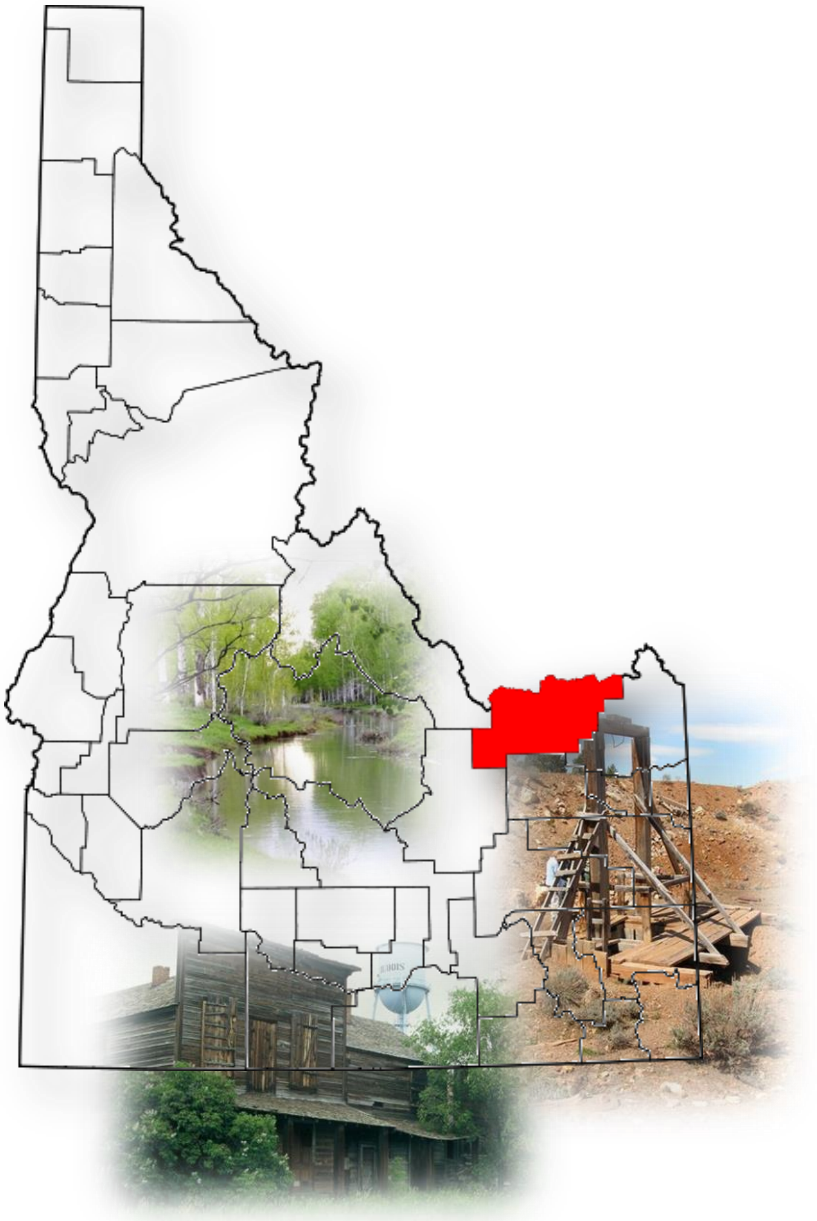
CLARK COUNTY IDAHO
MULTI-JURISDICTION
ALL HAZARD
MITIGATION PLAN
JULY 2014



Executive Summary

The Clark County Multi-Jurisdiction All Hazard Mitigation Plan 2013 is a complete revision of the 2008 Clark County All Hazard Mitigation Plan. The entire Hazard and Vulnerability Assessment was updated. The hazard ranking was changed and a new format deployed that ranks the hazards according to five indices; 1) historical occurrence, 2) probability, 3) vulnerability, 4) spatial extent, i.e. the extent impact based on geography, and 5) the magnitude which looks specifically at the loss of life, injuries, and economic impact.

	Historical Occurrence	Probability	Vulnerability	Spatial Extent	Magnitude	Total
Drought	3	4	4	4	2	17
Severe Winter Storms	3	4	3	4	2	16
Wildfire	3	4	2	3	4	16
Earthquake	2	2	4	4	3	15
Severe Weather	3	4	2	2	3	14
Stream Flooding	2	2	3	3	3	13
Communicable Disease	1	2	3	3	4	13
Flash Flood	2	4	2	1	2	11
Bird Flu	0	1	3	3	4	11
Hazardous Materials	1	2	2	2	3	10
Nuclear Event	0	1	2	3	4	10
Structure Fire	1	4	1	1	2	9
Landslide	1	2	2	1	1	7
Terrorism	0	1	2	2	2	7
West Nile	1	2	1	1	1	6
Civil Disobedience	1	1	1	1	1	5
Lyme Disease	0	2	1	1	1	5
Dam Failure	0	1	1	1	1	4

The revision was under the direction of the Clark County All Hazard Mitigation Planning Committee. Community involvement took two forms; 1) an electronic based community questionnaire, and 2) invitation to attend the joint City/County local elected official's briefings. There was limited community participation; however, Clark County is the most sparsely populated county in the State of Idaho.

The Clark County Mitigation Team as led by the Clark County Emergency Management Coordinator who, under the direction of the Clark County Commissioners, is responsible for implementing the mitigation actions recommended in this Plan

While the focus of this Plan is on County-wide mitigation activities, it was developed through an integrated effort by representatives from many County jurisdictions. The Cities of Dubois and Spencer also participated in the development of this Plan.

Mitigation Actions have been reviewed and a status provided by the Mitigation Committee. Goals and Objectives developed in the initial planning process were maintained and additional mitigation actions were added to the Plan. The mitigation actions were reviewed and analyzed using the STAPLEE Method with each action given H, M, or L ranking.

Project	Hazard	Rank
Install Road Signs as prescribed by NFPA Standards	Wildfire	H
Construct Recreational Parking Areas	Severe Winter Weather	H
Place Seasonal Road Signage	Severe Winter Weather	H
Plant Living Windbreaks/Snow Fences	Severe Winter Weather	H
Harden County Radio Communications Sites	Earthquake	H
Install Smoke Detectors and Fire Extinguishers in all Residences	Structure Fire	H
Replace the undersized culvert at the West Fork of Three Mile Creek Crossing	Flood	H
Replace the undersized culvert at the Rattle Snake Creek Crossing	Flood	H
Replace the undersized culvert at the Hilman Lane Crossing	Flood	H
Replace the undersized culvert at the West Antelope Valley Culvert Crossing	Flood	H
Replace the undersized culvert at the East Antelope Valley Culvert	Flood	H
Develop a County-Wide Drought Response Plan	Drought	H
Designate Wildland Urban Interface in the County Comprehensive Plan as a Special Land Use category	Wildfire	M
Develop an agreement with developers and private landowners for access to and use of water sources for fire protection.	Wild/Structure Fire	M
Develop a listing of roads, bridges, cattle guards, culverts, and other limiting conditions and incorporate improvements into the Highway District Transportation Plans	Wildfire	M
Use GIS Technology to Link Red Zone Data to Landowner Parcel Maps	Wildfire	M
Conduct a County Terrorism assessment.	Terrorism	M
Protect Critical Infrastructure based on the assessment.	Terrorism	M
Develop wildfire fuel breaks around CRP Land	Wildfire	M
Develop a listing of schools and public buildings that need to seismically retrofitted	Earthquake	L
Earthquake Protection or Hardening the Clark County EOC the County Jail, The Clark County 911 Dispatch Center, Community Center and the County Court House.	Earthquake	L
Develop a standard practice for roadside vegetation management in the WUI	Wildfire	L
Develop and Adopt a WUI Ordinance	Wildfire	L
Develop an ingestion pathway protection program with INL	Nuclear	L
Develop secondary supply of electrical power	Severe/Severe Winter Weather	L
Organize a group to jointly apply for grants and other funding avenues to implement WUI Fire Mitigation Actions	Wildfire	L

The Plan, as developed, is much more user friendly, and designed specifically to enhance implementation. The jurisdictions have completed many of the mitigation actions, and as funding is available, additional mitigation actions will be addressed.

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Section 1: Planning Process

Clark County, Idaho and the incorporated cities that lie within the County boundaries are vulnerable to natural, technological, and man-made hazards that have the potential to cause serious harm to the health, welfare, and security of its residents. The cost of response to, and recovery from, disaster events can be lessened when attention is turned to mitigating their impacts and effects before they occur or re-occur.

This Plan seeks to identify the County's hazards, understand the vulnerabilities to those hazards, and craft solutions that, if implemented, will significantly reduce threats to life and property. The Plan is based on the premise that hazard mitigation works! With increased attention to managing natural hazards, communities can reduce the threats to citizens and, through proper land use and emergency planning, avoid creating new problems in the future. Many solutions can be implemented at minimal cost and social impact.

This is not an emergency response or management plan. The Plan can certainly be used to identify weaknesses and refocus emergency response planning. Enhanced emergency response planning is an important mitigation strategy. The focus of this Plan, however, is to support better decision making directed toward avoidance of future risks and to implement activities or projects that will eliminate or reduce current risks.

Hazard mitigation is defined as cost-effective actions that have the effect of reducing, limiting, or preventing the vulnerability of people, culture, property, and the environment to potentially damaging, harmful, or costly hazards. Hazard mitigation measures which can be used to eliminate or minimize the risk to life, culture, and property fall into three categories:

1) Those that keep the hazard away from people, property, and structures,

2) Those that keep people, property, or structures away from the hazard; and

3) Those that reduce the impact of the hazard on victims and their property, i.e., insurance.

Hazard mitigation measures must be practical, cost effective, and culturally, environmentally, and politically acceptable. Actions taken to limit the vulnerability of society to hazards must not, in themselves, be more costly than the anticipated damages.

Hazard mitigation planning must be based on vulnerabilities, and its primary focus must be on the point where capital investment and land use decisions are made. The placement of capital investments, whether for homes, roads, public utilities, pipelines, power plants, or public works, determine to a large extent the nature and degree of a community's hazard vulnerability. Once a capital facility is in place, there is little opportunity to reduce hazard vulnerability through correction of errors in location or construction. It is for this reason that often the most effective mitigation tools are zoning and other ordinances that manage development in high vulnerability areas, and building codes that ensure that new buildings are constructed to withstand the damaging forces of anticipated hazards.

Because disaster events are generally infrequent, the nature and magnitude of the threat is often ignored or poorly understood. Thus, the priority to implement mitigation measures is low and implementation is slowed. Mitigation success can be achieved, however, if accurate information is portrayed through complete hazard identification and impact studies, followed by effective mitigation management.

