. The downtown area is not considered to be at-risk to wildfire. The structures along the community perimeter, and scattered along the river drainages, on the hillsides, and in the forest, are at higher risk to wildfire loss. However, this risk management can be accomplished through a series of home-site defensible space projects. A wide-scale community defensible zone construction effort is warranted when considering the relative risk of this area in comparison to the rest of the county. The vast majority of wildfire mitigation efforts can be amplified with accompanying home site efforts.

This area receives rural fire protection from Shoshone County Fire District #2 with a station in Pinehurst. Wildland fire protection is provided by the Idaho Department of Lands with an office in nearby Cataldo.

Potential Loss of Private Property Improvements Due to Wildfire

Pinehurst City's private property improvement values are mainly concentrated in the lowest Fire Prone Landscapes consolidated score category of 5 (81%-$59.9 million; Table 4.25). As the risk category rating increases to 15, the private structue value totals $7.1 million (10%), at a score of 25 the private property improvement value is $4.6 million (6%), and at a score of 35 the private property value is estimated at $1.7 million (2%).

The rural areas of Pinehurst, including Pine Creek properties, show a different risk exposure to wildfire than the city located structures. This differential risk exposure is expected and is owing to the more rural setting where these structures are built. Within these rural areas, approximately $4.7 million (19%) of private property improvements are located within parcels ranked with a Fire Prone Landscapes consolidated rating score of 5 (Table 4.25). As the risk rating increases to 15 the value of private improvements increases to $7.7 million (31%), and as the risk category increases to 25 the value of private property improvements increases as well to $9.0 million (36%). It is only at a risk rating consolidated score of 35 that the exposure of private propery values decreases, but the exposure is substantial at $3.9 million (15%). These rural areas have been built within the forests of the landscape where wildfires are more prone to occur.

Within the area of Page, wildfire risks are also pronounced. Out of the total value of private assessed value in Page, none of the value is located in the lowest consolidated risk category of 5 (Table 4.25). As the risk increases to 15 the total assessed value of private property improvements totals $2.3 million (32% of the total in Page), at a risk category score of 25 the assessed value of improvements is $4.2 million (57%), and at a score of 35 the risk exposure to private structures is $797,000 (10%).

The private property improvements in the rural areas surrounding Pinehurst, and the structures around the perimeter of Pinehurst, will derive the greatest benefits from home site wildfire defensibility efforts. These labors have the direct impact of changing the characteristics of wildfire behaviour imediately adjacent to the structure. When accompanied by changes in structural ignitability such as addressing roofing materials, siding, and decks, the impact can be substantial.

Potential Loss of Private Property Improvements Due to Wildfire

All of the public structure insured value in Pinehurst and surrounding in the rural areas is located in the lowest consolidated Fire Prone Landscapes risk rating score of 5 (Table 4.26).

5.1.5. Smelterville

Smelterville is located along the banks of the South Fork Coeur d'Alene River between Pinehurst (to the west) and Kellogg (to the east). Smelterville's population was 651 at the 2000 census and approximately 600 in 2007 (Figure V). Smelterville has recently gained prominence in Shoshone County due to the addition of an outlet for the retail giant, Wal-Mart. The community was named for its lead and zinc smelters dating back to the turn of the 20th Century.

Smelterville is located along the southern flank of Interstate-90 in the broad and flat valley bottom. Most of the community structures are located against the hillsides to the south near the outlet of Grouse Creek. Several more structures are located in Government Gulch to the east of Grouse Creek. The Shoshone County airport is located to the north of Smelterville and the Interstate, and maintains a single runway for light aircraft.

5.1.5.1. Flood

The flood profile of Smelterville reveals an historical flood plain functioning, creating the current wide and expansive valley bottom. Regulatory floods span the entire valley bottom from Kellogg to the east, downriver to Pinehurst in the west. This stretch of floodwaters is the largest continuous flood water storage area in the South Fork Coeur d'Alene River. Small "islands" removed from risk to 100-year flood events are captured during heavier floods including the 500-year flood events. Interstate-90 infrastructure components such as the overpass exit into the airport and the city are elevated above the flood zones. The same condition applies to the sewage treatment plant located to the west of Smelterville.

Several mitigating factors apply to the extent of flooding in Smelterville. First, the South Fork Coeur d'Alene River follows a path along the northern edge of the floodplain. Between the city and the river is located Interstate-90 with substantial road surface elevation. Although elevated, the Interstate elevation is "leaky" because of free water flow access through the exit ramp underpasses, providing paths which allow free water flow.

Central Shoshone Water District manages a well water collection point for municipal water supplies south of Smelterville on Silver Creek, which is a Shreve Stream Order 1, and flows into Humbodt Gulch near its entry to the valley above the South Fork Coeur d'Alene River Sewage District operated treatment plant.

Additional flood water supplies are delivered to this area from Government Gulch (Shreve Stream Order 6), and Humboldt Gulch (Shreve Stream Order 4), both possessing regulatory flood profiles. Grouse Creek (Shreve Stream Order 1) also enters the community from the south but is not profiled as a FEMA flood zone stream. Because of this series of low-order streams flowing into the floodplain adjacent to Smelterville, the characteristics of flash flooding will be observed. This flash flood component of Smelterville will be quickly absorbed by the expansive floodplain in the valley bottom. Enhanced storm water drainage and reinforced culverts, bridges, and stream banks are not sufficient to usher excess waters from these low-order streams into the primary river channel heading west. Storm water flooding is common in this area and is easily overtopped by heavier water flows during flood events.

Despite the lack of a FEMA designated Flood Zone, in 1986 Grouse Creek flooded 12" to 26" over approximately 25-30% of Smelterville. The current routing of Grouse Creek empties into Smelterville from the south where it makes a sharp turn west and then is joined with other streams including Humboldt Gulch water flows. These streams then flow past the sewage ponds, and then into a flow structure where water is finally ushered under the interstate and into Pine Creek just before Pine Creek enters the South Fork Coeur d'Alene River.

The South Fork Coeur d'Alene River flood profile in this segment of the river is of the riverine flood – slow kind. These flood waters will grow in the valley bottom with water supplies from the vast upstream collection area through contributions from falling rain and melting snow. Near the access ramps of I-90, the Shreve Stream Order of the South Fork Coeur d'Alene River is 480. Upstream displacement of the natural flood plain in Kellogg means that flood waters in Smelterville may experience heavier backflow pressure during high water events. This is further complicated by the flash flood profiles of Bunker Creek and Government Gulch entering the South Fork Coeur d'Alene River near the borders of Smelterville and Kellogg.

Sandbagging has been used extensively in this area to mitigate rising waters during moderate and greater floods. Small scale river impoundment efforts have served to keep lower order streams confined to set channels as they move through the city. However, these efforts are not consistently effective as they are easily overtopped or blown-out from erosive forces of storm water and flood waters.

Flood protection of structures such as ground floor elevation and above-the-ground extensions of the foundation are not widely used in Smelterville.

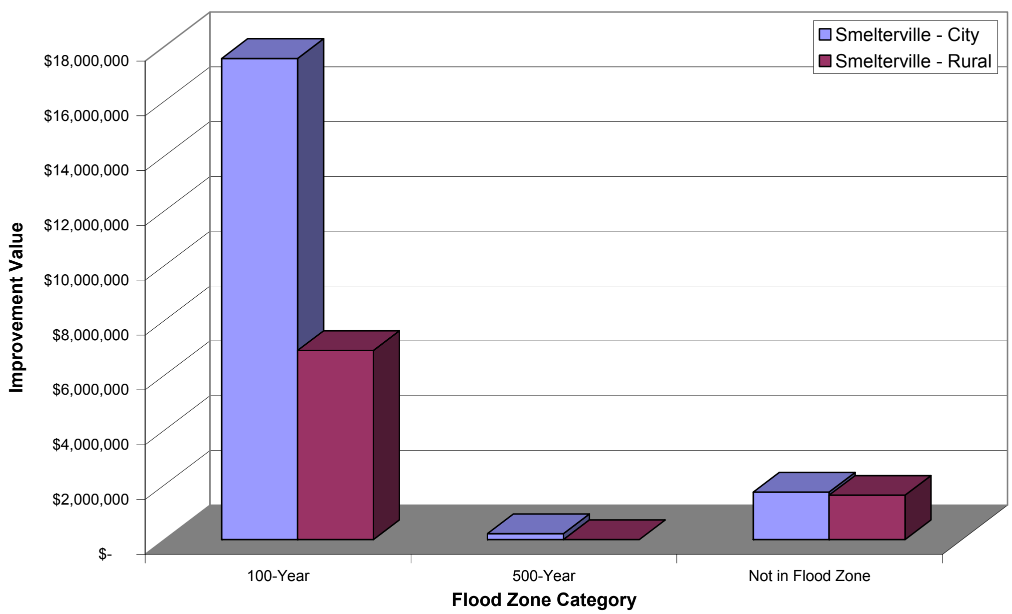
Potential Loss of Private Property Improvements Due to Flood

Consult Section 4.2.6. for a detailed explanation of how land and improvement values were determined for this section of the analysis.

Properties within the City of Smelterville have been assessed by the Shoshone County Assessor and this assessment was used for flood risk exposure analysis in combination with FEMA FIRM maps released September 2008. While the total value of privately owned land and improvements within Smelterville City limits equals $26.7 million, the value of private improvements on the land is approximately $19.5 million (Table 4.4). Private property improvement value in the 100-year flood zone is approximately $17.6 million (90% of total improvement values). An additional $217,000 of private improvements is located within the 500-year flood zone. The remaining $1.7 million of private improvement value in Smelterville City is located outside of flood zones (Table 4.4, Figure XXVI).

Privately owned rural properties, located outside the City of Smelterville, but in close proximity to the city limits were also evaluated for risk exposure. This area has a total assessed value of land and improvements of $14.5 million (Table 4.4). Total improvements in this area are over $8.5 million. Approximately $6.9 million of private improvements are located within the 100-year flood zone (81% of all private improvement values), with no improvements located in the 500-year flood zone (Table 4.4, Figure XXVI).

Figure XXVI. Smelterville City and Rural improvement value flood risk exposure.



Potential Loss of Public Property Improvements Due to Flood

Public structure improvement insured value has been cataloged for Smelterville (Table 4.5). Approximately $1.9 million of insurance policy value is carried on public structures within the Smelterville City limits. Of this value, approximately $1.7 million is located within the 100-year flood zone. The remaining $192,000 of insured value on public structures is located within the 500-year flood zone.

Potential Loss of Superfund Site Remedial Actions Due to Flood

The City of Smelterville has received substantial efforts to remediate the extensive soil and airborne contamination stemming from mining activities centered on this location. This community was at the focal point of the original "Box" identified by the USEPA in the identification of the Superfund Site. The exposure to existing remedial actions from potential flood damage is substantial. The establishment of remedial actions in Smelterville is estimated at $13.6 million (Table 4.6). Of this value, approximately $12.6 million is located on properties within the 100-year flood zone. An additional $64,000 is located on properties within the 500-year flood zone (Table 4.6).

The rural properties surrounding Smelterville have received approximately $64,000 in remedial actions to abate the pollution associated with the Superfund Site (Table 4.6). All of this value, all of it has been centered within the 100-year flood zone.

5.1.5.2. Earthquakes

The long series of parallel fault lines common to the Silver Valley straddle Smelterville in an east to west profile of fissures. Seismic shaking hazards are similar to neighboring communities and rated as moderate.

Very few structures in Smelterville are multistory unreinforced masonry buildings. Post 1960 construction of brick and masonry structures in the city appears to have utilized code-compliant materials and practices. At the same time, most of these are single-story structures such as the Post Office and some government buildings, and thus the conditions for concern are moderated.

Several homes in Smelterville sport the same complex of height elevated chimneys constructed from brick and affixed to an outer structural wall as in other Silver Valley communities. These chimneys show signs of time-wear and stresses and are at risk to failure in cases of earth shaking. Reinforcement of these chimney structures is recommended.

5.1.5.3. Landslides

The landslide profile of Smelterville is consistent with a valley bottom adjacent to steeply rising foothills. Soil materials are typical unconsolidated alluvial gravels and sedimentary deposits. Where these steep slopes and loose gravelly soils are found under a compromised vegetation layer, the result is a moderate to high potential landslide risk.

This situation is found south of Smelterville in the Grouse Creek drainage and the Government Gulch drainage. Although re-vegetation efforts have been extensive in these areas following denudation partially caused by historical smelting activities, the complex natural vegetation combination of mature trees, a shrub layer, and accumulated duff has not yet been formed (this may take another century to form). As a result, slope stability is weakened substantially and responds to the effects of road cut-bank modification and stream bank cutting. Recent rain events have caused slides in this area, which has placed water and mud inside homes south of 1st St., A St., and Hill Ave. Continued re-vegetation efforts in this area will mitigate the hazard exposure from landslides to the south of Smelterville.

Potential Loss of Private Property Improvements Due to Landslides

The Landslide Prone Landscapes profile for the City of Smelterville confirms the visual inspection of low relief slopes and accompanying low landslide risk factors within the city. Landslide Prone Landscape scores determined for individual parcels reveal that 99% ($19.2 million) of the assessed value of these structures is located on parcels within the consolidated risk category of 5 (Table 4.13). The remaining 1% of total value is located in the next higher risk category of 15.

In the rural areas of Smelterville, homes have been occasionally located on steeper sites. Approximately $8.5 million of assessed private property improvements have been invested in this area (Table 4.13). Of that value, about $7.9 million is located on the lowest risk category parcels (5). Within risk category 15, roughly $320,000 of private improvements are located, and in category 25 around $286,000 of private property improvements have been sited (Table 4.13).

Potential Loss of Public Property Improvements Due to Landslides

All of the public structures in Smelterville are located within the city limits where slopes are flat and expose the structures to flooding risks. However, these sites do not expose the structural improvements to landslide risks directly. All of the public improvement insurance values ($1.9 million) are located in the lowest landslide risk category of 5 (Table 4.14).

5.1.5.4. Severe Weather

As with this entire region, severe weather exposure is represented through winter storms bringing snowfall, and high wind events blowing up the South Fork Coeur d'Alene River valley. Smelterville's location next to the Interstate and the gentle slopes of the community are both points that minimize the negative effects of snow accumulations. Street widths are sufficient to store plowed snow from the road density of the city. Nearby snow storage locations facilitate off-site removal of high snow accumulations to wait for spring melt.

The vast majority of the homes in Smelterville have steep pitch metal roofs that shed snow easily. Many government and commercial buildings have flat roofs or low angle roof tops. These are less likely to "self-shed" heavy snow accumulations, especially heavy snowfall with a high moisture content found in this lower valley region of Shoshone County.

Many of the metal top roofs and composite shingle roofs found here are well attached and stable against high wind damage. Many of the trees in Smelterville are hardwoods and do not tower over homes. Power lines run through and next to many trees, but stability does not seem to be weakened in terms of tree top and branch breakage.

5.1.5.5. Wildfire

Smelterville is a small community with a concentration of buildings near the community center, and a dispersion of rural structures in the surrounding hillsides and at the airport. The structures within the city are at a low risk to wildfire loss. Many of the outlying structures in this area are associated with mining.

Rural fire protection for Smelterville is provided by Shoshone County Fire District #2 with stations in Pinehurst and Kellogg. Wildfire protection services are provided by the Idaho Department of Lands in Cataldo.

Defensible space construction is only warranted in a few locations such as the southern side of the city where urban developments are immediately adjacent to wildland fuels. At this time, the contributing area to Silver Creek is considered at low risk to wildfire losses.

Potential Loss of Private Property Improvements Due to Wildfire

Private property assessed improvement value exposure to wildfire risks is moderated in Smelterville. Out of the $19.5 million of private assessed improvement value in Smelterville, approximately $18.1 million is located in the lowest risk category of 5 (Table 4.25). Wildfire risk categories for parcels increase as the parcels are located away from the city center in the direction of the south side of Smelterville. Here risk category 15 contains about $1.1 million of improvements, risk category 25 shows $186,000 in private property improvements, and risk category 35 has only a trace of value improvements. These findings are consistent with the low risk exposure within the city center, and elevated risks around the southern perimeter of the city.

The rural areas of Smelterville represent a very similar risk profile to that of the city. There are around $8.5 million of private property improvements in these rural areas and just over $7.7 million of those private property investments have been made on sites with a Fire Prone

Landscapes consolidated risk rating of 5 (Table 4.25). The remaining 9% of the private property improvements have been made on nominally equal risk score distribution from 15 to 35.

All of these sites will respond well to home defensibility activities to maintain a low wildfire risk exposure around individual structures.

Potential Loss of Public Property Improvements Due to Wildfire

Public structures within Smelterville are all located within the city limits and in areas where wildland fuels are not problematic. All of the total public structure insured value of $1.9 million, is located in the Fire Prone Landscapes consolidated risk category of 5 (Table 4.26). Wildfire mitigation efforts surrounding these structures are not warranted at this time.

5.1.6. Wallace

In 1890, Shoshone County was the most populated county in the new state of Idaho, and Wallace was the County's largest city and the third largest city in the state, with 2,000 residents. The elevation is 2,728 feet. The historic City of Wallace is currently the county seat of Shoshone County and sits alongside the South Fork Coeur d'Alene River and Interstate-90. The population was 960 at the 2000 census and was approximately 867 in 2007 (Census 2008).

Wallace is prominently situated in the South Fork Coeur d'Alene River valley where the topography gives way to narrow valley bottoms carrying the headwater signature steep "V" bottom shape. Evergreen forests blanket the steep hills of the region.

Wallace still prides itself on having what was the last traffic light on I-90 between Seattle and Boston. Downtown Wallace showcases many historic buildings, which would have been demolished by the original planned route of the freeway improvement project, so in 1976 city leaders had the downtown placed on the National Register of Historic Places. As a result, the federal government was forced at great expense to reroute the freeway to the northern edge of downtown and elevate it. That section of I-90 opened in September 1991.

Burke-Canyon Road runs through historical mining communities — many of them now deserted — north and northeast toward the Montana border. Historically, the area periodically experienced open warfare between miners and mine owners. East of Wallace, the Route of the Hiawatha (rails-to-trails) and the Lookout Pass ski area are popular recreational sites.

Placer Creek, flowing into Wallace from the south on the west side of town, gained notoriety as the locale that Edward Pulaski and his 45-man crew evaded the 1910 wildfire by seeking refuge in a mine shaft until the fire had passed. Although six members of that crew perished, the tale of the leadership that Pulaski exhibited is legendary. Placer creek is important today for a variety of reasons including the location of the Wallace municipal watershed, access to Moon Pass and other backcountry backdrops.

Wallace is the Center of the Universe. On September 25, 2004, Mayor Ron Garitone proclaimed Wallace to be the center of the Universe. Specifically, a sewer access cover was declared to be the precise location of the center of the Universe. A specially made manhole cover was placed to mark the spot. It bears the words "Center of the Universe. Wallace, Idaho." This prompted British comedian and writer Danny Wallace to visit the city of Wallace. He wrote about his visit in the book Danny Wallace and the Centre of the Universe, published in 2006.

5.1.6.1. Flood

The South Fork Coeur d'Alene River valley is in a transition zone between the headwater classification seen upstream and eastward in Mullan and Larson, and the expansive flood storage classification observed downstream and to the northwest in Osburn and Kellogg. This transitional status means that water flow characteristics will be highly variable and multiplicative in effects. This is seen through flash flood characteristics delivered from tributaries that may be combined with riverine flood characteristics in the main channel of the fast kind and the slow kind one after the other. To further magnify the challenges to the city, storm water movement can clog the stressed system to exacerbate the flood hazard potential.

FEMA FIRM maps of the Wallace area identify regulatory food zones along the northern perimeter of the South Fork Coeur d'Alene River valley extending to encompass about half of the city's structures, which are located in the flat floodplain of the city, bounded by Pearl St on the eastern side of town. On the western side of Wallace this 100-year flood zone broadens to cover the entire flat bottom floodplain of the river network.

Additional flood prone areas from 500-year floods are seen along all of Placer Creek, entering Wallace from the south on the western side of the city. The combination of the 100-year and the 500-year flood zones serve to impact approximately 75% of the area of Wallace and all of the Historic district in the downtown area.

The South Fork Coeur d'Alene River attains a Shreve Stream Order of 110 before entering the City limits of Wallace and then grows to a Shreve Stream Order of 226 on the west side of town. The South Fork Coeur d'Alene River valley is typified by riverine flood characteristics of the fast kind and the slow kind. Additionally, ice and debris jam flooding can occur along this stretch of the river system in early spring often in combination with other severe weather events.

Three major tributaries contribute a substantial amount of flood water volume all joining at Wallace. The first, already mentioned, is Placer Creek with a Shreve Stream Order of 39 where it enters Wallace City limits. Flood control efforts in this stream have focused on impounding the river channel to a concrete chute from approximately the city limits to its confluence with the South Fork Coeur d'Alene River. The degree of impoundment is substantial and serves to keep the river under control during 100-year flood event water stages. Since Placer Creek is a moderately low stream order classification it would be expected to contribute flood waters from the classification of flash flood. However, this Stream Order magnitude does not reveal the large source area contributing water flow to the system. Placer Creek possesses no inherent floodplain water storage area where increased flows could be "staged" as the system fills with water. Placer Creek drains a watershed that receives water from terminal elevation at 5,178 feet all the way down to the city limits at 2,740 feet, representing 2,438 foot vertical drop in only 7 miles. Additional flood profile types include the Debris Jam flooding. A cursory look at the upstream extent of the Placer Creek impoundment reveals a substantial mass of debris already delivered and collected in the stream.

The East Shoshone County Water District operates the Placer Creek water supply system that collects and treats surface water along Placer Creek for the City of Wallace.

North of Wallace, Canyon Creek (Burke Canyon) enters the South Fork Coeur d'Alene River with a Shreve Stream Order of 49. This river system supports what most observers would call a minor stream flow during dry or frozen periods of the year. However, when heavy rains and rain-on-snow events occur, Canyon Creek is capable of delivering substantial amounts of water to the downstream systems. The flood profile of Canyon Creek is consistent with Flash Flooding and Debris Jam Flooding. Canyon Creek is characterized by a river system that is naturally impounded in a very narrow "V" shaped canyon with only a small amount of natural floodplain storage. Debris flows are also common as the fast moving channel erodes riverbanks to displace riparian vegetation and move it downstream.

Nine Mile Creek, located in the canyon immediately west of Canyon Creek, also flows into the South Fork Coeur d'Alene River valley at Wallace. Nine Mile Creek is a Shreve Stream Order 23 and possesses the same flood profile characteristics as Canyon Creek. There is a simple design debris rack installed at the entrance to a concrete culvert near the South Fork Coeur d'Alene River confluence in Wallace (Figure XII). Although simple in design, this debris catchment is easy to maintain and effective at keeping the culvert clear.

The impacts to Wallace are seen through the riverine flood waters delivered by the South Fork Coeur d'Alene River, coupled with the combined effects of rapid flood water accumulation from the many flash-flood prone rivers and debris jam-flood type rivers terminating at Wallace. This means simply that water will arrive in Wallace early during heavy rains only to be accompanied by higher sustained flood waters from the headwaters of the main valley system.

Downstream from Wallace the floodplain begins to open wider to create sustained flood water storage areas. Because of this feature, the backflow pressure on the system at Wallace is minimal.

The flood control and stream impoundment to Placer Creek is effective at minimizing the damage potential from flash flooding in this stream during 100-year flood events. It is advantageous to maintain this system and keep it functioning. Enhancement to the Canyon Creek and Nine Mile Creek systems can be made through debris catchment devices located upstream of culverts and bridges, but in places where they can be cleaned and operational. This will serve to reduce the clogging of the water system while facilitating normal river functioning as it moves through Wallace.

Finally, many structures in Wallace are elevated above the floodplain. These construction modifications are not in the form of lifted structures, but in the form of foundations that lift the entire ground floor above the regulatory floodplain. Unfortunately these elevated basements are used for domestic and business purposes so flood waters around these structures will most likely negatively impact their use. Most of the downtown buildings are in the historic district, and they are built from brick and masonry materials (including City Hall, County Courthouse, and the Post Office). Brick and masonry materials are more tolerant of flood waters for short periods of time than wood frame house and mobile home materials. Many of the structures in Wallace have borne the stress of floods over the past 100 years.

Drainage Assessment Summary

The City of Wallace Drainage Assessment Including Burke Canyon, Woodland Park, and Nine Mile was published on February 12, 2008, and is intended for all entities involved with drainage, infrastructure, remediation, and the ICP in the Coeur d'Alene Basin (TerraGraphics 2008b). This assessment was prepared under the direction of the BEIPC. The assessment was part of a larger effort to develop a regional Basin IRP that identifies infrastructure deficiencies and assists communities in prioritizing work and pursuing funding. The assessment also addresses the relationship of drainage deficiencies relative to the remediation work. The report was prepared by TerraGraphics through a contract with the BEIPC. The remainder of this sub-section is summarized from that report.

The assessment had two goals: 1) to identify drainage infrastructure deficiencies within the community and 2) to identify threats of flooding and recontamination from the surrounding natural drainages. Secondary issues associated with infrastructure and remediation that were identified during the preparation of this assessment are also included.

The City of Wallace downtown district has a typical curb-gutter-pipe storm water collection and conveyance system. This system appears to be in working condition. The city remains vulnerable to flooding from Printer's Creek and Placer Creek. Both creeks have flooded within the last 25 years. Drainage problems and the potential for recontamination of the Superfund remedial barriers were observed in the upland areas adjacent to the city. These upland areas include Burke, Nine Mile, and Placer Creek drainages. There are several mine workings susceptible to erosion and washout. Storm water runoff from mine dumps drains directly into residential properties in upland areas.

The Pearl Street area on the south side of Wallace does not have a storm water conveyance system to address drainage issues. The upstream areas of Burke Canyon and Nine Mile are devoid of any drainage infrastructure. These areas of the community experience frequent nuisance flooding due to inadequate drainage infrastructure. The problems created by the inadequate drainage infrastructure are multi dimensional and include nuisance flooding, erosion of Superfund barriers, transport of contaminated soils, and storm water and heavy metals inflow to the sanitary sewer.

Significant progress has been made over the last few years to remove contaminated material from the residential and commercial properties in the community as part of the Superfund Site remedial action. The long term integrity of the clean cap in parts of Wallace and the surrounding populated areas is at risk because of the drainage problems.

This drainage assessment was conducted by field evaluations of the drainage systems in the city, and the drainages upstream or adjacent to the city. Five populated areas (urban drainages) and five upstream areas (natural drainages) were delineated as study areas. Drainage issues were observed affecting each of these areas. These issues include:

- Ineffective storm water collection systems caused by improper surface grading or placement of storm water inlets,
- Erosion in gravel road shoulders along paved streets,
- Drainage from the public right-of-way extending into private property,
- Possible mine waste impacts on the public drinking water sources,
- Erosion of contaminated material affecting surface water quality,
- Storm water (heavy metal) inflow to sanitary sewer, and
- Deteriorated roads from uncontrolled drainage.

There is a potential for large-scale recontamination in the event of a major flood. Large mine activity areas were specifically observed upstream of the community. One hundred sixty-seven historical mine sites are located in the watersheds that drain into the study area. Four of the five major streams in the study area are diverted from their natural channel.

The recontamination potential associated with drainage problems can be mitigated with the expansion of the existing storm sewer within the city limits, and construction of drainage systems for the upstream communities in Nine Mile Canyon and Canyon Creek.

The drainage deficiencies in the City of Wallace and the surrounding upland areas appear to be isolated problems that can be addressed as discrete projects. The type of improvements that are needed can be implemented in a phased approach with benefits from each phase. The benefits to addressing the problems include reducing nuisance flooding, reducing storm water inflow to the sanitary sewer, ensuring safe drinking water, and maintaining integrity of the remedy.

Potential Loss of Private Property Improvements Due to Flood

Consult Section 4.2.6. for a detailed explanation of how land and improvement values were determined for this subsection of the analysis.

Properties within the city limits of Wallace have been assessed by the Shoshone County Assessor and this assessment was used for flood risk exposure analysis in combination with FEMA FIRM maps released September 2008. While the total value of land and improvements within Wallace City limits equals $59.7 million, the value of improvements on the land is approximately $51.4 million (Table 4.4). Improvement value in the 100-year flood zone of Wallace City is approximately $19.5 million. An additional $26.0 million of improvements are located within the 500-year flood zone of Wallace. The remaining $5.9 million of improvement value in Wallace City is located outside of flood zones (Table 4.4, Figure XXVII). Approximately 88% of the assessed private property improvement value in Wallace is in the combined 100-year and 500-year flood zones.

Rural properties located outside the City of Wallace have been grouped as properties in the (1) properties in the Placer Creek drainage, but outside City limits in this area, (2) properties in the

Burke Canyon area (Canyon Creek), (3) properties in the Nine Mile Gulch area, and (4) a general Wallace Rural classification accounting for properties near Wallace city limits downstream and along the Interstate. All of these areas were evaluated for their risk exposure to flood (Table 4.4).

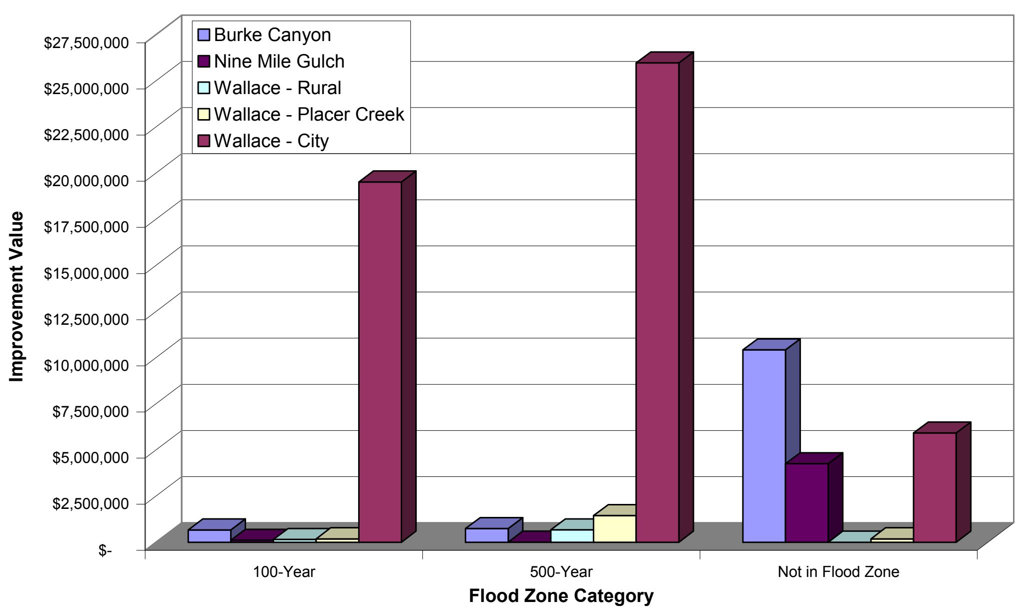
Wallace Placer Creek is a small area southwest of Wallace along Placer Creek with $2.3 million of land and improvements. This neighborhood has improvements valued at $1.8 million. Approximately $179,000 of improvements are located within the 100-year flood zone, with about $1.4 million in the 500-year flood zone (Table 4.4, Figure XXVII).

Burke canyon (Canyon Creek) properties are located to the northeast of Wallace, from the city limits northeast to the historic community of Burke. This area includes Burke, Gem, and Mace. The entire drainage area possesses approximately $15.8 million in land and property improvements. Of this total, about $11.8 million is assessed as personal property improvements. Only $663,000 of improvement value is located within the 100-year flood zone and $735,000 of improvement value is in the 500-year flood zone. The remaining $10.4 million is located outside of the flood zone (Table 4.4, Figure XXVII). A very large amount of the transportation infrastructure in this canyon is located in the flood zones.

Nine Mile Gulch, located to the west of Canyon Creek (Burke Canyon), is assessed at $6.1 million in land and property improvement value. Of this, approximately $4.3 million is property improvements. A very small amount of value ($104,000) of personal property improvements is located in the 100-year flood zone. There is no 500-year flood zone mapped in the Nine Mile Gulch drainage (Table 4.4, Figure XXVII).

The rural areas of Wallace include those properties located outside of the city limits and outside of the areas already described; most are downstream of Wallace along the Interstate. This area, referred to as Wallace Rural, is assessed at $1.4 million in property and improvements, with $809,000 of this value representing private property improvements. Only $144,000 of property improvements is located in the 100-year flood zone, with another $665,000 in the 500-year flood zone. None of the properties in the Wallace Rural area are outside the designated flood zones (Table 4.4, Figure XXVII).

Figure XXVII. Wallace City and Rural improvement value flood risk exposure.



Potential Loss of Public Property Improvements Due to Flood

Public structure improvement insured value has been cataloged for Wallace (Table 4.5). Approximately $17.3 million of insurance policy value is carried on public structures within the

Wallace City limits. All of this value is located within the 100-year flood zone. This collection of structures includes the Wallace City Hall, the Shoshone County Courthouse, and the Shoshone County Sheriff's Office.

Potential Loss of Superfund Site Remedial Actions Due to Flood

The City of Wallace has received substantial efforts to remediate contamination stemming from mining activities in this location. The exposure to existing remedial actions from potential flood damage is substantial. The establishment of remedial actions in the City of Wallace is estimated at $12.2 million (Table 4.6). Of this value, approximately $3.2 million is located on properties within the 100-year flood zone. An additional $8.0 million is located on properties within the 500-year flood zone (Table 4.6).

Additional areas centered around Wallace City include the rural areas listed above. Burke Canyon has received approximately $7.4 million in remedial actions with about $1.6 million located on properties in the 100-year flood zone, and $254,000 on properties in the 500-year flood zone (Table 4.6). Nine Mile Gulch properties have received approximately $355,000 of remedial action activities, with about 10% of that value ($35,000) located on properties in the 100-year flood zone. Placer Creek properties have received roughly $285,000 in remedial activities, with about 95% of that spent in the 500-year flood zone. The Wallace Rural area has received approximately $740,000 of remediation efforts as part of the Superfund Site cleanup and the majority of this effort has been on properties located within the 500-Year flood zone (Table 4.6).

5.1.6.2. Earthquakes

The long web of fault lines in the South Fork Coeur d'Alene River valley splits west of Wallace to straddle the community along the ridgelines to the north and south of the city. One particular fault line breaks formation with the nominal east-west trajectory of the faults in this region to run north-south on a bearing terminating just to the north of Wallace. The impact of this type of fault formation is to create a weakness in the "push-and-shove" shaking brought about in an earthquake, which can give way to a thrust-type fault movement. When this occurs the result can cause more local damage through shocks and jolts as opposed to continuous shaking.

Rockbursts are also common in this area and can be felt periodically in Wallace.