The Federal Emergency Management Agency has identified hazards to be analyzed by each jurisdiction completing an All Hazard Mitigation Plan. The hazards analyzed in this Plan include the following:

Natural Hazards

- Weather: Severe Weather
  - Extreme Heat
  - Lightning
  - Hail
  - Tornado
  - Straight Line Wind
- Severe Winter Storms
  - Extreme Cold
- Drought

- Flooding:
  - Flash Flood
  - River Flooding
  - Dam Failure

- Geologic:
  - Earthquake
  - Landslide/Mudslide

- Other:
  - Wildfire
  - Biological
  - Vector Borne Disease
    - West Nile
    - Lyme Disease
    - Bird Flu
  - Human Borne (Communicable) Disease

Technological (Manmade) Hazards

- Structural Fire
- Hazardous Materials Event
- Riot/Demonstration/Civil Disorder
- Terrorism

Participating Jurisdictions

This Plan covers all areas within Clark County Idaho, including the incorporated cities of Dubois and Spencer, who will be asked to endorse the Plan and participate in the implementation.

Clark County All Hazard Mitigation Planning Committee

The Clark County All Hazard Planning Committee was formed on January 24, 2013. Committee membership is comprised of representatives from the Clark County Local Emergency Planning Committee, Clark County Department heads, and representatives from the incorporated cities. Minutes of the committee meetings are provided in Attachment 1.

The Committee Roster is provided below:

Agency	Representative	Position
Clark County Emergency Management	Russ Kerr	Emergency Manager
Clark County Road and Bridge	Kevin Hathaway	Manager
Idaho Bureau of Homeland Security	Mike Clements	Area Field Officer
Clark County Board of Commissioners	Todd Shenton	Commissioner
City of Dubois	Randy Meade	Mayor
Clark County Planning and Zoning/City of Dubois	Kerri Ellis	Director/City Council
Clark County Board of Commissioners	Bill Frederiksen	Commissioner
Clark County Sheriff's Office	Jeffery Macinanti	Deputy
Clark County Extension	Lori Small	Office Manager
Clark County Sheriff	Bart May	Sheriff
Clark County Sheriff	Boyd Eddins	Chief Deputy
City of Spencer	Lyle Holden	Mayor
City of Spencer	Treva May	Councilmember
City of Spencer	Sandy McClure	Councilmember
City of Spencer	Elie Gus	Clerk
City of Spencer	Mary Edwards	Citizen
City of Spencer	Ted Edwards	Citizen

Committee Member Roster

AHMP Committee Meetings

The Planning Process began in January 2013 with the kick off meeting. Planning meetings concluded with the Elected Officials' briefings which were held during the last week of June 2013. Following the Planning Meetings, the drafting of the Plan was completed and the Plan was submitted to the Planning Committee for review prior to sending the Plan to the Idaho Bureau of Homeland Security (BHS) for approval. Following the approval of the Plan by BHS, the Plan will be reviewed and approved by FEMA Region 10.

January 24, 2013

The first meeting of the Clark County Multi-Jurisdiction All Hazard Mitigation Plan Committee was held in Dubois, Idaho at the City Building on January 24, 2013 at 4:00 pm. The meeting was

called to order by Mr. Russ Kerr who explained to those in attendance that the purpose of the meeting was to update Clark County's existing plan to be in compliance with FEMA. He then turned the time over to Dr. Rick Fawcett of Whisper Mountain Professional Services, Inc., the contractor hired by the County to update the plan. Rick reminded the committee the purpose of the Plan is to save lives and reduce the loss of public and private property. Dr. Fawcett gave a power point presentation identifying past and current known risks to the County. He explained how the risks are ranked for magnitude and frequency in the past, and how the new method better identifies those risks specific to Clark County.

Discussion was then opened up to the committee to discuss current risks. One of the greatest risks to the City of Dubois is the flooding through the Smalls; some ground and creek stabilization has been done to date to mitigate that flooding. A grant to replace the bridge has been applied for. The ability to run water continuously through the sewer plant to keep it from freezing was discussed. Cost has been the issue preventing it from being done in the past. Dr. Fawcett said they would look at the Cost Benefit Analysis from incidents of the water freezing in the past in terms of man-hours, water loss, replacement of pipes, etc. to see if the project would pay back. Burrowing rodents were discussed as a current problem to canal erosion.

Dr. Fawcett thanked those in attendance and set a date for February 28, 2013 for the next meeting.

See Attachment 1 for presentations, attendance rosters/sign in sheets, and minutes.

February 28, 2013

The second meeting of the Clark County Multi-Jurisdiction All Hazard Mitigation Plan Committee was held in Dubois, Idaho at the City Building on February 28, 2013 at 4:00 pm. The meeting was called to order by Mr. Russ Kerr who explained to those in attendance that the purpose of the meeting was to update Clark County's existing plan to be in compliance with FEMA. He then turned the time over to Dr. Rick Fawcett of Whisper Mountain Professional Services, Inc., the contractor hired by the County to update the plan. Rick reminded the committee the purpose of the Plan is to save lives and reduce the loss of public and private property. Dr. Fawcett gave a power point presentation identifying past and current known risks to the County. He showed how the risks are ranked for magnitude and frequency and how the new method better identifies those risks specific to Clark County today based on historical and actual events.

Discussion was then opened up to the committee to discuss any risks they personally perceived. It was mentioned there is still a need for signs in the City for better location identification for emergency services.

Past disasters mentioned by the committee were severe winter storms (1989 particularly severe), wildfire, drought, and hazardous materials spills. It was also mentioned that the City of Dubois has a City Flood Insurance Resolution. Dr. Fawcett said he would check to see if Clark County and the City of Dubois have National Flood Insurance.

Members of the committee were encouraged to review the old plan and also to think of any current conditions that pose a risk to the County that would be good mitigation projects. The next meeting would be a review of those projects and any changes to the ranking of the risks based on the past study of events in Clark County.

Dr. Fawcett thanked those in attendance and set a date for completion around the end of August.

See Attachment 1 for presentations, attendance rosters/sign in sheets, and minutes.

Update Process

The following strategy was taken to update the 2012 Plan. The Plan update builds on the existing mitigation strategy developed during the 2008 Planning Process. All of the hazard analyses were updated and additional hazards were added to the 2013 analysis.

Identify Hazards

Clark County hazards were identified, and their frequency of occurrence evaluated using a number of resources including:

- Hazard planning documents developed by State, Federal, and private agencies;
- National Weather Service weather data from the past 50 years; and,
- 100 year historical analysis of hazardous event occurrences published by Federal, State, and local government agencies.

To determine frequency of occurrence, the historical analysis of hazardous events was conducted. One of the difficult tasks facing hazard mitigation professionals is the determination of the potential frequency of a natural hazard occurrence. Comparing historical facts against technically determined probability allows one to establish confidence, or not, in published scientific predictions. The process, whereby the frequency is determined and then expressed in an expected reoccurrence interval, is based on research conducted at the University of South Carolina, and illustrated in the chart below.

The estimated occurrence of the hazard is a useful element in the hazards assessment so one can distinguish between infrequent hazards, like volcano eruptions, and from frequent hazards, such as flooding. This calculation provides a useful indicator of the relative importance of each of the hazards that affect the jurisdictions, individually or collectively. The frequency of occurrence is a straight-forward calculation from the historical data and the length of that record in years. The number of hazard occurrences is divided by the number of years in the record. This yields the probability of the event occurring in any given year. For instance, if a hypothetical hazard "A" occurred 17 times in the County over the past 23 years, the probability of occurrence for that hazard in a given year would be 17 / 23 = .739, or 73.9%. The reverse of this equation results in a reoccurrence interval in years. For example, the reoccurrence interval of this hazard is calculated as 23 / 17 = 1.35. Hazard "A" can be expected to occur every 1.35 years. These frequencies are then correlated with magnitude to define the risk of a given hazard.

Location	No. of Years	No. of Events	Frequency	Reoccurrence Interval
County	23	17	73.9%	1.35

Example of Reoccurrence Interval

Identify Vulnerabilities

The Committee examined the potential effects on the County of the listed raw hazards by identifying vulnerable populations, infrastructure, critical services, facilities, and the environment. Vulnerabilities were geographically identified using Geographical Information System (GIS) technology and then linked to a GIS database describing the vulnerable target, including potential damage and estimates of losses.

Hazard Mapping

Hazard and vulnerability maps are extremely important in illustrating hazard and vulnerability locations. Information used to conduct the risk assessment and to make loss estimates has been linked electronically to the maps using GIS technology. The electronic versions of these maps were provided to the Committee and other reviewing agencies.

Risk Analysis

The risk analysis was updated using the information gathered in the steps above. To determine the risk posed by each hazard, several kinds of information are required: 1) the number of historical occurrences, 2) the probability or likelihood of the hazard occurrence, at times without regard to hazard history, 3) vulnerability, expressed as the percentage of people and property that would be affected by the hazard event, 4) spatial extent, the geographical area of the community that might be impacted, and 5) the magnitude or severity of impact, based on an assessment in terms of fatalities, injuries, and property/economic losses. Tables illustrating this process are provided below.

1) **Historical Occurrence** – Number of historical occurrences within community.

Rating	Adjective Description	Number of Historical Occurrences (within 50 years)
0	None	• Never occurred
1	Low	• 5 or few occurrences
2	Medium	• 6-9 occurrences
3	High	• More than 10 occurrences

Historical Occurrence Ranking Table

2) **Probability** – Likelihood of the hazard occurrence, sometimes without regard to hazard history.

Rating	Likelihood	Frequency of Occurrence
1	Rare	• Probability of occurrence = one chance in the next 50+ years
2	Low	• Probability of occurrence = at least one chance in the next 25-50 years
3	Medium	• Probability of occurrence = at least one chance in the next 10-25 years
4	High	• Probability of occurrence = at least one chance in the next 1 to 10 years

Probability Ranking Table

3) **Vulnerability** –Percentage of people and property that would be affected by the hazard event.

Rating	Magnitude	Percentage of People and Property Affected
1	Negligible	• Less than 5%
2	Limited	• 5% to 10%
3	Critical	• 10% to 25%
4	Catastrophic	• More than 25%

Vulnerability Ranking Table

4) **Spatial Extent** –The geographical area of the community that might be impacted.

Rating	Magnitude	Percentage of jurisdiction affected
1	Negligible	• Less than 10%
2	Limited	• 10% to 25%
3	Critical	• 25% to 50%
4	Catastrophic	• More than 50%

: Spatial Extent Ranking Table

5) **Magnitude (Severity of Impact)** – Assessment of severity in terms of fatalities, injuries, property/economic losses

Rating	Likelihood	Characteristics
1	Negligible	• Few if any injuries or illness • Minor quality of life lost with little or no property damage • Brief interruption of facilities/services less than 4 hrs
2	Limited	• Minor injuries and illness • Minor or short term property damage that does not threaten structural stability • Loss of essential facilities and services for 4 to 24 hours
3	Critical	• Serious injury and illness • Major/ long term property damage; threatens structural stability • Shutdown of essential facilities and services for 24 to 72 hours
4	Catastrophic	• Multiple deaths • Property destroyed or damaged beyond repair • Complete shutdown of essential facilities/services for 3+ days.

Magnitude Ranking Table

Risk assessment methods included the use of FEMA's HAZUS but, because of limitations associated with this data, Clark County's own current GIS property valuation data was primarily used to generate loss estimates.

Risk assessment activities also included the mapping of hazard occurrences, at-risk structures including critical facilities, and repetitive flood loss structures, land use, and populations.

Repetitive Loss designations are used to eliminate or reduce the damage to property and the disruption of life caused by repeated damage, such as flooding, of the same properties. The criteria to determine repetitive loss includes the following:

- Four or more losses of more than $1,000 each in a 5 year period; or,
- Two losses within a 10-year period that, in the aggregate, equal or exceed the current value of the insured property.

Quantify Risk

Once a hazard's risk has been evaluated, a picture of the over-all risk severity associated with that hazard emerges. The hazards with the highest total scores were considered the hazards of greatest concern for the County. The table below demonstrates the ranking of the eight natural hazards, with the priority hazards scoring highest and appearing in the light red rows, medium hazards appearing in light yellow, and the hazards ranking lowest appearing in green.

Natural Hazards Qualitative Risk Assessment EXAMPLE

	Historical Occurrence	Probability	Vulnerability	Spatial Extent	Magnitude	Total	Rank
Flood	3	4	3	3	3	16	H
Earthquake	3	3	3	3	3	15	H
Severe Storm	3	4	2	2	3	14	H
Wildland Fire	3	4	2	2	2	13	H
Volcano	1	1	2	2	2	8	M
Landslide	3	3	2	1	2	11	M
Avalanche	3	4	1	1	1	10	M
Drought	1	2	1	1	2	7	L

Risk Ranking Table

Once the numerical ranking was completed, in an effort to remain consistent with the local jurisdictions, as most utilize a High/Medium/Low ranking system, the total score was then converted to a High/Medium/Low method of priority ranking.

The breakdown of ranking is as follows:

- ✓ Low - Generating a total score of </=7
- ✓ Medium - Generating a score of 8-12
- ✓ High - Generating a score >13

Rank Severity

To assist in prioritizing mitigation activities, the severities of all hazards considered in the Plan are ranked relative to one another using the above plotting scheme. Prioritization is also based on goals and objectives developed and approved by the Clark County Board of County Commissioners.

Develop Mitigation Strategy

As required by FEMA, this planning effort is centered on community supported hazard reduction goals to be implemented and evaluated based on measurable objectives. Mitigation projects are to be assessed against the established goals and objectives to ensure that the selected projects reduce risk as desired.

Capabilities Review

The ability of the participating jurisdictions to implement mitigation strategies is critical to the success of the Mitigation Program. The following table provides an assessment of each participating jurisdictions' capabilities in relationship to the mitigation strategy. Additionally each jurisdiction has planning processes which are in place to direct land use planning. Those documents were also reviewed and recommendations provided which will lead to a synergistic approach to mitigation in the communities.

Agency Name (Mission/Function	Programs, Plans, Policies, Regulations, Funding, ,or Practices	Effect of Loss Reduction*			Comments
		Support	Facilitate	Hinder	

Capabilities Review

*Definitions:

- Support: Programs, plans, policies, regulations, funding, or practices that help the implementation of mitigation actions
- Facilitate: Programs, plans, policies etc. that make implementation actions easier
- Hinder: Programs, plans, policies, etc., that pose obstacles to implementation of mitigation actions

The Clark County Comprehensive Plan and Development Code were reviewed against the list of ranked hazards to determine if there were any restrictions or enabling powers that affect possible hazard mitigation alternatives. Additionally, the community planning tools are reviewed in an effort to identify consistency between planning activities.

Develop Mitigation Actions

Potential projects to address identified risk have been developed and listed in Section 3 Mitigation Strategy. The project descriptions and associated roadmap address approximate costs, possible returns on investments, environmental, and socioeconomic benefits.

Revise Plan

This Plan meets, and in some instances exceeds, the requirements set forth by FEMA in the FEMA PDM Criteria Crosswalk. Plan drafts were presented in hard and electronic copy and were provided to the Committee for review. This Plan includes information on Plan adoption, including a promulgation page for the County, and an agreement to participate page for each incorporated city.

Plan Review

Plan review occurred at two distinctly different times. The initial plan review was conducted by the Planning Committee during development. Once the Plan was completed, it was submitted along with the completed FEMA PDM Criteria Cross Walk to the Idaho Bureau of Homeland Security's Hazard Mitigation Officer, and then to FEMA Region 10's Hazard Mitigation Officer for review. The Clark County Board of County Commissioners also reviewed the Plan in a parallel time frame.

Public and Stakeholder Involvement

Public Meetings

A *"Focused"* Joint Public Meeting was held for the County and participating incorporated cities with the elected officials, staff members, and the general public. Notices of the meeting were published in advance, as required by open meeting laws in Idaho, by placing notices of the meetings in the local newspapers and physically posting notices in public locations. The minutes of the joint meeting is contained in Attachment 1. During the public meeting, a presentation was given to the attendees outlining the purpose of the AHMP, why each jurisdiction is requested to participate, and the benefits of participation. In addition, the presentation outlined the risks posed to the communities, the potential losses, and then a request was made to those attending to propose any potential mitigation alternatives which might be undertaken to reduce the risk posed to the city's infrastructure, critical facilities, private residences, and businesses. The meetings were well attended by the elected officials; however, attendance by the general public was low.

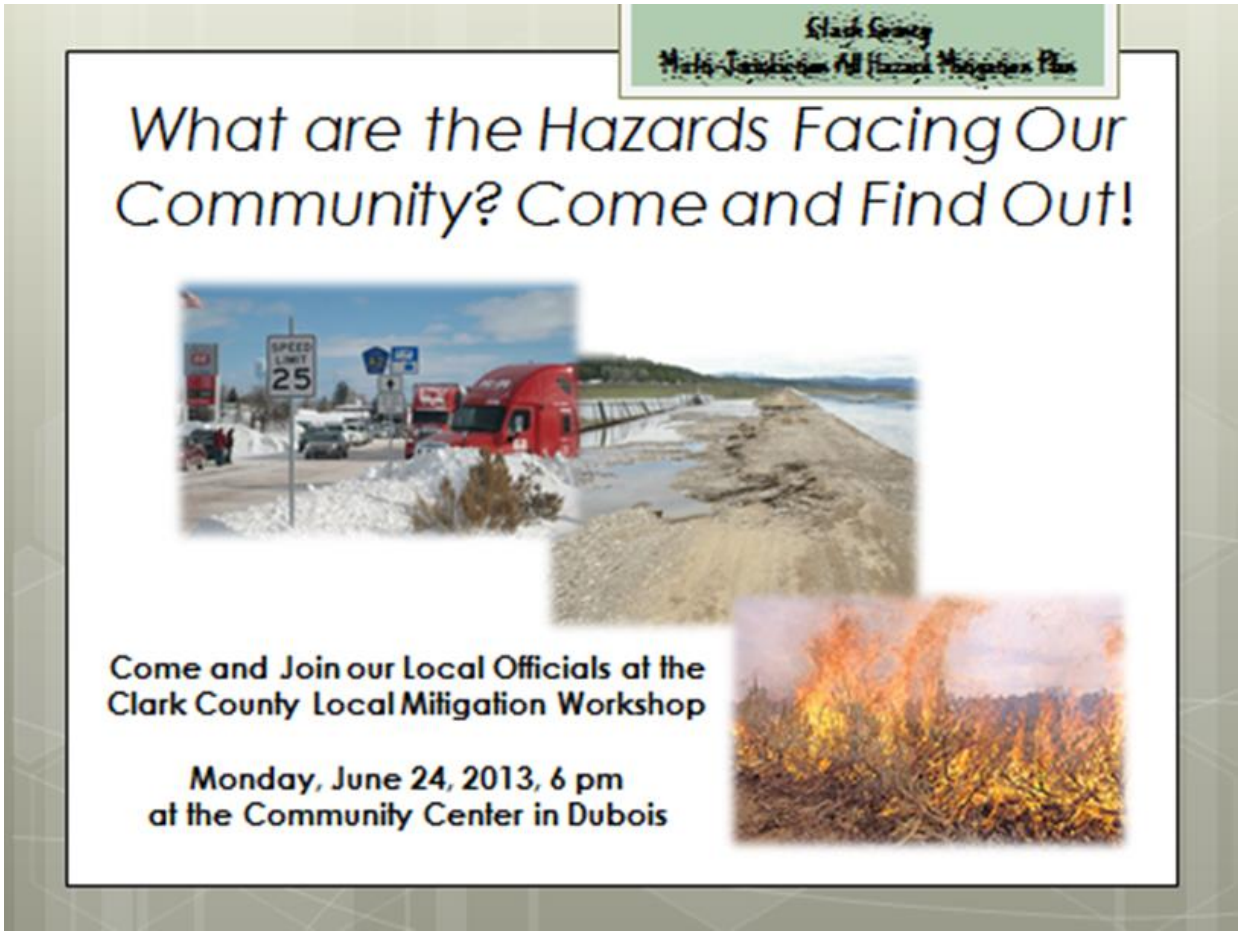
Joint Public Meeting

Dr. Rick Fawcett, President of Whisper Mountain Professional Services, Inc. met with the representatives from Clark County and the City of Dubois. The City of Spencer was invited to attend, but no one came to represent Spencer. The purpose of the meeting was to inform elected officials and the general public of the update to the County Multi-Jurisdiction All Hazard Mitigation Plan to bring it to conformity with FEMA guidelines. He emphasized the purpose of the Plan is to save lives and reduce the loss of private and public property through pre-disaster mitigation. Dr. Fawcett presented a Power Point presentation on how the Plan was updated, the resulting risk assessment, and how the Plan would be reviewed.

See Attachment 1 for presentations, attendance rosters/sign in sheets, and minutes.

Agency	Representative	Position
Clark County Emergency Management/EMS	Russ Kerr	Manager
City of Dubois	Kerri Ellis	Council Member
City of Dubois Fire Department	Troy Stone	Chief
Clark County Sheriff	Bart May	Sheriff
Clark County Commissioners	Wm Fredericksen	Commissioner

Attendance Roster June 24, 2013



Mitigation Workshop Announcement

January 9, 2014

The City of Spencer was provided a briefing on the Clark County Multi-Jurisdiction All Hazard Mitigation Plan and the risk ranking for the City of Spencer. Attending the meeting were members of the City Council, the Mayor, and citizens of the community. There were 6 of the 14 permanent residents of the City of Spencer in attendance. Also attending were the Clark County Emergency/Floodplain Manager and the Clark County Planning and Zoning Administrator.

Dr. Rick Fawcett provided a briefing on the Plan and went over the process of developing the Plan as well as the hazard analysis process and the resulting risk rankings for the City of Spencer. The City Council concurred with the rankings as provided.