The seismic shaking hazards of this area are rated at moderate. Soils around Wallace are typical unconsolidated alluvial deposits with a high degree of river rock sediment. Stability is good but can be compromised when earthquakes hit an area where soils are supersaturated from rains or land use contributions.

A large number of structures in Wallace utilize masonry construction and are multiple-story buildings. Most of these structures were built before 1955 and their status for reinforcement is questionable. The area of the highest concentration of these buildings-at-risk is the historic downtown area covering virtually all of the commercial area.

Other structures in the city, such as the Wallace Junior/Senior High School maintained the façade presented by the brick motif but were constructed after building techniques and codes required reinforcement. These newer construction examples appear to be resistant to the hazards of earthquakes expected to be witnessed in this part of north Idaho.

Wallace's wood frame houses have embraced brick chimneys as a preferred appendage to homes and is observed in all of the residential areas of the city. The mix between reduced shaking hazards witnessed from internal to-the-frame chimney stacks, and increased shaking hazards from external wall-mounted chimney stacks is about 50/50 (Figure XIII). Because many of the homes were built to withstand deep snow loads, roof tops were made with steep pitches. Build Codes dictate that the chimney extend above the peak of the roof and therefore the external wall-mounted chimney stack extends many feet above the wall and is unsupported. These chimney stacks need attention and potentially reinforcement.

Several structures in Wallace, which were made from brick, were constructed after the time the city burned in 1910. Although some are single-story buildings, their status as unreinforced is further exacerbated by aging materials and crumbling external walls (Figure XIV). In the downtown area multi-story brick buildings face the same challenge of aging materials and collapse risk. Since Historic Wallace relies on this motif for a portion of its commerce, reinforcement and stabilization should take place before an earthquake event damages these structures beyond repair.

5.1.6.3. Landslides

Landslide risks in and around Wallace are concentrated on the steep hillsides adjacent to the South Fork Coeur d'Alene River valley, mainly to the north of the river. In these locations riverbank erosion cuts the toe of the slope and creates small-scale mass wasting events. Sediment and debris is transported downstream and does not typically directly impact homes. This debris movement does impact infrastructure.

Additional landslide risks are seen along the South Hill area of Wallace. Dozens of homes have been built on this steep hillside along single-lane access streets and avenues with names like High, Maple, Olive, Silver, Pearl, and Oak. Most of the streets in this part of town are reinforced with roadside stabilization solutions and home sites have the same types of reinforcements. One home observed on the west side of this collection of homes appears to have slid several feet down the hill with its foundation. Extreme caution should be applied to the homes in this area to consider micro-site stability factors and potential mass wasting that could cause complete failure of homes and infrastructure.

Potential Loss of Private Property Improvements Due to Landslides

Private property improvements within the City of Wallace are generally located in areas considered low in landslide risks. From the total of approximately $51.4 million of private property assessed value improvements in Wallace, about 95% ($49.0 million) is located on properties with the lowest consolidated Landslide Prone Landscapes risk score of 5 (Table 4.13). Another $1.9 million of private property improvements is located in risk category 15, and $488,000 is located on properties with a risk category of 25 (Table 4.13).

The rural areas surrounding Wallace all exhibit increased landslide risk profiles over the parcels in Wallace City. In Burke Canyon the total private improvement value is assessed at $11.8 million (Table 4.13). Of this total value, about 89% is in the lowest risk categories, but about 6% of this value is located on sites with a Landslide Prone Landscapes risk rating of 25 to 45.

Within the Nine Mile Gulch the majority of the $4.4 million total private assessed value (81%) rests on low risk (category 5) parcels. Most of the area’s remaining parcels with improvements are located on risk category 15 parcels, with a small amount located on risk category 25 parcels (Table 4.13).

Placer Creek rural homes (located outside the Wallace City limits) are appraised at $1.8 million. About $1.2 million of private value is located on low risk rated parcels (category 5), $475,000 is located on parcels with a risk category rating of 15, and $138,000 is located on parcels with a risk rating of 25 (Table 4.13).

All of the properties collectively called the Wallace Rural area have an assessed value of $809,000 and all of this is in the lowest landslide prone landscapes risk category of 5 (table 4.13.).

Potential Loss of Public Property Improvements Due to Landslides

All of the public property insured value of improvements in Wallace is located within the city limits, and all of this value is located on parcels with the lowest risk category rating of 5 (Table 4.14).

5.1.6.4. Severe Weather

Because of the location of Wallace, seated high in the South Fork Coeur d'Alene River valley system, and in a deep canyon bottom, weather impacts are amplified. Winter storms drop deep snows that can melt late in the spring because of a lack of direct solar radiation until the sun angle increases to clear the mountain ridgelines to the south. Although it may be the Center of the Universe, Wallace does not receive a lot of winter sunlight that might melt snow packs quickly.

Prevailing winds and storm fronts move eastward in the direction of Montana. They are lifted by area mountain ranges, causing rising air currents and subsequent condensing of the moisture. Storms drop their moisture load in the form of rain or snow, or both. Although this leads to a rain shadow effect eastward in Montana, it results in heavy precipitation in eastern Shoshone County.

The challenge for Wallace is to be prepared for the conditions that have defined life in this area since European settlement. The narrow streets of Wallace make snow removal difficult. Downtown areas have little space to store plowed snow, although off-site staging of snow accumulations is common.

Roofs of homes are almost exclusively steep-angle metal materials that shed snow easier than other roofing materials. Most of the historic downtown area's structures were made using masonry building materials. Seasonal snow removal is needed to ensure these low-pitch roofs do not collapse under the weight of snow loads. This becomes critical where building heat escapes through the roof because of less than optimal insulation. The warming of the snow from below (through the roof) causes the snow to partially melt, increasing the water content of the snow load. As more snow is added from continued snow fall, the weight increases substantially per foot of snow load on the roof. Eventually, structural failure can result. Examples of structure failure in Wallace have been detailed in earlier sections of this document.

5.1.6.5. Wildfire

The Wallace community is located within a forested area and is inherently at-risk to forest fires. With the history of Wallace in mind (1890 & 1910 fires), wildfire mitigation should continue as an important hazard prevention measure in order to protect the homes and businesses located within the forested and steep slopes of the community.

As additional development occurs in the Wallace area, it is important to develop roads, utilities and property boundaries with defensible space from wildfire in mind. Defensible space around currently standing homes is also an important mitigation measure in the prevention of fires moving from the town into the forest or visa-versa. Mitigation of these areas can greatly reduce the risk and possible damage to the infrastructure of the town in the event of a large wildfire in the area.

The fire prone landscape assessment of Wallace and adjoining areas reveals that while most of the remote gulches and mountain sides are prone to wildland fire events because of vegetation, slope, access constraints, and forest health, the areas within and immediately adjacent to Wallace are in comparatively good shape concerning wildfire risk. There are a few exceptions to this observation.

First, several homes are located on the South Hill area of Wallace. During the development of the 2002 Shoshone County Wildfire Mitigation Plan, this area was targeted for substantial wildland fuel mitigation efforts. Surface fuels were abundant, and ladder fuels tied surface fuels to tree crowns, homes, and garages. When the 2002 plan was implemented this area was given a high priority and most of the area was treated. The results are striking in terms of comparative risk between 2002 and 2008. The recommendation today is to maintain these treatments and improve road widths and access.

On the same southern hill, and to the east, in the direction of Weyer Gulch, several homes have been built to perch on the overlook to the city. Little in terms of wildland fuels mitigation has been done here, and these homes and their access would benefit from fuels modifications.

Homes located in Canyon Creek and Nine Mile Creek have been maintained in a checker-board combination of unprotected and protected sites. Some homeowners have maintained a green lawn, pruned trees, and kept surface fuels away from structures. Neighbors have structures built extremely close together and overtopped by a thick canopy of trees. The opportunities for consistent fuels mitigation work would make a difference to the defensibility of these homes.

The Placer Creek water treatment plant is nestled in the forest where wildfire has the potential to rage. The condition of Placer Creek from a vegetative health view is not unlike thousands of acres in the region. Access is provided on the Placer Creek road (USFS road #456), which parallels the river. Various forest health conditions and use patterns have united to create a mosaic of low-to-moderate-to-high fire danger in this drainage. Recreational access has increased in recent decades as this access road feeds numerous recreational trails for all terrain vehicles.

The 2002 Shoshone County Wildfire Mitigation Plan recommended a running fire-break extending from the Placer Creek Road at a distance of 150 feet on both sides of the road from the edge of the BLM ownership, along the road to the summit at Moon Pass. This project was not implemented because of environmental, political, financial, and temporal realities.

The Shoshone County Fire District №1, with a station located in Wallace, provides fire protection for homes in the city. The Idaho Department of Lands in Cataldo provides wildfire protection for most of this region.

Potential Loss of Private Property Improvements Due to Wildfires

Private property improvements within the City of Wallace are generally located on parcels with a low wildfire risk exposure in the center of the city, and higher risk profiles around the perimeter of the city. Out of the approximate $51.4 million assessed value of private properties in Wallace City, about $38.8 million is located on parcels with the lowest risk profile of 5 (Table 4.25). As consolidated parcel risk increases to category 15 the value exposed is approximately $4.5 million. At a risk category of 25 the value of improvements is $6.9 million, and at a risk category of 35 the assessed value of private improvements is about $1.2 million. Only a small amount of the total value in the City of Wallace is located on parcels in risk category 45 (Table 4.25).

Burke Canyon private properties are located in a mosaic of risk categories ranging from the low of 5 to consolidated risk categories as high as 45. Nearly $3.0 million of private property assessed value is exposed to risks of 25 and higher in this area (Table 4.25). Nine Mile Canyon, located to the west of Burke Canyon exhibits a similar risk profile with one notable exception: only 3% of the Nine Mile Gulch private property improvements are located on parcels with a risk rating of 5. The majority of the private improvements in this area are located on parcels with a consolidated risk rating of 35 ($2.3 million). These two drainages combined share a common need for home defensibility efforts and community protection through fuels modification.

Within the rural areas of Placer Creek, the wildfire profile places 90% of the private improvement values within the risk categories of 25 and 35 (Table 4.25). These areas share the need for wildland fuels modifications similar to Burke Canyon and Nine Mile Gulch properties.

The private property improvements located in the area labeled Wallace Rural have a total assessed private value of $809,000. None of this value is located on parcels with the lowest risk rating of 5 (Table 4.25). Approximately $415,000 is located on parcels with a risk rating of 15, $156,000 is located on parcels rated at 25, and $238,000 is located on parcels with a score of 35.

Potential Loss of Public Property Improvements Due to Wildfires

All of the public property insured value of improvements in Wallace is located within the city limits, and all of this value is located on parcels with the lowest risk category rating of 5 (Table 4.26).

5.2. Un-Incorporated Places Risk Assessments

Unincorporated communities in Shoshone County are numerous. The following section discusses each of the more populated places in the county and their exposure to the various forms of risk from natural hazards.

5.2.1. Silverton

Silverton is an unincorporated community located on the northern side of the South Fork Coeur d'Alene River between Wallace (to the east) and Osburn (to the west). The private land holdings in Silverton are surrounded by USFS, BLM, and forest industry lands on all sides. Interstate-90 defines the southern boundary of the community.

Revenue Gulch flows water from the northeastern sections of the community into Silverton and then southward along the ditch of Markwell Ave., until it intersects the South Fork Coeur d'Alene River. At one time, the USFS District Office was located in a building in Silverton and provided stability through jobs and general commerce. Today that office staff has relocated to an office site in Smelterville. The building where the USFS once was located is vacant and appears to be bearing the weight of time poorly. This building is owned by Shoshone County.

The Silver Wood Village Assisted Living Facility is located on the western side of Silverton on top of a general rise in topography to overlook the community. Also located in Silverton is the Silver Valley Special Services Pre-School, and a real estate office. These facilities represent the main sources of local commerce for the community. The remainder of the residents are mostly either retired or commute to other nearby communities for employment.

Much of the downtown area (about 32 acres) surrounding the former USFS Ranger District Headquarters and the current Wind River Building (three story brick building in the center of the public ownership) is in local government ownership and is also located in the 500-year flood zone. This site was the location of the Silverton school facility which is now closed. However, a track, football field, baseball field, and some play equipment are still located on this site.

5.2.1.1. Flood

Water flows from Revenue Gulch (Revenue Creek) present the highest complication to the private property in Silverton. Revenue Creek is a Shreve Stream Order 6 where it enters the community along the Revenue Gulch Road above 9th Street. The stream is curbed within the ditch of Markwell Ave. as it traverses southward to I-90. The contributing area of Revenue Gulch is not extensive but it does collect the surface waters from USFS, BLM, and forest industry lands in the area.

This stream network is prone to a flash flood profile with a propensity to overtop the road ditch and claim flood zones along Markwell Ave in the 100-year flood profile, and into the previously used school yard and former USFS District Office locations. Flood water transference must consider the additional burden of normal storm water conveyance, and the infrastructure in place is generally inadequate to these tasks. Several homes are located along this drainage route and subject to flood water damage.

Drainage Assessment Summary

The Town of Silverton Drainage Assessment report was intended to inform all entities involved with drainage, infrastructure, remediation, and the ICP in the Coeur d'Alene Basin (TerraGraphics 2008c). This assessment was prepared under the direction of the BEIPC by TerraGraphics, and was last updated on February 12, 2008. The assessment was part of a larger effort to develop a regional Basin IRP to identify infrastructure deficiencies and assist communities in prioritizing their public works projects and pursuing funding. The assessment also addressed the relationship of drainage deficiencies relative to the remediation work conducted through Superfund Site.

The assessment had two goals: 1) to identify drainage infrastructure deficiencies within the community, and 2) to identify the threat of flooding and recontamination from the surrounding natural drainages. The flooding threat is presented qualitatively and is intended to describe if a threat exists and the general characteristics of the threat.

The drainage infrastructure system in the Silverton community is deficient. The community relies on small drain systems installed by homeowners to address local drainage issues. The town does not have a public storm water collection and conveyance system. There is no curb and gutter system. Underground springs are located throughout town and are piped beneath streets and houses via small systems that have been installed by homeowners.

Storm water runoff from the public streets and rights-of-way drains onto private property. The town has steep streets that result in high velocity storm water runoff. Erosion of the remediation barriers installed under Superfund Site remediation efforts were observed during the assessment. Nuisance flooding due to insufficient drainage occurs within the community.

Revenue Creek is a threat for flooding and recontamination. This creek was diverted from its natural channel as the town developed. This creek flooded in 1996. Improvements constructed as a result of the 1996 event were only completed in the upper reach of this creek. It appears the improvements may have increased the risk of flooding in the downstream reach located in the community. Three mine activity areas were observed during the assessment. Thirteen historical mine sites are located in the watersheds that drain into the study area.

This drainage assessment was conducted by field evaluations of the drainage systems in the city and the drainages upstream or adjacent to town. The town was delineated into smaller study areas based on topography and common drainage infrastructure. Five populated areas (urban drainages) and two upstream areas (natural drainages) were delineated as study areas. Significant drainage issues observed throughout Silverton are as follows:

- Private storm water drain systems move drainage problems from upstream to downstream properties.
- Gravel road shoulders reconstructed during remediation of the community and located along paved streets erode due to high velocity storm water runoff on the steep grades.
- Storm water runoff from the public rights-of-way drains onto private property.
- There is a potential for recontamination caused by storm water transporting contaminated soils through the community.

Based on the assessment, the town of Silverton needs a storm water collection and conveyance system. A storm water system would solve the drainage and erosion problems within the community. A drainage plan should be developed to identify alternatives for the type of system that should be constructed and the associated costs.

There is a threat of flooding and recontamination from Revenue Creek and the South Fork of the Coeur d'Alene River. The degree of risk and possible measures to mitigate the risk of flooding need to be determined by hydraulic modeling of the systems as the extent of the risks are not easily understood through a visual assessment.

Potential Loss of Private Property Improvements Due to Flood

Consult Section 4.2.6. for a detailed explanation of how land and improvement values were determined for this subsection of the analysis.

The community of Silverton has approximately $28.5 million of personal property improvement value assessed by the Shoshone County Assessor (Table 4.4). Of this value, approximately $2.5 million of personal property improvements are located within the 100-year flood zone. The majority of the structures attributable to this value are located along Markwell Ave. and Interstate-90. Within the 500-year flood zone, which is much more expansive to the west of Markwell Ave. and includes a substantial area of school district property, approximately $11.7 million of personal property improvements are found. The remaining $14.3 million of improvements in Silverton are located outside of the FEMA flood zone (Table 4.4).

School district facilities are located in Silverton, but are currently out of public use and not valued in this report. Thus, no public structure values are included in this estimate.

Potential Loss of Superfund Site Remedial Actions Due to Flood

The community of Silverton has received substantial efforts to remediate contamination stemming from mining activities. The exposure to existing remedial actions from potential flood damage and storm water movement is substantial. The establishment of remedial actions in the community is estimated $7.3 million (Table 4.6). Of this value, approximately $1.9 million is located on properties within the 100-year flood zone. An additional $3.5 million is located on properties within the 500-year flood zone (Table 4.6).

The protection of homes, personal property improvements, and the remedial actions taken as part of the Superfund Site cleanup efforts can only be protected through an improved storm water and flood water conveyance system throughout the community to the confluence with the South Fork Coeur d'Alene River.

5.2.1.2. Earthquakes

The exposure of Silverton to seismic shaking hazards and fault lines is similar to the risk profile of other communities along the Silver Valley. One notable fault line is located north of, and parallel to, the South Fork Coeur d'Alene River and cuts through the northern third of the community roughly along 9th street.

The exposure of Silverton to seismic shaking hazards can be witnessed in three instances. The first is the presence of the three-story brick building located along Satherfield Rd. in the geographic center of the community (Wind River Publishing building). While this building appears to be fundamentally sound from a structural standpoint, there are several indicators that point to possibly unstable features. These factors include cracks between the foundation and the brick walls at the base, unsteady mortar between bricks, and the extended brick chimney of the structure. This is a privately owned structure, surrounded by publically owned property. If this structure is to be used for commercial purposes into the future, it is recommended that reinforcements to the structural stability be considered and implemented.

The second instance of seismic shaking hazards to Silverton is the common issue for most communities in the Silver Valley – brick and mortar chimneys. While some of the homes in the community exhibit brick or metal chimney structures located along an interior wall and show signs of strength and internal support, others do not. Some of these less than desirable examples show crumbling mortar between bricks, extended reaches from wall-support to the terminus of the chimney and even missing brick material. Correcting these faults in the chimney structures and adding vertical supports would reduce the potential of damage in the event of seismic activity in the area. This should be considered for all residential areas of Silverton.

The third exposure to seismic shaking activities in Silverton is the presence of several mobile homes in the southwest reaches of the community. No conclusive details are available concerning the foundations under these homes. However, at least two mobile homes were observed with missing base-skirts to reveal stacked cinder block mounting. In the event of seismic shaking activities these homes could shake off their base to cause structural damage and injury to people inside or beside the structures. A complete review of these homes and an improvement plan should be developed and implemented to improve the protection of people and structures.

5.2.1.3. Landslides

Landslide risks in and around Silverton are minor. Most of the community is located on the sloping profile of Revenue Gulch with moderated valley-type meadow at the south side of the community. The Landslide Prone Landscape assessment of this community shows a slight increase in this profile along the hillside sloping away from the Silver Wood Village Assisted Living Facility. However, this hillside supports a healthy forest vegetation type that is generally considered to moderate landslide risk.

Potential Loss of Private Property Improvements Due to Landslides

The total value of private property improvements in Silverton is approximately $28.5 million. Of this amount, about $26.5 million is located on properties that support the lowest consolidated Landslide Prone Landscapes risk rating of 5 (Table 4.13). Approximately $2.0 million of private property improvements are located on parcels with a risk rating of 15, and $60,000 of private improvement value is located on parcels showing a risk rating of 25 to potential landslides (Table 4.13). Generally speaking, Silverton has a relatively slight risk exposure to landslide risks.

5.2.1.4. Severe Weather

Silverton is located within the tightening walls of the South Fork Coeur d'Alene River system where snow accumulations are substantial. On one hand, Silverton's situation is moderated in comparison to its neighbors, Wallace and Osburn, as Silverton is located north of the river system while its neighbors are located on the southern side. This northern venue allows more direct sunlight to melt snow loads earlier than other locations. On the other hand, Silverton does not have the access to snow plowing equipment that an incorporated city might have. Silverton is plowed by local residents and the county. Snow staging areas have been limited as the community access routes are narrow and homes are built close to the travel surfaces. Snow staging in the area of the old schoolhouse has been observed.

Numerous examples of unstable roofing attachments were observed in Silverton. As with other assessments, some of the structures exhibit excellent roof resistance to wind damage, while others do not. A moderating factor to Silverton's wind exposure profile is the presence of a ridgeline west of Silverton and another to the east. This undulating topography breaks the direct force of winds rolling up the valley. While this factor does not eliminate the risk exposure to high winds, it does diminish the risk marginally.

Trees overtopping structures are observed throughout Silverton. These trees are a mix of conifer and hardwoods. The hardwoods are mainly variants of poplar trees, which are notorious for breaking during wind storms and landing on the valuables located nearby. The conifer trees located throughout the community are a mix of Colorado blue spruce, Douglas-fir, and ponderosa pine. Fortunately, most of these examples are shorter than their hardwood neighbors and less prone to breakage during a wind storm.

5.2.1.5. Wildfire

The main area of the community of Silverton is considered at low risk to wildfire spread. However, at the perimeter of Silverton where community homes are nestled against the surrounding forests, the wildfire loss potential is substantially higher. This region has witnessed past wildfires that are prone to burn in these natural forestlands.

The eastern side of the community includes land under private and BLM ownership. A similar profile is observed to the north of the community where private and USFS ownership dominates. To the west of Silverton a combination of private, forest industry, and BLM ownership is seen. Completing the compass to the south, the parcels consist of a mix of forest industry and BLM ownership. This property supports a generally healthy forest ecosystem on moderately steep slopes. These slopes are not immune to wildfire risks. Only a moderate amount of fuels mitigation efforts have been concentrated around Silverton properties.

On the positive side, the juxtaposition of the community to the Interstate is a positive factor in the potential unlucky event of an evacuation or in the response mode of ingress by emergency services. Silverton receives structural fire protection by Fire District #1 with a station in Osburn. Wildfire protection is provided by the Idaho Department of Lands in Cataldo.

Potential Loss of Private Property Improvements Due to Wildfire

The Shoshone County Assessor has assessed Silverton to contain approximately $28.5 million of private property improvements. Of this value about $15.2 million of private improvements are located on parcels within the lowest consolidated Fire Prone Landscapes risk rating of 5 (Table 4.25). As the risk rating increases to 15, the value of private improvements is approximately $10.1 million; with an estimated value of $2.0 million at a risk score of 25, and improvement values of $1.1 million at a risk category of 35. At the high end of the scale, a risk factor of 45, Silverton private landowners have just over $156,000 at risk (Table 4.25).

This risk profile demonstrates the exposure the ownership periphery of Silverton has to wildfire risks. Fortunately, the community is not battling forest health issues (from insect or disease). The challenge is to create and maintain home defensible spaces, moderate the factors of structural ignitability, and generate a community defensible buffer between the forests and the community.

These efforts will be especially productive along the eastern boundary of Silverton along Revenue Gulch, then continuing this community defensible space, crossing Revenue Gulch, after encompassing all of the private homes in the upper drainage, and moving eastward along the northern perimeter of the community. None of these efforts will make Silverton immune to wildfire risks, but these efforts will increase the ability of firefighters to control blazes before homes and people are damaged or injured.

5.2.2. Kingston / Enaville / Cataldo

The communities of Cataldo, Kingston, and Enaville are located at the entry to Shoshone County from the west along Interstate-90. These communities are not incorporated but there is a substantial population living in this area as well as some of the regional support services (Idaho Department of Lands Office in Cataldo).

The Cataldo community spans into both Kootenai County and Shoshone County, mostly along the Interstate. On the eastern side of the community a small amount of livestock farming is visible. Ownership patterns consist mainly of private and forest industry holdings. The Idaho Department of Lands Cataldo office is located inside Shoshone County, south of I-90 along Hilltop Overpass and Silver Valley Road. The Kingston-Cataldo Sewer District also provides services from this location with final treatment by the South Fork Coeur d'Alene River Sewer District at the Page Waste Water Treatment Plant. Private homes are nestled into the forest vegetation throughout this area.

Kingston is located to the east of Cataldo and west of Pinehurst, and is adjacent to the Interstate and the Main Fork Coeur d'Alene River. Here the South Fork, the North Fork, and the Main Fork of the Coeur d'Alene River have combined and continue the journey to Lake Coeur d'Alene. A small amount of local commerce is present here in the form of a convenience store, gas station, and auto service. Private homes are located in the general Kingston area, mostly placed in close proximity to Interstate-90 and along the drainages to the south of the Coeur d'Alene River including Hunt Gulch and French Gulch.

Enaville is northeast of Kingston along the North Fork Coeur d'Alene River. Here the access from the Interstate is left behind and the Coeur d'Alene River Road is used. This two-lane route follows the Coeur d'Alene River upstream to access this drainage and the communities of Prichard, Murray, and Eagle, ultimately crossing into Montana via Thompson Pass after a turn at Prichard. Commerce in Enaville is centered around a gas station and the Snakepit Bar and Grill. Rural residences in this area are concentrated along the river. Directly east of Enaville a small community of structures is located in an area referred to as the Bear Creek Community; a sub-division of private land surrounded by forest industry holdings and State of Idaho property.

5.2.2.1. Flood

Floods are a striking reality in the Enaville, Kingston, and Cataldo corridor. Here, one of the two the major river systems of Shoshone County combines into a single river channel on its way to Lake Coeur d'Alene. The South Fork Coeur d'Alene River is a Shreve Stream Order 718, while the Main Fork Coeur d'Alene River is a Shreve Stream Order 2,272, producing a Shreve Stream Order 3,020 as the Main Fork Coeur d'Alene River leaves Shoshone County.

From a flood water management standpoint these characteristics represent a daunting challenge to ensure free flowing water during a flood event. Fortunately, the Main Fork Coeur d'Alene River has not experienced the development pressures from expanding communities and floodplains converted to other uses. The floodplain of the North Fork Coeur d'Alene River is mostly functioning normally. A few notable exceptions to this are seen in Enaville and upstream where numerous private properties have been purchased by the County following repetitive loss events from flooding.

The FEMA Flood Zone along the Main Fork Coeur d'Alene River is mapped to include the nominally flat river bottom area where flood waters would be expected to stand. Most of the Coeur d'Alene River Road traverses the eastern boundary of the flood zone and has been overtopped by floodwaters frequently. Most of the structures in this community are also within the 100-year flood zone.

At the confluence of the two river systems the 100-year flood zone expands notably. The South Fork Coeur d'Alene River is combined with discharge from Bear Creek, a stream that also possesses a 100-year flood profile and several structures at-risk. This lower order confluence of Bear Creek and the South Fork Coeur d'Alene River is only 2,500 feet from the next confluence, a major joining with the Main Fork Coeur d'Alene River. Less than a mile downstream French Gulch enters the system followed closely by Hunt Gulch discharge.

Here backflow pressures are substantial as Kingston often shows standing flood waters at the interchange of Interstate-90 and Coeur d'Alene River Road. Structures are frequently found to be at-risk to flood damage and the roadways are covered with flood water and debris.

Unfortunately, new housing development is seen in both Hunt Gulch and French Gulch, very near the respective rivers and completely within the 100-year flood zone. These new homes do not exhibit the trademark flood protection measures that would mitigate future damages from flooding. Both access roads through these gulches traverse the 100-year flood zone and parts of the 500-year flood zone through the extent of the mapped risk areas. French Gulch drains an area about twice the size of that area drained by Hunt Gulch. The river system adjacent to French Gulch Road shows signs of high water flow velocity that has eroded cutbanks and undercut culverts in the area.

Throughout the Kingston and Cataldo area, storm water drainage is reliant on roadside ditch networks to deposit surface water flow into the nearby stream. This is especially problematic when surface soils are saturated or covered with a frozen layer of snow. Drainage systems quickly overtop their bank-full widths and lead to small scale flooding. When heavy storms hit, especially as a rain-on-snow event, the result is rapid flooding incidence. All of the Coeur d'Alene River flooding profile is consistent with riverene flooding of the slow kind. The potential high yield of water is staggering from Enaville downstream. Water flows from Hunt Gulch and French Gulch are characteristic of flash flood profiles. However, unlike many of the other flash flood profile streams seen in this river network, both gulches possess a small flood water storage area just above the confluence with the Main Fork Coeur d'Alene River. As already detailed, developments within this flood zone are present, and directly at-risk to flood damages.

Potential Loss of Private Property Improvements Due to Flood

Consult Section 4.2.6. for a detailed explanation of how land and improvement values were determined for this subsection of the analysis.

Private property assessed values in each of these three communities have been summarized in Table 4.4. Each will be considered separately in this section of the report.

Enaville private property assessed improvement value is estimated at $4.5 million. This includes the properties along the river in the area generally considered to be Enaville, and the private properties along Bear Creek subdivision to the east of Enaville. Approximately $1.9 million of private property improvement value is located within the 100-year flood zone. There is basically no 500-year flood zone mapped for this area. The conceptual reasoning behind this omission is that the 100-year flood zone occupies the entire "flat river bottoms" so that any extension of this zone would be experienced through flood depth and not extended width. The remaining $2.9 million of private property improvement value is located outside of the flood zone (Table 4.4). Literally all of the access to this region traverses the 100-year flood zone area.

Individual private properties in Kingston have been assessed by the Shoshone County Assessor to comprise approximately $35.1 million in value. Of this amount about $4.9 million is located within the 100-year flood zone (Table 4.4). The relative size of the 500-year flood zone in this area is small and no private property improvements were identified in these areas. The remaining private value of private property improvements in Kingston totals about $30.3 million (Table 4.4). As with Enaville, all of the access to these areas must traverse the 100-year flood zone.

The Shoshone County portion of Cataldo is located generally into two separate areas. The first area, where the Idaho Department of Lands office is located, is on a topographical rise well outside of the flood zone. The other area is located along the Main Fork Coeur d'Alene River adjacent to the Shoshone-Kootenai County line. These properties are squarely within the 100-year flood zone. Out of the total assessed private property improvements of $4.2 million, approximately $1.3 million is in the 100-year flood zone (Table 4.4). Again, very little in the way of a 500-year flood zone has been mapped for this area of the Main Fork Coeur d'Alene River. The remaining appraised private property value of $2.9 million is located outside of the FEMA flood zone.

Potential Loss of Public Property Improvements Due to Flood

Only the Idaho Department of Lands in Cataldo has provided a value for public improvements. All of this value is located outside the FEMA flood zones, and thus no public value of structures is listed as being at-risk to flood damage (Table 4.5).

Potential Loss of Superfund Site Remedial Actions Due to Flood

The communities of Enaville, Kingston, and Cataldo have received substantial remediation efforts to mitigate contamination stemming from mining activities. The exposure to existing remedial actions from potential flood damage and storm water movement is substantial.

The establishment of remedial actions in the Enaville area is minimal and estimated at $39,000 (Table 4.6). Of this value, only $3,500 is located on properties within the 100-year flood zone. The remaining $35,000 is located outside of the flood zone (Table 4.6). Enaville is located outside of the Superfund Site, but some of the properties in the area are within the site and have been attributed to Enaville.

Kingston is within the Superfund Site and has received substantial remedial action efforts. The total value of remediation activities in the area totals approximately $8.4 million (Table 4.6). Of this total, approximately $1.7 million has been located on properties within the 100-year flood zone, and $104,000 has been located on properties within the 500-year flood zone. The remaining $6.6 million has been located on properties outside the flood zone (Table 4.6).

Cataldo properties within Shoshone County have received approximately $607,000 in remedial action value (Table 4.6). Of this total, only $84,000 is located on properties within the 100-year flood zone. All of the remaining remediation effort value is located on properties outside of the FEMA flood zones (Table 4.6).

The protection of homes, personal property improvements, and the remedial actions taken as part of the Superfund Site cleanup efforts can only be protected through an improved storm water and flood water conveyance system throughout these communities.

5.2.2.2. Earthquakes

The exposure of these communities to seismic shaking hazards and fault lines is similar to the risk profile of other communities within Shoshone County. One notable fault line is located underneath Interstate-90 from the county line to Pinehurst. Parallel fault lines accompany this fissure, separated by a couple of miles.

Most of the structures in this tri-community area are private homes and small businesses built using wood-frame construction materials. There are a few exceptions to this observation as brick and mortar, multi-story structures are present. One of these examples was listed as “for sale” during the field work observations.

Unlike most of the Silver Valley, the chimney structures in these communities were not typical of the steep-pitch roofs and extended (and unsupported) brick chimney stacks. In this area, many of the wood frame structures support a more moderate roof slope and the chimneys are for the most part internal to the structure walls and pose little if any hazard to collapse.

5.2.2.3. Landslides

Landslide risks in and around Enaville, Kingston, and Cataldo are relatively minor. The only exception of note to this generalization is the southern edge of the Bear Creek watershed near its confluence located between the South Fork Coeur d’Alene River and Bear Creek. In that location potential landslide profiles show more instability. Fortunately, there are no homes located in this area to become damaged from landslide activity.

Potential Loss of Private Property Improvements Due to Landslides

The total value of private property improvements in Enaville is approximately $3.8 million. Of this amount, about $2.8 million is located on properties that support the lowest consolidated Landslide Prone Landscapes risk rating of 5 (Table 4.13). Approximately $923,000 of private property improvements are located on parcels with a risk rating of 15, and $90,000 of private improvement value is located on parcels showing a risk rating of 25 to potential landslides (Table 4.13). Generally speaking, Enaville private property improvements have a relatively slight exposure to landslide risks.

In Kingston, the level of assessed private property improvements is $35.1 million. Most of this value ($28.3 million) is located on the lowest consolidated Landslide Prone Landscapes risk category of 5 (Table 4.13). Approximately $6.5 million of private property improvements is located on parcels with a risk category of 15, and only $197,000 is located on properties with a risk category of 25 (Table 4.13).

In Cataldo, the level of assessed private property improvements is approximately $4.2 million (Table 4.13). Most private property value (84%) in this area is located on parcels ranked in the lowest risk category of 5. Approximately $408,000 of private property improvements are located in risk category 15 lands, and the remaining $265,000 of private property improvements are located on properties in the risk category 25 (Table 4.13).

Potential Loss of Public Property Improvements Due to Landslides

Only the Idaho Department of Lands has a public structure in this area that is included in the assessment. The total $1.0 million value of this facility is located in the lowest Landslide Prone Landscapes risk category of 5 (Table 4.14).