Mayor Holden discussed recent flooding that occurred in Spencer. The flooding was caused by the over topping of the Spayberry/Lent Pond which is filled year round by a small creek. The Mayor suggested a project to improve the overflow from the Sprayberry/Lent Pond into the creek below the Pond. He felt that this would reduce annual flooding caused by ice backing up on the outlet of the Pond.

Dr. Fawcett discussed the existing projects that the City has proposed. The Council decided to move the project forward to the new Plan revision. There was discussion around the fire wise measures taken in the community to protect structures from wildfire. The consensus was to continue the practices as they had been very effective.

Agency	Representative	Position
Clark County Emergency Management/EMS/Floodplain	Russ Kerr	Manager
Clark County Planning and Zoning	Kerri Ellis	Administrator
City of Spencer	Lyle Holden	Mayor
City of Spencer	Treva May	Councilmember
City of Spencer	Sandy McClure	Councilmember
City of Spencer	Elie Gus	Clerk
City of Spencer	Mary Edwards	Citizen
City of Spencer	Ted Edwards	Citizen

City of Spencer Elected Officials and Public Meeting

See Attachment 1 for presentations, attendance rosters/sign in sheets, and minutes.

Stakeholder Participation

State, County, and local agencies participated in the Clark County Multi- Jurisdiction All Hazard Mitigation Planning process. These Agencies also participate regularly in the Clark County LEPC.

Non-County/City Agencies that participated in the Planning Process include:

- State of Idaho Bureau of Homeland Security
- University of Idaho Extension

Participating Clark County Public Safety Agencies

Fire Protection

Fire protection for the County is provided by a twenty member volunteer fire department located in Dubois.

Public Safety

Law enforcement and emergency services in Clark County are limited. According to the Clark County Comprehensive Plan, law enforcement lies primarily with the Sheriff's Department with help from one Idaho State trooper who patrols State and Federal Highways, and two Idaho Fish and Game Department conservation officers that cover districts in Clark County. Forest Service employees are contracted by the Sheriff's Department to patrol campgrounds and conduct search and rescue during the summer months. The County has a Search and Rescue team of 23 volunteers (as of 1995) and is considered a Level 3 Sheriff's Reserve. Clark County Sheriff's office provides dispatch for both Search and Rescue and the Fire Department. Nine volunteer Emergency Medical Technicians provide emergency medical services in Clark County. A crew of three is on call at all times. Dispatch is also provided through the Sheriff's Office. As of 1995, the emergency services available in the County were effective for the population. The growing summer population, however, increases the demand for services, and more volunteers or facilities may be needed[1].

Health Care

There are no health care facilities in Clark County, although one ambulance is based in Dubois and linked into the State Emergency Medical Service System. It receives back up from the Mud Lake district and the Air Idaho Rescue helicopter. The nearest hospitals are located in Rexburg and Idaho Falls, each one approximately 50 miles away.

Emergency Management

Clark County has a very active Emergency Management Program headed by a part time Emergency Manager under the direction of the County Commission and the Sheriff.

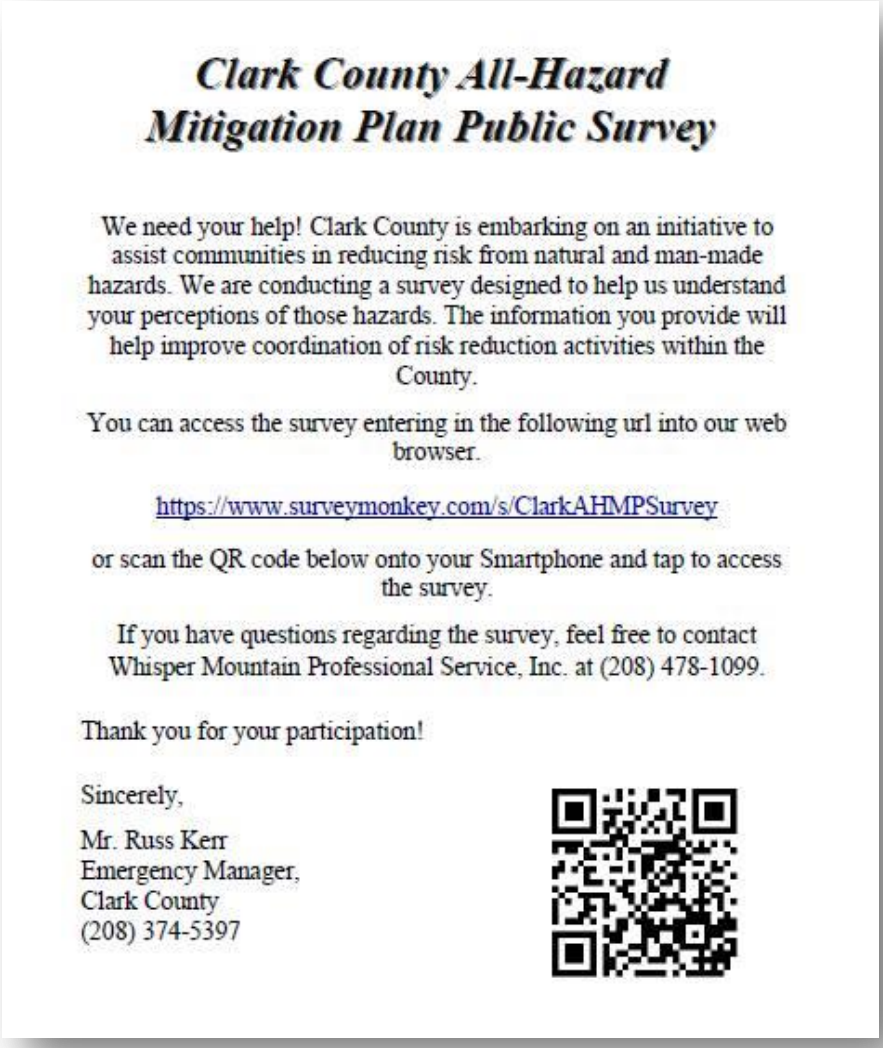
[1] Comprehensive Plan for Clark County, 1996-97

Public Participation

Public Involvement in the All Hazard Mitigation Process has three distinct objectives: documenting risk perception, development of risk reduction requirements, and solicitation of support for mitigation actions. A public questionnaire was utilized to gain a subjective measure of how the public and committee participants believe hazards impact their community. These results were then used to assist in the development of requirements for risk reduction projects. This involvement of the public serves to validate and raise awareness of the planning process and, thus, generate support for elected and appointed officials as they seek to implement the mitigation actions identified in the Clark County Multi-Jurisdiction All Hazard Mitigation Plan.

Public Questionnaire

The post card announcing the opportunity to participate in the public questionnaire was mailed to 110 residents of the County. Members of the Committee were also asked to participate in the survey. The following charts illustrate a summary of the questionnaire. The complete text of the questionnaire and results are provided in Attachment 2



Clark County All-Hazard Mitigation Plan Public Survey

We need your help! Clark County is embarking on an initiative to assist communities in reducing risk from natural and man-made hazards. We are conducting a survey designed to help us understand your perceptions of those hazards. The information you provide will help improve coordination of risk reduction activities within the County.

You can access the survey entering in the following url into our web browser.

https://www.surveymonkey.com/s/ClarkAHMPSurvey

or scan the QR code below onto your Smartphone and tap to access the survey.

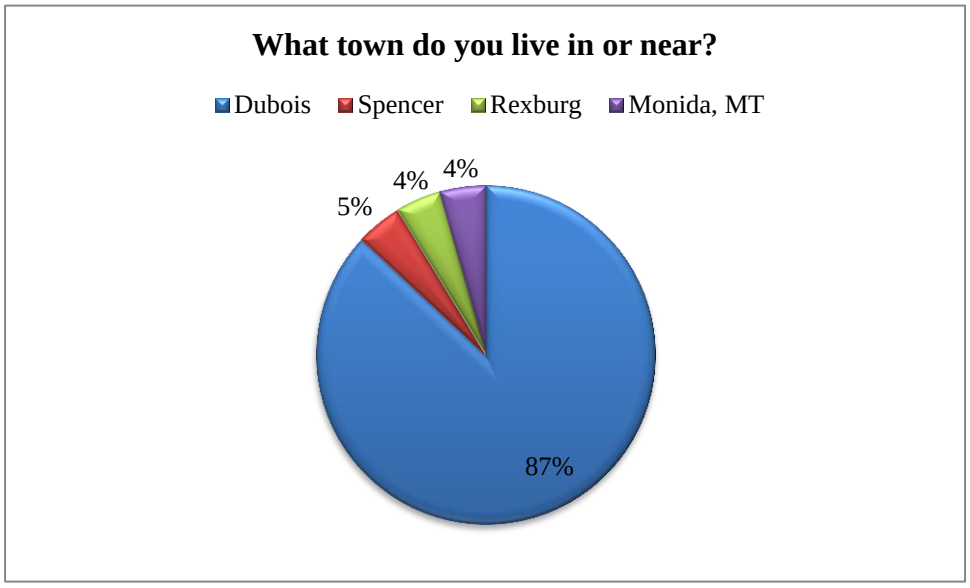
If you have questions regarding the survey, feel free to contact Whisper Mountain Professional Service, Inc. at (208) 478-1099.

Thank you for your participation!