5.2.2.4. Severe Weather

Enaville is located at the focal point of the confluence of the North Fork Coeur d'Alene River and Main Fork Coeur d'Alene River, while Cataldo and Kingston are located along the Main Fork Coeur d'Alene River, with Kingston situated near the confluence of the South Fork Coeur d'Alene River and Main Fork Coeur d'Alene River. Weather patterns generally move from west to east during severe storm events and can impact this area significantly. Heavy rains, sustained snowfall, and high winds can impact structures through this dangerous combination.

Homes in this area are a combination of newer construction and well established structures. The newer construction shows roofing materials and design relatively well suited to the environmental conditions of this area. Some of the older construction shows signs of weather beaten wear-and-tear. Metal roofing materials on several structures of this latter category are partially torn from the corners of the roof and structure walls. Cedar shakes on some of the outbuildings, such as barns and garages, show missing shakes or damaged alignment. Some of the structures supporting metal roofs were also designed with an inconsistent roof pitch, starting steep and then moderating to an almost flat relief. Winter time observations show these roofs hold excessive snow load accumulations.

On the positive side of the severe weather consideration, many of the structures in this area are not overtopped by trees prone to breakage in wind storms. There are notable exceptions to this scrutiny, but in general structures are not at an increased relative risk to tree breakage damage from wind storms. On the other hand, the power line infrastructure in the are is at increased risk to tree breakage. Power line routes along Silver Valley Road, Hunt Gulch Road, French Gulch Road, and even along Valley View Road (north of the Main Fork Coeur d'Alene River) show notable instances of trees overtopping power lines and where wind damage potential is elevated.

Finally, the ability to plow large accumulations of snow is limited. While the main road systems mentioned above are generally plowed, the snow accumulations are mainly pushed to the sides of the roads. Home sites are not typically nestled against the road surfaces, but snow removal provides challenges for many homeowners. A winter time survey of this area reveals many personal trucks sporting mobile snow plow attachments to the front bumpers.

5.2.2.5. Wildfire

The wildfire exposure profile of the tri-community area around the Coeur d'Alene River confluence is highly variable. Many of the low elevation grass lands are at very low wildfire risk. Nearby, homes nestled within the dense forest environment are at increased risk to loss from a wildfire. The largest complication for the homeowners in this area is a general lack of home defensibility space.

Several homes enjoy the visual and noise buffer benefits of wooded vegetation between their home and the homes of neighbors and to decrease sounds from the Interstate. However, these forest trees are accompanied by shrubs, dried grasses, suppressed trees, and other normal forest litter that is at-risk to spreading wildfires. While there are some examples in this area of homes where fire defensible space has been created and maintained, the overall application of this technique is low.

The vegetative profile of this area is susceptible to wildfire spread. When wildfires spread, they often burn homes located within the path of the fire. Fortunately, there are two moderating factors which relieve the pressure on local homeowners in this area. The first factor is the presence of a generally moderate terrain. This moderate terrain does not tend to encourage wildfire spread as steep slopes can. Various locations in this immediate area have steep slopes, but in general they are not long reaches of long and steep slopes with heavy forest vegetation.

The second moderating factor is the presence of the Idaho Department of Lands Fire Office in Cataldo. These communities can generally rely on a rapid response to wildfire ignitions before fires spread to any significant size.

Even considering these factors, the residents of this area are encouraged to participate in the creation of home defensibility space, and reducing the factors of home ignitability through roofing, decking, and siding material selection.

Potential Loss of Private Property Improvements Due to Wildfire

The Shoshone County Assessor has assessed Enaville to contain approximately $3.8 million of private property improvements. Of this value, only about $94,000 of private improvements are located on parcels within the lowest consolidated Fire Prone Landscapes risk rating of 5 (Table 4.25). As the risk rating increases to 15, the value of private improvements increases to approximately $1.6 million. At a risk score of 25 the private property improvement value is estimated at $1.8 million and at a risk category of 35 the improvement values at risk total $357,000 (Table 4.25).

A similar wildfire risk profile is revealed in Kingston where approximately $35.1 million in private property improvements are located. About $6.2 million of this private property improvement value is located in the lowest Fire Prone Landscapes risk category of 5 (Table 4.25). As the risk category is increased to 15, the private assessed value of private property improvements is roughly $16.5 million. About $9.6 million of private property improvements are located on parcels with a consolidated risk rating of 25, and $2.8 million are located on parcels with a consolidated risk rating of 35. Only a small amount of total value in this area ($75,000) is located on parcels with the highest consolidated Fire Prone Landscapes risk score of 45 (Table 4.25).

The Cataldo area is perhaps more pronounced in its wildfire risk profile than either of its neighbors. This is partially owing to the increased placement of this community in the forest-urban interface. Of the $4.2 million of assessed private property improvements in this area, approximately $675,000 is located on parcels rated in the lowest risk category of 5, and $935,000 is located in risk category 15 (Table 4.25). As the risk categories increase further to 25, the assessed private property value increases to $1.6 million, and at risk category 35 roughly $1.1 million of private property improvement value is at risk (Table 4.25). This profile demonstrates that more private property value is in higher risk categories than in lower risk categories. This area is an excellent location to increase home defensibility efforts.

Potential Loss of Public Property Improvements Due to Wildfire

The public property risk exposure to wildfire in Cataldo can be assessed on two levels. First, this facility is located on a parcel at the lowest rated wildfire risk rating of 5. Second is the recognition that this facility, the Idaho Department of Lands office, is the central wildfire fighting facility in Shoshone County and at almost no risk to loss from a wildfire!

5.2.3. Prichard / Murray

Prichard is located along the Main Fork Coeur d'Alene River almost 25 miles upstream from Kingston. The river corridor surrounding and downstream from Prichard has been populated by private structures in a combination of year-round residents and summertime visitors. Much of the private property development in this area is along the Main Fork Coeur d'Alene River corridor, and consequently within the FEMA flood zone. The USFS manages vast territories in this region beginning immediately adjacent to the private landholdings along the river low-lands.

Beaver Creek enters the Main Fork Coeur d'Alene River at Prichard. The Beaver Creek area also contains a thin sliver of private lands straddling a river system. The area of Delta is located along the Beaver Creek Road. Beyond the private landholdings in this area, the USFS manages the forestlands. The Beaver Creek Road traverses a route generally heading southward and ultimately enters the Silver Valley at Wallace (Nine Mile Creek Road). A once dirt and gravel road, this paved rural road crosses the divide at Dobson Pass to enter the South Fork Coeur d'Alene River drainage. Access for forest industry logging trucks, mining equipment, and local residents/visitors is provided through this route. Dobson Pass is not a preferred route to traverse in the winter when heavy (or light) snows are present. However, it is an important infrastructure component of the area.

Near Prichard, the Coeur d'Alene River Road meets the Prichard Creek Road. The Prichard Creek Road follows the stream by the same name through the community area of Eagle and Murray, then finally crosses over the Rocky Mountain divide at Thompson Pass. This pass is generally closed in the winter months due to snow, but during the warmer months this route is traversed by local residents, commercial logging trucks, and vacationers.

In Prichard, where Beaver Creek meets the North Fork Coeur d'Alene River, there are several sites of local business and a scattered number of structures. Included in this collection of structures are a couple taverns, a small resort, a gas station, and a fire station (Prichard-Murray Volunteer Fire).

The Prichard Creek Road travels parallel to Prichard Creek past the joining of Eagle Creek with Prichard Creek. Murray is situated parallel and to the north of the Prichard Creek Road. Murray is literally a one-street community spanning the terminus of Buckskin Gulch, Alder Gulch, Gold Run Gulch, and Cougar Gulch. These private properties are tightly packed together and surrounded by USFS land.

5.2.3.1. Flood

Each community in this area is potentially impacted by flood waters. From the homes and businesses located along the North Fork Coeur d'Alene River, to the homes located along Beaver Creek and Prichard Creek, a significant exposure to flooding risk is present. At Prichard, below the confluence with Beaver Creek, the North Fork Coeur d'Alene River is a Shreve Stream Order 1,462, approximately twice the size of the South Fork Coeur d'Alene River Shreve Stream Order number where it meets the North Fork at Enaville and Kingston.

The North Fork Coeur d'Alene River is prone to riverene flooding of the slow kind and the fast kind. The steep "V" shaped valley bottom of this river system in its upper reaches translates into lower-system flooding where the flood plain begins to widen significantly more. This widening occurs near Prichard and continues as the observations are made downstream.

Both Beaver Creek (Shreve Stream Order 98) and Prichard Creek (Shreve Stream Order 242) are prone to flash flooding profiles. Both stream networks are capable of heavy debris flow and high water velocities. Prichard Creek, especially, is prone to larger flood event capacity matching a riverene flood type of the fast kind. At Murray the Shreve Stream Order is 95 on Prichard Creek. Several lower order streams pass through Murray on the way to join Prichard Creek. These streams are all Shreve Stream Orders 1 through 6 and prone to flash flooding profiles although none of them drain extensive watershed areas.

Murray possesses no integrated storm water drainage systems. Surface waters are transported through road ditch networks into the nearby streams and transported through culverts to Prichard Creek. This causes the complication of spring and warm-wintertime standing water in and around the community while soils are saturated.

The limited area mapped as a 100-year and 500-year FEMA flood zone around Eagle encompasses many of the local structures at the interchange between the Prichard Creek Road and Eagle Road.

It is apparent that the mapped flood zone was created to consider only the populated places along Prichard Creek. Mapped flood zones by FEMA only include areas surrounding Murray, Eagle, and Prichard. On-site evaluations reveal a significantly larger flood zone exists along Prichard Creek, Eagle Creek, and Beaver Creek.

Potential Loss of Private Property Improvements Due to Flood

Consult Section 4.2.6. for a detailed explanation of how land and improvement values were determined for this subsection of the analysis.

Prichard rural areas possess approximately $10.2 million in assessed private property improvements (Table 4.4). Of this value, approximately $3.9 million of assessed value is located on parcels within the 100-year flood zone, and $1.3 million is located on parcels in the 500-year flood zone. The remaining $4.9 million is located outside of a mapped flood zone.

Within Murray the assessed private property improvement value is approximately $2.0 million (Table 4.4). However, when the FEMA FIRM map analysis was created none of the community was mapped as being within the flood zone. The entire flood zone is considered only for Prichard Creek located south of Prichard Creek Road. In fact, the FEMA Flood zone appears to follow a path not shared by the actual location of Prichard Creek. The flood zone area is situated along the northern boundary of the Prichard Creek channel while the river during low flows is located along the southern edge of the channel. This area and all of Prichard Creek may be considered for additional FIRM mapping efforts by FEMA.

Within the Eagle area, approximately $732,000 of private property improvements are located (Table 4.4). About $81,000 of this value is located in the 500-year flood zone, a slight amount is located in the 100-year flood zone, and the remaining $649,000 is located outside the flood zone.

Potential Loss of Public Property Improvements Due to Flood

The Prichard-Murray Volunteer Fire Department structure is the only public facility in Prichard with insurance values provided (Table 3.12). The County Shop Road District #1 located in Murray is the only public facility in that location (Table 3.12). Because of the mapping techniques used in Murray, that building is not mapped as being within the flood zone. The Prichard-Murray Volunteer Fire Department station in Prichard is located within the 500-year flood zone with an insured value of $91,000 (Table 4.5).

5.2.3.2. Earthquakes

The majority of the northern two-thirds of Shoshone County is located within an area considered at moderate risk to seismic shaking hazards. The only area within Shoshone County considered at high risk to seismic shaking hazards is located northeast of Murray, near the Montana State line. These designations are not as “line-defined” as mapping would seem to indicate. Instead these transitions from moderate-risk to high-risk should be considered on a continuously changing scale. With this in mind, it could be considered that the Prichard and Murray areas represent the highest seismic shaking hazard exposure to populated places in Shoshone County.

The fault line geology of this area is different from that of other areas discussed in this report. Along most of the river drainage areas of Shoshone County the fault lines are arranged largely parallel to the general direction of the major river systems. In the Prichard to Murray area the fault line orientation is not parallel to the North Fork Coeur d'Alene River system, but instead is parallel with the crest line of the Rocky Mountains. All of the faults in this area are characteristic slip-faults.

Structures in this area are all the result of wood-frame construction techniques. There are several chimney stacks built from mortar and brick, and many of these would benefit from reinforcement. However, few of the structures are multiple story buildings with extended chimney structures that would otherwise be at increased risk during seismic events.

5.2.3.3. Landslides

The surface geology of the Prichard – Murray area is consistent with alluvial deposits and eroded parent materials. The slopes in this area are normally steep and show continuous vegetation. Where road construction and site developments have cut into the toes of slopes, some small scale erosion has taken place. In other areas, where the site disturbance has been greater, the localized erosion has been significant.

In terms of risk exposure to private and public structures, very little relative risk is seen from landslide events.

Potential Loss of Private Property Improvements Due to Landslide

Within the community of Eagle, approximately $732,000 of private property improvements are assessed by the Shoshone County Assessor and all of this value is located in the lowest landslide risk category of 5 (Table 4.13). The Community of Murray is similarly situated in landslide stable locations where the total value of assessed private property improvements is $2.0 million and 75% of that value is in the lowest landslide risk category (Table 4.13). Finally, Prichard properties are assessed by the Shoshone County Assessor with a total value of $10.2 million and all of this value is located on properties with a Landslide Prone Landscapes consolidated risk category of 5 (Table 4.13).

Potential Loss of Public Improvements Due to Landslide

The Murray road district facility owned by Shoshone County is located in Landslide Prone Landscapes risk rating score 5 (the lowest rating) placing the entire $291,000 insured value in that category. The Prichard-Murray Volunteer Fire Station is located in risk category 15, placing that $91,000 value in the slightly elevated risk score. This latter risk category is reflective of the steep hillsides immediately adjacent to the structure.

5.2.3.4. Severe Weather

Severe weather effects are especially pronounced in this region of Shoshone County. The canyon walls drop steeply into the North Fork Coeur d'Alene River from high mountain peaks. Where topography is moderated, such as in the Prichard Creek and Beaver Creek drainages, the elevation is above 2,700 feet, and the surrounding peaks are as high as 5,800 feet.

These topographic combinations ensure sustained snow accumulations in the winter, preceded by early storms, and followed by rain-on-snow events in the spring. High winds are also common in these areas as storms roll up the valleys and approach the Rocky Mountain range.

Structures in this area are generally built to withstand the forces of nature. However, some of the roofing materials used appear to be much less than acceptable to withstand the combined forces of high winds and heavy snow loads. Many of these have stood the test of time, but some have stood this time-test better than others. New construction in the area generally exhibits the architectural designs needed to withstand severe weather conditions. Some of the existing structures appear to be good candidates for roof retrofits.

Hazard tree removal has been completed by many homeowners in the area. There appear to be many candidate locations for more hazard tree removal, especially in the area adjacent to the North Fork Coeur d'Alene River near Prichard. Fortunately, these homes are sheltered from high winds during most storm events.

5.2.3.5. Wildfire

Wildfire risks within the areas surrounding Prichard and Murray are very pronounced. This entire region contains the combination of forest vegetation, steep and moderate slopes, limited access in some areas, and low population densities. The majority of the land in this region is managed by the USFS. The only exceptions to this ownership pattern are scattered State of Idaho parcels and private holdings. Much of this region has burned historically, although many of these large fire events date back to the 1889-90 and 1910-1913 fires.

Home site defensible space is generally very limited. Most homes in this area support vegetative management measures consistent with a recreational use motif. This will become problematic in the event of a wildfire occurrence as these homes will show an increased resistance to fire control: they will be harder for firefighters to protect than sites with limited surface fuels next to the structures. Homeowners are highly encouraged to participate in WUI programs that control ignitable vegetation next to the homes and in communities, control factors of home site ignitability, and improve access to clusters of structures.

Potential Loss of Private Property Improvements Due to Wildfire

The private property improvements located near Prichard are assessed at $10.2 million (Table 4.25). The highest concentration of private improvement value ($6.3 million) is located on parcels with a Fire Prone Landscapes rating score of 25. More parcels with improvements valued at $658,000 have a risk rating score of 35. The lower ranked scores of 15 ($3.1 million) and 5 ($130,000) contain only one-third of the total private improvement value in this community (Table 4.25). These scores are reflective of the general recommendation for this area: mitigate the fuels near the homes in a home site defensibility zone.

In the area of Murray, the total assessed value of $2.0 million is also at increased wildfire risk. The largest component of private improvement value in this area (58%; $1.1 million) is on parcels with a Fire Prone Landscapes consolidated risk rating of 25 (Table 4.25). An additional $343,000 of private property improvement value is located on higher risk rated parcels with a consolidated score of 35. Approximately $481,000 of private property appraised value is located on parcels rated at 15, and no value is located on parcels with a score of 5 (Table 4.25). In Murray, a community defensible space program is highly recommended. This type of fuels mitigation project would establish a buffer zone around the north side of the community in an effort to increase the potential of stopping wildfire blazes encroaching on the community and its structures.

As structures in the area of Eagle are located near the confluence of two river systems, on moderate terrain, the fire risk profile is slightly reduced. Even with this moderating factor, approximately 58% ($1.1 million) of the assessed private property improvements are located within parcels with a Fire Prone Landscapes rating of 25 (Table 4.25). About $343,000 of private property improvements are located on parcels with a risk rating of 35, and the remaining $481,000 are on parcels with a risk rating of 15.

Potential Loss of Public Property Improvements Due to Wildfire

All of the public property insured improvement values in this area are tied into rural fire protection organizations. In Prichard, the $91,000 insured value of the fire station is located in an area rated at a Fire Prone Landscapes score of 15 (Table 4.26). In Murray the insured value of $291,000 is located on a parcel with a Fire Prone Landscapes risk score of 25.

5.2.4. St. Joe River Communities

The St. Joe River Valley spans the entire width of Shoshone County in a nearly continuous east to west line. The highest contributing area of the St. Joe River is on Illinois Peak, the highest point in Shoshone County at 7,700 feet (also located on the border between Idaho and Montana). The St. Joe River then flows to the exit point from Shoshone County to Benewah County at the county's lowest point, with an elevation of 2,132 feet. This 5,568 foot drop is made within a reach of roughly 100 miles. During this trek, there are no lakes along its path, with only moderate amounts of slack water flow. This drainage presents stunning valley walls covered with forest vegetation, exposed rocks, and signs of natural environmental conditions.

Much of this region was impacted directly by the historic fires of 1890 and 1910. Today the scars of, and recovery from, those fires are seen in the form of slightly recovered south facing aspects (to the north of the St. Joe River), and densely vegetated north facing aspects (south of the river). While there are exceptions to this observation, the visual scenery is highly variable and attracts thousands of visitors to the region annually.

The St. Joe River Road (USFS Development Road 50) is an important access route in Shoshone County. This route connects St. Maries (located in Benewah County) to Shoshone County communities in this valley. The route then connects to Montana, entering populated places there at St. Regis. While this route is not maintained to the level of Interstate-90 to the north, it is used by forest industry transportation, local access, and vacationers.

The communities of this valley include (from west to east): Trout Creek, Calder, Big Creek, Marble Creek, Hoyt, and Avery. Local commerce in the region is limited to local services, convenience stores, a school and a USFS Ranger Station at Avery, and a USFS work center at Hoyt. Ranching is pronounced in this area, with local efforts using the river lowlands to overwinter their cattle and the surrounding hillsides and mountains to feed on in the summer. Local agricultural efforts are generally limited to hay and pasture lands for the stock.

Forest industry holdings in the St. Joe River valley are extensive. Most of the industrial forestlands are located within two miles to the north of the St. Joe River and then to the south to the county line. More industrial forestland holdings are seen north of Calder and to the southeast of Avery. Southeast of Avery the checkerboard pattern of ownership is an intermix of USFS and forest industry ownership each owning one-square mile areas in the squares of the checkerboard.

Almost exclusively, the private ownership with structures in this St. Joe River valley is located immediately adjacent to the river. This is easily explained by the fact that there is little habitable ground above the valley bottom as the hillsides are steep. Most exceptions to this observation are the locations of the listed communities.

One of the most notable features of this region is the presence of rural addressing in the communities of Calder, Big Creek, and Marble Creek. Here, Fire District #4 has taken recommendations developed as part of the 2002 Shoshone County Wildfire Mitigation Plan, and implemented a full program of posting addresses visible from the nearest public road. This effort is clearly visible and the impact is notable.

5.2.4.1. Flood

The St. Joe River follows an east-west trajectory from its headwaters to the point of exit from Shoshone County. The southern edge of this river system is lined with steep mountain ridges towering thousands of feet over the river below. This shadowing effect of the mountains guarantees that the river is isolated from solar heat all winter. With the headwaters towering over 7,000 feet high, the water is cold and thick ice formation in the river is common.

When warm winter weather systems blow into the region, as is common even in January and February, rainfall can cause ice jam flooding. One of these events occurred in early 2009 as ice jam flooding became an emergency situation. Structures and people at Trout Creek and Calder became threatened and downstream a state of emergency was declared. Shoshone County and Benewah County (downstream) activated their emergency services, and an ice breaking tug boat was brought in to help break the ice jam.

The typical flooding profile of the St. Joe River is riverene flooding of the slow kind. This extensive drainage evacuates the runoff from hundreds of thousands of acres of high elevation forestlands. At the Avery location, the river is a Shreve Stream Order 1,470, but is still in a reasonably narrow channel with a minor sized flood plain. FEMA FIRM maps have not identified a flood zone as of the September 2008 release. The FIRM mapping of flood zones stops abruptly slightly upstream of Hoyt.

The hundreds of low and moderate size tributaries to the St. Joe River possess a typical flash flood profile with the water release from the streams to the north of the river (south aspect) releasing water earlier than the streams to the south of the river (north aspect) due to earlier snow melt. Because of the variable land management and environmental conditions in this region, the delivery of debris can be seen along most of the tributaries in this drainage system. This debris accumulation can be seen clogging various culverts and bridge crossings along the St. Joe River Road and side access routes.

The first visages of an established flood plain are seen within Avery, although this area is relatively small and currently occupied by privately owned structures. In Hoyt, the flood plain becomes slightly larger for a small distance along the river's path. This flood plain again begins to widen around Marble Creek, but is confined by natural obstacles to expansion. At Marble Creek community, the tributary named Marble Creek enters the system with a Shreve Stream Order of 371, elevating the St. Joe River Shreve Stream Order value to 2,253.

With this elevated river size, the St. Joe River begins to meander slightly more, cutting interior bank water storage areas. By the time the St. Joe River exits the community of Big Creek, several additional large tributaries have entered the system bringing the Shreve Stream Order to 2,472. At this point, the St. Joe River's Shreve Stream Order is greater than the North Fork Coeur d'Alene River's order (2,270) before it is joined by the South Fork Coeur d'Alene River.

Below Big Creek's confluence, Mica Creek (Shreve Stream Order 100) enters the system and additional flood zone areas along the St. Joe River are present. Slightly above Calder a formidable natural flood zone area has been established. Where the Calder Road crosses the St. Joe River, the St. Joe River's Shreve Stream Order is 2,600. Here lies the first substantial flood zone area of the St. Joe River. Human habitation is mainly located to the north of this natural zone area, however, contributing flows from Bear Creek (flowing from the north of Calder and through the edge of town) cause the 100-year flood zone to encompass much of the community.

Further downstream of Calder, the natural flood plain widens substantially to claim transient water flows. Several meandering turns of the river claim more flood plain areas slightly upstream from Trout Creek. Here the Shreve Stream Order is 2,745 and it grows to a terminal size of 2,791 where it enters Benewah County. Only in the final few miles of its journey out of Shoshone County does the St. Joe River claim a substantial and continuous flood plain area.

Potential Loss of Private Property Improvements Due to Flood

Consult Section 4.2.6. for a detailed explanation of how land and improvement values were determined for this subsection of the analysis.

Potential flood losses to private property investments in the St. Joe River Valley are apparently the lowest in the Avery area. This is only because the FEMA flood zone FIRM maps have not been developed for this area (Table 4.4). Anecdotal evidence suggests that this area experiences riverene flooding from the St. Joe River. Avery is located just below the confluence of the North Fork St. Joe River (Shreve Stream Order 277), and the Main Fork St. Joe River

(Shreve Stream Order 1,193). When the additional tributaries are included, the St. Joe River becomes a Shreve Stream Order 1,487 at the east side of the community. Indications of flooding are obvious and about half of the private structures in this community are at risk to flood damage.

The Hoyt area has a relatively small amount of private property improvements with only $75,000 in assessed value. Only $30,000 of this value is at flood damage risk and it is located in the 100-year flood zone (Table 4.4).

At the Marble Creek community, approximately $2.1 million of private property improvements have been assessed by the Shoshone County Assessor. Approximately $939,000 of this value is located in the 100-year flood zone. The remaining $1.2 million is located outside of the FEMA flood zone (Table 4.4).

The community of Big Creek contains an assessed private property improvements value of $1.9 million (Table 4.4). Of this value, approximately half, $965,000, is located in the 100-year flood zone, and no value is located in the 500-year flood zone. The remaining $904,000 is located outside the FEMA flood zone area (Table 4.4).

The community of Calder is the most extensive area of combined human habitation and flood plain in the St. Joe River Valley within Shoshone County. Approximately $1.9 million of total appraised improvement value is located in Calder. Of this amount, about $1.1 million of private property improvements is located within the 100-year flood zone (Table 4.4). There is no private property improvement value located within the 500-year flood zone. The remaining $763,000 of private improvement value is located outside of the FEMA flood zone. These estimates indicate that approximately 59% of the total improvement value in and around Calder is located within the 100-year flood zone (Table 4.4).

The last downstream community along the St. Joe River valley before entering Benewah County is Trout Creek. Here, approximately $1.0 million of private property improvements are located within the 100-year flood zone (Table 4.4), The remaining $930,000 of assessed private property value is located outside of the FEMA flood zone.

Potential Loss of Public Property Improvements Due to Flood

Substantial public property assets are located within the St. Joe River valley. Insured asset values reveal that approximately $3.6 million of assets are located in Avery (Table 4.5). These include the public school and the USFS Avery Ranger Station (Table 3.12). FEMA has not mapped the flood zones in this community.

At Hoyt, the USFS owns the Hoyt Flat Work Center with an insured value of $5.0 million (Table 3.12). This complex is comprised of several structures located along the river banks. However, preliminary estimates place all of these structures outside of the flood zones (Table 4.5).

The Marble Creek Fire Station (Fire District #4) is insured for approximately $15,000 (Table 3.12.) and is located outside of the FEMA flood zone (Table 4.5).

At Calder, the total insured value of public structures is $821,000 (Table 4.5). Approximately $432,000 of this insured value is located in the 100-year flood zone, and the remaining $389,000 is located outside of the flood zone (Table 4.5).

5.2.4.2. Earthquake

The quantification of seismic shaking hazards along the St. Joe River valley rates a low risk category from Marble Creek downstream to the county boarder with Benewah County. From Marble Creek upriver the seismic shaking hazards are ranked as moderate. This change in the relative risk should be considered to occur on a continuous scale.

The fault line activity in this region is notable. Most of the 580 fault lines in Shoshone County are considered a “normal fault” by the USGS. These are faults that slide against each other in a lateral movement. Only 26 fault lines in Shoshone County are of the "thrust fault" designation. These faults tend to represent movements of the earth where one layer rises over the opposing layer. The Hoyt Mountain thrust fault cuts across the St. Joe River beginning near Marble Creek and terminates about 6 miles southeast of Hoyt. Two more short segments of thrust faults extend eastward, generally on the same trajectory as the first. This fault line was near the epicenter of the Hoyt Mountain earthquakes on March 7, and June 3, 1994. Fortunately no recorded reports of injuries or damages were made. Subjective reports by local residents describe various disruptions as a result of this earthquake ranging from cracked windows to broken water lines.

The remaining thrust fault lines in Shoshone County are concentrated along the Montana state line, near the Rocky Mountain crest. The remainder of the St. Joe River valley is blanketed with a mesh of normal faults running parallel to the river's course.

Very few structures in this river valley are multi-story brick or masonry buildings that would be considered at risk due to seismic shaking hazards. One structure of note is the school at Avery. This building is constructed with at-risk materials, and the age of the structure would indicate concern for these factors. However, this building is a single story edifice and therefore the risk is exponentially less than if it were a multiple story construction.

Another concern of this region, from a seismic shaking hazards standpoint is the bridge at Avery. This bridge connects Kelly Creek Road to the St. Joe River Road. This is an impressive engineering feat in the sense that the crossing comes off the steep hillside of Kelly Creek, makes a sharp turn over the St. Joe River Road and then drops the remaining elevation needed to join the main road while paralleling the St. Joe River Road. This iron and concrete overpass is used daily by logging trucks, school busses, vacationing RVs, and local residents. Although it seems to be sustaining the weight of its daily burden, in time this structure will need to be reinforced or replaced.

5.2.4.3. Landslides

Much of the St. Joe River valley is settled on consolidated alluvial soils consistent with the location at the bottom of a major river drainage. Human habitation in this region is either on the banks of the river, or cut into the hillsides adjacent to, or above, the river. When the toes of these slopes are cut, the stability of the hillside becomes unstable. Many instances of this are seen in the area where roads are built and homes are sited.

Potential Loss of Private Property Improvements Due to Landslides

Avery shows some isolated significant signs of exposure to landslide losses. Observations were made of hillsides encroaching on the structures built decades prior through rock fall and general wasting. In other examples, homes have been moved off their foundations. There are approximately $1.9 million of private property improvements in Avery (Table 4.13). Of this total value, about $1.5 million is located on parcels with the lowest Landslides Prone Landscapes risk rating of 5. As the risk rating increases to 15, the private property improvement value is roughly $313,000, at 25 the exposed value is $164,000, and at 35, the risk exposure is about $16,000 (Table 4.13). This analysis demonstrates that while most of the structures are located on parcels not considered to be at extreme risk to landslide damage, some of the parcels do bear exposure to these risks.

The area of Hoyt is home to approximately $75,000 of assessed private property improvements (Table 4.13). Of this value, an estimated $56,000 is located in the lowest landslide risk rating score of 5, and the remaining $18,000 is located on parcels with a risk rating of 25 (Tale 4.13.).

Marble Creek private property improvements are appraised at just over 2.1 million (Table 4.13). Of this value, $1.9 million is located in the lowest risk rating of 5, $155,000 is located in landslide risk rating 15, and the remaining $115,000 is located on properties rated as 35 in the landslide risk rating scale (Table 4.13).

Within the Big Creek area approximately $1.9 million of private property assessed value is located (Table 4.13). Of this value, about $1.6 million is located on properties with the lowest Landslide Prone Landscapes consolidated score of 5. As the risk rating increases to 15, the value of private assets is roughly $172,000 and at a risk rating of 25, the exposure to loss from landslides is just over $47,000 (Table 4.13).

Calder properties are appraised at roughly $1.9 million in private property improvements (Table 4.13). The majority of this value, $1.5 million is located on parcels in the lowest Landslide Prone Landscapes risk rating of 5. Approximately $265,000 of private property improvement value is located on parcels with a risk rating of 15, and $45,000 is on parcels in the 25 category.

Trout Creek private properties have been assessed for a total improvement value of $1.0 million by the Shoshone County Assessor (Table 4.13). Of this value, $902,000 is located on parcels in the lowest risk category rating of 5. Risk rating category 15 parcels contain approximately $33,000 of private property improvements, and risk category 25 properties contain the remaining $69,000 of private property improvements (Table 4.13).

Potential Loss of Public Property Improvements Due to Landslides

Public structure insured values within the St. Joe River valley are located in Calder ($821,000), Marble Creek $15,000), Hoyt Flats ($5.0 million), and Avery ($3.6 million) (Table 3.12). The majority of these public structures are located on parcels ranked at the lowest Landslide Prone Landscapes risk rating category (5). Only the Calder School Building ($404,000), USFS Avery Ranger Station ($2.5 million), and the Fire District Building #2 at Marble Creek ($15,000) are located on properties considered at slightly elevated landslide risk in category 15 (Table 4.14).

5.2.4.4. Severe Weather

The entire St. Joe River corridor is exposed to the forces of nature. Severe weather patterns move from west to east in traditional weather patterns bringing all forms of storms including rain, wind, snow, and lightning. Because all of the human habitation and business structures are located in the river valley bottom lands, the effect of some of this foul weather is moderated, but, the negative effects of the weather are not eliminated.

Access in and out of the St. Joe River valley is limited to one all-year route, the St. Joe River Road. Another potential access route is the road from Avery to Wallace (North Fork St. Joe River Road, also known as the National Forest Development Road 456). This is a USFS route and is currently not plowed of snow in the winter. This is a route favored by wintertime snowmobile enthusiasts. Additional dirt and gravel routes are located throughout the vast river system (and the entire county), allowing a seasoned traveler to traverse the entire county while only crossing paved roads occasionally.

Normal fall and spring weather transitions in the St. Joe River valley are pronounced along the St. Joe River Road where freeze-thaw cycles wedge rocks from the road cut-bank onto the travel surface below. There is a general lack of debris catchment along the most vulnerable segments of the road. Evidence of rock debris on the road is common and anecdotal evidence confirms the scattered damage to personal and commercial vehicles from driving over these rocks in the road.

Maintaining an open route of ingress and egress for local access to the communities of the St. Joe River valley is a challenge for winter time snow plowing. However, snow staging along the St. Joe River Road is not problematic. Plowing the residential driveways and local access is more of a challenge, but as with many of the other communities in Shoshone County, there are a large percentage of homeowners in this valley with snow-plows mounted on their personal trucks to clear access as needed.

Gusting winds are a concern for many of the home sites in the St Joe River valley. Metal roofs at a low pitch are not always well anchored to the structures and show signs of wind damage. At the same time, several hardwood and conifer trees overtop valley bottom structures. Many of these trees are potential sources of breakage and subsequent damage to the structures they overtop.

5.2.4.5. Wildfire

The risks of wildfire in the St. Joe River valley are real and elevated. Most of the lowlands adjacent to the river corridor represent a reduced risk to wildland fire loss. However, the steep slopes, mosaic of aspects, and distributed forest vegetation fuels present a complicated montage of fire control components. Historical wildfires have burned through this region and recent fires have ignited. Fortunately, the control efforts exercised in the current era have been effective at controlling the fires in this area while still relatively small.

Home and business structures in the St. Joe River valley are generally nestled into the embrace of the forestlands and the scenic river ecology of this valley. A combination of native evergreen forest tree species such as ponderosa pine, Douglas-fir, western larch, grand fir, lodgepole pine, western white pine, and even wetter site species such as western red cedar and western hemlock can be found throughout this valley. Within the lowest elevations, along the river banks and within the flood zone, hardwood species are common and intermixed with the range of conifer species.