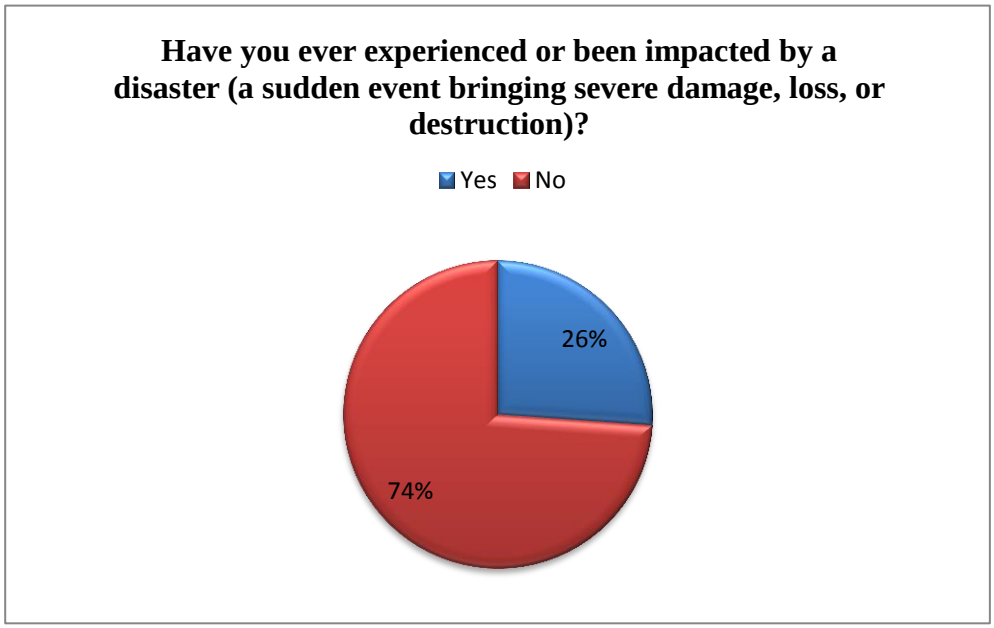
Sincerely,

Mr. Russ Kerr
Emergency Manager,
Clark County
(208) 374-5397

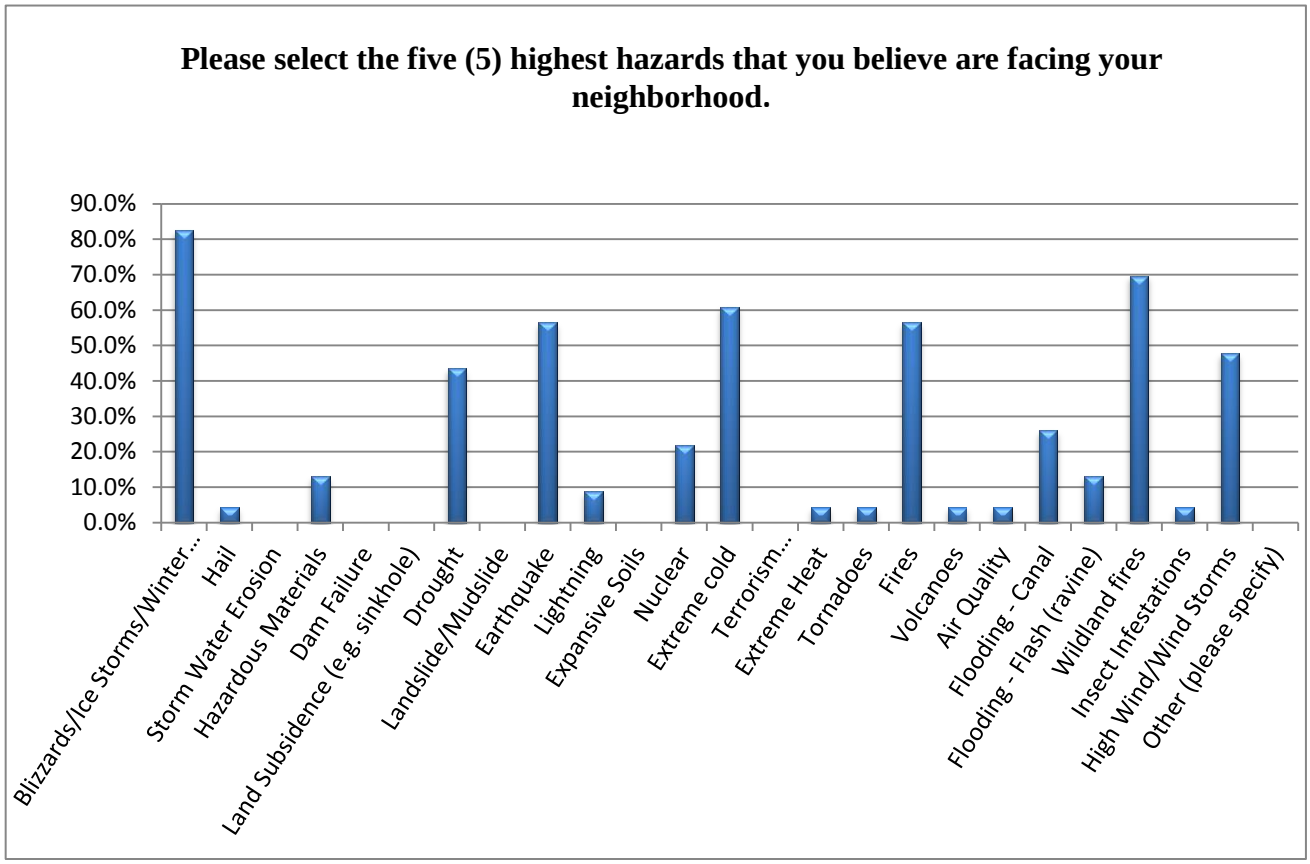
Public Survey Postcard



Public Survey Participant Demographic



Public Survey Participant Disaster Experience



Public Survey Hazard Ranking

The Top Five Hazards according to public perception, and as reported in the questionnaire:

1. Blizzards/Ice Storms/Winter Storms
2. Wildfires
3. Extreme Cold
4. Structure Fires
5. Earthquake

Continued Public Participation

The Emergency Manager is dedicated to the concept of public involvement in the planning process, including the review and updating of the Plan. The Emergency Manager will provide an annual status briefing to the elected officials in open public meetings. These briefings will provide the public information to understand mitigation concepts and witness support from their elected officials. Additionally an electronic copy of the Plan will be maintained on the Clark County Website for public viewing.

The public will be provided with the opportunity to provide input into the five year Plan revisions and updates. To this end, public meetings will be held when deemed necessary by the

Emergency Manager, providing a forum where the public can express concerns, opinions, or new alternatives. These will be recorded and considered by the Committee when updating the Plan. The Board of County Commissioners and the participating City Councils will be responsible for using county resources to publicize public meetings and to maintain public involvement.

Plan Monitoring and Review

The Clark County AHMP maintenance process includes a schedule for annually monitoring and evaluating the programmatic outcomes called for in the Plan, and for producing a Plan revision every five years.

The Plan will be reviewed on an annual basis by the Emergency Manager and reviewed and revised every five years by the committee to determine the effectiveness of programs and to reflect changes that may affect mitigation priorities. The Emergency Manager, or designee, will be responsible for contacting the Mitigation Committee members and organizing the review. Committee members will be responsible for monitoring and evaluating the progress of the mitigation strategies in the Plan. The Committee will review the goals and action items to determine their relevance to changing situations in the County as well as changes in federal policy, and to insure that they address current and expected conditions. The Committee will also review the risk assessment portion of the Plan to determine if this information should be updated or modified, given any new available data. The organizations responsible for the various action items will report on the status of the projects, the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised or removed.

The Emergency Manager, or designee, will be responsible to insure the update of the Plan. The Manager will also notify all holders of the Clark County AHMP and affected stakeholders when changes have been made. Every five years the updated plan will be submitted to the State of Idaho Bureau of Homeland Security's Mitigation Program and the Federal Emergency Management Agency for review.

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Section 2: Risk Assessment

2012 Revision Summary: The Risk Assessment has been updated to include the following hazards not included in the original Plan: Dam Failure, Canal/Drainage Failure, Rodents, Communicable Disease, Structure Fire, Hazardous Material Event, Riot/Demonstration/Civil Disorder, and Terrorism.

Each hazard's risk assessment was updated with new information regarding losses, historic frequencies, and impacts.

Hazards that pose a threat to human life, health, and well-being are myriad and no attempt is made here to compile an exhaustive list. Those that are addressed in disaster planning are generally categorized as "natural" or "technological" (sometimes "manmade"). The FEMA website[2] contains a thorough discussion of hazards in the section entitled "FEMA's Multi-Hazard Identification and Risk Assessment (MHIRA)"[3]. Some hazards are a threat to all geographic areas while others (e.g. Tsunami in coastal regions) are more limited in their extent. Studies were conducted to determine which hazards are of concern in Clark County. Hazards that have been identified as significant in this County and that will be considered in this plan are:

Natural Hazards

- Weather:
  - Severe Weather
    - Extreme Heat
    - Lightning
    - Hail
    - Tornado
    - Straight Line Wind
  - Severe Winter Storms
    - Extreme Cold
  - Drought
- Flooding:
  - Flash Flood
  - River Flooding
  - Dam Failure
- Geologic:
  - Earthquake
  - Landslide/Mudslide
- Other:
  - Wildfire
  - Biological
  - Vector Borne Disease
    - West Nile
    - Lyme Disease
  - Human Borne (Communicable) Disease

[2] http://www.fema.gov/index.shtm
[3] http://www.fema.gov/plan/prevent/fhm/ft_mhira.shtm

Technological (Manmade) Hazards
- Structural Fire
- Hazardous Material Event
- Riot/Demonstration/Civil Disorder
- Terrorism

Weather Hazards

The impact of weather hazards may be widespread (drought) or more localized (lightning), but all have the potential to be severe and directly life-threatening. Historical weather data is generally available in good detail over long time periods, allowing for reasonably accurate risk assessment for planning purposes.