Forest management activities in this region are extensive. The ownership is a mix of forest industry, State of Idaho Department of Lands, and the USFS. While the timber sale program of the latter owner has been significantly curtailed in recent decades, the former two categories of ownership still implement an assertive timber sale program. Generally, these active forest management efforts have a positive impact on wildfire risk in the valley. Managed forests are generally supportive of a healthy vegetative cover and the Idaho Forest Practices Act regulates the disposal of logging slash during and after logging operations.

The challenge for homeowners in the St. Joe River valley is to establish and maintain home site defensibility areas. Several examples of homes with established home defensibility sites were located. In these locations, surface fuels were cut and disposed of, trees were pruned to a level of ten feet and higher, and only healthy and mature conifer trees were left standing. Green grass was maintained and trimmed in the areas surrounding the home site. Access was wide enough to facilitate fire fighting vehicles to enter, turn around, and exit. Equally important, the characteristics of home ignitability were adequately tempered with composite material roofing and non-flammable siding.

Other homes in the region are completely lacking home site defensibility efforts. Auspiciously, most of the homes in the region were observed to be between these two extremes. Because of the combination of factors leading to wildfire control success in the St. Joe River valley, the more home owners can increase the defensibility of their homes, the higher the probability the home will be saved during a wildfire event. Home owners in this region are encouraged to participate in home site modifications beginning with fuels treatments surrounding each home and including modifications of the factors of structure ignitability.

Potential Loss of Private Property Improvements Due to Wildfires

Avery private property owners have been assessed by the Shoshone County Assessor to have approximately $1.9 million in private improvements (Table 4.25). Only $104,000 of the assessed value is in Fire Prone Landscapes consolidated risk score of 5. Substantially more value is estimated to reside on parcels ranked in risk category 15 ($727,000) and risk category 25 ($749,000). The remaining $368,000 of assessed private property improvements are located on parcels with a risk category of 35 (Table 4.25). Avery structures are wedged in between the steep hillsides of the St. Joe River valley very close the river network and huddled into the forest. The south side of the valley supports a dense collection of moist-site tree species while the north side of the river (south aspect) has more brush fields and scattered dry-site tree species. These forests are not immune to wildfire ignition and challenges for control. Wildfire fuel controlled home sites would increase the potential of saving structures in the event of a wildfire.

Within the area of Hoyt, the risk profile is dominated by public structure ownership. However, private assessed values have been estimated at approximately $75,000 and this value is fairly equally distributed across the three risk categories of 15, 25, and 35 (Table 4.25).

The Marble Creek Community rests within a conspicuous meander of the St. Joe River. This is one of the locations within the river system where all aspects are represented on the low-elevation profile. In most locations, the solar exposure in this valley is either north or south facing. The Marble Creek area shows profiles from all angles to the compass. This creates more of a complex system of fuel drying, wind patterns, and complications for wildfire control. The Shoshone County Assessor has appraised approximately $2.1 million in private improvement value in Marble Creek (Table 4.25). Only $25,000 of this value is located on parcels with the lowest risk rating of 5. As the risk category increases to 15, the value of private property improvements increases to $293,000, and at a risk rating of 25, a large jump in exposed value is seen with $1.5 million located on these parcels. Even at the risk rating of 35 the Marble Creek area still has approximately $306,000 of value exposed to wildfire risks.

Big Creek community along the St. Joe River holds approximately $1.9 million in assessed private property improvements (Table 4.25). None of this value is located on parcels ranked in the lowest Fire Prone Landscapes consolidated risk rating (5). Roughly $995,000 of private assessed value is located on parcels with a risk rating of 15, and $601,000 is located on parcels ranked in category 25. As the risk rating score increases to 35, another $272,000 is at risk, and at the consolidated risk rating of 45, just under $1,000 of private property improvements can be found (Table 4.25). This community will equally benefit from home site defensibility efforts.

Calder’s wildfire risk profile is moderated somewhat by the community’s location adjacent to the extended flood plain of the St. Joe River. However, many private structures are located further away from the valley bottom exposing a variable risk profile. Within Calder, approximately $1.9 million in private property improvements have been assessed by the Shoshone County Assessor (Table 4.25). Only $345,000 of private appraised value is located within the consolidated risk category of 5. Approximately 47% of the appraised value ($882,000) is located in wildfire risk category 15, $520,000 of assessed value is in risk category 25, and the remaining $109,000 of assessed private value is located on parcels in Fire Prone Landscapes risk category 35 (Table 4.25). Most of these private structures at increased risk to wildfire exposure are located outside of the community center and would benefit greatly from home site defensibility efforts.

Trout Creek community, located near the Benewah County line, has been assessed by the Shoshone County Assessor with $1.0 million of private property improvements. Most of this value, $606,000, is located on parcels with a Fire Prone Landscapes consolidated risk score of 15 (Table 4.25.). Small, nearly equal amounts of property improvements are located either side of this risk rating (5 and 25). Another significant grouping of private improvement values is located in Fire Prone Landscapes risk rating of 35, where approximately $364,000 of private improvement values are to be found (Table 4.25). It should not be surprising that this community will also benefit from home defensibility space creation and maintenance.

Potential Loss of Public Property Improvements Due to Wildfires

Public property insured values for structures within the St. Joe River valley total approximately $9.4 million (Table 3.12 and Table 3.13). Fire Prone Landscape risk rating scores for the parcels where these improvements are located are highly variable. Within Avery these public structures are located in risk category 15 ($1.2 million) and in risk category 25 ($2.5 million). Within Calder, the public structure insured value risk exposure comprises $30,000 in risk category 5, $387,000 in risk category 15, and $404,000 in risk category 25. The fire station in Marble Creek is located on Landside Prone Landscapes risk category 25 (Table 4.26). All of these structures will benefit from increased attention to parcel-level defensibility space creation.

5.2.5. Clarkia Community

The community of Clarkia is located in the furthest southwestern quadrant of Shoshone County. The residents of this area have strong economic ties to the neighboring counties of Latah, Benewah, and Clearwater. Interestingly, it is closer to drive a vehicle from Clarkia to the County Seat locations of Latah, Benewah, Clearwater, and Kootenai Counties in Idaho, and to the County Seat of Whitman County (Colfax), Washington, than it is to drive to the County Seat of Shoshone County in Wallace. Nevertheless, these residents are proud citizens of Shoshone County.

The economic foundations of Clarkia have always been tied closely to natural resources. The Potlatch Corporation operates a log sorting yard at the rail access point the company maintains at the community's central location. The USFS operates an office of the St. Joe Ranger District in Clarkia, providing employment for almost half of the workforce in Clarkia (Census 2000). Logging is a major employment sector in this area along with cattle ranching. Farming is concentrated on pasture and hay in support of livestock husbandry efforts. A tourist attraction of this locale is the world famous Clarkia Fossil Locality. The total population of Clarkia is approximately 100 people (Census 2000), and all of the school children attend school in St. Maries located in Benewah County.

Clarkia rests at about 2,830 feet elevation in the broad and gently sloping flood plain of the St. Maries River between Bechtel Butte (4,680 feet), Clarkia Peak (3,520 feet), and Anthony Peak (4,680 feet). The Native American name for this region is “Chatnna” meaning “meadow area”.

Access through Clarkia is provided along State Highway 3, through the headwaters of the West Fork St. Maries River from the southwest in Latah County into Shoshone County slightly southwest of Clarkia. State Highway 3 traverses the broad floodplain at the confluence of the West Fork and the Middle Fork of the St. Maries River, then follows the Main Fork of the St. Maries River downstream and crosses into Benewah County and the communities of Santa and St. Maries. This highway route is the only paved route of ingress and egress from Clarkia. Hundreds of miles of dirt and gravel surfaces are accessible from Clarkia and are used for forest management purposes as well as recreational uses.

Services in Clarkia are relatively limited. There is no rural fire protection in Clarkia. Wildfire protection is provided by the Idaho Department of Lands – West St. Joe Fire Protection with an office in St. Maries. Further to the east from Clarkia, wildfire protection is provided by the Clearwater-Potlatch Timber Protective Association (C-PTPA) an organization with headquarters and offices in Clearwater County. C-PTPA is managed as a division of the Idaho Department of Lands.

Water and sewer treatment is conducted at a site adjacent to the Potlatch Corporation log yard, and is located within the FEMA flood zone. Clarkia is one of the “coldest places” in Shoshone County (Table 3.8).

5.2.5.1. Flood

The flood profile for the community of Clarkia is very pronounced owing to the location of the community adjacent to the confluence of the two main forks of the St. Maries River. The large meadow area upstream of Clarkia is composed of meandering streams cutting through river deposited sediment. Human habitation and livestock are scattered through this stream network, with several homes nestled into the surrounding forests. Vegetation is dominated by meadow grasses in the floodplain and forestlands surrounding the perimeter.

Local roads provide access through this maze of river tributaries with a combination of bridges and culverts providing stream crossings. An inspection of this transportation network reveals that annual flooding is characteristic of flash flood events from the headwaters. This flood zone area is the first established flood zone along these river networks. Debris flooding is also evident in the form of vegetative fragments wedged in and around bridge abutments and around culvert entrances.

While many of the tributaries passing through this floodplain are impacted where they flow, flood stage events see these streams exceed their bank full width to occupy the wide extent of the valley bottom. When this happens debris is transported into livestock fencing, onto the local access roads, to homes within the flood zone, and surrounds the general infrastructure of Clarkia.

Within the community's most populated areas, structures are mostly located slightly above the FEMA flood zone but are between the two forks of the river above the confluence. However, this elevation above the flood zone is minimal. Several structures adjacent to Highway 3 and northwest of the community center are completely covered by this flood zone. In addition, the flooding represented by the Middle Fork of the St. Maries River has been truncated artificially as the designation of the flood zone was left incomplete. This situation is repeated across all of the tributaries to the St. Maries River system with the flood zone designations prepared as part of the FIRM maps left incomplete as they encounter tributaries.

All of the Potlatch Corporation log sort yard and the rail line are located within the FEMA flood zone. State Highway 3 defines the flood zone boundary on the western side in several locations. A few structures are raised, such as the post office modular structure, which is elevated on its foundation to rest above a regulatory flood.

Potential Loss of Private Property Improvements Due to Flood

The Shoshone County Assessor has estimated a total private value of improvements of $1.7 million in the Clarkia area (Table 4.4). Out of this total private improvement value, approximately $377,000 is located within the 100-year flood zone. There is no 500-year flood zone mapped within the Clarkia area. The remaining $1.3 million of private property improvements are located outside of the FEMA flood zone (Table 4.4).

Potential Loss of Public Property Improvements Due to Flood

The significant investment by public entities in the Clarkia area, totaling $5.5 million, is mostly located outside the FEMA flood zone (Table 4.5). Only $198,000 of public property insured value is located in the 100-year flood zone. This insured value is represented by the Clarkia Water and Sewer treatment facility managed by the Clarkia Water & Sewer District (Table 3.12). The facility is located very near the West Fork St. Maries River and the Potlatch Corporation sort yard. The remaining insured value in Clarkia is located outside the FEMA flood zone areas. This includes the Clarkia Free Library and the USFS Work Center.

When considering potential mitigation measures for Clarkia, specific attention must be applied to the strategic location of additional structures in future developments. First, the 100-year flood plain in this area is not completely mapped and a strong recommendation is to extend the logical boundary of the 100-year floodplain upstream along the Middle Fork St. Maries River where private property is located. Several structures are currently located along this river above the confluence of the Middle Fork St. Maries River and Merry Creek. The extension of this floodplain would only need to be considered for an additional 1.25 miles to encompass all private properties along this river.

Second, a flood water retaining wall is recommended northwest of the main collection of structures in Clarkia, shaped as a "V" pointing in the direction of the confluence, to prevent backwater flooding of the community.

Identifying a viable solution for the dozen parcels located within the 100-year flood zone between State Highway 3 and the community center is difficult. Road access could be better facilitated by constructing an overpass elevated above the flood zone, but this solution would not solve any of the problems for the structures located here. Impounding the river channel into a controlled conveyance structure may limit the ability of the West Fork St. Maries River to damage homes and businesses during regulatory floods.

In all events, the future restriction of new developments to locations outside the FEMA flood zone will help to ensure a limited exposure to flood damage.

5.2.5.2. Earthquakes

Geologically, the Clarkia area is located in a zone of unique historic proportions. This region possesses a large mass of intrusive igneous granitic rock (Herrick Stock) believed to have solidified deep within the earth. The Clarkia formation contains sediments eroded from the Herrick Stock and is the source of the Clarkia Fossil Bowl tourist attraction in the community. This site is characterized by the soft silts that accumulated here 15 million years ago on the bottom of a Miocene era lake bed, preserving an unusually large collection of fossilized prehistoric flora and occasionally fauna as well.

The St. Maries River downstream of the community center lies on a lengthy fault line that begins near Merry Creek and terminates in Benewah County. Another parallel normal fault line is situated between Bechtel Butte and Clarkia Butte and runs in an arc the length of the West Fork St. Maries River floodplain, extending into Clearwater County. Several short fault lines are perpendicular to these main fault-features and one of those cuts right through the Clarkia community, terminating on the extended fault lines already discussed. The result of these crossing fault lines is a tendency for seismic shaking events to be more pronounced as movements will not always be a continuous forward-and-back shaking movement, but more of a jerky and abrupt jolting activity.

Perhaps fortunately, and perhaps in response to these characteristics, there are very few examples of brick and mortar structures located in this area. Structures are characteristically wood frame construction and modular units mounted on stable foundations. Chimney construction is also resilient to seismic shaking hazards described in this area. Seismic shaking hazards in this region are the lowest seen in Shoshone County.

5.2.5.3. Landslides

Because Clarkia's structure location profile is concentrated on the moderate slope flood plain, the risks to landslides in the area are minor. This is not to imply that the region is not at increased landslide risk, but only that the risk exposure to structures is minimal.

One example of the exception to this low landslide risk profile is seen along the Merry Creek Road. This forest access road traverses from Clarkia to Marble Creek on the St. Joe River. Along the path, several severe landslide prone areas are seen and many of these are induced from the presence of the cut banks for the road itself and from general geologic instability.

State Highway 3, within Shoshone County, is fairly free from landslide prone areas, with the exception of a small area about half a mile north of the USFS Work Station, on the west side of the road. However, this site has remained stable in recent times.

Potential Loss of Private Property Improvements Due to Landslides

As previously discussed, the private structures in and around Clarkia are located within the moderately sloped flood plain of the St. Maries River system. Of the $1.7 million of private assessed improvements in Clarkia, all of the value is located on structures within the lowest consolidated Landslide Prone Landscapes score of 5 (Table 4.13).

Potential Loss of Public Property Improvements Due to Landslides

The public structures within the area of Clarkia follow the same tendencies as the private structures located here. Of the $5.5 million of insured public structure value found in Clarkia area, all of it is located in the lowest risk category of 5 (Table 4.14).

5.2.5.4. Severe Weather

Clarkia residents have turned an annual winter weather problem (excessive snowfall) into a winter-time recreational opportunity. This area is a popular jump-off point for snow mobiles, cross country skiers, and winter enthusiasts looking for deep snow and miles of back roads to traverse. While this provides countless days of outdoor recreation, the burden on structures can be extensive.

Surprisingly, the structures in this area of the county show low pitch roofs. Most have metal roofing, which does shed snow better than composite roofing, but the gravity force to encourage snow to shed on steeper angle roofs would seem to be intuitive.

High winds accompanied by other severe weather components such as lightning and heavy rains are commonplace in the St. Maries River drainage. This region rests just below the 3,000-foot elevation mark and witnesses some record high winds during storms that can break trees, dislocate roofs and other property improvements, and take out power for days at a time.

Through severe wind storms, lightning, heavy snow loads, and other weather related events, the Clarkia area is frequently challenged to maintain a continuous supply of electric power and landline telephone service. Internet service has not yet been reliably provided to this very rural community. The lack of a reliable telephone service is, in this day and age, extremely problematic and presents a challenge for residents in terms of emergency services coming to the community, and for the community members to learn about emergency warnings as they happen. Add to this the remoteness of this community and even radio services do not provide the level of warning needed to ensure public safety.

Two factors combine to moderate this communications problem. The first is the presence of the USFS Ranger Station in Clarkia. This facility has digital two-way radio communications via repeater site linkages to most of the major cities in the region. The forest industry presence in this community also has access to communications through two-way radio communications using antenna repeaters around the region. When telephones are down, these communication linkages can be used to stage messaging in emergencies.

Unfortunately, this added communication complication can delay response when time is critical. Improved communication network from Clarkia to the rest of the world, especially in the winter, is needed to develop the ability of residents to deal with emergency situations.

Power supplies during and after severe weather events are problematic. Many of the Clarkia households own backup generators and stock fuel for powering them. Heating is provided through natural gas and firewood burning in wood heat stoves. Commercial applications have large power generators to deal with the frequent power outages in the community. An improved power supply system will also increase the ability of these residents to deal with the realities of typical weather systems pounding Clarkia.

5.2.5.5. Wildfire

While the grasslands dominating the flood plain of the St. Maries River system present a minimal resistance to wildfire control, the slopes leading out of the valley bottom are all populated by a mix of conifer tree species which are the fodder of wildfire spread. Many factors determine the potential spread and extent of wildfires in any location. Suffice to say, this region is not immune to wildfire risks.

Historically, much of this area has witnessed wildland fires and the future is expected to be no different. A significant mitigating force is the location of wildland fire fighting resources in the region (in response to the local risk factors) such as the USFS Ranger District office, the juxtaposition of the Idaho Department of Lands in St. Maries, and the C-PTPA in Bovill. Forest industry equipment and human resources are also frequently here and can serve as a mitigating force during wildfire events.

However, as has been stated, many of the private structures are located within the valley bottom surrounded by meadow grasses. Livestock grazing within the St. Maries River valley and in the surrounding hillsides adjacent to the flood plain is a positive wildfire fuel reducing factor. As cattle graze these grasses, they are reducing the potential fuel loads that build-up and dry in the late summer months. By grazing these grasses when green and then when cured, the cattle reduce the fuel loading and therefore fire intensity on these sites.

Potential Loss of Private Property Improvements Due to Wildfire

The Shoshone County Assessor has determined that the private property improvements in the Clarkia area total $1.7 million (Table 4.25). Of this value, approximately $377,000 of private property improvements are located on parcels with a Fire Prone Landscapes consolidated risk rating of 5. Approximately $621,000 of private improvement value is located in risk category 15, and roughly $689,000 is located on parcels ranked at a risk rating of 25. Only $55,000 of private property improvement value is located on parcels with a risk rating of 35 (Table 4.25).

Potential Loss of Public Property Improvements Due to Wildfire

Public property insured values within the area of Clarkia have been recorded at $5.5 million (Table 4.26). The Clarkia Free Library structure (insured value of $120,000) is located on a parcel with a slightly elevated risk rating of 15. However, much of this classification is related to the potential for the area to ignite and not the resistance to control on this site. The USFS Ranger District Office/work center (insured value of $5.2 million) is located on a parcel evaluated at a risk rating of 25 (Table 4.26). However, as this analysis has pointed out in reference to the wildfire risk of other fire fighting organizations, this risk rating category fails to quantify the mitigating factor of the presence of wildfire fighting personnel and equipment housed on site during the fire season.

Despite the lower than average risk exposure to structures in the Clarkia area, the recommendation that these homeowners, especially those located outside of the flood zone and in the forest intermix area, establish home defensibility zones and modify the characteristics of home ignitability. Wildfires have occurred in this region historically, they currently occur in areas similar to the Clarkia region, and they will occur here in the future. The only remaining question is the type of damage these fires will inflict on the people, structures, and infrastructure of this community.

6. Resources, Capabilities, and Needs Summary

This Resources and Capabilities summary was completed to summarize the human and technological services available to the citizens of Shoshone County and each jurisdiction. These services include Fire (structure and wildfire) Protection, Highways and Roads, Sewer and Water, administrative services, and others.

6.1. Shoshone County

The Emergency Manager for Shoshone County completed Resource, Capabilities, and Needs assessments as part of this analysis. Their analysis results are presented here with only minor editing.

Table 6.1. Shoshone County, Resources, Capabilities and Needs.

Name & Position of Person Preparing this Summary	John Specht, Emergency Manager
Address & Telephone	700 Bank Street Wallace, Idaho 83873 208-556-0392
Service Area	Shoshone County
Describe your services and organization goals in overview (100 words or less)	Provide Emergency assistance within Shoshone County in the event of natural or man-made disasters. Provide for transportation management on County Roads and their maintenance. Set policies for planning and zoning requirements for areas outside city boundaries. Provide Law Enforcement for all unincorporated area of Shoshone County and the Cities of Mullan, Wallace, Smelterville.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	4 Backhoes, 3 Crawler Tractors, 1 Mini Excavator, 1 Large Excavator, 10 Road Graders, 9 Front end Loaders, 2 Chippers, 25 Pickups, 2 Plow/Sander Trucks, 14 Sander Trucks, 2 Mechanics Shop Trucks, 14 Trailers, 1 Suburban, 3 Single Axel Dump Trucks, 19 Tandem Axel Dump Trucks, 1 Lowboy, 1 3000 Gallon Water Truck, 28 Law Enforcement vehicles, 5 ATV's, 3 Snowmobiles, 1 Command Trailer
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	1 Emergency Manager, 3 County Commissioners, 2 Planning and Zoning officials, 1 Public Works Director, 2 Public Works Administrative Assistants, 27 Public Works Equipment Operators, 28 Commissioned Law Enforcement Officers, 3 Law Enforcement Administrative Assistants, 10 Volunteer Law Enforcement Officers, 30 Volunteer Search and Rescue Members
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	5 Hand held portable radios, 2 laptop computers, 5- ¾ ton 4x4 Law Enforcement Pickups, 3 high performance Snowmobiles, 1 Tandem Axel enclosed Trailer, 3 Road Graders, 4 Front End Loaders, 1 Backhoe, 2 Mechanic Shop Trucks, 6- ¾ ton Pickups with snow plows, 1- 2-ton Deicer Truck, 2 Snow Plow/Sander trucks.
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	1 trained GIS specialist, 1 qualified finance officer, 2 qualified Information Computer Personnel, 3 Volunteer Radio Operators, 1 trained Public Information Officer, 4 Equipment Operators, 1 Assistant Public Works Director

6.2. Municipality & Community Capabilities / Needs

Each municipality and one community completed Resource, Capabilities, and Needs assessments as part of this analysis. Their analysis results are presented here with only minor editing.

6.2.1. City of Kellogg

Table 6.2. City of Kellogg, Resources, Capabilities and Needs.

Name & Position of Person Preparing this Summary	Walter J. Hadley Planning Administrator
Address & Telephone	1007 McKinley Avenue, Kellogg, Idaho 83837 208-786-9131
Service Area	City of Kellogg
Describe your services and organization goals in overview (100 words or less)	I provide planning services, floodplain administration, grant writing, park & roadway planning within the City limits of Kellogg, Idaho. Our overall goal within the city is to provide a safe environment for residents while allowing planned development within those areas suitable for development to build our tax base and economy.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	The city has a number of trucks and pieces of equipment that can be mobilized to plow snow, flood fight, and provide support for wildfire and search and rescue efforts.
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	The City of Kellogg currently has 25 employees and 5 advisory boards with approximately 35 volunteers that could help in a time of need.
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	An upgraded radio system of portables
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	Training for volunteers and staff would be nice.

6.2.2. City of Mullan

Table 6.3. City of Mullan, Resources, Capabilities and Needs.

Name & Position of Person Preparing this Summary	Daniel T. White, City Council Member
Address & Telephone	112 Terril Loop, PO Box 475, Mullan ID 83846 208-744-1515
Service Area	Mullan City limits and impact area

Table 6.3. City of Mullan, Resources, Capabilities and Needs.	
Describe your services and organization goals in overview (100 words or less)	General city municipality services
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	• 1970 International, Pumper Fire Truck • 1996 Freightliner, Fire Truck • 1975 Ford, Dump Truck • 1989 Chevrolet, K3500 pickup with snowplow and sander • 2000 John Deer, 624H 4WD loader with Monroe snowplow • 2008 John Deer, 544J 4WD loader with Monroe snowplow • 1970 Austin Western, Maintainer • 1985 Kubota, Trackhoe
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	Two street workers with about 25 volunteer firemen
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	• None at this time.
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	Additional volunteer EMP's, more training for volunteer firemen and street workers in hazardous waste containment.

6.2.3. City of Osburn

Table 6.4. City of Osburn, Resources, Capabilities and Needs.	
Name & Position of Person Preparing this Summary	Charles Angle
Address & Telephone	921 E. Mullan Ave., Osburn ID
Service Area	City of Osburn
Describe your services and organization goals in overview (100 words or less)	General city municipality services
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	• 2 loaders equipped with snow plows • 2 single axle dump trucks with bladed • 3,000 gal water tanker truck • 1 sweeper truck with vac.
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number,	• 3 paid staff o 2 Police Officers o 1 Public Works person

Table 6.4. City of Osburn, Resources, Capabilities and Needs.	
plus volunteers)	
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	We need radios for all emergency & public works vehicles.
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	Two volunteers when available.

6.2.4. City of Pinehurst

Table 6.5. City of Pinehurst, Resources, Capabilities and Needs.

Name & Position of Person Preparing this Summary	Carla Ross, City Clerk
Address & Telephone	106 North Division P.O. Box 417 Pinehurst, ID 83850 208-682-3721
Service Area	City of Pinehurst
Describe your services and organization goals in overview (100 words or less)	At this time the City is limited to one full time police officer and one full time street employee. It would be ideal if we could hire 2 more full time police officers and another full time street employee. This would allow for better service to the community and less that we need to rely on the County for help.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	The City has a dump truck with mounted plow and two other vehicles with mounted plows
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	We currently have a police chief, 3 reserve officers and a street overseer.
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	The City could use a front end loader and grader and two newer police vehicles. The police department also needs to upgrade their radios.
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	The City could use one or two more full time police officers, another full time street employee and training for volunteers

6.2.5. City of Smelterville

Table 6.6. City of Smelterville, Resources, Capabilities and Needs.

Name & Position of Person Preparing this Summary	Lee Haynes, City Planner
Address & Telephone	PO Box 340, Smelterville, ID
Service Area	City of Smelterville
Describe your services and organization goals in overview (100 words or less)	The City of Smelterville is a rural town with limited resources. The City employs two street and general maintenance personnel who also fill positions as Sewer Treatment Plant Technicians. The City also employs a full-time City Clerk and a part-time City Planner / consultant. The City provides snow removal, sewer maintenance and compliance, park service and general maintenance to City property. The City of Smelterville recently completed a sewer line replacement project and upgrade to the wet well at the Sewer Treatment Plant. The City will start a storm water replacement project this fall using Army Corps of Engineers 595 funding. The City is annexing numerous properties into the City limits north and adjacent to the current City limits.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	• 1 – ¾ ton Dodge diesel truck with snow plow (2006) • 1 – 3 ton Chevy dump truck with snow plow (1987) • 1 – Computer system with Internet • 1 – ATV 2 seater
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	• 1 – city planner (formerly Shoshone County Disaster Services Director) • 2 – City street & sewer personnel
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	• Back hoe • Track hoe • Fire Truck • EMS
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	• Fire • Police • Engineering

6.2.6. City of Wallace

Table 6.7. City of Wallace, Resources, Capabilities and Needs.

Name & Position of Person Preparing this Summary	Chase Sanborn, City Council
Address & Telephone	703 Cedar Street, Wallace Id. 83873 208-660-3430
Service Area	City limits of the City of Wallace

Table 6.7. City of Wallace, Resources, Capabilities and Needs.

Describe your services and organization goals in overview (100 words or less)	The City of Wallace is responsible for providing services which directly affect the lives of their residents. Through fire and police protection, Wallace safeguards lives and property. Wallace also constructs and maintain streets, provide facilities for sewage, storm drainage, and waste disposal, and look after health, recreational and social needs. The City of Wallace also provides water. City planning and zoning determine land use compatible with community economic, environmental, historic and cultural goals. To carry out the functions of local government, Wallace is granted powers by the state of Idaho. City of Wallace may legislate to protect the health, safety, and welfare of their people, provided that these regulations are not in conflict with Idaho or federal law. Wallace may generate revenue by levying taxes, by license and service fees, and by borrowing. Wallace may employ needed personnel. They may condemn property for public use. While the city of Wallace powers are derived from the Idaho constitution and from laws enacted by the legislature, Wallace was created only by the request and consent of the residents in our area.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	• 2 Pick-ups with snowplows • 2 Front end loaders • 1 Grader • 1 Sander • 1 Water truck
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	• 2 Full time Public Works employees • 1 Full time office staff • 1 Part time office staff • 2 Part time Library staff • 7 Full time Pool staff (Summer Only)
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	• Radio's & radio communication network • 1 Dump Truck • 1 Front end Loader
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	• Volunteers & Volunteer Training

6.2.7. City of Wardner

Table 6.8. City of Wardner, Resources, Capabilities and Needs.

Name & Position of Person Preparing this Summary	Rhonda Kays – City Council
Address & Telephone	537 S. Main St., Wardner D 83837 208-209-3862
Service Area	City of Wardner
Describe your services and organization goals in overview (100 words or less)	To anticipate and provide for the needs of the community through quality service, innovation and leadership for today and in the future. Our goals are: Committed to delivery of quality services, provide a safe community with a high quality of life, strive to be proactive, innovative and plan for the future, encourage broad-based public dialogue and consensus concerning strategic issues, and finally to protect the financial health of the City and promote the economic viability of the region.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	• 1995 Dodge flatbed truck ($25,000) • 1998 New Holland tractor ($52,865) • 1999 International dump truck ($45,000) • 2005 Tennant power sweeper ($30,417)
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	None
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	• Fire truck • Water tenders • Radio communications network
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	The City of Wardner needs volunteers and training for those volunteers.

6.2.8. Community of Clarkia

The community of Clarkia possesses little in the way of community resources such as municipal winter time snowplowing, a City Fire Department, or City Police. However, their community sense of determination is high. This document has already detailed the selfless contribution made by two of the community members to participate in this planning process, and to provide the information detailed in Table 6.9.

Table 6.9. Clarkia Community Resources, Capabilities and Needs.

Name & Position of Person Preparing this Summary	Karen Anderson (Community Member), and Mellisa Stoor (Community Member)
Address & Telephone	PO Box 1146, 83 Cedar St., Clarkia, Idaho 83812
Service Area	Clarkia Community
Describe your services and organization goals in overview (100 words or less)	Clarkia's goal is to have an emergency plan in place that will utilize our community members, because out resources are limited. Knowing whom to get in touch with for services would be a great asset.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	Clarkia Road District (County), has two snow plows and a water truck for community use and the US Forest Service has a water truck, radio, GPS, and a helo-pad for non-private uses. Clarkia has one fire hydrant in town and a 980 (loader) at the Potlatch log yard for loading trucks, trains, and dump trucks.
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	Emergencies are responded to by community members. We also have Road District and Water and Sewer District employees (wheat Kruger and Fred Turner), a librarian (Karen Anderson), and a Forest Service employee (Wanda Edwards) who share in responses when needed.
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (e.g., fire trucks or water tenders, fire hydrant network, radio communications network, etc.).	The Clarkia Community is very self sufficient, but we desperately need phone lines that are reliable, because of our aging community dynamics. During the winter months our phone services are often disconnected due to weather and our cell and satellite phone reception is seldom possible.
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (e.g., additional number of paid staff, more volunteers, training for volunteers and staff, etc.).	Most emergency personnel can be flown into Clarkia in a timely manner. Training for volunteers in medical and fire services would be used extensively.

6.3. Fire Protection Capabilities / Needs

Resource, Capabilities, and Needs form were completed by each of the fire protection organizations in Shoshone County and are presented in this section with only minor editing.

6.3.1. Shoshone County Fire District #1

Table 6.10. Shoshone County Fire District #1, Resources, Capabilities, and Needs.

Name & Position of Person Preparing this Summary	James R. Walcker, Fire Chief
Address & Telephone	P.O. Box 723, Osburn, Idaho 83849, 208-752-1101
Service Area	Service Area: MP 55 West to MP 65 East, Unincorporated area within the Cities of Wallace-Osburn. The total size of area is 14 square miles.

Table 6.10. Shoshone County Fire District #1, Resources, Capabilities, and Needs.

Describe your services and organization goals in overview (100 words or less)	Fire and EMS response to citizenry and visitors Public education programs. Goal is to improve services continuously.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	• 3 Engines (1250/1000/750) • 2 water tenders (2100/3000) • 1 Type 6 Brush • 1 medium rescue/extrication
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	Career: • 1-Fire Chief • 1-Sr. FF/EMT (In charge in absence of Chief) • 2-FF/EMT Volunteers: • 5 FF/EMT • 7- EMT • 14 FF/Driver • 7 Auxiliary
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	• P-25 Compliant radios • Portables-16 min • Mobiles-7 min • Base-2 min • SCBA Inventory upgrade to CBRN (20 minimum) • Replace/Upgrade hydrants in District • New Fire Station/EOC-DO NOT OWN A BUILDING • Replace aging apparatus/Engines 1-over 25 years old, 1-over 21 years old, 1-over 18 years old
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	Double career staff at a minimum; • 4 personnel per shift is national standard • Update training standards to FF 1 minimum (Volunteer) • Update training standards to FF2/EMTA (Career) • Develop retention program that is realistic • Automatic aid agreements/consolidation of districts

6.3.2. Shoshone County Fire District #2

Table 6.11. Shoshone County Fire District #2, Resources, Capabilities, and Needs.

Name & Position of Person Preparing this Summary	Dale A. Costa, Fire Chief
Address & Telephone	14 W. Market Street, Kellogg, ID 83837 (208) 784-1188
Service Area	Starting at I-90 milepost 55.5 west to milepost 29.5. Down State highway 3 to milepost 103.4. We service both Western Shoshone and Eastern Kootenai County. We only go approximately 2-tenths of a mile up the Coeur d'Alene River from I-90. We take in all the gulches within our jurisdiction. Pinecreek we up 10 miles from the station to the Spokane/Idaho Mine. Approximately 2 miles above the Sunshine Mine. We do have 37 private fire protection contracts up the Coeur d'Alene River. Our district covers approximately 200 square miles.

Table 6.11. Shoshone County Fire District #2, Resources, Capabilities, and Needs.