Drought

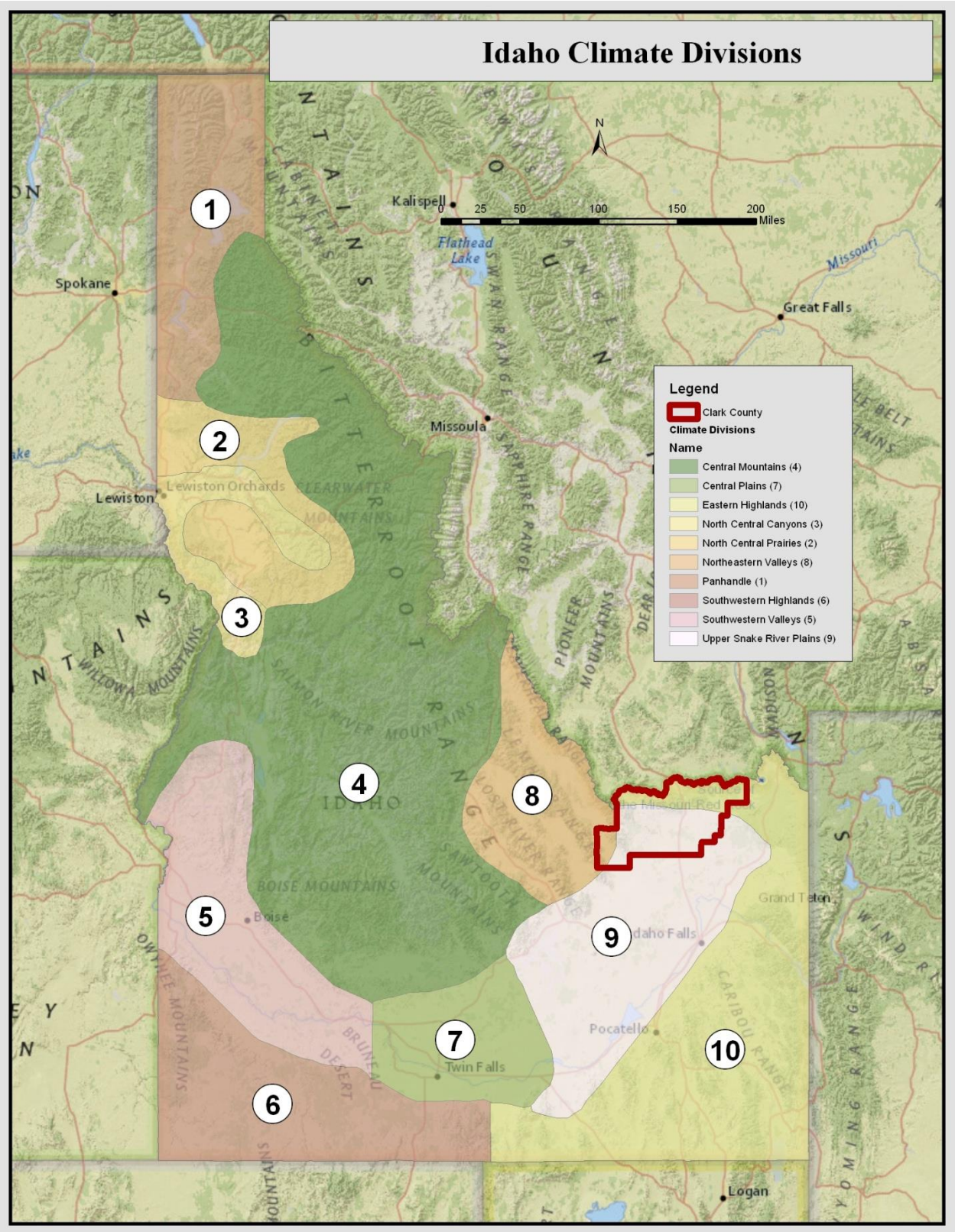
Description

Drought is an expected phase in the climactic cycle of almost any geographical region. Certainly that is the case in the State of Idaho. Objective, quantitative definitions for drought exist but most authorities agree that, because of the many factors contributing to it, and because its onset and relief are slow and indistinct, none is entirely satisfactory. According to the National Drought Mitigation Center, drought "originates from a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector." What is clear is that a condition perceived as "drought" in a given location is the result of a significant decrease in water supply relative to what is "normal" in that area.

It should be noted that water supply is not only controlled by precipitation (amount, frequency, and intensity), but also by other factors including evaporation (which is increased by higher than normal heat and winds), transpiration, and human use. According to the NOAA National Climactic Data Center, much of the State of Idaho most recently experienced moderate to extreme drought conditions from the years 2000 through 2005. Drought Emergency Declarations were issued for various counties by the Idaho Department of Water Resources in the years 2002 through 2010. Idaho's only Federal Drought Emergency Declaration was issued in 1977.

The Palmer Modified Drought Index (PMDI) is a means of quantifying drought in terms of moisture demands versus moisture supply. Moisture demands include plant requirements and water needed for recharge of soil moisture supplies.

An allowance is also included for runoff amounts necessary for recharging both ground water and surface water supplies such as rivers, lakes, aquifers, and reservoirs. The PMDI balances the moisture demands against the moisture supply available.



Idaho Climate Divisions

The PMDI expresses this comparison of moisture demand to moisture supply on a numerical scale that usually ranges from positive six to negative six. Positive values reflect excess moisture supplies, while negative values indicate moisture demands in excess of supplies.

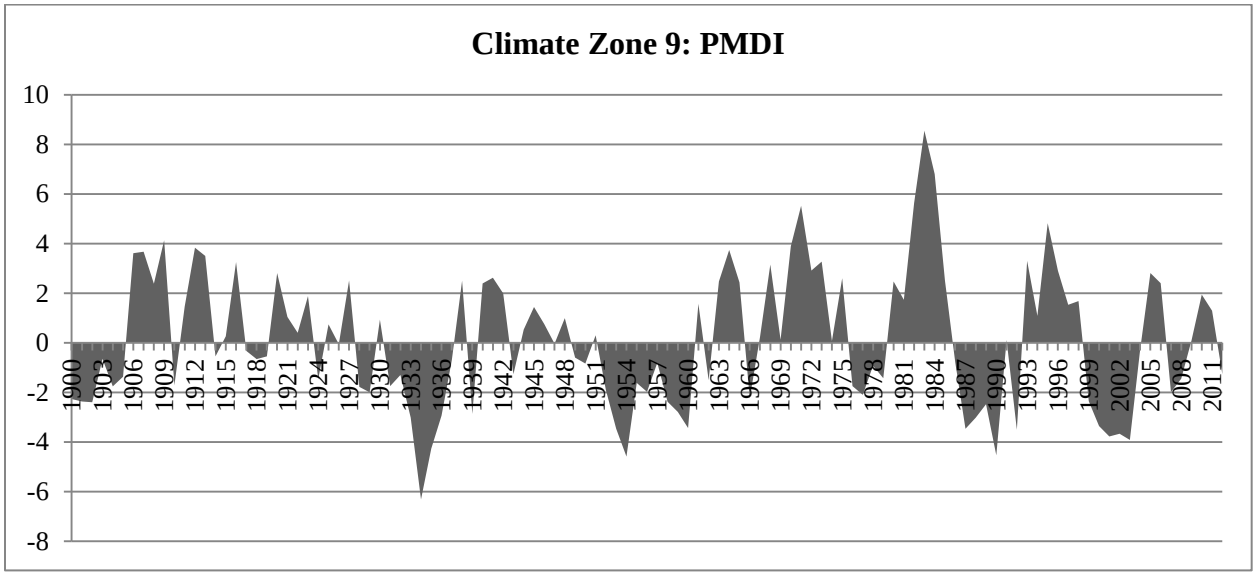
Approximate Cumulative Frequency %	Category	PMDI Range
> 96	Extreme Wetness	> 3.50
90-95	Severe Wetness	2.50 – 3.49
73 – 89	Mild to Moderate Wetness	1.00 – 2.49
28 – 72	Near Normal	-1.24 - .099
11 -27	Mild to Moderate Drought	-1.25 - -1.99
5 – 10	Severe Drought	-2.00 – 2.74
1 - <4	Extreme Drought	< -2.75

Palmer Modified Drought Index

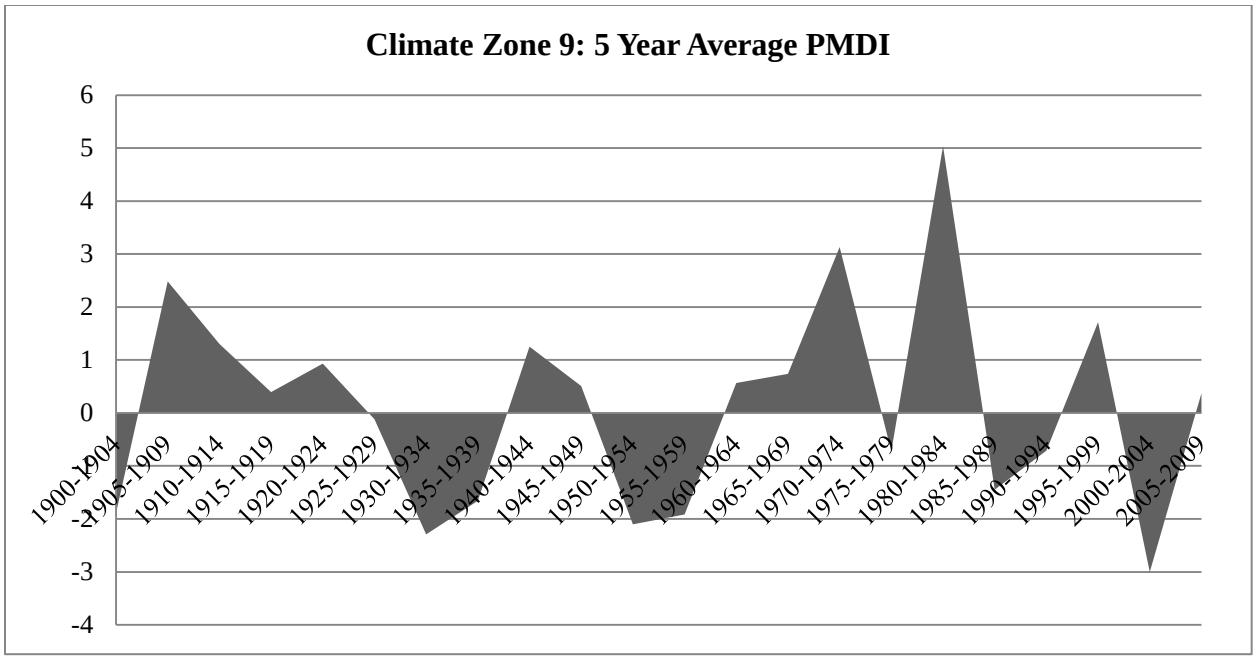
Portions of Clark County are located in Idaho Climate Division 8, 9, and 10: Northeastern Idaho. Data used in this analysis is grouped by the recognized climate divisions. The map above shows the climate division boundaries in Idaho.

Historical Frequencies

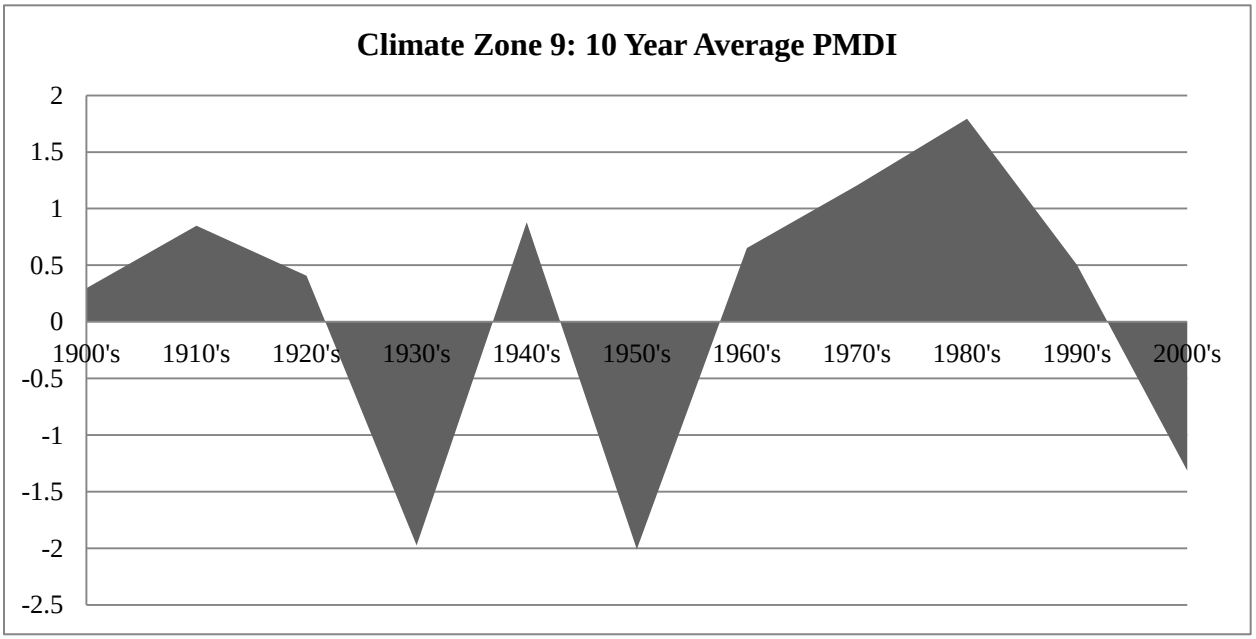
Drought trends over the past 112 years are shown in the graphs below. The graphs show the yearly PMDI, 5 year average PMDI, and 10 year average PMDI for each climate zone.



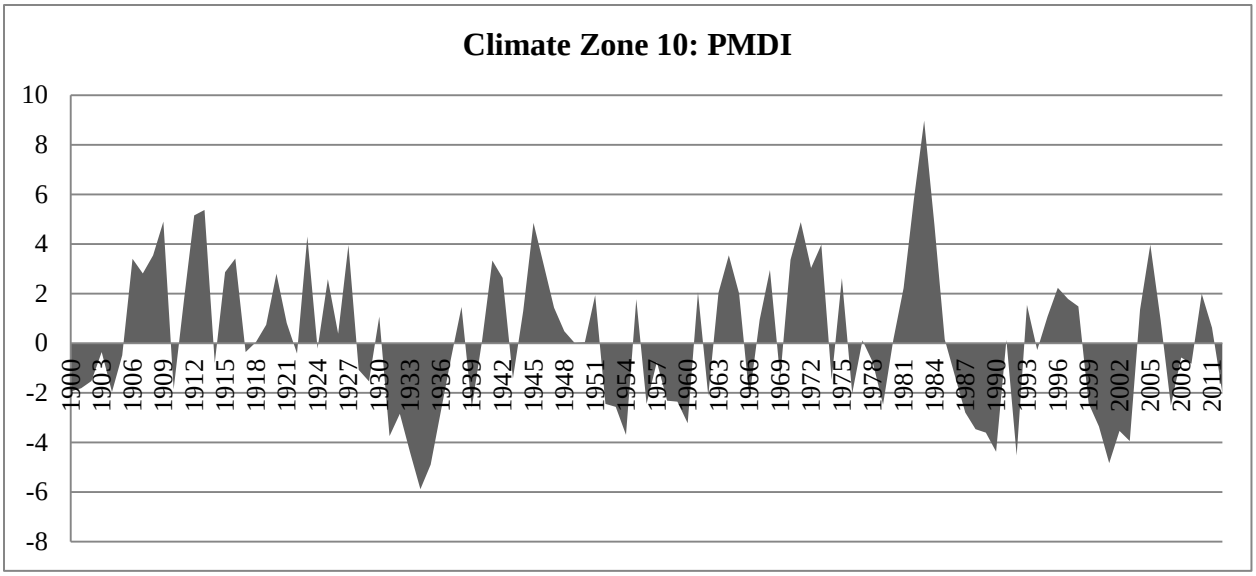
Climate Zone 9 - 112 Years PMDI



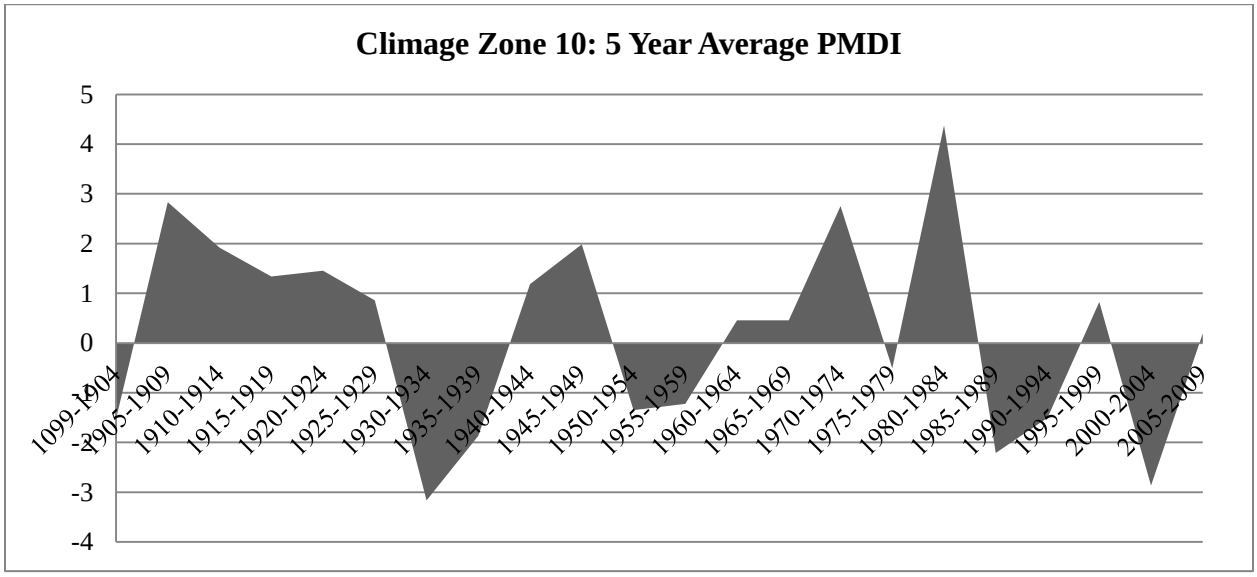
Climate Zone 9 - 5 Year Average PMDI



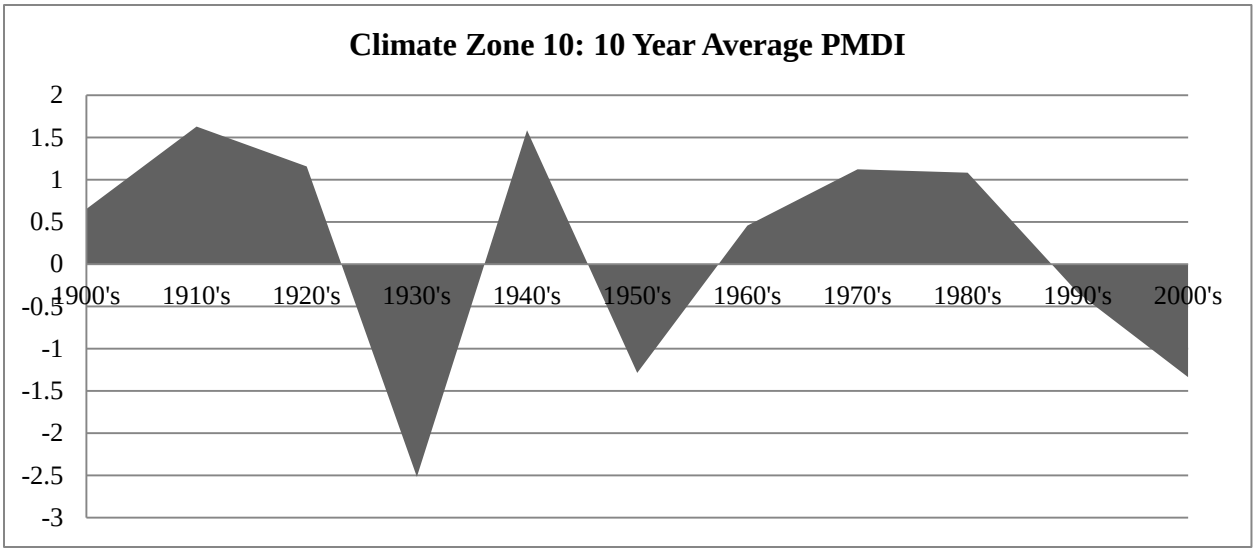
Climate Zone 9 - 10 Year Average PMDI



Climate Zone 10 - 112 Years PMDI



Climate Zone 10 - 5 Year Average PMDI



Climate Zone 10 - 10 Year Average PMDI

The Idaho Department of Water Resources reports that meteorological drought conditions (a period of low precipitation) existed in the State approximately 30% of the time during the period 1931-1982. Principal drought in Idaho, indicated by stream flow records, occurred during 1929-41, 1944-45, 1959-61, 1977, and 1987-92. The most prolonged drought in Idaho was during the 1930s. For most of the State, that drought lasted for 11 years (1929-41) despite greater than average stream flows in 1932 and 1938. In 1977, the worst single year on record, a severe water shortage occurred throughout Idaho and the West. Stream flows were below normal from 1979 to 1981. A federal declaration was issued in 1977 for the State of Idaho[4].

According to the Idaho Department of Water Resources (IDWR) the following Drought Emergency Declarations were issued for Clark County since 2002:

- May 17, 2002
- April 29, 2003
- April 14, 2004
- May 12, 2005
- May 15, 2007
- May 12, 2010
- May 16, 2012

Impacts

Drought is agriculture's most expensive, frequent, and widespread form of natural disaster. The current drought in the interior West is part of a multi-year drought that began in 1999, worsened in 2000, and has continued, with some interruptions thus far into 2013. As a result, the drought in the West was slow to develop, and likewise, will be slow to recede. Drought produces a complex web of impacts that spans many sectors of the economy and reaches well beyond the

[4] Idaho State Hazard Mitigation Plan 2004 http://www.bhs.idaho.gov/bhslibrary/SHMP2004.pdf

area experiencing physical drought. This complexity exists because water is integral to our ability to produce goods and provide services.

Impacts are commonly referred to as direct or indirect. Reduced crop, rangeland, and forest productivity, increased fire hazard, reduced water levels, increased livestock and wildlife mortality rates, and damage to wildlife and fish habitat are a few examples of direct impacts of drought. The consequences of these impacts illustrate indirect impacts. For example, a reduction in crop, rangeland, and forest productivity may result in reduced income for farmers and agribusiness, increased prices for food and timber, unemployment, reduced tax revenues because of reduced expenditures, increased crime, foreclosures on bank loans to farmers and businesses, migration, and disaster relief programs. Direct or primary impacts are usually biophysical. Conceptually speaking, the more removed the impact from the cause, the more complex the link to the cause. In fact, the web of impacts becomes so diffuse that it is very difficult to come up with financial estimates of damages. The impacts of drought can be categorized as economic, environmental, or social.

Many economic impacts occur in agricultural and related sectors because of the reliance of these sectors on surface and subsurface water supplies. In addition to obvious losses in yields in crop and livestock production, drought is associated with increases in insect infestations, plant disease, and wind erosion. Droughts also bring increased problems with insects and diseases to forests, and reduce growth. The incidence of forest and range fires increases substantially during extended droughts, which in turn places both human and wildlife populations at higher levels of risk.

Loss Estimates

Income loss is another indicator used in assessing the impacts of drought because so many sectors are affected. Reduced income for farmers has a ripple effect. Retailers and others who provide goods and services to farmers face reduced business. This leads to unemployment, increased credit risk for financial institutions, capital shortfalls, and loss of tax revenue for local, State, and Federal government. Less discretionary income affects the recreation and tourism industries. Prices for food, energy, and other products increase as supplies are reduced. In some cases, local shortages of certain goods result in the need to import these goods from outside the stricken region. Reduced water supply impairs the navigability of rivers and results in increased transportation costs because products must be transported by rail or truck. Hydropower production may also be curtailed significantly.