Describe your services and organization goals in overview (100 words or less)	Shoshone County Fire District No. 2 responds to both structural and wildland fires within our jurisdiction. We provide basic first responder non-transport Emergency Medical Services, Heavy Rescue Extrication and some Backcountry Rescue Operations and are capable of responding to any Hazardous Materials Situation, to provide for rescue operations, and initial size up along with securing the scene until the arrival of the Region 1 Response Team. We also provide mobile decontamination services. In addition, we provide ice rescue services and have six certified drivers that are supported by the Fire District to work with the Shoshone County Dive Rescue Team. Shoshone County Fire District No. 2 is dedicated to providing a Well Trained, Highly Efficient, and Cost Effective Fire / Rescue Entity along with Public Services provided to all the citizens and visitors that are encountered.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	Shoshone County Fire District No. 2 operates out of 4 stations with a 5th to be built this Summer. The 2 fire stations in Kellogg are owned by the City. Both the Kellogg and Doyle Road Stations have training rooms. Apparatuses We have six type on engines that meet or exceed NFPA Standards. One is equipped with an on board foam system and three have onboard generators with lights. 3 Equipped with 1500 GPM pumps with 1000 gallons of water. 1 Equipped with 1000 GPM pump with 750 gallons of water. 1 Equipped with 750 GPM pump with 750 gallons of water. 1 Equipped with 1500 GPM pump with 1000 gallons of water. 1 50-foot aerial platform, 1000 GPM pump with 300 gallons of water. 1 2500 Gallon Water Tender. 1 Heavy Rescue Extrication Vehicle with the Hurst “Jaws of Life”. 1 2500 Gallon Water Tender. 1-250 gallon Water Donkey, not potable. 1 Hazardous material Response Trailer. 9 Level A Hazardous Material suites. 6 level A Training suites. Decontamination Equipment. Portable Propane Hot Water Heater. 4 CBRNE Certified Self Contained Breathing Apparatus. 1 – 6000 PSI Hypress Compressor with 4 bottle Cascade System. 2 – 2 bottle Cascade Systems. 6 Ice Rescue Suites. 2 Fold-A-Tanks, 1-2500 gallon and 1-1500 galloon. 2 Thermal Imaging Cameras, one with remote video feed. 2 District owned command Vehicles.
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	8 Career Fire Fighters with 2 Chief Officers and 6 Fire Fighters with 2 on duty 24-7. 30 Volunteer Fire Fighters

Table 6.11. Shoshone County Fire District #2, Resources, Capabilities, and Needs.

List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	We need to update our portables and pagers. We provide one each for all personnel and 1 for each of our apparatus. Total need is 47 of each. All our equipment is old and we maintain them to the best of our ability. We are updating when possible We need to add three water tenders and three type 6 brush trucks, one for each of our stations We need a 100-foot ladder for Kellogg, which would require a new station for it to fit in.
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	We need to add 9 fire fighters to bring us back to our 1982 staffing with duty personnel 24-7. To meet NFPA standards we need 18 personnel to be in complacence with NFPA 2-in-2-out rule on a first in engine.

6.3.3. Shoshone County Fire District #3

Table 6.12. Shoshone County Fire District #3, Resources, Capabilities, and Needs.

Name & Position of Person Preparing this Summary	Bruce VanBroeke
Address & Telephone	PO Box 83 Mullan, Id 83846 208 744 1194
Service Area	All Private structures outside the City of Mullan in the Eastern part of Shoshone County. Approximately 100 residences and several industrial facilities.
Describe your services and organization goals in overview (100 words or less)	Provide structure fire protection to the unincorporated areas in the eastern parts of Shoshone County. Work in cooperation with the Mullan Volunteer Fire Department to assist them in structure protection within the City of Mullan. District #3 has three Fire Commissioners and shares 20 Volunteer Firemen with Mullan. Assure that all Volunteers are trained and equipped to provide safe fire operations. Assist Idaho Department of Lands and US Forest Service in Wildland Fire suppression as requested.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	District #3 has one fire station and City of Mullan has one Station we share the following equipment: One 4000 gallon water tender, One type 6 engine, One type 7 engine and Two type 3 structure engines.
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	3 Fire commissioners, 1 volunteer chief, 20 volunteer firefighters, 4 EMT's
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	Updated communications equipment including repeaters, portable and mobile radios and pagers to be compliant with new regulations. One combined structure and wildland engine, 3000 gallon and all wheel drive.

Table 6.12. Shoshone County Fire District #3, Resources, Capabilities, and Needs.

List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	Would like to have 2 paid positions, 4 additional trained EMT's, structure and hazardous materials training.

6.3.4. Shoshone County Fire District #4

Fire District #4 is also known as the St. Joe Valley Fire District #4. They have a chief and 12 volunteers. They have 4 pieces of equipment; three 1000 gallon Water Trucks and a 2007 6-passenger Type 2 structural engine. Two buildings, one located in Calder, and the other in Marble Creek.

6.3.5. Prichard-Murray Volunteer Fire Department

Prichard / Murray Volunteer Fire Department Inc., 21109 Coeur D'Alene River Road, Wallace, Idaho 83873, (208) 682-3952

Stations

- Prichard Station; 21109 Coeur d'Alene River Road, Wallace, Idaho 83873
    - Type 1 Engine,
    - 1 Type 2 Water Tender,
    - 1 Type 4 Brush Unit,
    - 1 EMS ILS / Rescue Vehicle
- Murray Station; 6343 Prichard Creek Road, Murray, Idaho 83874
    - Resources   1-Type 1 Engine, 1- EMS BLS response vehicle

Equipment Summary:

- E511   Type 1 Engine w/1500 gpm pump & 750 gal water (1986 Mack)
- E512   Type 1 Engine w/1250 gpm pump & 1000 gal water (1983 Spartan)
- T521   Type 2 Tender w/375 gpm pump & 2700 gal water (1965 Military 5 ton)
- R531   Rescue vehicle w/EMS, Extrication, Water Rescue (2007 Dodge)
- R532   Rescue Vehicle w/EMS (1989 Suburban)
- B541   Type 4 Engine w/100 gpm pump & 750 gal water (1983 International)

Table 6.13. Prichard-Murray Volunteer Fire Department personnel summary.

ID	Name	Rank	Station	Alt. Phone	Phone
C501	Steve Coyle	Chief / EMT	Prichard	664-3398 (CDA)	682-3952
C502	James Cleveland	Asst. Chief / EMT-A	Murray		682-4436
C503	Joe Moos	Captain / EMT	Prichard		682-9137
C504	Rich Babin	Captain	Prichard		682-3990
C505		Captain	Murray		
C506	Mike Decker	Engineer	Prichard		682-2310
C507	Dewey Skaggs	Engineer / EMT	Prichard	682-4420	682-9954
C508	Ron Wilson	Engineer	Murray		682-3903

Table 6.13. Prichard-Murray Volunteer Fire Department personnel summary.

ID	Name	Rank	Station	Alt. Phone	Phone
C509	Donna Skaggs	Safety Officer / EMT	Prichard	682-4420	682-9954
P510	Terran Tester	Prevention Officer	Prichard		682-4003
F590	Donald Erickson	Firefighter	Prichard		682-4720
F591	Corlina Erickson	Firefighter / EMT	Prichard		682-4450
F592	Randy Childress	Firefighter	Prichard		682-4653
F593	James McFeeley	Firefighter	Murray		682-4708
F594	Mariann Cleveland	Firefighter / EMT	Murray	512-0209	682-4436
F595	Clint Kunze	Firefighter / EMT	Prichard		682-2267
F596	Lloyd Roath	Firefighter	Murray	682-3901 (work)	682-4787

6.4. Organization and Agency Capabilities / Needs

6.4.1. South Fork Coeur d'Alene River Sewer District

Table 6.14. South Fork Coeur d'Alene River Sewer District Resources, Capabilities, and Needs.

Name & Position of Person Preparing this Summary	Ross Stout, District Manager
Address & Telephone	PO Box 783, Osburn ID 83849 208-753-8041
Service Area	All communities along the South Fork Coeur d'Alene River, from Mullan to Pinehurst
Describe your services and organization goals in overview (100 words or less)	Sewage collection and treatment to maintain public and aquatic health.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	• Vactor unit • Sewer jet • VAC tank truck (1500 gal/cap) • Power rodder • Trailer mounted generator • TV unit and push cameras • Contained space entry equipment
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	• Four collection / treatment plant operators
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	Six inch trailer mounted pump unit with associated suction and discharge piping.
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	Engineering specialist.

6.4.2. Idaho Department of Lands

Table 6.15. Idaho Department of Lands – Cataldo Supervisory Area, Resources, Capabilities, and Needs.

Name & Position of Person Preparing this Summary	Bob Burke; Area Manager
Address & Telephone	Idaho Department of Lands/ Cataldo Supervisory Area 80 Hilltop Overpass Road Kingston ID, 83839 Office: 208.682.4611 Fax: 208.682.2991
Service Area	• Administrative Area; Forest Practices/ Lands, Minerals and Range = 888,300 acres • Fire/ Forest Protection District = 312,300 acres • State Endowment Management = 34,000 acres
Describe your services and organization goals in overview (100 words or less)	Our Mission: "We will manage endowment trust lands to maximize long-term financial returns to the beneficiary institutions and provide protection to Idaho's natural resources." The services we provide in support of our mission are: • Endowment Land management • Fire Suppression • Regulatory Functions For o Slash Management o Forest Practices o Mineral Reclamation o Navigable Waters
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	• One Type 6 Wildland fire engine (300 Gal.) w/ portable pumps, chainsaw, hand tools, fittings and hoses. (mobile radio, GPS, Kestrel). Vehicle: 31-F-42 • Two Type 5 Wildland fire engines (500 Gal.) w/ portable pumps, chainsaws, hand tools, fittings and hoses. (mobile radio, GPS, Kestrel). Vehicle: 31-F-43 and Vehicle: 31-F-47. • Fourteen Portable/ Programmable Radios (Bendix King GPH) • Four ATV's; Vehicle: 31-F-45, Vehicle: 31-T-52, Vehicle: 31-T-55, Vehicle: 31-T-59. • Nine four wheel drive pickups; o Vehicle: 31-F-40; ½ ton o Vehicle: 31-F-41; ½ ton o Vehicle: 31-F-44; 1 ton crew o Vehicle: 31-T-12; ¾ ton o Vehicle: 31-T-18; ½ ton crew o Vehicle: 31-T-48; ¾ ton o Vehicle: 31-T-49; ¾ ton o Vehicle: 31-T-53; 1 ton crew o Vehicle: 31-T-54; ¾ ton

Table 6.15. Idaho Department of Lands – Cataldo Supervisory Area, Resources, Capabilities, and Needs.

	• Two Snowmobiles; Vehicle: 31-T-51 and Vehicle: 31-T-20 • Two Camp Trailers; Unit: 31-F-50, and Unit: 31-F-57. • Other supplies may be obtained through the Coeur d'Alene Interagency Fire Cache
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	**Position** — **Duties** Area Manager — Line Officer Fire Warden — Fire, Hazard Mgmt., Forest Practices Assistant Fire Warden — Fire, Hazard Mgmt., HFT Private Forestry Specialist — FPA, Service Forestry, Fire Private Forestry Technician — FPA, Service Forestry, Fire 2 Endowment Foresters — Timber Mgmt., Fire Office Specialist — Receptionist, Office Admin Administrative Assistant — Office Admin Resource Foreman- Fire — Fire Suppression, Hazard Mgmt., HFT 8 Seasonal Firefighters — Fire Suppression, HFT, Hazard Mgmt. Timber Technician — Salvage, Direct Timber Sale Admin. Timber Resource Foreman — Timber Sale Preparation 3 Timber Crew — Timber Sale Preparation
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	*Reference Idaho Department of Lands Fire Mobilization Guide for additional Resources.
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	*Reference Idaho Department of Lands Fire Mobilization Guide for additional Resources.

6.4.3. Panhandle Health District

Table 6.16. Panhandle Health District Resources, Capabilities, and Needs.

Name & Position of Person Preparing this Summary	Jerry Cobb, Program Manager
Address & Telephone	114 W. Riverside Ave., Kellogg, ID 83837 208-783-0707
Service Area	Shoshone County and Kootenai County within the Superfund Site

Table 6.16. Panhandle Health District Resources, Capabilities, and Needs.	
Describe your services and organization goals in overview (100 words or less)	Institutional Control Program (ICP) of the Bunkerhill Superfund Site The Institutional Controls Program (ICP) is a locally enforced set of rules and regulations designed to ensure the integrity of clean soil and other protective barriers placed over contaminants ledt throughout the Bunker Hill Superfund Site. The ICP Provides education, sampling assistance and access to permanent disposal sites for contaminated soils generated site wide. Work permits are required for excavation or grading projects and certain interior projects. All contractors doing such work must be licensed by the ICP. The fundamental purpose of the ICP is to protect the public health and assist local land transactions within the Superfund Site. ICP website is located at: www.phd1.idaho.gov
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	• 2 – ½ ton 4-wheel drive pickups • 1 – 1 ton dual wheel truck with a dump box • 3 – 1yd hydraulic lift trailors • 35 mm & digital cameras and video cameras • Large electronic and paper database on contamination site wide • Cell phones • Sampling equipment
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	• 1 – Program Manager • 2 – Field personnel • 1 – Full-time administrative Assistant • 1 – Part-time Administrative Assistant • List of all contractors licensed through the ICP
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	We have no radio communication capability.
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	None at this time.

6.4.4. Basin Environmental Improvement Project Commission

Table 6.17. Basin Environmental Improvement Project Commission Resources, Capabilities, and Needs.	
Name & Position of Person Preparing this Summary	Terry A. Harwood, PE Executive Director
Address & Telephone	1005 W. McKinley, Kellogg, ID 83837 208-783-2528
Service Area	CDA Basin from headwaters to Spokane River west of Spokane.

Table 6.17. Basin Environmental Improvement Project Commission Resources, Capabilities, and Needs.	
Describe your services and organization goals in overview (100 words or less)	Commission is established to implement, direct, and/or coordinate environmental remediation, natural resource restoration, and related measures to address water quality and heavy metal contamination in the CDA Basin. This includes coordinating the implementation of the 2002 Record of Decision approved pursuant to the Comprehensive Environmental Response Compensation Liability Act (CERCLA). Commission also works on implementation of Phase II of the Bunker Hill Comprehensive Cleanup Plan, adoption and implementation/coordination of the Lake Coeur d'Alene Management Plan, and remediation of heavy metal contamination at specific mining sites in the North Fork of the Coeur d'Alene River.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	None
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	2 staff members: Terry A. Harwood, PE Executive Director Jeri DeLange, Assistant to the ED Remainder of support is provided by a team of technical leaders from the various agencies cooperating within the Commission.
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	None
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	None

6.4.5. Bureau of Land Management

Table 6.18. U.S. Dept. of Interior, Bureau of Land Management (BLM), Resources, Capabilities, and Needs.	
Name & Position of Person Preparing this Summary –	Kurt Pavlat, Assistant Field Manager, Coeur d'Alene Field Office
Address & Telephone –	3815 Schreiber Way, Coeur d'Alene, ID 83815 (208) 769-5038
Service Area –	Boundary, Bonner, Kootenai, Benewah and Shoshone Counties

Table 6.18. U.S. Dept. of Interior, Bureau of Land Management (BLM), Resources, Capabilities, and Needs.	
Describe your services and organization goals in overview (100 words or less) –	Multiple use and sustained yield management of federal public lands located in the five northern counties of Idaho. BLM resource specialists located in Coeur d'Alene specialize in forest management, hazardous fuels management, botany, wildlife/fisheries management, lands/realty, noxious/invasive species management, hydrology, geology/mine engineering, GIS, IT, environmental engineering, outdoor recreation management, environmental planning, law enforcement, cadastral survey, public affairs, financial management and abandoned mine land (AML) management.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	The BLM has a type 6 fire engine located in Coeur d'Alene.
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	The BLM has one Law Enforcement Officer (LEO), various ICS qualified personnel (fire), one hydrologist, one mining engineer, one budget analyst, one public affairs officer, one information technology (IT) specialist, three administrative assistants and one environmental engineer located in Coeur d'Alene.
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (e.g., fire trucks or water tenders, fire hydrant network, radio communications network, etc.) –.	N/A
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (e.g., additional number of paid staff, more volunteers, training for volunteers and staff, etc.).	N/A

6.4.6. US Forest Service

Table 6.19. U.S. Forest Service, St. Joe Ranger District, Resources, Capabilities, and Needs.	
Name & Position of Person Preparing this Summary	James Grasham Assistant Fire Management Officer
Address & Telephone	222 South 7th Street St. Maries, ID 83861 208-245-6062
Service Area	Wildland fire protection on approximately 778,880 acres located within the St. Joe, Little North Fork of the Clearwater and St. Maries river drainages.
Describe your services and organization goals in overview (100 words or less)	The St. Joe Ranger District is dedicated to the highest quality of Natural Resource Stewardship while fostering teamwork, good communication, and respect within our agency and communities. The primary mission of the St. Joe Fire Management program is to provide safe, organized, mobile and highly skilled engine and hand crews for all phases of wildland fire suppression and fire and fuels management. Crew organization, qualifications, equipment and specialized skills can also be utilized to meet other management objectives.

Table 6.19. U.S. Forest Service, St. Joe Ranger District, Resources, Capabilities, and Needs.

List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	Two Type IV Engines and two Type VI Engines with six persons each. We have several portable pumps and chainsaws along with various water handling equipment and tools. We also have approximately 30 programmable Bendix King Portable Radios and two Palm Infra-red cameras for location of hotspots.
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	Personnel include: 1 District Fire Management Officer, 2 Assistant District Fire Management Officers, 26 production fire fighters, and 1 fire prevention technician.
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	Coeur d'Alene Interagency Fire Cache and Resource Orders to Coeur d'Alene Interagency Dispatch Center for additional resource needs.
List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	Administered on a regional, state, and national level.

6.4.7. Avista Corporation

Table 6.20. Avista Utilities Resources, Capabilities, and Needs.

Name & Position of Person Preparing this Summary	Allison Sieverding, Construction Design Rep
Address & Telephone	120 N Hill St, Kellogg Id 83837 208-659-9761
Service Area	Silver Valley (Office also serves St. Maries and Avery)
Describe your services and organization goals in overview (100 words or less)	We are an electric and gas provider. We generate and distribute these commodities across our distribution system which includes transmission and generation facilities.
List your currently available technological resources for use in responding to emergencies in your service area (e.g. list of fire protection apparatus, snow plows, search and rescue trucks, etc.)	• 5 aerial devices up to 60' high • 2 line trucks – for lifting a limited load • 2 snow cat vehicles with plow • Misc. small trucks, pickups
List your currently available human resources for use in responding to emergencies in your service area (e.g. detail staff by position and number, plus volunteers)	• 8- field personnel (Silver Valley) • 3 administration • 5 field personnel (St. Maries – for Avery)
List your organization's technological needs for responding to hazard emergencies, which are not currently in inventory, in your service area (eg., fire trucks or water tenders, fire hydrant network, radio communications network, etc.)	Avista Corp. would assist in every way possible to protect and or support our electric and gas facilities. Our other offices would provide the same type of support as our local office, but with more manpower.

Table 6.20. Avista Utilities Resources, Capabilities, and Needs.

List your organization's human resource needs for responding to hazard emergencies, which are not currently utilized, in your service area (eg., additional number of paid staff, more volunteers, training for volunteers and staff, etc.)	Avista Corp. would assist in every way possible to protect and or support our electric and gas facilities. Our other offices would provide the same type of support as our local office, but with more manpower.

7. Potential Mitigation Measures

7.1. Summary of the Mitigation Measures Approach

This Multi-Jurisdictional Hazards Mitigation Plan's implementation will reflect the unique challenges of Shoshone County and each municipality and community within the county. In response to these challenges, it is the desire of Shoshone County and each municipality to continue the implementation of existing programs that have already provided a level of safety and preparedness in the protection of people, structures, infrastructure, and the economy of Shoshone County.

One of these programs of notable mention is the current participation in the National Flood Insurance Program currently in place within all of the Cities and the County where a 100-year flood profile has been located. Since the placement of the Milo Creek stream impoundment structures, and the subsequent removal of the 100-year flood zone along that stream, the City of Wardner has not been subject to structure coverage in the NFIP, but the City of Wardner has a NFIP policy. All of the remaining Cities and the County have active NFIP policies. It is the intent of this Multi-Jurisdictional Hazards Mitigation Plan, through its implementation, that the NFIP participation will continue and that the relative NFIP community scores will improve through targeted activities to reduce risk exposure to flood damages. Continued NFIP compliance will be maintained in Shoshone County and all municipalities with eligibility.

A series of potential mitigation measures have been developed in this section of the Multi-Jurisdictional Hazards Mitigation Plan. These activities are listed in Tables 7.4 – 7.7. While each of these activities have been presented as stand-alone projects, in reality these projects must be implemented in a holistic approach to hazard mitigation. For instance, the development of a levee system along the South Fork Coeur d'Alene River would not function optimally if the storm water considerations within each community along the system were not addressed. Further, artificial stream channel routing must be addressed and considered in terms of linkages with a potential levee system further downstream. These examples apply to most of the potential mitigation measures presented in this section. A holistic approach to hazard mitigation must be adhered to.

7.2. Potential Funding Opportunities

An extensive report compiled by the Basin Commission, "Upper Coeur d'Alene Basin Infrastructure Funding" detailed potential funding resources. The Basin Environmental Improvement Project Commission has developed the Upper Coeur d'Alene Basin Communities Drainage Control and Infrastructure Revitalization Plan (DCIRP). The DCIRP is a comprehensive project identification, planning, and financial document for infrastructure reconstruction, protection of Superfund remedies, preservation of public and private property, and revitalization of local economies within the upper basin. The DCIRP will be published in 2009. the information presented in this document is summarized an early-release of the Financial Planning section of the plan, in draft form. It is intended to help facilitate funding pursuits for fiscal year 2010 by Idaho's Congressional Delegation and State Leadership. In this context we are using the findings to better estimate potential funding opportunities in Shoshone County for these parallel efforts.

The DCIRP is a need and grant based program designed to leverage multi-community planning, local and state resources, and project varieties. Financial considerations include federal, state, and private granting entities, directed local in-kind services, local funding, local funding assistance from state resources, and general long-range fiscal planning. Funding mechanisms are combined to maximize project financing and project diversity. This program also coordinates with the local Institutional Controls Program (ICP) and establishes the actions needed to leverage the Superfund investment into a viable economic development tool.

The Upper South Fork Coeur d'Alene Basin has unique conditions that require innovative financial planning to maintain basic services within the communities. The basic services are integral to protection of the Superfund Site remedy and providing equitable economic conditions to the residents and businesses. An evaluation of local communities' ability-to-pay for infrastructure shows significant funding from outside sources is necessary to meet their infrastructure needs and protect the Superfund remedy. The communities can contribute some funding via utility fees and general funds. Successful infrastructure projects that were recently constructed were funded through a conglomeration of local, state and federal grant and loan programs. It appears future projects will rely on a similar funding strategy.

7.2.1. Project Funding Opportunities to Protect the Superfund Site Remediation Effort

The "Upper Coeur d'Alene Basin Infrastructure Funding" (Forseth 2009) report identified several potential funding sources. These are presented and briefly discussed here. However, in order to grasp the full context of the opportunities, the project report should be consulted. The entirety of Section 7.3.1. has been summarized from the "Upper Coeur d'Alene Basin Infrastructure Funding" report provided by the Basin Environmental Improvement Project Commission.

7.2.1.1. Traditional Funding Agency Approach

Traditional funding agencies (i.e., Rural Development, Department of Commerce, Corps of Engineers) are focused on particular infrastructure issues that address regulatory compliance or public safety. Regulated systems typically funded are water and sewer because of the Clean Water Act, National Pollution Discharge Elimination System (NPDES), Safe Drinking Water Act, and other federal and State laws. These two systems are common to all communities and are a focus of lawmakers and regulators. Finally, these systems are necessary for development, job creation, and other high priority uses for grant and loan monies made available by the government.

7.2.1.2. Non-Traditional Funding Opportunities

Private funding from foundations and corporations is very competitive, and their process is different from government funding. Because they are not accountable to voters, they fund according to their own specific set of priorities. The most common recipients of this type of funding are non-profit organizations. These non-profit organizations typically carry forward the goals of these non-traditional funding sources and can be an important implementation mechanism for rural communities. This funding source will typically contribute $5,000 to $100,000 towards a project. This source should be viewed as a supplement to the major funding agencies or as a funding source for smaller projects.

7.2.1.3. Local Community Ability to Fund Projects

A cursory economic analysis was conducted, utilizing 2004 census data and other sources, that collected and reviewed median value of owner-occupied housing and current property taxes being collected based on that value for the cities of Kellogg, Pinehurst, and Smelterville. This analysis considered all the overlapping taxing districts for Shoshone County, School District 391, Joint Fire District #2, the respective cities, and the West Shoshone Hospital District. Additional data was examined involving both median household income and disposal household income. Utility rates were analyzed including power, natural gas, water, wastewater, refuse collection and disposal, telephone and cable TV. Finally, miscellaneous household and living expenses were identified and included as expenditures against median household income.

Beyond the income findings, the overall property tax amounts may be the only expenditure that is higher than other households throughout the state. The average property tax rate for the three cities is 2.37% of taxable market value. The state's average urban tax rate is 1.68% or 30% less than the rate paid by Shoshone County residents.

With an average of $24,906 annual median household disposable income for the three cities (Census 2000), at least in the short term, there is no budgetary room for additional household expenditures. This annual income figure is 31% less than the state's median household disposal income of $35,998.

Based on the analysis of the local communities' ability to pay toward the infrastructure needs, there is a large deficit between what the communities can pay and the level of funding needed. Given the financial conditions, it is likely not possible to 'raise rates enough' to cover even the level of funding needed for matching funds if agency assistance is provided. It appears enough local funds can be generated to deliver high priority projects if grant or loan program assistance is provided.

7.2.1.4. Federal, State, and Local Funding Options

Federal, State and local funding sources are available to the cities and utility districts located in Shoshone County. An overview of the most promising programs is provided in the "Upper Coeur d'Alene Basin Infrastructure Funding" document and many of these opportunities are available to all communities in Shoshone County. In general, funding options can be broken down into several categories, including grant and loan programs. The following list provides potential sources of funding and the document contains outlines for availability and eligibility requirements for the various funding options.

Grant Programs

- Community Development Block Grant Program (Idaho Department of Commerce)
- Economic Development Administration (U.S. Department of Commerce)
- Rural Development Program, US Department of Agriculture (formerly Farmers Home Administration)
- Surface Transportation Program (STP) Local Rural, Idaho Transportation Department
- Surface Transportation Program (STP) Local Urban, Idaho Transportation Department
- Surface Transportation Program Enhancement, Idaho Transportation Department

Loan Programs

- Drinking Water State Revolving Fund Loan
- Wastewater Revolving Fund Loan

Local Resources

- Pay-As-You-Go
- Reserve Fund Financing
- General Obligation Bonds
- Revenue Bonds
- Local Improvement District (LID)
- Business Improvement District (BID)
- Tax Increment Financing (TIF)
- Impact Fees

7.2.1.5. Leveraging Funds

There are several methods to make grant dollars stretch so that the county, cities, and communities can get the "biggest bang for the buck." The concept of leveraging means that you use more than one source of money to supplement your project. The "Upper Coeur d'Alene Basin Infrastructure Funding" documents lists three methods to stretch financial resources.

Percentage and/or In-Kind Match

The Percentage and/or In-Kind Match method requires a set percentage (such as 25%) in local cash or in-kind resources from an entity to support a project. Without this amount of local financial contribution the grant application may not receive sufficient scoring points used to calculate grant awards, or may not be eligible to receive the intended grant award.

In-Kind Match

A second method, In-Kind Match, means that your agency or community will make a non-cash contribution toward the project. Non-cash contributions can be in the form of goods, services, and, facilities, space, personnel, materials, and equipment calculated at fair market value.

Dollar-for-Dollar Leverage Match

A third method, Dollar-for-Dollar Match, means that an entity can leverage grant funds from one funding source with grant funds from a second funding source. For instance, an entity may be able to leverage state grant funds with federal dollars. Verification that a grantor agency will allow this arrangement before implementation is necessary. Some grantor agencies use a so-called leveraging ratio to measure money an entity has from other sources that could be matched to the project grant. Generally, the more money an entity can bring in from other sources the better the chance of being funded.

7.2.2. Project Funding Opportunities Identified by FEMA

FEMA Region X has provided valuable references for potential funding of projects identified in thie planning effort. These are summarized in Table 7.1 and are available to the communities, cities, and Shoshone County.

Table 7.1. Federal Financial Resources for Hazard Mitigation.

Subtype	Administrator	Purpose	Amount/Availability
Hazard Mitigation Grant Program (HMGP)	Federal Emergency Management Agency (FEMA)	Support pre- and post-disaster mitigation plans and projects.	Available to communities after a Presidentially declared disaster has occurred within state. Grant award based on specific projects as they are identified.
Pre-Disaster Mitigation (PDM) grant program	FEMA	Support pre-disaster mitigation plans and projects.	Available on an annual basis, nationally competitive grant. Grant award based on specific projects as they are identified (no more than $3M federal share for projects).
Flood Mitigation Assistance (FMA) grant program	FEMA	Mitigate repetitively flooded structures and infrastructure.	Available on an annual basis, distributed to communities within state by the state emergency management grants specialists. Grant award based on specific projects as they are identified.
Assistance to Firefighters Grant (AFG) Program	FEMA/USFA (U.S. Fire Administration)	Provide equipment, protective gear, emergency vehicles, training, and other resources needed to protect the public and emergency personnel from fire and related hazards.	Available to fire departments and nonaffiliated emergency medical services. Grant award based on specific projects as they are identified.

Table 7.1. Federal Financial Resources for Hazard Mitigation.

Subtype	Administrator	Purpose	Amount/Availability
Homeland Security Preparedness Technical Assistance Program (HSPTAP)	FEMA/DHS	Build and sustain preparedness technical assistance activities in support of the four homeland security mission areas (prevention, protection, response, recovery) and homeland security program management.	Technical assistance services developed and delivered to state and local homeland security personnel. Grant award based on specific projects as they are identified.
Community Block Grant Program Entitlement Communities Grants	US HUD (U.S. Department of Housing and Urban Development)	Acquisition of real property, relocation and demolition, rehabilitation of residential and non-residential structures, construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes.	Available to entitled cities. Grant award based on specific projects as they are identified.
Community Action for a Renewed Environment (CARE)	U.S. Environmental Protection Agency (EPA)	Through financial and technical assistance offers an innovative way for a community to organize and take action to reduce toxic pollution (i.e., storm water) in its local environment. Through CARE, a community creates a partnership that implements solutions to reduce releases of toxic pollutants and minimize people's exposure to them.	Competitive grant program. Grant award based on specific projects as they are identified.
Clean Water State Revolving Fund (CWSRF)	EPA	The CWSRF is a loan program that provides low-cost financing to eligible entities within state and tribal lands for water quality projects, including all types of non-point source, watershed protection or restoration, estuary management projects, and more traditional municipal wastewater treatment projects.	CWSRF programs provided more than $5 billion annually to fund water quality protection projects for wastewater treatment, non-point source pollution control, and watershed and estuary management.
Public Health Emergency Preparedness (PHEP) Cooperative Agreement.	Department of Health and Human Services' (HHS's) Centers for Disease Control and Prevention (CDC)	Funds are intended to upgrade state and local public health jurisdictions' preparedness and response to bioterrorism, outbreaks of infectious diseases, and other public health threats and emergencies.	Competitive grant program. Grant award based on specific projects as they are identified.

7.3. Mitigation Strategies for the County and Municipalities

Mitigation strategies detailed within this Shoshone County Multi-Jurisdictional Hazards Mitigation Plan haven been developed through an integrated approach of (1) findings determined through this series of analyses, (2) recommendations from planning committee members, and (3) suggestions and ideas presented by the public during the public mail survey, public meetings, and open discussions between the planning team members and the public.

Critical to the implementation of this Multi-Jurisdictional Hazards Mitigation Plan will be the identification of, and implementation of, an integrated schedule of treatments targeted at achieving an elimination of the lives lost, and reduction in structures damaged or destroyed, infrastructure compromised, and unique ecosystems damaged that serve to sustain the way-of-life and economy of Shoshone County and the region. Since there are many management agencies and thousands of private landowners in Shoshone County, it is reasonable to expect that differing schedules of adoption will be made and varying degrees of compliance will be observed across all ownerships.

Shoshone County and the incorporated cities of Shoshone County, encourage the philosophy of instilling disaster resistance in normal day-to-day operations. By implementing plan activities through existing programs and resources, the cost of mitigation is often a small portion of the overall cost of a project's design or program.

The federal land management agencies in Shoshone County, specifically the USDA Forest Service, and Bureau of Land Management, are participants in this planning process and have contributed to its development. Where available, their schedule of land treatments have been considered in this planning process to better facilitate a correlation between their identified planning efforts and the efforts of government organizations (County and City).

All risk assessments were made based on the conditions existing during 2008-09, thus, the recommendations in this section have been made in light of those conditions. However, the components of risk and the preparedness of the county's resources are not static. It will be necessary to fine-tune this plan's recommendations annually to adjust for changes in the components of risk, population density changes, infrastructure modifications, and other factors.

7.3.1. Prioritization of Mitigation Activities

Prioritization of projects will occur at the County, City, agency, and private levels. Differing prioritization processes will occur, however, the county and cities will adopt the prioritization process, as indicated through the adoption of this plan by each municipality.

The prioritization process includes a special emphasis on cost-benefit analysis review. The process will reflect that a key component in funding decision is a determination that the project will provide an equivalent or more in benefits over the life of the project when compared with the costs. Projects will be administered by county and local jurisdictions.

County Commissioners and the elected officials of all jurisdictions will evaluate opportunities and establish their own unique priorities to accomplish mitigation activities where existing funds and resources are available and there is community interest in implementing mitigation measures. If no federal funding is used in these situations, the prioritization process may be less formal. Often the types of projects that the County can afford to do on their own are in relation to improved codes and standards, department planning and preparedness, and education. These types of projects may not meet the traditional project model, selection criteria, and benefit-cost model. The County will consider all pre-disaster mitigation proposals brought before the County Commissioners by department heads, city officials, fire districts, local civic groups, and private citizens.

When federal or state funding is available for hazard mitigation, there are usually requirements that establish a rigorous benefit-cost analysis as a guiding criterion in establishing project priorities. Shoshone County will understand the basic federal grant program criteria which will drive the identification, selection, and funding of the most competitive and worthy mitigation projects. FEMA's three primary grant programs (the post-disaster Hazard Mitigation Grant Program, the pre-disaster Flood Mitigation Assistance and Pre-Disaster Mitigation grant programs) that offer federal mitigation funding to state and local governments all include the benefit-cost and repetitive loss selection criteria.

The prioritization of projects will occur annually and be facilitated by Shoshone County to include the County Commissioner's Office, City Mayors and Councils, Fire District Chiefs and Commissioners, agency representatives (USFS, BLM, State Lands, etc.). The prioritization of projects will be based on the selection of projects which create a balanced approach to pre-disaster mitigation which recognizes the hierarchy of treating (highest first):

- People and Structures
- Infrastructure
- Local and Regional Economy
- Traditional Way of Life
- Ecosystems

The resources at risk within each populated place in Shoshone County and the municipalities, detailed in this document, will serve to establish a consistent and uniform basis for the "benefit" portion of the cost-benefit ratio analysis for all projects.

7.3.2. STAPLEE Matrix for Initial Ranking of Mitigation Measures

The STAPLEE matrix has been proposed as an approach to use when creating unbiased evaluations of potential mitigation measures. These seven criteria are determined subjectively and independently from each other. For these purposes each project has been rated on a scale of zero (0) to ten (10). The cumulative scores can range from zero to seventy. The score of seventy would be considered a highly desirable project while a very low scoring project would be considered a very undesirable project. Table 7.2 defines the conditions considered with each criteria.

Table 7.2. Evaluation Criteria (STAPLEE) for Mitigation Actions.

Evaluation Category	Discussion "It is important to consider…"	Considerations
Social	The public support for the overall mitigation strategy and specific mitigation actions.	Community acceptance Adversely affects population
Technical	If the mitigation action is technically feasible and if it is the whole or partial solution.	Technical feasibility Long-term solutions Secondary impacts
Administrative	If the community has the personnel and administrative capabilities necessary to implement the action or whether outside help will be necessary.	Staffing Funding allocation Maintenance/operations
Political	What the community and its members feel about issues related to the environment, economic development, safety, and emergency management.	Political support Local champion Public support
Legal	Whether the community has the legal authority to implement the action, or whether the community must pass new regulations.	Local, state, and federal authority Potential legal challenge
Economic	If the action can be funded with current or future internal and external sources, if the costs seem reasonable for the size of the project, and if enough information is available to complete a FEMA Benefit-Cost Analysis.	Benefit/cost of action Contributes to other economic goals Outside funding required FEMA Benefit-Cost Analysis
Environmental	The impact on the environment because of public desire for a sustainable and environmentally healthy community.	Effect on local flora and fauna Consistent with community environmental goals Consistent with local, state, and federal laws

All of these will be ranked on scale (subjective) from 0 to 10. The sum of the total will create the Mitigation Action's overall score with the highest ranked scores achieving the highest ranked mitigation measures. If any one score is below 3, the mitigation measure will be determined to be "unfeasible", removing it from further consideration.

7.3.3. Proposed Mitigation Measures

Potential mitigation measures are presented in Tables 7.4 – 7.7. These measures include a Project Number. Project numbers contain a series of letters and numbers separated by dashes. For instance, PIN-3002 is one example of a project identifier used in Table 7.6, representing a project in Pinehurst (PIN), in the “3000” series (Enhanced Resources and Capabilities), and unique project number “002”. The definition of these codes is listed in Table 7.3.

Table 7.3. Unique project codes for potential mitigation measures.

City Codes	Series Codes
KEL: City of Kellogg	1000: Policy Related Activities
MUL: City of Mullan	2000: Activities to Reduce Loss Potential
OSB: City of Osburn	3000: Resource and Capabilities Enhancements
PIN: City of Pinehurst	4000: Activities to Change the Characteristics of Risk
SME: City of Smelterville	
WAL: City of Wallace	
WAR: City of Wardner	
SHO: All of Shoshone County	

The Series Codes (1000-4000) include projects generally listed by their potential to accomplish certain hazard mitigation goals. The first, Policy Related Activities (1000), are projects that specifically target the plans, policies, and programs conducted through existing governmental structures such as City Councils with Mayors, and through the Board of County Commissioners. These are the efforts that can preclude future developments from placing resources at-risk to hazards currently identified. In this way, the cities and the county can focus on correcting current problems without allowing the same conditions to be repeated in the future. Shoshone County and the municipalities can also insure that the practices currently on-going, such as participation in the NIFP, are continued into the foreseeable future.

The second category, Activities to Reduce Loss Potential (2000), are activities generally targeted at changing a structure’s risk or infrastructure component’s risk profile. This may include elevating homes currently located within a flood zone above the regulatory flood height, or replacing roofing on homes showing vulnerability to wind damage. These activities are targeted to change the risks of improvements placed in harm’s way.

The third category, Resource and Capability Enhancements (3000), are efforts to enhance the ability of the cities and the county when responding to emergencies from natural hazards. For instance, one of the repeated themes in this risk assessment has been the need for increased radio communications between the cities, county, fire protection, regional, state, and federal agencies. These types of improvements generally apply equally to all hazard types and can impact the effectiveness of disaster response.

Finally, the forth category, Activities to Change the Characteristics of Risk (4000), represents activities targeted at changing the characteristics of the hazard. In the instance of flooding, a levee is an example of a mitigation measure targeting the change of a risk component based on the vector of the hazard. Another example is improving storm water handling as it moves through a community to alleviate potential structure damages from flood-type impacts. Elevating a road access and improving culvert sizing and location are more examples to change the characteristics of risk exposure.

Each table includes a project type defined by the hazard most directly affected by the proposed activity. Some of the mitigation measures includes multiple hazards, and others state they are applicable to “All Hazards”. The order these potential mitigation measures are listed in is random. The STAPLEE score is determined for each project in Tables 7.8-7.11 based on the discussion in Table 7.2.

7.3.4. Implementation Timeframe

The implementation timeframe for these mitigation measures will be dependant on several factors including funding, personnel time to implement these activities within existing budgets and manpower resources, and the political realities of implementing these activities within the realm of day-to-day activities all administrators of small jurisdictions face. The implementation timeframe listed with each action item in Tables 7.4 through 7.7 include the following:

- **Immediate:** to be completed within the next 12 months,
- **Short-Term:** to be initiated within the next 12 months (completion may be longer),
- **Mid-Term:** to be initiated between 1 year and 3 years from now,
- **Long-Term:** to be initiated within the next 5 years and developed into a sustainable program.

It is reasonable to expect that certain municipalities will incorporate these mitigation measures into their programs quicker than other municipalities. It is expected that Shoshone County government will provide a leadership in the implementation of this series of mitigation measures through example and knowledge of the regulatory environment.

Table 7.4. Potential Mitigation Activities for Policy Related Activities (1000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
KEL-1001	Update existing **City of Kellogg Comprehensive Plan** to incorporate hazard mitigation recommendations in this plan, especially those related to NFIP and CRS compliance.	All Hazards	City of Kellogg	70	Immediate
MUL-1002	Update existing **City of Mullan Comprehensive Plan** to incorporate hazard mitigation recommendations in this plan, especially those related to NFIP compliance.	All Hazards	City of Mullan	70	Immediate
OSB-1003	Update existing **City of Osburn Comprehensive Plan** to incorporate hazard mitigation recommendations in this plan, especially those related to NFIP compliance.	All Hazards	City of Osburn	70	Immediate
PIN-1004	Update existing **City of Pinehurst Comprehensive Plan** to incorporate hazard mitigation recommendations in this plan, especially those related to NFIP compliance.	All Hazards	City of Pinehurst	70	Immediate
SME-1005	Update existing **City of Smelterville Comprehensive Plan** to incorporate hazard mitigation recommendations in this plan, especially those related to NFIP compliance.	All Hazards	City of Smelterville	70	Immediate
WAL-1006	Update existing **City of Wallace Comprehensive Plan** to incorporate hazard mitigation recommendations in this plan, especially those related to NFIP compliance.	All Hazards	City of Wallace	70	Immediate
WAR-1007	Update existing **City of Wardner Comprehensive Plan** to incorporate hazard mitigation recommendations in this plan, especially those related to NFIP compliance.	All Hazards	City of Wardner	70	Immediate
SHO-1008	Update existing **Shoshone County Planning and Zoning Ordinance** to incorporate the recommendations in this plan to include strict enforcement of policies related to limiting or excluding certain activities in hazard prone areas such as the DFIRM flood zones. Penalties for violations should be clear and consider property title restrictions and compliance penalties against violators of the ordinances.	All Hazards (especially flood)	Shoshone County	68	Immediate
KEL-1009	Develop & Adopt **City of Kellogg Planning and Zoning Ordinance** (Plan) to include strict enforcement of policies related to limiting or excluding certain activities in hazard prone areas such as the DFIRM flood zones. Penalties for violations should be clear and consider property title restrictions and compliance penalties against violators of the ordinances.	All Hazards (especially flood)	City of Kellogg	65	Immediate

Table 7.4. Potential Mitigation Activities for Policy Related Activities (1000 series).					
Project Number	**Project Name**	**Type of Project**	**Responsible Organization**	**STAPLEE Score**	**Implementation Time Frame**
MUL-1010	Develop & Adopt **City of Mullan Planning and Zoning Ordinance** (Plan) to include strict enforcement of policies related to limiting or excluding certain activities in hazard prone areas such as the DFIRM flood zones. Penalties for violations should be clear and consider property title restrictions and compliance penalties against violators of the ordinances.	All Hazards (especially flood)	City of Mullan	65	Immediate
OSB-1011	Develop & Adopt **City of Osburn Planning and Zoning Ordinance** (Plan) to include strict enforcement of policies related to limiting or excluding certain activities in hazard prone areas such as the DFIRM flood zones. Penalties for violations should be clear and consider property title restrictions and compliance penalties against violators of the ordinances.	All Hazards (especially flood)	City of Osburn	65	Immediate
PIN-1012	Develop & Adopt **City of Pinehurst Planning and Zoning Ordinance** (Plan) to include strict enforcement of policies related to limiting or excluding certain activities in hazard prone areas such as the DFIRM flood zones. Penalties for violations should be clear and consider property title restrictions and compliance penalties against violators of the ordinances.	All Hazards (especially flood)	City of Pinehurst	65	Immediate
SME-1013	Develop & Adopt **City of Smelterville Planning and Zoning Ordinance** (Plan) to include strict enforcement of policies related to limiting or excluding certain activities in hazard prone areas such as the DFIRM flood zones. Penalties for violations should be clear and consider property title restrictions and compliance penalties against violators of the ordinances.	All Hazards (especially flood)	City of Smelterville	65	Immediate
WAL-1014	Develop & Adopt **City of Wallace Planning and Zoning Ordinance** (Plan) to include strict enforcement of policies related to limiting or excluding certain activities in hazard prone areas such as the DFIRM flood zones. Penalties for violations should be clear and consider property title restrictions and compliance penalties against violators of the ordinances.	All Hazards (especially flood)	City of Wallace	65	Immediate
KEL-1015	**City of Kellogg Storm Water Runoff** Policy Development, Updates, and Enforcement of ICP Guidelines for Storm Water Management, and EPA's Clean Water Act associated with Storm Water Protection Plans.	Flood	City of Kellogg, PHD, BEIPC, IDEQ	66	Immediate
MUL-1016	**City of Mullan Storm Water Runoff** Policy Development, Updates, and Enforcement of ICP Guidelines for Storm Water Management, and EPA's Clean Water Act associated with Storm Water Protection Plans.	Flood	City of Mullan, PHD, BEIPC, IDEQ	66	Immediate

Table 7.4. Potential Mitigation Activities for Policy Related Activities (1000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
OSB-1017	**City of Osburn Storm Water Runoff** Policy Development, Updates, and Enforcement of ICP Guidelines for Storm Water Management, and EPA's Clean Water Act associated with Storm Water Protection Plans.	Flood	City of Osburn, PHD, BEIPC, IDEQ	66	Immediate
PIN-1018	**City of Pinehurst Storm Water Runoff** Policy Development, Updates, and Enforcement of ICP Guidelines for Storm Water Management, and EPA's Clean Water Act associated with Storm Water Protection Plans.	Flood	City of Pinehurst, PHD, BEIPC, IDEQ	66	Immediate
WAL-1019	**City of Wallace Storm Water Runoff** Policy Development, Updates, and Enforcement of ICP Guidelines for Storm Water Management, and EPA's Clean Water Act associated with Storm Water Protection Plans.	Flood	City of Wallace, PHD, BEIPC, IDEQ	66	Immediate
WAR-1020	**City of Wardner Storm Water Runoff** Policy Development, Updates, and Enforcement of ICP Guidelines for Storm Water Management, and EPA's Clean Water Act associated with Storm Water Protection Plans.	Flood	City of Wardner, PHD, BEIPC, IDEQ	66	Immediate
SHO-1021	Shoshone County **Storm Water Runoff Policy** Revision & Enforcement to further address this component in the Site Disturbance Ordinance (Entire County).	Flood	Shoshone County, PHD, BEIPC, IDEQ	66	Immediate
SHO-1022	**Shoshone County Wildfire Control Protocol** within the Superfund Site (advanced priority for control efforts and erosion mitigation within the site).	Wildfire	Shoshone County, US Forest Service, Bureau of Land Management, forest industry, private forestland owners	65	Immediate
SHO-1023	Identification of landslide prone areas where development is unstable due to exposure to landslide risks. Prohibit further unmitigated development in these landslide prone areas through **Planning & Zoning Ordinances**.	Landslides	Shoshone County	63	Short-term
SHO-1024	Develop a complete **geospatial database and geospatial library** of information used by the County and Cities, and make those data, along with detailed maps of the County and Cities available to all decision makers in the municipalities and the general public. Offer the services through existing offices and over the Internet.	All Hazards	Shoshone County & All Cities	64	Immediate
SHO-1025	Develop **Minor Home Repair Program** and obtain grant funding support to award low-interest deferred loans for emergency preparedness repairs for low income resident homeowners in **Shoshone County**.	All Hazards	Shoshone County & All Cities	63	Immediate

Table 7.4. Potential Mitigation Activities for Policy Related Activities (1000 series).					
Project Number	**Project Name**	**Type of Project**	**Responsible Organization**	**STAPLEE Score**	**Implementation Time Frame**
KEL-1026	Participate in the **Panhandle Stormwater & Erosion Education Program (SEEP)** sponsored by the Panhandle Area Council to distribute information and increase awareness and skills of construction professionals in the **City of Kellogg**.	Flood, Landslides	City of Kellogg, Shoshone County, PHD, BEIPC, IDEQ	59	Short-term
MUL-1027	Participate in the **Panhandle Stormwater & Erosion Education Program (SEEP)** sponsored by the Panhandle Area Council to distribute information and increase awareness and skills of construction professionals in the **City of Mullan**	Flood, Landslides	City of Mullan, Shoshone County, PHD, BEIPC, IDEQ	59	Short-term
OSB-1028	Participate in the **Panhandle Stormwater & Erosion Education Program (SEEP)** sponsored by the Panhandle Area Council to distribute information and increase awareness and skills of construction professionals in the **City of Osburn**.	Flood, Landslides	City of Osburn, Shoshone County, PHD, BEIPC, IDEQ	59	Short-term
PIN-1029	Participate in the **Panhandle Stormwater & Erosion Education Program (SEEP)** sponsored by the Panhandle Area Council to distribute information and increase awareness and skills of construction professionals in the **City of Pinehurst**.	Flood, Landslides	City of Pinehurst, Shoshone County, PHD, BEIPC, IDEQ	59	Short-term
SME-1030	Participate in the **Panhandle Stormwater & Erosion Education Program (SEEP)** sponsored by the Panhandle Area Council to distribute information and increase awareness and skills of construction professionals in the **City of Smelterville**.	Flood, Landslides	City of Smelterville, Shoshone County, PHD, BEIPC, IDEQ	59	Short-term
WAL-1031	Participate in the **Panhandle Stormwater & Erosion Education Program (SEEP)** sponsored by the Panhandle Area Council to distribute information and increase awareness and skills of construction professionals in the **City of Wallace**.	Flood, Landslides	City of Wallace, Shoshone County, PHD, BEIPC, IDEQ	59	Short-term
WAR-1032	Participate in the **Panhandle Stormwater & Erosion Education Program (SEEP)** sponsored by the Panhandle Area Council to distribute information and increase awareness and skills of construction professionals in the **City of Wardner**.	Flood, Landslides	City of Wardner, Shoshone County, PHD, BEIPC, IDEQ	59	Short-term
SHO-1033	Participate in the **Panhandle Stormwater & Erosion Education Program (SEEP)** sponsored by the Panhandle Area Council to distribute information and increase awareness and skills of construction professionals in the unincorporated areas of **Shoshone County**.	Flood, Landslides	Shoshone County, PHD, BEIPC, IDEQ	59	Short-term
SHO-1034	**Develop realistic Volunteer Firefighter Recruitment & Retention Program** for all Shoshone County Fire Districts.	All Hazards	Shoshone County Fire Districts 1, 2, 3, 4, and Prichard-Murray Volunteer Fire Department, Shoshone County, Each City	63	Short-term

Table 7.4. Potential Mitigation Activities for Policy Related Activities (1000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
SHO-1035	**Enhance Automatic Mutual Aid Agreements** between fire districts in Shoshone County and neighboring counties.	All Hazards	Shoshone County Fire Districts 1, 2, 3, 4, and Prichard-Murray Volunteer Fire Department, Shoshone County, Each City	70	Short-term
SHO-1036	Evaluate a **Fire District Consolidation Feasibility Plan** and consider implementation based on the findings.	All Hazards	Shoshone County Fire Districts 1, 2, 3, 4, and Prichard-Murray Volunteer Fire Department, Shoshone County, Each City	70	Short-term
SHO-1037	**Annex the Lookout Ski Hill area into Shoshone County Fire District #3** to reflect current area of services.	All Hazards	Shoshone County Fire District #3, Shoshone County	64	Short-term
SHO-1038	Continue to provide **public information** about the unique problems of the floodplain in the South Fork Coeur d'Alene River System to area residents.	Flood	Shoshone County, PHD, BEIPC, IDEQ	70	Short-term
SHO-1039	Develop Shoshone County **Planning and Zoning Policy** to encourage or require new developments in the Wildland-Urban Interface to make initial installation of **home defensibility space around new structures**.	Wildfire	Shoshone County, all Cities	65	Short-term
SHO-1040	Clearly delineate all **Shoshone County boarders** including the state line.	All Hazards	Shoshone County, Idaho State Tax Commission	60	Short-term
SHO-1041	Provide information about, and clearly identify with signs, for area residents, the locations of **Emergency Shelters and Emergency Plans** in each City.	All Hazards	Shoshone County, all Cities	69	Short-term
KEL-1042	Participate in, and become officially registered in the **StormReady** Community Program	Severe Weather	City of Kellogg, NOAA	69	Short-term
MUL-1043	Participate in, and become officially registered in the **StormReady** Community Program	Severe Weather	City of Mullan, NOAA	69	Short-term
OSB-1044	Participate in, and become officially registered in the **StormReady** Community Program	Severe Weather	City of Osburn, NOAA	69	Short-term
PIN-1045	Participate in, and become officially registered in the **StormReady** Community Program	Severe Weather	City of Pinehurst, NOAA	69	Short-term
SME-1046	Participate in, and become officially registered in the **StormReady** Community Program	Severe Weather	City of Smelterville, NOAA	69	Short-term
WAL-1047	Participate in, and become officially registered in the **StormReady** Community Program	Severe Weather	City of Wallace, NOAA	69	Short-term
WAR-1048	Participate in, and become officially registered in the **StormReady** Community Program	Severe Weather	City of Wardner, NOAA	69	Short-term

Table 7.4. Potential Mitigation Activities for Policy Related Activities (1000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
SHO-1049	Participate in, and become officially registered in the **StormReady** Community Program with the unincorporated communities of Shoshone County	Severe Weather	Shoshone County, NOAA	69	Short-term
KEL-1050	Continue participation in the **National Flood Insurance Program** (NFIP) and strive to implement activities and policies that improve the NFIP rating score while reducing the risk exposure to flooding in the **City of Kellogg**. This effort includes, but is not limited to, participation in community assistance visits, flood mapping priorities or update needs, potential changes to flood ordinance regulations, enforcement, or permitting, and / or actions that will support CRS rating improvements.	Flood	City of Kellogg, Shoshone County, PHD, BEIPC, IDEQ	70	Short-term
MUL-1051	Continue participation in the **National Flood Insurance Program** (NFIP) and strive to implement activities and policies that improve the NFIP rating score while reducing the risk exposure to flooding in the **City of Mullan**. This effort includes, but is not limited to, participation in community assistance visits, flood mapping priorities or update needs, potential changes to flood ordinance regulations, enforcement, or permitting.	Flood	City of Mullan, Shoshone County, PHD, BEIPC, IDEQ	70	Short-term
OSB-1052	Continue participation in the **National Flood Insurance Program** (NFIP) and strive to implement activities and policies that improve the NFIP rating score while reducing the risk exposure to flooding in the **City of Osburn**. This effort includes, but is not limited to, participation in community assistance visits, flood mapping priorities or update needs, potential changes to flood ordinance regulations, enforcement, or permitting.	Flood	City of Osburn, Shoshone County, PHD, BEIPC, IDEQ	70	Short-term
PIN-1053	Continue participation in the **National Flood Insurance Program** (NFIP) and strive to implement activities and policies that improve the NFIP rating score while reducing the risk exposure to flooding in the **City of Pinehurst**. This effort includes, but is not limited to, participation in community assistance visits, flood mapping priorities or update needs, potential changes to flood ordinance regulations, enforcement, or permitting.	Flood	City of Pinehurst, Shoshone County, PHD, BEIPC, IDEQ	70	Short-term

Table 7.4. Potential Mitigation Activities for Policy Related Activities (1000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
SME-1054	Continue participation in the **National Flood Insurance Program** (NFIP) and strive to implement activities and policies that improve the NFIP rating score while reducing the risk exposure to flooding in the **City of Smelterville**. This effort includes, but is not limited to, participation in community assistance visits, flood mapping priorities or update needs, potential changes to flood ordinance regulations, enforcement, or permitting.	Flood	City of Smelterville, Shoshone County, PHD, BEIPC, IDEQ	70	Short-term
WAL-1055	Continue participation in the **National Flood Insurance Program** (NFIP) and strive to implement activities and policies that improve the NFIP rating score while reducing the risk exposure to flooding in the **City of Wallace**. This effort includes, but is not limited to, participation in community assistance visits, flood mapping priorities or update needs, potential changes to flood ordinance regulations, enforcement, or permitting.	Flood	City of Wallace, Shoshone County, PHD, BEIPC, IDEQ	70	Short-term
SHO-1056	Continue participation in the **National Flood Insurance Program** (NFIP) and strive to implement activities and policies that improve the NFIP rating score while reducing the risk exposure to flooding in the unincorporated areas of **Shoshone County**. This effort includes, but is not limited to, participation in community assistance visits, flood mapping priorities or update needs, potential changes to flood ordinance regulations, enforcement, or permitting, and / or actions that will support CRS rating improvements.	Flood	Shoshone County, PHD, BEIPC, IDEQ	70	Short-term
SHO-1057	**Establish Hazard Advisory Commission** composed of representatives of the Local Emergency Planning Committee, all cities, fire protection districts, agencies and organizations in Shoshone County. Purview of this commission is to ensure a consolidated approach to the implementation of this Multi-Jurisdictional Hazards Mitigation Plan.	All Hazards	Shoshone County, PHD, BEIPC, IDEQ, US Forest Service, BLM, State of Idaho Department of Lands, and others	70	Short-term
SHO-1058	Develop a Shoshone County **internet web site** with information about natural disasters, contact information for the county and cities, and emergency response details for the citizens and visitors of the region. Include an **interactive mapping feature** to share the county and city information on hazard risks, developments, property ownership, infrastructure, mitigation measures, and all related data.	All Hazards	Shoshone County & All Cities	68	Immediate

Table 7.4. Potential Mitigation Activities for Policy Related Activities (1000 series).					
Project Number	**Project Name**	**Type of Project**	**Responsible Organization**	**STAPLEE Score**	**Implementation Time Frame**
SHO-1059	Develop a Shoshone County **comprehensive disaster database** of all hazards in terms of the hazard event, location, beginning date, ending date, and impact of the event on people, structures, infrastructure, and the economy of the region. Include the cost of rehabilitating the site to pre-disaster conditions, and any mitigation measures implemented to prevent future disaster losses.	All Hazards (especially Landslides and Floods)	Shoshone County Disaster Services Department	70	Immediate
SHO-1060	Develop and deliver an information sharing **public relations program** for residents and businesses in Shoshone County to disseminate detailed information about hazards in Shoshone County (especially flooding and the NFIP program), to highlight ongoing management of hazard mitigation programs, information on risks (including flooding), and City and County responses to implementing programs and policies to reduce losses from natural disasters.	All Hazards (especially Flood)	Shoshone County Floodplain Administrator & All Cities	70	Immediate
SHO-1061	**Shoshone County Floodplain Administrator** will complete requirements for training to certify through the Building Code Effectiveness Grading Schedule (BCEGS), which assesses the building codes in effect and how the communities enforce building codes, with special emphasis on mitigation of losses from natural hazards. The County Floodplain Administrator will then work with the Board of County Commissioners to implement these findings through current programs in the County, while working with the City Councils to implement these programs through City programs and policies.	All Hazards (especially flood, windstorm, and earthquake damage)	Shoshone County Floodplain Administrator & All Cities	70	Immediate
SHO-1062	**Shoshone County Floodplain Administrator** will complete requirements for training to continue advancement of National Incident Management System (NIMS) training.	All Hazards (especially Flood and wildfire)	Shoshone County Floodplain Administrator	70	Immediate
SHO-1063	**Shoshone County Floodplain Administrator** will complete requirements for training to complete training course E-273- Managing Floodplain Development, through the NFIP.	Flood	Shoshone County Floodplain Administrator	70	Immediate
SHO-1064	**Shoshone County Floodplain Administrator** will complete requirements for training to complete training course E-278- NFIP, Community Rating System.	Flood	Shoshone County Floodplain Administrator	70	Immediate
SHO-1065	**Shoshone County Floodplain Administrator** will complete requirements for training to complete training and certification as a **Federally Certified Floodplain Administrator** by FEMA.	Flood	Shoshone County Floodplain Administrator	70	Immediate

Table 7.4. Potential Mitigation Activities for Policy Related Activities (1000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
KEL-1066	**Shoshone County Floodplain Administrator** will work with the **City of Kellogg Planning Administrator** to maintain and implement improved floodplain management activities in the City of Kellogg including CRS score improvements for the City of Kellogg CRS rating already in effect. These activities to include integration with the proposed levee system for the South Fork Coeur d'Alene River system in Shoshone County. These activities build on increased capabilities developed through the implementation of measures SHO-1062 through SHO-1065. Kellogg has already identified to FEMA and is implementing projects to maintain and improve its CRS rating score.	Flood	Shoshone County Floodplain Administrator, City of Kellogg Planning Administrator	70	Short-term
MUL-1067	**Shoshone County Floodplain Administrator** will work with the **City of Mullan Planning Administrator** to maintain and implement improved floodplain management activities in the City of Mullan. These activities to include integration with the proposed levee system for the South Fork Coeur d'Alene River system in Shoshone County, and the creation of a database of actions implemented within the past 5 years to mitigate flood damages along the local river drainages in Mullan. These activities build on increased capabilities developed through the implementation of measures SHO-1062 through SHO-1065.	Flood	Shoshone County Floodplain Administrator, City of Mullan Planning Administrator with consultations by City of Kellogg Planning Administrator	70	Short-term
OSB-1068	**Shoshone County Floodplain Administrator** will work with the **City of Osburn Planning Administrator** to maintain and implement improved floodplain management activities in the City of Osburn. These efforts will include consideration of introducing Osburn as a CRS participant. These activities to include integration with the proposed levee system for the South Fork Coeur d'Alene River system in Shoshone County. These activities build on increased capabilities developed through the implementation of measures SHO-1062 through SHO-1065.	Flood	Shoshone County Floodplain Administrator, City of Osburn Planning Administrator with consultations by City of Kellogg Planning Administrator	70	Short-term
PIN-1069	**Shoshone County Floodplain Administrator** will work with the **City of Pinehurst Planning Administrator** to maintain and implement improved floodplain management activities in the City of Pinehurst These efforts will include consideration of introducing Pinehurst as a CRS participant. These activities to include integration with the proposed levee system for the South Fork Coeur d'Alene River system in Shoshone County. These activities build on increased capabilities developed through the implementation of measures SHO-1062 through SHO-1065.	Flood	Shoshone County Floodplain Administrator, City of Pinehurst Planning Administrator with consultations by City of Kellogg Planning Administrator	70	Short-term

Table 7.4. Potential Mitigation Activities for Policy Related Activities (1000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
SME-1070	**Shoshone County Floodplain Administrator** will work with the **City of Smelterville Planning Administrator** to maintain and implement improved floodplain management activities in the City of Smelterville. These activities to include integration with the proposed levee system for the South Fork Coeur d'Alene River system in Shoshone County. These activities build on increased capabilities developed through the implementation of measures SHO-1062 through SHO-1065.	Flood	Shoshone County Floodplain Administrator, City of Smelterville Planning Administrator with consultations by City of Kellogg Planning Administrator	70	Short-term
WAL-1071	**Shoshone County Floodplain Administrator** will work with the **City of Wallace Planning Administrator** to maintain and implement improved floodplain management activities in the City of Wallace. These efforts will include consideration of introducing Wallace as a CRS participant. These activities to include integration with the proposed levee system for the South Fork Coeur d'Alene River system in Shoshone County. These activities build on increased capabilities developed through the implementation of measures SHO-1062 through SHO-1065.	Flood	Shoshone County Floodplain Administrator, City of Wallace Planning Administrator with consultations by City of Kellogg Planning Administrator	70	Short-term
WAR-1072	**Shoshone County Floodplain Administrator** will work with the **City of Wardner Planning Administrator** to maintain and implement improved floodplain management activities in the City of Wardner. These activities build on increased capabilities developed through the implementation of measures SHO-1062 through SHO-1065.	Flood	Shoshone County Floodplain Administrator, City of Wardner Planning Administrator with consultations by City of Kellogg Planning Administrator	70	Short-term
SHO-1073	**Shoshone County Floodplain Administrator** to coordinate an informational meeting for the County and City Departments to discuss detailed NFIP and CRS program requirements. This seminar and discussion will be designed to detail specific implementation activities for each jurisdiction to develop and implement in a holistic approach to floodplain management activities in Shoshone County. Further, this seminar will facilitate the potential application for certain cities not already in the CRS program to join through concentrated efforts to be identified with the Shoshone County Floodplain Administrator.	Flood	Shoshone County Floodplain Administrator, each City, Idaho State Floodplain Coordinator, Idaho Bureau of Homeland Security	70	Short-term
SHO-1074	**Shoshone County** and **all Municipalities** will encourage Idaho Bureau of Homeland Security and FEMA Region X to use the newly acquired **LiDAR elevation models** in the **development of revised DFIRM maps** for Shoshone County.	Flood	Shoshone County and all Municipalities	70	Immediate

Table 7.4. Potential Mitigation Activities for Policy Related Activities (1000 series).					
Project Number	**Project Name**	**Type of Project**	**Responsible Organization**	**STAPLEE Score**	**Implementation Time Frame**
SHO-1075	**Shoshone County** and **all Municipalities** will take an active participant role in the identification and mapping of Flood Insurance Rate Maps developed by FEMA by asking for a "seat at the table", and expecting FEMA to respond favorably to the request. This participation will be indicated by the development and sharing of pertinent information collected locally that influences the identification of the floodplain in Shoshone County. Further, this activity level will be indicated by the enforcement of the DFIRM map zones for planning and zoning ordinances in each Municipality and the County.	Flood	Shoshone County and all Municipalities	70	Immediate
SHO-1076	**Shoshone County Floodplain Administrator and the Municipalities,** will develop and implement a community appropriate **building code request for upgrades program** to address structures built within the current floodplain (DFIRM 08) but prior to the current designation as a flood zone to require substantial improvements to abate flood damages while seeking a building permit to complete "**significant improvements**" to existing structures. The definition of "significant" to be determined locally and based on a percent of total value of the structure versus the value of the improvement.	Flood	Shoshone County and all Municipalities jointly	70	Immediate
SHO-1077	Increase NFIP participation with new policies for existing structures and new construction through public information sharing of the benefits of the NFIP in **Shoshone County**. Include data about the CRS program and the County's rating score and ongoing activities.	Flood	Shoshone County	69	Immediate
KEL-1078	Increase NFIP participation with new policies for existing structures and new construction through public information sharing of the benefits of the NFIP in the **City of Kellogg**. Include data about the CRS program and the City's rating score and ongoing activities.	Flood	City of Kellogg	69	Immediate
MUL-1079	Increase NFIP participation with new policies for existing structures and new construction through public information sharing of the benefits of the NFIP in the **City of Mullan**.	Flood	City of Mullan	69	Immediate
OSB-1080	Increase NFIP participation with new policies for existing structures and new construction through public information sharing of the benefits of the NFIP in the **City of Osburn**.	Flood	City of Osburn	69	Immediate
PIN-1081	Increase NFIP participation with new policies for existing structures and new construction through public information sharing of the benefits of the NFIP in the **City of Pinehurst**.	Flood	City of Pinehurst	69	Immediate
SME-1082	Increase NFIP participation with new policies for existing structures and new construction through public information sharing of the benefits of the NFIP in the **City of Smelterville**.	Flood	City of Smelterville	69	Immediate

Table 7.4. Potential Mitigation Activities for Policy Related Activities (1000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
WAL-1083	Increase NFIP participation with new policies for existing structures and new construction through public information sharing of the benefits of the NFIP in the **City of Wallace**.	Flood	City of Wallace	69	Immediate
KEL-1084	**City of Kellogg Floodplain Administrator** will complete requirements for training to certify through the Building Code Effectiveness Grading Schedule (BCEGS), which assesses the building codes in effect and how the communities enforce building codes, with special emphasis on mitigation of losses from natural hazards. The City of Kellogg Floodplain Administrator will then work with the City Council to implement these findings through current programs in the City, while working with the Shoshone County Floodplain Administrator to implement these programs within the scope of other local activities.	All Hazards (especially flood, windstorm, and earthquake damage)	City of Kellogg Floodplain Administrator & Shoshone County Floodplain Administrator	70	Immediate
KEL-1085	**City of Kellogg Floodplain Administrator** will complete requirements for training to continue advancement of National Incident Management System (NIMS) training.	All Hazards (especially Flood and wildfire)	City of Kellogg Floodplain Administrator	70	Immediate
KEL-1086	**City of Kellogg Floodplain Administrator** will complete requirements for training to complete training course E-273- Managing Floodplain Development, through the NFIP.	Flood	City of Kellogg Floodplain Administrator	70	Immediate
KEL-1087	**City of Kellogg Floodplain Administrator** will complete requirements for training to complete training course E-278- NFIP, Community Rating System.	Flood	City of Kellogg Floodplain Administrator	70	Immediate
KEL-1088	**City of Kellogg Floodplain Administrator** will complete requirements for training to complete training and certification as a **Federally Certified Floodplain Administrator** by FEMA.	Flood	City of Kellogg Floodplain Administrator	70	Immediate

Table 7.5. Potential Mitigation Activities to Reduce Loss Potential (2000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
KEL-2001	**Structural flood-proofing** of private structures: identification of public assistance money, design and implementation of structural enhancements within the **City of Kellogg**.	Flood	City of Kellogg, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	57	Short-term

Table 7.5. Potential Mitigation Activities to Reduce Loss Potential (2000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
MUL-2002	**Structural flood-proofing** of private structures: identification of public assistance money, design and implementation of structural enhancements within the **City of Mullan**.	Flood	City of Mullan, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	57	Short-term
OSB-2003	**Structural flood-proofing** of private structures: identification of public assistance money, design and implementation of structural enhancements within the **City of Osburn**.	Flood	City of Osburn, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	57	Short-term
PIN-2004	**Structural flood-proofing** of private structures: identification of public assistance money, design and implementation of structural enhancements within the **City of Pinehurst**.	Flood	City of Pinehurst, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	57	Short-term
SME-2005	**Structural flood-proofing** of private structures: identification of public assistance money, design and implementation of structural enhancements within the **City of Smelterville**.	Flood	City of Smelterville, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	57	Short-term
WAL-2006	**Structural flood-proofing** of private structures: identification of public assistance money, design and implementation of structural enhancements within the **City of Wallace**.	Flood	City of Wallace, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	57	Short-term
WAR-2007	**Structural flood-proofing** of private structures: identification of public assistance money, design and implementation of structural enhancements within the **City of Wardner**.	Flood	City of Wardner, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	57	Short-term
SHO-2008	**Structural flood-proofing** of private structures: identification of public assistance money, design and implementation of structural enhancements within the unincorporated areas of **Shoshone County**.	Flood	Shoshone County Planning and Building Department, Shoshone Disaster Services Department	57	Mid-term
KEL-2009	Seek project funding, and identify **Un-Reinforced Masonry buildings** and design corrective actions to correct risk to public safety within **City of Kellogg**.	Earthquake	City of Kellogg, Shoshone County	44	Mid-term
MUL-2010	Seek project funding, and identify **Un-Reinforced Masonry buildings** and design corrective actions to correct risk to public safety within **City of Mullan.**	Earthquake	City of Mullan, Shoshone County	44	Mid-term

Table 7.5. Potential Mitigation Activities to Reduce Loss Potential (2000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
OSB-2011	Seek project funding, and identify **Un-Reinforced Masonry buildings** and design corrective actions to correct risk to public safety within **City of Osburn**.	Earthquake	City of Osburn, Shoshone County	44	Mid-term
PIN-2012	Seek project funding, and identify **Un-Reinforced Masonry buildings** and design corrective actions to correct risk to public safety within **City of Pinehurst**.	Earthquake	City of Pinehurst, Shoshone County	44	Mid-term
SME-2013	Seek project funding, and identify **Un-Reinforced Masonry buildings** and design corrective actions to correct risk to public safety within **City of Smelterville**.	Earthquake	City of Smelterville, Shoshone County	44	Mid-term
WAL-2014	Seek project funding, and identify **Un-Reinforced Masonry buildings** and design corrective actions to correct risk to public safety within **City of Wallace**.	Earthquake	City of Wallace, Shoshone County	44	Mid-term
WAR-2015	Seek project funding, and identify **Un-Reinforced Masonry buildings** and design corrective actions to correct risk to public safety within **City of Wardner**.	Earthquake	City of Wardner, Shoshone County	44	Mid-term
SHO-2016	Seek project funding, and identify **Un-Reinforced Masonry buildings** and design corrective actions to correct risk to public safety within the unincorporated areas of **Shoshone County**.	Earthquake	Shoshone County	44	Mid-term
KEL-2017	Seek project funding, and identify exposed and **unreinforced masonry or brick chimney** structures, then design improvements and reinforce these structures to correct the risk to public safety within the **City of Kellogg**.	Earthquake	City of Kellogg, Shoshone County	59	Mid-term
MUL-2018	Seek project funding, and identify exposed and **unreinforced masonry or brick chimney** structures, then design improvements and reinforce these structures to correct the risk to public safety within the **City of Mullan**.	Earthquake	City of Mullan, Shoshone County	59	Mid-term
OSB-2019	Seek project funding, and identify exposed and **unreinforced masonry or brick chimney** structures, then design improvements and reinforce these structures to correct the risk to public safety within the **City of Osburn**.	Earthquake	City of Osburn, Shoshone County	59	Mid-term
PIN-2020	Seek project funding, and identify exposed and **unreinforced masonry or brick chimney** structures, then design improvements and reinforce these structures to correct the risk to public safety within the **City of Pinehurst**.	Earthquake	City of Pinehurst, Shoshone County	59	Mid-term
SME-2021	Seek project funding, and identify exposed and **unreinforced masonry or brick chimney** structures, then design improvements and reinforce these structures to correct the risk to public safety within the **City of Smelterville**.	Earthquake	City of Smelterville, Shoshone County	59	Mid-term
WAL-2022	Seek project funding, and identify exposed and **unreinforced masonry or brick chimney** structures, then design improvements and reinforce these structures to correct the risk to public safety within the **City of Wallace**.	Earthquake	City of Wallace, Shoshone County	59	Mid-term

Table 7.5. Potential Mitigation Activities to Reduce Loss Potential (2000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
WAR-2023	Seek project funding, and identify exposed and **unreinforced masonry or brick chimney** structures, then design improvements and reinforce these structures to correct the risk to public safety within the **City of Wardner**.	Earthquake	City of Wardner, Shoshone County	59	Mid-term
SHO-2024	Seek project funding, and identify exposed and **unreinforced masonry or brick chimney** structures, then design improvements and reinforce these structures to correct the risk to public safety within the unincorporated areas of **Shoshone County**.	Earthquake	Shoshone County	59	Mid-term
KEL-2025	Seek project funding, and identify needed **roofing improvements**, especially for low income families, related to severe weather events such as heavy snowfall or high winds. Implement corrective actions within the **City of Kellogg**.	Severe Weather	City of Kellogg, Shoshone County	66	Mid-term
MUL-2026	Seek project funding, and identify needed **roofing improvements**, especially for low income families, related to severe weather events such as heavy snowfall or high winds. Implement corrective actions within the **City of Mullan**.	Severe Weather	City of Mullan, Shoshone County	66	Mid-term
OSB-2027	Seek project funding, and identify needed **roofing improvements**, especially for low income families, related to severe weather events such as heavy snowfall or high winds. Implement corrective actions within the **City of Osburn**.	Severe Weather	City of Osburn, Shoshone County	66	Mid-term
PIN-2028	Seek project funding, and identify needed **roofing improvements**, especially for low income families, related to severe weather events such as heavy snowfall or high winds. Implement corrective actions within the **City of Pinehurst**.	Severe Weather	City of Pinehurst, Shoshone County	66	Mid-term
SME-2029	Seek project funding, and identify needed **roofing improvements**, especially for low income families, related to severe weather events such as heavy snowfall or high winds. Implement corrective actions within the **City of Smelterville**.	Severe Weather	City of Smelterville, Shoshone County	66	Mid-term
WAL-2030	Seek project funding, and identify needed **roofing improvements**, especially for low income families, related to severe weather events such as heavy snowfall or high winds. Implement corrective actions within the **City of Wallace**.	Severe Weather	City of Wallace, Shoshone County	66	Mid-term
WAR-2031	Seek project funding, and identify needed **roofing improvements**, especially for low income families, related to severe weather events such as heavy snowfall or high winds. Implement corrective actions within the **City of Wardner**.	Severe Weather	City of Wardner, Shoshone County	66	Mid-term

Table 7.5. Potential Mitigation Activities to Reduce Loss Potential (2000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
SHO-2032	Seek project funding, and identify needed **roofing improvements**, especially for low income families, related to severe weather events such as heavy snowfall or high winds. Implement corrective actions within the unincorporated communities of **Shoshone County**.	Severe Weather	Shoshone County	66	Mid-term
KEL-2033	Continue the Shoshone County **Wildland-Urban Interface Fire Mitigation Program** efforts to identify and implement structural protection for at-risk fuels around homes, and modifications to the structural factors at-risk in the **City of Kellogg**.	Wildfire	City of Kellogg, Shoshone County	67	Short-term
MUL-2034	Continue the Shoshone County **Wildland-Urban Interface Fire Mitigation Program** efforts to identify and implement structural protection for at-risk fuels around homes, and modifications to the structural factors at-risk in the **City of Mullan**.	Wildfire	City of Mullan, Shoshone County	67	Short-term
OSB-2035	Continue the Shoshone County **Wildland-Urban Interface Fire Mitigation Program** efforts to identify and implement structural protection for at-risk fuels around homes, and modifications to the structural factors at-risk in the **City of Osburn**.	Wildfire	City of Osburn, Shoshone County	67	Short-term
PIN-2036	Continue the Shoshone County **Wildland-Urban Interface Fire Mitigation Program** efforts to identify and implement structural protection for at-risk fuels around homes, and modifications to the structural factors at-risk in the **City of Pinehurst**.	Wildfire	City of Pinehurst, Shoshone County	67	Short-term
SME-2037	Continue the Shoshone County **Wildland-Urban Interface Fire Mitigation Program** efforts to identify and implement structural protection for at-risk fuels around homes, and modifications to the structural factors at-risk in the **City of Smelterville**.	Wildfire	City of Smelterville, Shoshone County	67	Short-term
WAL-2038	Continue the Shoshone County **Wildland-Urban Interface Fire Mitigation Program** efforts to identify and implement structural protection for at-risk fuels around homes, and modifications to the structural factors at-risk in the **City of Wallace**.	Wildfire	City of Wallace, Shoshone County	67	Short-term
WAR-2039	Continue the Shoshone County **Wildland-Urban Interface Fire Mitigation Program** efforts to identify and implement structural protection for at-risk fuels around homes, and modifications to the structural factors at-risk in the **City of Wardner**.	Wildfire	City of Wardner, Shoshone County	67	Short-term

Table 7.5. Potential Mitigation Activities to Reduce Loss Potential (2000 series).					
Project Number	**Project Name**	**Type of Project**	**Responsible Organization**	**STAPLEE Score**	**Implementation Time Frame**
SHO-2040	Continue the Shoshone County **Wildland-Urban Interface Fire Mitigation Program** efforts to identify and implement structural protection for at-risk fuels around homes, and modifications to the structural factors at-risk in the unincorporated areas of Shoshone County. Target the expansion of this program to include community defensible space around all populated places, even **outside the incorporated cities**.	Wildfire	Shoshone County	67	Short-term
KEL-2041	**Structural Landslide Protection** of private structures and public structures: identification of public assistance money, design and implementation of structural enhancements and access stabilization within the **City of Kellogg**.	Landslide	City of Kellogg, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	56	Short-term
MUL-2042	**Structural Landslide Protection** of private structures and public structures: identification of public assistance money, design and implementation of structural enhancements and access stabilization within the **City of Mullan**.	Landslide	City of Mullan, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	56	Short-term
OSB-2043	**Structural Landslide Protection** of private structures and public structures: identification of public assistance money, design and implementation of structural enhancements and access stabilization within the **City of Osburn**.	Landslide	City of Osburn, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	56	Short-term
PIN-2044	**Structural Landslide Protection** of private structures and public structures: identification of public assistance money, design and implementation of structural enhancements and access stabilization within the **City of Pinehurst**.	Landslide	City of Pinehurst, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	56	Short-term
SME-2045	**Structural Landslide Protection** of private structures and public structures: identification of public assistance money, design and implementation of structural enhancements and access stabilization within the **City of Smelterville**.	Landslide	City of Smelterville, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	56	Short-term
WAL-2046	**Structural Landslide Protection** of private structures and public structures: identification of public assistance money, design and implementation of structural enhancements and access stabilization within the **City of Wallace**.	Landslide	City of Wallace, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	56	Short-term
WAR-2047	**Structural Landslide Protection** of private structures and public structures: identification of public assistance money, design and implementation of structural enhancements and access stabilization within the **City of Wardner**.	Landslide	City of Wardner, Shoshone County Planning and Building Department, Shoshone Disaster Services Department	56	Short-term

Table 7.5. Potential Mitigation Activities to Reduce Loss Potential (2000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
SHO-2048	**Structural Landslide Protection** of private structures and public structures: identification of public assistance money, design and implementation of structural enhancements and access stabilization within the unincorporated areas of **Shoshone County**.	Landslide	Shoshone County Planning and Building Department, Shoshone Disaster Services Department	56	Mid-term

Table 7.6. Potential Mitigation Activities to Enhance Resources and Capabilities (3000 series).

Project Number	Project Description	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
KEL-3001	**Radio System Operability and Deployment**. Upgrade radio communications between personnel, vehicles, and station, and allow interoperable (P25) communications with County, State, and Federal responders in the **City of Kellogg**.	All Hazards	City of Kellogg, Shoshone County Fire District 2, Shoshone County, PHD, BEIPC, IDEQ	68	Short-term
MUL-3002	**Radio System Operability and Deployment**. Upgrade radio communications between personnel, vehicles, and station, and allow interoperable (P25) communications with County, State, and Federal responders in the **City of Mullan**.	All Hazards	City of Mullan, Shoshone County Fire District 3, Shoshone County, PHD, BEIPC, IDEQ	68	Short-term
OSB-3003	**Radio System Operability and Deployment**. Upgrade radio communications between personnel, vehicles, and station, and allow interoperable (P25) communications with County, State, and Federal responders in the **City of Osburn**.	All Hazards	City of Osburn, Shoshone County Fire District 1, Shoshone County, PHD, BEIPC, IDEQ	68	Short-term
PIN-3004	**Radio System Operability and Deployment**. Upgrade radio communications between personnel, vehicles, and station, and allow interoperable (P25) communications with County, State, and Federal responders in the **City of Pinehurst**.	All Hazards	City of Pinehurst, Shoshone County Fire District 2, Shoshone County, PHD, BEIPC, IDEQ	68	Short-term
SME-3005	**Radio System Operability and Deployment**. Upgrade radio communications between personnel, vehicles, and station, and allow interoperable (P25) communications with County, State, and Federal responders in the **City of Smelterville**.	All Hazards	City of Smelterville, Shoshone County Fire District 2, Shoshone County, PHD, BEIPC, IDEQ	68	Short-term
WAL-3006	**Radio System Operability and Deployment**. Upgrade radio communications between personnel, vehicles, and station, and allow interoperable (P25) communications with County, State, and Federal responders in the **City of Wallace**.	All Hazards	City of Wallace, Shoshone County Fire District 1, Shoshone County, PHD, BEIPC, IDEQ	68	Short-term

Table 7.6. Potential Mitigation Activities to Enhance Resources and Capabilities (3000 series).

Project Number	Project Description	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
WAR-3007	**Radio System Operability and Deployment**. Upgrade radio communications between personnel, vehicles, and station, and allow interoperable (P25) communications with County, State, and Federal responders in the **City of Wardner**.	All Hazards	City of Wardner, Shoshone County Fire District 2, Shoshone County, PHD, BEIPC, IDEQ	68	Short-term
SHO-3008	**Radio System Operability and Deployment**. Upgrade radio communications between personnel, vehicles, and station, and allow interoperable (P25) communications with County, State, and Federal responders in the **Prichard-Murray Volunteer Fire District**.	All Hazards	Prichard-Murray Volunteer Fire District, Shoshone County, PHD, BEIPC, IDEQ	68	Short-term
SHO-3009	**Radio System Operability and Deployment**. Upgrade radio communications between personnel, vehicles, and station, and allow interoperable (P25) communications with County, State, and Federal responders in the Shoshone County Fire District #4 (Calder to Marble Creek on the St. Joe River).	All Hazards	Shoshone County Fire District 4, Shoshone County, PHD, BEIPC, IDEQ	68	Short-term
SHO-3010	**Radio System Coverage Enhancement**. Enhance radio communications through Shoshone County by locating **radio repeaters** in strategic locations to allow access in the several remote areas accessed by emergency responders.	All Hazards	Shoshone County, US Forest Service, Bureau of Land Management, State of Idaho, PHD, BEIPC, IDEQ	67	Mid-term
SHO-3011	Develop a scenario to provide **fire protection to the communities of Clarkia and Emerald Creek** on the St. Maries River. Include fire apparatus, facilities, communications equipment, training and other support to the protection area. Consider new fire protection district or expansion of the Fernwood Fire District (Benewah County).	All Hazards	Shoshone County	60	Short-term
SHO-3012	**Fire Department Training Opportunities:** develop custom training programs for firefighting in Shoshone County and implement training for all fire department staff and volunteers in Shoshone County.	All Hazards	Shoshone County Fire Districts, 1, 2, 3, 4, and Prichard-Murray Volunteer Fire Department, and Shoshone County	70	Short-term
SHO-3013	**Fire Department Training Opportunities:** develop custom training programs for hazardous waste containment in Shoshone County and implement training for all fire department staff and volunteers in Shoshone County.	All Hazards	Shoshone County Fire Districts, 1, 2, 3, 4, and Prichard-Murray Volunteer Fire Department, and Shoshone County	70	Short-term
KEL-3014	**Heavy Equipment Acquisition for Emergency Response:** Locate equipment needed for emergency response situations such as a front-end loader for flood sludge removal, snowplow or grader for snow removal, or similar equipment for the City of Kellogg.	Flood, Severe Weather, Landslide	City of Kellogg, Shoshone County, PHD, BEIPC, IDEQ	65	Mid-term

Table 7.6. Potential Mitigation Activities to Enhance Resources and Capabilities (3000 series).					
Project Number	**Project Description**	**Type of Project**	**Responsible Organization**	**STAPLEE Score**	**Implementation Time Frame**
MUL-3015	**Heavy Equipment Acquisition for Emergency Response:** Locate equipment needed for emergency response situations such as a front-end loader for flood sludge removal, snowplow or grader for snow removal, or similar equipment for the City of Mullan.	Flood, Severe Weather, Landslide	City of Mullan, Shoshone County, PHD, BEIPC, IDEQ	65	Mid-term
OSB-3016	**Heavy Equipment Acquisition for Emergency Response:** Locate equipment needed for emergency response situations such as a front-end loader for flood sludge removal, snowplow or grader for snow removal, dump truck, sand spreader, or similar equipment for the City of Osburn.	Flood, Severe Weather, Landslide	City of Osburn, Shoshone County, PHD, BEIPC, IDEQ	65	Mid-term
PIN-3017	**Heavy Equipment Acquisition for Emergency Response:** Locate equipment needed for emergency response situations such as a front-end loader for flood sludge removal, snowplow or grader for snow removal, or similar equipment for the City of Pinehurst.	Flood, Severe Weather, Landslide	City of Pinehurst, Shoshone County, PHD, BEIPC, IDEQ	65	Mid-term
SME-3018	**Heavy Equipment Acquisition for Emergency Response:** Locate equipment needed for emergency response situations such as a front-end loader for flood sludge removal, snowplow or grader for snow removal, or similar equipment for the City of Smelterville.	Flood, Severe Weather, Landslide	City of Smelterville, Shoshone County, PHD, BEIPC, IDEQ	65	Mid-term
WAL-3019	**Heavy Equipment Acquisition for Emergency Response:** Locate equipment needed for emergency response situations such as a front-end loader for flood sludge removal, snowplow or grader for snow removal, or similar equipment for the City of Wallace.	Flood, Severe Weather, Landslide	City of Wallace, Shoshone County, PHD, BEIPC, IDEQ	65	Mid-term
WAR-3020	**Heavy Equipment Acquisition for Emergency Response:** Locate equipment needed for emergency response situations such as a front-end loader for flood sludge removal, snowplow or grader for snow removal, or similar equipment for the City of Wardner.	Flood, Severe Weather, Landslide	City of Wardner, Shoshone County, PHD, BEIPC, IDEQ	65	Mid-term
SHO-3021	**Heavy Equipment Acquisition for Emergency Response:** Locate additional equipment needed for emergency response situations such as a front-end loader for flood sludge removal, snowplow or grader for snow removal, or similar equipment for the unincorporated areas of Shoshone County.	Flood, Severe Weather, Landslide	Shoshone County, PHD, BEIPC, IDEQ	65	Mid-term
SHO-3022	**Enhanced Telephone Operability in Clarkia, the St. Joe River Valley, Prichard, Murray, and other rural areas.** Work with service providers to improve the level of service in these areas, especially in the winter, to provide reliable telephone services.	All Hazards	Shoshone County	65	Immediate
SHO-3023	**Self-Contained Breathing Apparatus (SCBA) inventory upgrade.** Needs include 20 new units.	All Hazards	Shoshone County Fire District #1, Shoshone County	65	Immediate

Table 7.6. Potential Mitigation Activities to Enhance Resources and Capabilities (3000 series).					
Project Number	**Project Description**	**Type of Project**	**Responsible Organization**	**STAPLEE Score**	**Implementation Time Frame**
SHO-3024	**Hydrant Replacement & System Extension.** Replace and locate existing hydrant system.	All Hazards	Shoshone County Fire District #1, Shoshone County	62	Short-term
SHO-3025	**Structure Fire & Wildfire Vehicle Purchase.** Replace aging rolling stock (3 vehicles).	All Hazards	Shoshone County Fire District #1, Shoshone County	63	Short-term
SHO-3026	**Wildfire Firefighting Vehicle Purchase**; 3 water tenders, 3 type-6 brush trucks.	Wildfire	Shoshone County Fire District #2, Shoshone County	63	Short-term
SHO-3027	**Structure Fire Fighting Vehicle Purchase**; 100-foot ladder truck, and a station to store it in.	All Hazards	Shoshone County Fire District #2, Shoshone County	63	Long-term
SHO-3028	**Wildfire Firefighting Vehicle Purchase**; combined structure and wildfire engine, and a 3,000 gallon all-wheel drive water tender.	Wildfire	Shoshone County Fire District #3, Shoshone County	63	Mid-term
SHO-3029	**Six inch trailer mounted pump unit** with associated suction and discharge piping**.**	All Hazards	South Fork Coeur d'Alene River Sewer District, Shoshone County	63	Mid-term
SHO-3030	**Increase Water Reserve Capacity** available to fire protection: enhance water storage and reserve it for fire protection in Shoshone County.	Wildfire	Shoshone County Fire Districts, 1, 2, 3, 4, and Prichard-Murray Volunteer Fire Department, Shoshone County, US Forest Service, BLM, IDL	62	Mid-term
SHO-3031	**Rural Addressing & Sign Posting** available for all **Shoshone County** residents: in Cities post street signs with address block numbers, and in rural areas post house numbers visible from the nearest public access route (as Fire District #4 has done).	All Hazards	Shoshone County Fire Districts, 1, 2, 3, 4, and Prichard-Murray Volunteer Fire Department, Shoshone County Disaster Services	67	Mid-term
SHO-3032	Acquisition of three **Trailer Mounted Generators** necessary to power emergency relief centers identified in the Shoshone County Emergency Operations Plan. Couple this effort with electric wiring of facilities to accept alternate power supplies when main power supplies are unavailable.	All Hazards	Shoshone County Disaster Services, All Cities, School Districts (and other EOP Relief Centers).	63	Short-term

Table 7.7. Potential Mitigation Activities to Change Characteristics of Risk (4000 series).					
Project Number	**Project Name**	**Type of Project**	**Responsible Organization**	**STAPLEE Score**	**Implementation Time Frame**
KEL-4001	South Fork Coeur d'Alene River **Levee System**, tributary confluence enhancement, and implementation system in the **City of Kellogg**.	Flood	City of Kellogg, Shoshone County, PHD, BEIPC, IDEQ	39	Short-term

Table 7.7. Potential Mitigation Activities to Change Characteristics of Risk (4000 series).					
Project Number	**Project Name**	**Type of Project**	**Responsible Organization**	**STAPLEE Score**	**Implementation Time Frame**
MUL-4002	South Fork Coeur d'Alene River **Levee System**, tributary confluence enhancement, and implementation system in the **City of Mullan**.	Flood	City of Mullan, Shoshone County, PHD, BEIPC, IDEQ	39	Short-term
OSB-4003	South Fork Coeur d'Alene River **Levee System**, tributary confluence enhancement, and implementation system in the **City of Osburn**.	Flood	City of Osburn, Shoshone County, PHD, BEIPC, IDEQ	39	Short-term
PIN-4004	South Fork Coeur d'Alene River **Levee System**, tributary confluence enhancement, and implementation system in the **City of Pinehurst**.	Flood	City of Pinehurst, Shoshone County, PHD, BEIPC, IDEQ	39	Short-term
SME-4005	South Fork Coeur d'Alene River **Levee System**, tributary confluence enhancement, and implementation system in the **City of Smelterville**.	Flood	City of Smelterville, Shoshone County, PHD, BEIPC, IDEQ	39	Short-term
WAL-4006	South Fork Coeur d'Alene River **Levee System**, tributary confluence enhancement, and implementation system in the **City of Wallace**.	Flood	City of Wallace, Shoshone County, PHD, BEIPC, IDEQ	39	Short-term
SHO-4007	South Fork Coeur d'Alene River **Levee System**, tributary confluence enhancement, and implementation system in **unincorporated areas of the river.**	Flood	Shoshone County, PHD, BEIPC, IDEQ	39	Short-term
SHO-4008	South Fork Coeur d'Alene River **flood water containment system and flood storage enhancement.**	Flood	Shoshone County, PHD, BEIPC, IDEQ	48	Short-term
SHO-4009	Community of **Silverton storm water system** design and implementation.	Flood	Shoshone County, PHD, BEIPC, IDEQ	61	Mid-term
KEL-4010	**Storm water** drainage system design and implementation to link to improved levee system within **City of Kellogg**.	Flood	City of Kellogg, Shoshone County, PHD, BEIPC, IDEQ	64	Mid-term
MUL-4011	**Storm water** drainage system design and implementation to link to improved levee system within **City of Mullan**.	Flood	City of Mullan, Shoshone County, PHD, BEIPC, IDEQ	64	Mid-term
OSB-4012	**Storm water** drainage system design and implementation to link to improved levee system within **City of Osburn**.	Flood	City of Osburn, Shoshone County, PHD, BEIPC, IDEQ	64	Mid-term
PIN-4013	**Storm water** drainage system design and implementation to link to improved levee system within **City of Pinehurst** and upstream along Pine Creek. Resize culvert at off/on ramp to I-90 (longer and larger diameter).	Flood	City of Pinehurst, Shoshone County, PHD, BEIPC, IDEQ	64	Mid-term
SME-4014	**Storm water** drainage system design and implementation to link to improved levee system within **City of Smelterville**.	Flood	City of Smelterville, Shoshone County, PHD, BEIPC, IDEQ	64	Mid-term
WAL-4015	**Storm water** drainage system design and implementation to link to improved levee system within **City of Wallace**.	Flood	City of Wallace, Shoshone County, PHD, BEIPC, IDEQ	64	Mid-term
WAR-4016	**Storm water** drainage system design and implementation to link to improved levee system within **City of Wardner**.	Flood	City of Wardner, Shoshone County, PHD, BEIPC, IDEQ	64	Mid-term

Table 7.7. Potential Mitigation Activities to Change Characteristics of Risk (4000 series).

Project Number	Project Name	Type of Project	Responsible Organization	STAPLEE Score	Implementation Time Frame
SHO-4017	**Storm water** drainage and **St. Maries Creek flood control** through the community of **Clarkia** and across the access to Highway 3.	Flood	Shoshone County	64	Mid-term
SHO-4018	**Storm water** drainage and **Bear Creek flood control** through the community of **Calder**. Placement of Bear Creek and culvert sizing.	Flood	Shoshone County	64	Mid-term
SHO-4019	**Calder Road reconstruction** from the St. Joe River road to the north end of the Calder Road Bridge entering the community of **Calder**.	Flood	Shoshone County	67	Mid-term
SHO-4020	**North Side Road reconstruction** from the intersection with the St. Joe River road to the north end of the North Side Road Bridge entering the community of **Marble Creek**.	Flood	Shoshone County	67	Mid-term
SHO-4021	Installation of **debris catchment devices** along the St. Joe River Road, the North Fork Road, Prichard Creek Road, and Dobson Pass Road to prevent rock and debris from falling on the road surface.	Landslide	Shoshone County	69	Mid-term
MUL-4022	**Enhancement of Mill Creek and Boulder Creek** courses through **City of Mullan** to the confluence with the South Fork Coeur d'Alene River, to keep the watercourse in its channel during high water events. Address channel and culvert issues.	Flood	City of Mullan, Shoshone County, PHD, BEIPC, IDEQ	66	Mid-term
SHO-4023	Engineer and build a **dike (floodwall) around the Waste Water Treatment Facility's Lift Station** in **Page** that houses the emergency power, screening facility and plant lift station.	Flood	Shoshone County, South Fork River Sewer District, PHD, BEIPC, IDEQ	69	Short-term
SME-4024	Engineer and build a **dike (floodwall) around the Waste Water Treatment Facility** in **Smelterville**.	Flood	City of Smelterville, Shoshone County, PHD, BEIPC, IDEQ	69	Short-term
SHO-4025	Engineer and build a **dike (floodwall) around the Community Water Supply and Sewage Treatment Facility** in **Clarkia**.	Flood	Shoshone County, Clarkia Water and Sewer District	69	Short-term
SHO-4026	**Elevate Old Milwaukee Railroad grade** providing access to **Trout Creek** on the St. Joe River.	Flood	Shoshone County	63	Long-term
SHO-4027	**Replace 6th Street bridge** on Small Fork in **City of Wallace.**	Flood	City of Wallace, PHD, BEIPC, IDEQ	68	Long-term
SHO-4028	**Replace South Fork Coeur d'Alene River retaining wall in City of Wallace.**	Flood	City of Wallace, PHD, BEIPC, IDEQ	68	Long-term
SHO-4029	**Enhancement of Printers Creek, Canyon Creek, and Nine Mile Creek** courses into the City of Wallace to the confluence with the South Fork Coeur d'Alene River. Address channel and culvert issues.	Flood	City of Wallace, PHD, BEIPC, IDEQ	64	Long-term
SHO-4030	Analyze and implement **bank and slope stabilization** on Pearl, Maple, High, and High Bank Roads in the **City of Wallace.**	Landslides	City of Wallace	60	Long-term

Table 7.7. Potential Mitigation Activities to Change Characteristics of Risk (4000 series).					
Project Number	**Project Name**	**Type of Project**	**Responsible Organization**	**STAPLEE Score**	**Implementation Time Frame**
SHO-4031	Analysis of tributaries flowing into the **South Fork Coeur d'Alene River** for flow **diversions and culvert sizing.** Address channel and culvert issues for 20 tributaries identified in Section 4.2.9.	Flood	Shoshone County, All Cities, PHD, BEIPC, IDEQ	70	Short-term
SHO-4032	Implementation of the tributary analysis flowing into the **South Fork Coeur d'Alene River** for flow **diversions and culvert sizing** recommended in Project SHO-4031. Correct channel and culvert issues for 20 tributaries identified in Section 4.2.9.	Flood	Shoshone County, All Cities, PHD, BEIPC, IDEQ	64	Long-term
SHO-4033	Inspect schools, City Hall offices, Fire District offices, and other **public structures for snow-load capability** and retrofit (using budgets and grant funding) where appropriate and continue effort to create a snow removal plan.	Severe Weather	Shoshone County Disaster Services, All Cities, School Districts	67	Long-term
SHO-4034	Engineer and build a **dike (floodwall) around the Central Shoshone Water District Well Facility** in **Enaville**.	Flood	Shoshone County, Central Shoshone Water District, PHD, BEIPC, IDEQ	68	Short-term
SHO-4035	Engineer and build adequate **storm drainage system** for **Silver Valley Road** Old Highway #10 (county road) from the easterly city limit of Osburn to the city limits of Wallace.	Flood	Shoshone County, PHD, BEIPC, IDEQ	68	Long-term
SHO-4036	Engineer and build an adequate **storm drainage system** on county road system in **Burke Canyon** east of State Highway #4.	Flood	Shoshone County, PHD, BEIPC, IDEQ	68	Long-term
SHO-4037	Engineer and build adequate **storm drain system** for the **Elizabeth Park** development.	Flood	Shoshone County, PHD, BEIPC, IDEQ	68	Mid-term
SHO-4038	Engineer and build **embankment and shoulder stabilization from Bumblebee to Old Silver Bridge** on Old Coeur d'Alene River Road (west side).	Flood	Shoshone County	68	Short-term
SHO-4039	Engineer and build and adequate **storm drainage system on Silver Valley Road** Old Highway #10 from city limit of Kellogg to Evolution Bridge.	Flood	Shoshone County, PHD, BEIPC, IDEQ	68	Long-term
SHO-4040	Design and build adequate **storm drainage system for Meyer Gulch & McPherson Gulch.**	Flood	Shoshone County, PHD, BEIPC, IDEQ	68	Long-term
SHO-4041	Establish a site location for a **NOAA Weather Radio Tower Repeater** in collaboration between **Shoshone County and the National Weather Service** for participation in the **StormReady Program**.	All	Shoshone County, National Weather Service	70	Immediate

7.3.5. Proposed Mitigation Measures STAPLEE Scores

STAPLEE Scores have been subjectively determined for each project proposed in Tables 7.4-7.7 and are presented in Tables 7.8. – 7.11.

Table 7.8. STAPLEE Scores for 1000 Series Potential Mitigation Measures.

Project	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total Score
KEL-1001	10	10	10	10	10	10	10	70
MUL-1002	10	10	10	10	10	10	10	70
OSB-1003	10	10	10	10	10	10	10	70
PIN-1004	10	10	10	10	10	10	10	70
SME-1005	10	10	10	10	10	10	10	70
WAL-1006	10	10	10	10	10	10	10	70
WAR-1007	10	10	10	10	10	10	10	70
SHO-1008	10	10	10	8	10	10	10	68
KEL-1009	7	10	10	8	10	10	10	65
MUL-1010	7	10	10	8	10	10	10	65
OSB-1011	7	10	10	8	10	10	10	65
PIN-1012	7	10	10	8	10	10	10	65
SME-1013	7	10	10	8	10	10	10	65
WAL-1014	7	10	10	8	10	10	10	65
KEL-1015	8	10	10	8	10	10	10	66
MUL-1016	8	10	10	8	10	10	10	66
OSB-1017	8	10	10	8	10	10	10	66
PIN-1018	8	10	10	8	10	10	10	66
WAL-1019	8	10	10	8	10	10	10	66
WAR-1020	8	10	10	8	10	10	10	66
SHO-1021	8	10	10	8	10	10	10	66
SHO-1022	10	8	8	10	9	10	10	65
SHO-1023	8	10	10	7	8	10	10	63
SHO-1024	10	7	7	10	10	10	10	64
SHO-1025	10	10	6	10	10	7	10	63
KEL-1026	8	8	8	7	10	8	10	59
MUL-1027	8	8	8	7	10	8	10	59
OSB-1028	8	8	8	7	10	8	10	59
PIN-1029	8	8	8	7	10	8	10	59
SME-1030	8	8	8	7	10	8	10	59
WAL-1031	8	8	8	7	10	8	10	59
WAR-1032	8	8	8	7	10	8	10	59
SHO-1033	8	8	8	7	10	8	10	59
SHO-1034	10	7	10	10	10	6	10	63
SHO-1035	10	10	10	10	10	10	10	70
SHO-1036	10	10	10	10	10	10	10	70
SHO-1037	9	10	10	9	6	10	10	64

Table 7.8. STAPLEE Scores for 1000 Series Potential Mitigation Measures.

Project	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total Score
SHO-1038	10	10	10	10	10	10	10	70
SHO-1039	7	10	10	8	10	10	10	65
SHO-1040	7	10	10	8	5	10	10	60
SHO-1041	10	10	10	10	10	9	10	69
KEL-1042	10	9	10	10	10	10	10	69
MUL-1043	10	9	10	10	10	10	10	69
OSB-1044	10	9	10	10	10	10	10	69
PIN-1045	10	9	10	10	10	10	10	69
SME-1046	10	9	10	10	10	10	10	69
WAL-1047	10	9	10	10	10	10	10	69
WAR-1048	10	9	10	10	10	10	10	69
SHO-1049	10	9	10	10	10	10	10	69
KEL-1050	10	10	10	10	10	10	10	70
MUL-1051	10	10	10	10	10	10	10	70
OSB-1052	10	10	10	10	10	10	10	70
PIN-1053	10	10	10	10	10	10	10	70
SME-1054	10	10	10	10	10	10	10	70
WAL-1055	10	10	10	10	10	10	10	70
SHO-1056	10	10	10	10	10	10	10	70
SHO-1057	10	10	10	10	10	10	10	70
SHO-1058	10	10	10	10	10	8	10	68
SHO-1059	10	10	10	10	10	10	10	70
SHO-1060	10	10	10	10	10	10	10	70
SHO-1061	10	10	10	10	10	10	10	70
SHO-1062	10	10	10	10	10	10	10	70
SHO-1063	10	10	10	10	10	10	10	70
SHO-1064	10	10	10	10	10	10	10	70
SHO-1065	10	10	10	10	10	10	10	70
KEL-1066	10	10	10	10	10	10	10	70
MUL-1067	10	10	10	10	10	10	10	70
OSB-1068	10	10	10	10	10	10	10	70
PIN-1069	10	10	10	10	10	10	10	70
SME-1070	10	10	10	10	10	10	10	70
WAL-1071	10	10	10	10	10	10	10	70
WAR-1072	10	10	10	10	10	10	10	70
SHO-1073	10	10	10	10	10	10	10	70
SHO-1074	10	10	10	10	10	10	10	70
SHO-1075	10	10	10	10	10	10	10	70
SHO-1076	10	10	10	10	10	10	10	70
SHO-1077	10	10	10	9	10	10	10	69
KEL-1078	10	10	10	9	10	10	10	69
MUL-1079	10	10	10	9	10	10	10	69

Table 7.8. STAPLEE Scores for 1000 Series Potential Mitigation Measures.

Project	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total Score
OSB-1080	10	10	10	9	10	10	10	69
PIN-1081	10	10	10	9	10	10	10	69
SME-1082	10	10	10	9	10	10	10	69
WAL-1083	10	10	10	9	10	10	10	69
KEL-1084	10	10	10	10	10	10	10	70
KEL-1085	10	10	10	10	10	10	10	70
KEL-1086	10	10	10	10	10	10	10	70
KEL-1087	10	10	10	10	10	10	10	70
KEL-1088	10	10	10	10	10	10	10	70

Table 7.9. STAPLEE Scores for 2000 Series Potential Mitigation Measures.

Project	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total Score
KEL-2001	8	8	7	6	10	8	10	57
MUL-2002	8	8	7	6	10	8	10	57
OSB-2003	8	8	7	6	10	8	10	57
PIN-2004	8	8	7	6	10	8	10	57
SME-2005	8	8	7	6	10	8	10	57
WAL-2006	8	8	7	6	10	8	10	57
WAR-2007	8	8	7	6	10	8	10	57
SHO-2008	8	8	7	6	10	8	10	57
KEL-2009	5	4	5	6	8	6	10	44
MUL-2010	5	4	5	6	8	6	10	44
OSB-2011	5	4	5	6	8	6	10	44
PIN-2012	5	4	5	6	8	6	10	44
SME-2013	5	4	5	6	8	6	10	44
WAL-2014	5	4	5	6	8	6	10	44
WAR-2015	5	4	5	6	8	6	10	44
SHO-2016	5	4	5	6	8	6	10	44
KEL-2017	8	7	7	8	10	9	10	59
MUL-2018	8	7	7	8	10	9	10	59
OSB-2019	8	7	7	8	10	9	10	59
PIN-2020	8	7	7	8	10	9	10	59
SME-2021	8	7	7	8	10	9	10	59
WAL-2022	8	7	7	8	10	9	10	59
WAR-2023	8	7	7	8	10	9	10	59
SHO-2024	8	7	7	8	10	9	10	59
KEL-2025	8	10	10	9	10	9	10	66
MUL-2026	8	10	10	9	10	9	10	66
OSB-2027	8	10	10	9	10	9	10	66
PIN-2028	8	10	10	9	10	9	10	66

Table 7.9. STAPLEE Scores for 2000 Series Potential Mitigation Measures.

Project	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total Score
SME-2029	8	10	10	9	10	9	10	66
WAL-2030	8	10	10	9	10	9	10	66
WAR-2031	8	10	10	9	10	9	10	66
SHO-2032	8	10	10	9	10	9	10	66
KEL-2033	8	10	10	10	10	9	10	67
MUL-2034	8	10	10	10	10	9	10	67
OSB-2035	8	10	10	10	10	9	10	67
PIN-2036	8	10	10	10	10	9	10	67
SME-2037	8	10	10	10	10	9	10	67
WAL-2038	8	10	10	10	10	9	10	67
WAR-2039	8	10	10	10	10	9	10	67
SHO-2040	8	10	10	10	10	9	10	67
KEL-2041	8	6	8	8	8	8	10	56
MUL-2042	8	6	8	8	8	8	10	56
OSB-2043	8	6	8	8	8	8	10	56
PIN-2044	8	6	8	8	8	8	10	56
SME-2045	8	6	8	8	8	8	10	56
WAL-2046	8	6	8	8	8	8	10	56
WAR-2047	8	6	8	8	8	8	10	56
SHO-2048	8	6	8	8	8	8	10	56

Table 7.10. STAPLEE Scores for 3000 Series Potential Mitigation Measures.

Project	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total Score
KEL-3001	10	10	10	10	10	8	10	68
MUL-3002	10	10	10	10	10	8	10	68
OSB-3003	10	10	10	10	10	8	10	68
PIN-3004	10	10	10	10	10	8	10	68
SME-3005	10	10	10	10	10	8	10	68
WAL-3006	10	10	10	10	10	8	10	68
WAR-3007	10	10	10	10	10	8	10	68
SHO-3008	10	10	10	10	10	8	10	68
SHO-3009	10	10	10	10	10	8	10	68
SHO-3010	10	10	10	10	10	7	10	67
SHO-3011	10	10	10	10	5	5	10	60
SHO-3012	10	10	10	10	10	10	10	70
SHO-3013	10	10	10	10	10	10	10	70
KEL-3014	10	10	10	10	10	5	10	65
MUL-3015	10	10	10	10	10	5	10	65
OSB-3016	10	10	10	10	10	5	10	65

Table 7.10. STAPLEE Scores for 3000 Series Potential Mitigation Measures.

Project	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total Score
PIN-3017	10	10	10	10	10	5	10	65
SME-3018	10	10	10	10	10	5	10	65
WAL-3019	10	10	10	10	10	5	10	65
WAR-3020	10	10	10	10	10	5	10	65
SHO-3021	10	10	10	10	10	5	10	65
SHO-3022	10	10	10	10	10	5	10	65
SHO-3023	10	10	10	10	10	5	10	65
SHO-3024	10	8	10	10	10	6	8	62
SHO-3025	10	8	10	10	10	5	10	63
SHO-3026	10	8	10	10	10	5	10	63
SHO-3027	10	8	10	10	10	5	10	63
SHO-3028	10	8	10	10	10	5	10	63
SHO-3029	10	8	10	10	10	5	10	63
SHO-3030	10	8	10	10	10	5	9	62
SHO-3031	9	10	10	10	10	8	10	67
SHO-3032	10	8	10	10	10	5	10	63

Table 7.11. STAPLEE Scores for 4000 Series Potential Mitigation Measures.

Project	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total Score
KEL-4001	7	5	5	6	5	5	6	39
MUL-4002	7	5	5	6	5	5	6	39
OSB-4003	7	5	5	6	5	5	6	39
PIN-4004	7	5	5	6	5	5	6	39
SME-4005	7	5	5	6	5	5	6	39
WAL-4006	7	5	5	6	5	5	6	39
SHO-4007	7	5	5	6	5	5	6	39
SHO-4008	8	6	5	7	7	7	8	48
SHO-4009	10	8	8	9	9	8	9	61
KEL-4010	10	8	8	10	10	9	9	64
MUL-4011	10	8	8	10	10	9	9	64
OSB-4012	10	8	8	10	10	9	9	64
PIN-4013	10	8	8	10	10	9	9	64
SME-4014	10	8	8	10	10	9	9	64
WAL-4015	10	8	8	10	10	9	9	64
WAR-4016	10	8	8	10	10	9	9	64
SHO-4017	10	8	8	10	10	9	9	64
SHO-4018	10	8	8	10	10	9	9	64
SHO-4019	10	9	9	10	10	9	10	67
SHO-4020	10	9	9	10	10	9	10	67
SHO-4021	10	10	10	10	10	9	10	69

Table 7.11. STAPLEE Scores for 4000 Series Potential Mitigation Measures.

Project	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total Score
MUL-4022	9	10	10	9	10	9	9	66
SHO-4023	10	10	10	10	10	9	10	69
SME-4024	10	10	10	10	10	9	10	69
SHO-4025	10	10	10	10	10	9	10	69
SHO-4026	8	8	10	10	10	8	9	63
SHO-4027	10	10	10	10	10	8	10	68
SHO-4028	10	10	10	10	10	8	10	68
SHO-4029	10	10	10	10	10	7	7	64
SHO-4030	9	8	10	8	10	8	7	60
SHO-4031	10	10	10	10	10	10	10	70
SHO-4032	10	8	10	10	10	6	10	64
SHO-4033	10	10	10	10	10	7	10	67
SHO-4034	10	10	10	10	10	8	10	68
SHO-4035	10	10	10	10	10	9	9	68
SHO-4036	10	10	10	10	10	9	9	68
SHO-4037	10	10	10	10	10	9	9	68
SHO-4038	10	10	10	10	10	9	9	68
SHO-4039	10	10	10	10	10	9	9	68
SHO-4040	10	10	10	10	10	9	9	68
SHO-4041	10	10	10	10	10	10	10	70

7.4. Maintenance Program by each Municipality and the County

PLAN MAINTENANCE

This Progress Report is to be completed annually on the review of the Shoshone County Multi-Jurisdictional Hazards Mitigation Plan by Shoshone County and each municipality. Representatives from each municipality (appointed by the Mayor or City Council), and the Shoshone County Emergency Management Department will complete these forms annually in preparation for the annual review completed by the municipalities and the county. Once completed, the progress report and the and the annual review questionnaire for each municipality will be combined with the county forms, and summarized in an annual notebook. This notebook of status reports will form the basis for a summary presentation with the Shoshone Board of County Commissioners, open to the public, discussing the status and pending action items related to hazard mitigation and preparedness in Shoshone County and each municipality.

These annual summaries will form the basis for updating the plan within a five year cycle. The Shoshone County Emergency Management Department will be responsible for coordinating the efforts of Shoshone County, each municipality, organization, and agency involved in hazard preparedness on a continual basis, for coordinating the annual reviews, and preparing the county for the five year update process of the Multi-Jurisdictional Hazards Mitigation Plan.

At the three-year anniversary of the adoption of this Multi-Jurisdictional Hazards Mitigation Plan, the Shoshone County Emergency Manager will identify the funding mechanism to seek an update to this plan considering potential grants, in-kind contributions, budgets, and other funding mechanisms to initiate planning for funding within ongoing budgets and grant applications that will require one or two years to realize. The award of potential grants or budget monies should be scheduled well enough in advance to facilitate funding, contract with potential consultants to the planning process, initiate the planning process, and to complete the plan's update prior to the five year expiration of this approved plan.

Multi-Jurisdictional Hazards Mitigation Plan Progress Report			
Progress Report Period From (date):		**To (date):**	
Plan Title:	**Shoshone County Multi-Jurisdictional Hazards Mitigation Plan**		
Description of Plan:	**Hazard Preparedness**		
Implementing Agency:	**(List the Name of the County or Municipality)**		
Contact Name:			
Contact E-mail and Number:			
Summary of Progress of Multi-Jurisdictional Hazards Mitigation Plan for this Reporting Period			
1. Did any hazard / disaster events occur during this report period? If so, list events.			
2. Did anyone from the public comment on the plan during this reporting period? If so, list the comments.			

3. Were any mitigation projects identified in the HMP implemented during this reporting period?
4. What obstacles, problems, or delays did any current or ongoing mitigation projects encounter, if any? How were the problems resolved?

PLAN MAINTENANCE

Annual Review Questionnaire				
Project Title	**Questions**	**Yes**	**No**	**Comments**
PLANNING PROCESS	Are there internal or external organizations and agencies that have been invaluable to the planning process or to mitigation action?			
	Are there procedures (e.g., meeting announcements, plan updates) that can be done differently or more efficiently?			
	Has the Planning Team undertaken any public outreach activities regarding the HMP or a mitigation project?			
HAZARD ANALYSIS	Has the natural and/or human-caused disaster occurred in this reporting period?			
	Are there natural and/or human-caused hazards that have not been addressed in this HMP and should be?			
	Are additional maps or new hazard studies available? If so, what are they and what have they revealed?			
VULNERABILITY ANALYSIS	Do any new critical facilities or infrastructure need to be added to the asset lists?			
	Have there been changes in development trends that could create additional risks?			
CAPABILITY ASSESSMENT	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?			
MITIGATION STRATEGY	Should new mitigation actions be added to the Implementation Strategy/Plan?			
	Are the mitigation actions listed in a community's Implementation Strategy/Plan appropriate foe available resources?			

Mitigation Project Progress Report			
Progress Report Period From (date):		**To (date):**	
Project Title and Project ID:			
Description of Project:			
Implementing Agency:			
Contact Name:			
Contact E-mail and Number:			
Grant/Finance Administrator:			
Total Project Cost:			
Anticipated Cost Overun/Underrun:			
Date of Project Approval:			
Project Start Date:			
Anticipated Completion Date:			
Summary of Progress of Project for this Reporting Period			
1. What was accomplished during this reporting period?			
2. What obstacles, problems, or delays did the project encounter, if any? How were the problems resolved?			

7.5. Continued Public Involvement Program

Shoshone County and each municipality are dedicated to involving the public directly in review and updates of the Multi-Jurisdictional Hazards Mitigation Plan. The Shoshone County Commissioners are responsible for the annual review and update of the plan as recommended in the “Recommendations” section of this document.

The Shoshone County Emergency Manager will take the responsibility of meeting with each municipality at least annually to discuss ongoing projects, needs, and changes in the hazard preparedness status. This annual meeting with each municipality will be summarized in written form and presented at an open public meeting of the Shoshone Board of County Commissioners where the county’s summary will be presented and discussed. These meetings will result in an action plan to deal with the status of preparedness and mitigation measures.

The public will have the opportunity to provide feedback about the Multi-Jurisdictional Hazards Mitigation Plan annually on the anniversary of the adoption of this plan, at the meeting of the County Commissioners. Copies of the Plan will be catalogued and kept at all of the appropriate agencies in the county. The existence and location of these copies will be publicized. Instructions on how to obtain copies of the plan will be made available on the County’s Internet web site (the development of the web site is recommended in this plan). The Multi-Jurisdictional

Hazards Mitigation Plan also includes (below) the address and phone number of the County Planning and Zoning Department, responsible for keeping track of public comments to the Multi-Jurisdictional Hazards Mitigation Plan.

Shoshone County Planning and Zoning Department
700 Bank St #25
Wallace, Idaho 83873
208-752-8891 Office
208-556-5135 Fax

In addition, copies of the plan and any proposed changes will be posted on the County website (recommendation to develop this site in this plan). This web site will also contain an e-mail address and phone number to which people can direct their comments and concerns.

A public meeting will also be held as part of each annual evaluation or when deemed necessary by the Shoshone County Emergency Manager. The meetings will provide the public a forum for expressing concerns, opinions, or ideas about the implementation of the Multi-Jurisdictional Hazards Mitigation Plan. The Shoshone County Emergency Manager will be responsible for using county resources to publicize the annual public meetings and maintain public involvement through the webpage and the Shoshone News Press.

8. Information Citations

8.1. Acronyms and Abbreviations Used

Table 8.1. List of Acronyms and Abbreviations used in this report.

ALDS	Automated Lightning Detection System
BEIPC	Basin Environmental Improvement Project Commission
BFE	Base Flood Elevation
BLM	Bureau of Land Management
CDC	Coeur d'Alene Interagency Dispatch Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
C-PTPA	Clearwater-Potlatch Timber Protective Association
CRS	Community Rating System
EOP	Emergency Operations Plan?
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Federal Insurance Rate Map
FRCC	fire regime condition class
FTP	File Transfer Protocol
FWS	U.S. Fish and Wildlife Service
HFR	Historic Fire Regime
HMGP	Hazard Mitigation Grant Program
IBC	International Building Code
ICP	Institutional Controls Program
IDEQ	Idaho Department of Environmental Quality
IDL	Idaho Department of Lands
IDWR	Idaho Department of Water Resources
IGS	Idaho Geological Survey
IRP	Infrastructure Revitalization Plan
LHIP	Lead Health Intervention Program
MRLC	Multi-Resolution Land Characteristics
NFIP	National Flood Insurance Program
NLCD	National Land Cover Database
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	USDA Natural Resources Conservation Service
OU	Operable Unit
PDF	Portable Document Format (Adobe Acrobat Reader file)
PDM	Pre-Disaster Mitigation Program
PHD	Panhandle Health District
PNV	Potential Natural Vegetation Type
RFLP	Repetitive flood loss properties
ROD	Record of Decision
SFHA	Special Flood Hazard Area
SHMO	State Hazard Mitigation Officer
STATSGO	NRCS State Soils Geographic Database
TerraGraphics	TerraGraphics Environmental Engineering, Inc.
UBC	Uniform Building Code

Table 8.1. List of Acronyms and Abbreviations used in this report.	
USACE	US Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDI	US Department of Interior
USFS	USDA Forest Service
USGS	U.S. Geological Survey
WRCC	Western Regional Climate Center
WUI	Wildland-Urban Interface

8.2. *Literature Cited*

ABAG (Association of Bay Area Governments). 2003. Typical Unreinforced Masonry Building Damage: Shaken Awake! Report – Unreinforced Masonry Buildings. Last accessed on the Internet on November 20, 2008 at: http://www.abag.ca.gov/bayarea/eqmaps/shelpop/typ2_f.html

Agee, J.K. 1993. Fire ecology of the Pacific Northwest forests. Washington: Island Press.

Agee, J.K. 1998. The Landscape Ecology of western Forest Fire Regimes. Northwest Science, Vol. 72, Special Issue 1998.

Aiken, K. 1998. The Bunker Hill Mine Superfund Site at Kellogg, Idaho. A brief summary of the history and health effects to residents of the Silver Valley. University of Idaho, Issues lectures. Last accessed on the Internet on December 4, 2008, at: http://www.class.uidaho.edu/kpgeorge/issues/bunkerhill/bunker.htm

Arattano, M, and L. Marchi. 2005. Measurements of debris flow velocity through cross-correlation of instrumentation data. Natural Hazards and Earth System Sciences (2005) 5: 137-142. European Geosciences Union. Pp 6.

Barrett, J.W. 1979. Silviculture of ponderosa pine in the Pacific Northwest: the state of our knowledge. USDA Forest Service, General Technical Report PNW-97. Pacific Northwest Forest and Range Experiment Station, Portland, OR. 106 p.

Breckenridge, R.M., R.S. Lewis, G.W. Adema, and D.W. Weisz. 2003. *Miocene and Younger Faults in Idaho.* Map series of the Idaho Geological Survey, University of Idaho, Moscow.

Brookhouse, P. 1999. Lightning detection and operations systems in North America. Conference Proceedings from the Australian Brushfire Conference, Albury, July 1999.

Brown, J.K. 1995. Fire regimes and their relevance to ecosystem management. Pages 171-178 In Proceedings of Society of American Foresters National Convention, Sept. 18-22, 1994, Anchorage, AK. Society of American Foresters, Wash. DC.

CSSC (California Seismic Safety Commission). 2005. Homeowner's Guide to Earthquake Safety (HOG), 2005 edition. Summarized at DareToPrepare.org last accessed on December 9, 2008, on the Internet at http://www.earthquakecountry.info/daretoprepare/building/urmwalls.html

Cantor, D. 2008. 5 of the largest, oddest and most useless state projects. CNN.com / living. Last accessed on the Internet on August 15, 2007 at http://www.cnn.com/2007/LIVING/wayoflife/07/26/mf.gov.projects/index.html

Carree, Y., C. Schnepf, W.M. Colt. 1998. Landscaping for Wildfire Prevention; Protecting Homes on the Wildland-Urban Interface. Idaho Forest, Wildlife and Range Experiment Station, Moscow, Idaho. Station Bulletin 67, March, 1998.

Census. 2000. The US Census Bureau, US Department of Commerce. American Community Survey database. Last accessed on the Internet on December 5, 2008, at http://www.census.gov/

CSD (City of San Diego). 2008. Visual Examples - Unreinforced Masonry Building (URM) Program; Development Services. Last viewed on the Internet on December 4, 2008 http://www.sandiego.gov/development-services/industry/urmexamples.shtml

Dillman, D.A. 1978. Mail and Telephone Surveys: The Total Design Method. Hoboken: John Wiley & Sons, Incorporated. 344 p.

Easterbrook, D.J. 1999. *Surface Processes and Landforms.* Upper Saddle River, NJ: Prentice-Hall, Inc. Second Ed. pp 564.

FEMA. 2009. Federal Emergency Management Agency Internet web site repository of information last accessed on April 3, 2009 at: http://www.fema.gov/

Forseth, D.O. 2009. Upper Coeur d'Alene Basin Infrastructure Funding. Prepared by TerraGraphics Environmental Engineering, Inc., for Basin Environmental Improvement Project Commission, Moscow, Idaho. Pp. 31.

Fragaszy, J. 2002. USGS 2004. National Landslide Hazards - Mitigation Strategy - A Framework for Loss Reduction. Circular 1244. U.S. Department of the Interior U.S. Geological Survey. Accessed on the internet at http://pubs.usgs.gov/circ/c1244/c1244.txt on September 25, 2008.

GenDisasters. 2008. Events That Touched Our Ancestor's Lives. An Internet based Genealogy site maintaining data on disasters in the US which affected the lives of our ancestors. Last accessed on December 10, 2008 on the Internet at: http://www3.gendisasters.com/idaho

Hann, W.J., and Bunnell, D.L. 2001. Fire and land management planning and implementation across multiple scales. Int. J. Wildland Fire. 10:389-403.

Hardy, C.C., Schmidt, K.M., Menakis, J.M., Samson, N.R. 2001. Spatial data for national fire planning and fuel management. International Journal of Wildland Fire 10:353-372.

Harwood, T. 2008. Personal communication provided by Terry Harwood, of the Basin Commission to William Schlosser of TerraGraphics as part of the development of this plan.

HCN (High Country News). 2002. EPA wants to supersize Idaho Superfund site; State and federal officials squabble over how to clean up the Silver Valley. Article published on March 4, 2002. Last accessed on the Internet on December 4, 2008, at: https://www.hcn.org/issues/221/11052

Harris, C., P.S. Cook, and J. O'Laughlin. 2003. Forest Resource-Based Economic Development in Idaho: Analysis of Concepts, Resource Management Policies, and Community Effects. Policy Analysis Group, University of Idaho, College of Natural Resources, Report № 22. Pp 82.

Homer, C.G. 1998. Idaho/western Wyoming landcover classification report and metadata. Department of Geography and Earth Resources. Utah State University. Logan, UT 84322-9635. chomer@gis.usu.edu

IBHS (Idaho Bureau of Homeland Security). 2007. State of Idaho Hazard Mitigation Plan. Idaho Bureau of Homeland Security November 2007. p 226. Last accessed on the Internet on April 23, 2009 at http://www.bhs.idaho.gov/Resources/PDF/SHMPFinalw-signatures.pdf

IBHS (Idaho Bureau of Homeland Security). 2008a. Press Release on August 1, 2008. Last accessed on the Internet on December 1, 2008 at http://www.bhs.idaho.gov

IBHS (Idaho Bureau of Homeland Security). 2008b. Written information provided to William Schlosser of TerraGraphics by Mark Stephensen of IBHS for use in the plan's development.

IDWR (Idaho Department of Water Resources). 2009. Idaho Department of Water Resources geospatial and tabular data provided on their Internet web site last accessed on February 1, 2009, at http://www.idwr.idaho.gov/

IFPC (Idaho Forest Products Commission). 2005. Trees of Idaho's Forests – Western White Pine. Health update. Updated 2005 and last accessed on the Internet on November 2, 2008 at http://www.idahoforests.org/whitpine.htm

Idaho Geological Survey (IGS). 2008. Idaho Geological Society, Internet web site last accessed on December 4, 2008 at http://www.idahogeology.com/Services/GeologicHazards/Earthquakes/ .

Luino, F. 2004. Sequence of instability processes triggered by heavy rainfall in northern Italy. Consiglio Nazionale delle Ricerche, Istituto di Ricerca per la Protezione Idrogeologica, Sezione di Torino, Strada delle Cacce 73, 10135 Torino, Italy

Marshak, S. 2001. Earth: Portrait of a Planet. New York: W.W. Norton & Company. pp. 463

McClelland D.E., R.B. Foltz, W.D. Wilson, T.W. Cundy, R. Heinemann, J.A. Saurbier, R.L. Schuster. 1997. Assessment of the 1995 & 1996 floods and landslides on the Clearwater National Forest Part 1: Landslide Assessment, A Report to the regional Forester Northern Region USDA Forest Service, December 1997.

Monroe, J.S., and R. Wicander. 1997. *The Changing Earth: Exploring Geology and Evolution*, 2nd ed. Belmont: West Publishing Company, 1997. pp. 96

MRLC (Multi-Resolution Land Characteristics Consortium). 2001. National Land Cover Database, geospatial data analysis of vegetation for north Idaho available on the Internet at http://www.mrlc.gov/, last accessed on February 21. 2009.

NAS (National Academy of Sciences). 2005. Superfund and Mining Megasites – Lessons Learned in the Coeur d'Alene River Basin. Board on Environmental Studies and Toxicology. The National Academic Press, Washington, D.C.

NFPCST (Northern Fire Plan Cohesive Strategy Team). 2005. GIS data for Idaho and Montana, developed by the NFPCST, in Kalispell, Montana, and distributed via CD and previously over the Internet. Information from Flathead National Forest, 1935 3rd Ave., East, Kalispell, MT 59901, and e-mail: dkrogstad@fs.fed.us

Norton, P. 2002. Bear Valley National Wildlife Refuge Fire Hazard Reduction Project: Final Environmental Assessment, June 20, 2002. Fish and Wildlife Service, Bear Valley National Wildlife Refuge.

NWCG (National Wildfire Coordinating Group). 1998. Wildfire Prevention Strategies, A publication of the National Wildfire Coordinating Group, PMS 455 – NFES 1572; March 1998. pp 117.

Panhandle Health District (PHD). 1999. Overview of the Silver Valley Lead Health Intervention Program Bunker Hill Superfund Site. Boise, ID, Prepared for Idaho Department of Health & Welfare Division of Health Bureau of Environmental Health & Safety.

Perkins, B. 2004. Quake shows danger of retrofit neglect. East Bay Times publication of the San Francisco Business Times, printed February 20, 2004.

Pyne, Stephen J. 2001. Year of the Fires: The Story of the Great Fires of 1910. New York: Viking.

Redmond, R.L. 1997. Mapping existing vegetation and land cover across western Montana and Northern Idaho. Wildlife Spatial Analysis Lab. Montana Cooperative Fish and Wildlife Research Unit. University of Montana, Missoula, MT 59812.

Reisner, M. 1993. Cadillac Desert; The American West and its Disappearing Water. New York U.S.A. Penguin Books 1993. pp 407.

Schlosser, W.E., V.P. Corrao, D. Thomas. 2002. Shoshone County Wildland Urban Interface Fire Mitigation Plan, Final Report. Northwest Management, Inc., Moscow, ID.

Schlosser, W.E. 2003. Landslide Prone Landscapes Geospatial Analysis technique, as used in the Adams County All Hazards Mitigation Plan, December 2004. pp 135.

Schmidt, K.M., Menakis, J.P. Hardy, C.C., Hann, W.J., Bunnell, D.L. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. General Technical Report, RMRS-GTR-87, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO.

Schuster, R.L. & Krizek, R.J. 1978. Landslides: Analysis and Control. Washington D.C.: National Academy of Sciences. National Transportation Research Board Special Report 176. pp 234.

SHELDUS. 2008. Summary Generated by Request Generated from SHELDUS on October 30, 2008, at http://webra.cas.sc.edu/hvriapps/sheldus_setup/sheldus_location.aspx

Shreve, R.L. 1967. Infinite Topologically Random Channel Networks. Journal of Geology, 74, 178-186.

SNP (Shoshone News Press). Various Dates. Shoshone News Press articles listed by date in each citation. Online links to the “Online Newspaper” available on the Internet at www.shoshonenewspress.com last accessed on February 20, 2009.

Sprenke, K.F., M.C. Stickney, R.M. Breckenbridge. 1994. The Hoyt Mountain Earthquakes Shoshone County, Idaho, March 7 and June 3, 1994. Idaho Geological Survey, University of Idaho, Moscow. September 1994. pp 23.

Stromberg, Mark. pers comm. 2009. Personal conversation between Susan Spalinger of TerraGraphics Environmental Engineering, Inc., and Mark Stromberg of Idaho Department of Environmental Quality on February 25, 2009.

TerraGraphics Environmental Engineering, Inc. 2004. City of Pinehurst Storm water Conveyance System Improvement report. June 30, 2004, Moscow, Idaho.

TerraGraphics Environmental Engineering, Inc. 2007. City of Mullan Drainage Assessment. Report prepared for the BEIPC on October 24, 2007, Moscow, Idaho.

TerraGraphics Environmental Engineering, Inc. 2008a. City of Osburn Drainage Assessment. Report prepared for the BEIPC on January 8, 2008, Moscow, Idaho.

TerraGraphics Environmental Engineering, Inc. 2008b. City of Wallace Drainage Assessment Including Burke Canyon, Woodland Park, and Nine Mile. Prepared for the BEIPC on February 12, 2008, Moscow, Idaho.

TerraGraphics Environmental Engineering, Inc. 2008c. Town of Silverton Drainage Assessment Report. Prepared for the BEIPC on February 12, 2008, Moscow, Idaho.

TerraGraphics Environmental Engineering, Inc., Shoshone County, and Basin Environmental Improvement Project Commission. 2008. Upper Coeur d’Alene River Basin Framework for a Flood Control Program. February 13, 2008, Moscow, Idaho.

TerraGraphics Environmental Engineering, Inc. 2008. Bunker Creek Study: Hydrologic and Hydraulic Models for the Bunker Creek System in Kellogg, Idaho. Prepared for Idaho Department of Environmental Quality, June, 2008. Moscow, Idaho.

UI (University of Idaho) Libraries. 1980. Shoshone County Flood Control Project. Manuscript 140; Records, 1935-1940. Prepared by Judith Nielsen in October 1980. Last accessed on December 26, 2008, at http://www.lib.uidaho.edu/special-collections/Manuscripts/mg140.htm

US Department of Transportation, Federal Highway Administration. 2008. Debris Control Structures Evaluation and Countermeasures, Hydraulic Engineering Circular No. 9, Chapter 5 - Debris Countermeasures. Last accessed on the Internet on December 1, 2008 at http://www.fhwa.dot.gov/engineering/hydraulics/pubs/04016/hec0905.cfm

USEPA (U.S. Environmental Protection Agency). 1991. Record of Decision - Bunker Hill Mining and Metallurgical Complex, Residential Soils Operable Unit, Shoshone County, Idaho. August 1991.

USEPA (U.S. Environmental Protection Agency). 1992. *Record of Decision, Bunker Hill Mining and Metallurgical Complex [Non-Populated Area].* Shoshone County, Idaho. EPA ROD R10-92-028. September 1992.

USEPA (U.S. Environmental Protection Agency). 2000. First 5-Year Review of the Non-Populated Operable Unit Bunker Hill Mining and Metallurgical Complex, Shoshone County, Idaho.

USEPA (U.S. Environmental Protection Agency). 2002. Record of Decision (ROD) - Bunker Hill Mining and Metallurgical Complex Operable Unit 3 (Coeur d'Alene Basin). September 2002.

USEPA (U.S. Environmental Protection Agency). 2005. Second Five-Year Review for the Bunker Hill Mining and Metallurgical Complex Superfund Site Operable Units 1, 2, and 3 Idaho and Washington. USEPA Region 10. EPA 910-R-05-006. October 2005.

USGS (US Geological Service). 2009. Stream flow gauge data were obtained on December 19, 2008 on the internet at http://nwis.waterdata.usgs.gov/id/nwis/

Wagner, W.R. 1949. The Geology of Part of the South Slope of the St. Joe Mountains – Shoshone County. University of Idaho, Moscow, Idaho Bureau of Mines and Geology. No. 82, pp 48.

Worrall, J. 2007. Forest Pathology: White Pine Blister Rust. A lecture series hosted on the Internet, last accessed on March 3, 2008, last modified 27 May 2007, at http://www.forestpathology.org/dis_wpbr.html

WRCC (Western Regional Climate Center). 2009. Regional climate database archived by a Three-Partner National Services Program of the National Climatic Data Center, the Region Climate Centers, and the Idaho State Climate Office. Reno, NV, last accessed on February 1, 2009, at http://www.wrcc.dri.edu/

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