Hazard Evaluation

Drought risk is based on a combination of the frequency, severity, and spatial extent of drought (the physical nature of drought) and the degree to which a population or activity is vulnerable to the effects of drought. The degree of a region's vulnerability depends on the environmental and social characteristics of the region and is measured by their ability to anticipate, cope with, resist, and recover from drought.

Society's vulnerability to drought is determined by a wide range of factors, both physical and social, such as demographic trends and geographic characteristics.

Repetitive Loss

Clark County experiences repetitive loss due to drought. Losses are related primarily to the crop production loss and the associated economics.

Drought		
Profile Category	**Rating**	**Description**
Historical Occurrence	3	High
Probability	4	High
Vulnerability	4	Catastrophic
Spatial Extent	4	Catastrophic
Magnitude	2	Limited
Total	**17**	**High**

Severe Weather

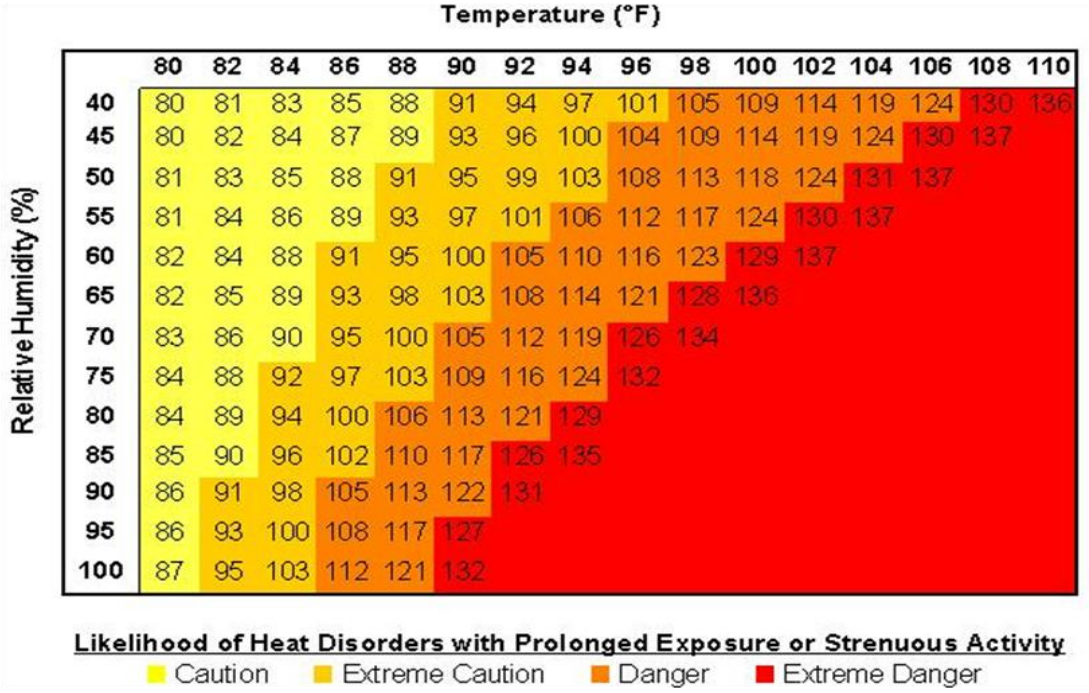
Severe Weather includes those hazards that are typically found during the spring, summer, and early fall seasons of the year in Clark County. Included in this category are extreme heat, lightning, hail, straight line wind, and tornado. Each hazard is examined independently; however, it is recognized that these hazards typically occur together.

Extreme Heat

Description

The term "extreme heat," sometimes called "heat wave," is to some extent a relative one describing a period when weather conditions include temperatures and humidity significantly of extreme heat, which are often exacerbated in large urban areas due to the heat island effect and

NOAA's National Weather Service Heat Index



National Weather Service Heat Index Chart
Source: http://www.nws.noaa.gov/om/heat/index.shtml)

because stagnant atmospheric conditions may trap pollutants. Extreme heat conditions are not common to Idaho where, in general, humidity is low and weather patterns are variable. The National Weather Service (NWS) issues alerts to the public based on its Heat Index which takes both temperature and humidity into account (see Figure 2.1.8). The NWS will initiate alert procedures when the High is expected to exceed 105°- 110°F (depending on local climate) for at least two consecutive days. The effects pattern is variable.

Historic Frequencies

Extreme heat events occur in Clark County. Daily weather summaries were taken from the Dubois Experiment COOP Weather Station near Dubois for a 64 year period (1948-2011) and analyzed using a Pearson Log III method to determine return interval of extreme heat events.

The table below details the return interval of extreme heat events in Clark County.

Return Period (years)	Probability (%)	Maximum Temperature
1.05	95.2	91
1.11	90.1	92
1.25	80	93
2	50	95
5	20	97
10	10	98
25	4	100
50	2	101
100	1	102
200	0.5	103

Historic Extreme Heat Summary

Even though the maximum temperature for a 100 year event is only 102 degrees, there is risk of extreme heat, especially when correlated with higher relative humidity levels.

Impacts

The primary impact of extreme heat is on human health, causing such disorders as sunstroke, heat exhaustion, and heat cramps. Particularly susceptible are the elderly, small children, and persons with chronic illnesses. There are also undoubtedly indirect and chronic health effects from extreme heat, the magnitude of which are difficult or impossible to estimate. Environmental effects can include loss of wildlife and vegetation, and increased probability of wildfires.

Loss Estimates

Extreme heat places high demands on electrical power supplies that can lead to blackouts or brownouts. Economic impacts result from such factors as increased energy prices, loss of business as people avoid leaving their homes to avoid the heat, and agricultural losses. The

magnitude of these, and other more indirect impacts, is again, difficult to assess; but, for severe heat waves, has been estimated to be in the billions to hundreds of billions of dollars.

Hazard Evaluation

The magnitude of the effects of extreme heat is centered on the individual citizen. Shelters might be opened for the elderly and/or homeless who do not have a means of relief from the heat. Heat related illnesses could cause death if shelter and hydration are not provided. Because the higher elevations are typically five to ten degrees cooler than the valley, extreme heat would most likely affect only that portion of the County at the lower elevations. Economic loss would primarily be related to the cost of energy consumption and to agricultural impacts. Extreme heat would exacerbate drought conditions and make response to wildfire more hazardous.

Extreme Heat		
Profile Category	**Rating**	**Description**
Historical Occurrence	1	Low
Probability	3	Medium
Vulnerability	1	Negligible
Spatial Extent	4	Catastrophic
Magnitude	2	Limited
Total	**11**	**Low**

Lightning

Description

Lightning is defined by the NWS as, "A visible electrical discharge produced by a thunderstorm. The discharge may occur within or between clouds, between the cloud and air, between a cloud and the ground, or between the ground and a cloud." A lightning discharge may be over five miles in length, generate temperatures upwards of 50,000^{o}F, and carry 50,000 volts of electrical potential. Lightning is most often associated with thunderstorm clouds, but lightning can strike as far as five to ten miles from a storm. Thunder is caused by the rapid expansion of air heated by a lightning strike. Cloud-to-ground lightning strikes occur with much less frequency in the northwestern U.S. than in other parts of the country.

Historic Frequencies

The lightning data used in this analysis is from old newspaper accounts, the NWS Severe Storm Event Database, and the SHELDUS Database. No injuries or deaths have been reported in Clark County due to lightning, but property damage occurs fairly regularly.

The period of record is from 1960 – 1992. Though the data is not recent, it is enough to establish a trend. Neither the SHELDUS nor the NWS Severe Storm Event databases have recorded damaging lightning events from 1992 to the present. During the 33 year period of record there were 12 years in which damaging lightning events occurred; therefore, an event can be expected to occur once every 2.75 years. Damage has occurred to both crops and property. No injuries or fatalities were recorded.

Impacts

Lightning is one of the most deadly weather phenomena in the US. On average, sixty to seventy deaths per year are attributed to lightning nationally, and in Idaho the average is less than one per

year. Injuries and fatalities due to lightning do not occur frequently in Clark County. Despite the enormous energy carried by lightning, only about 10% of strikes are fatal. Injuries include central nervous system damage, burns, cardiac effects, hearing loss, and trauma. The effects of central nervous system injures tend to be long-lasting and severe, leading to such disorders as depression, alcoholism, and chronic fatigue, and in some cases suicide. Lightning also strikes structures causing fires and damaging electrical equipment. Wildland fires are often initiated by lightning strikes, as are petroleum storage tank fires. About one third of all power outages are lightning-related.

Loss Estimates

The magnitude of economic loss is difficult to estimate. Government figures suggest annual national costs at around $30 million, but some researchers find evidence that losses may be in the billions of dollars. Over a 52 year period there was a recorded $92,970 in property damage attributed to lightning in Clark County. The annualized loss from lightning in Clark County is estimated at $18,482.

Hazard Evaluation

Lightning		
Profile Category	**Rating**	**Description**
Historical Occurrence	2	Medium
Probability	4	High
Vulnerability	1	Negligible
Spatial Extent	1	Negligible
Magnitude	3	Critical
Total	**11**	**Low**

Hail

Description

The NWS definition of "hail" is: Showery precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter, falling from a cumulonimbus cloud. Its size can vary from the defined minimum, a little over a quarter of an inch, up to 4.5 inches or larger. "Severe hail" is defined as being 0.75 inches or more in diameter. The largest hailstones are formed in supercell thunderstorms because of their sustained updrafts and long duration. Hail and severe hail are relatively uncommon in Idaho. In the ten year period from 1986 to 1995 the national weather service recorded severe hail in Idaho on 113 occasions while in the same time period severe hail was recorded in Colorado nearly 1,400 times.

Historic Frequencies

Severe hail events occur in Clark County. From 1960 to 2011 there were 9 recorded severe hail events in the NWS Severe Hail Database. The events occurred in the months of June, July, August, and September. There have been no reported severe hail events since 2005 in the County. The following table details these events:

Place	Date	Time	Event	Magnitude	Reported Damages
Clark	7/18/1967	8:00 PM	Hail	1.75 in	
Clark	7/16/1970	7:25 PM	Hail	.75 in	
Port of Entry	6/5/1995	3:12 PM	Hail	1.50 in	$5,000
Dubois	6/5/1995	3:50 PM	Hail	.75 in	
Dubois	8/7/1997	8:43 PM	Hail	.75 in	
Dubois	9/1/2000	12:15 PM	Hail	1.25 in	
Kilgore	8/27/2002	5:40 PM	Hail	1.00 in	
Dubois	8/10/2005	11:40 AM	Hail	.75 in	
Dubois	8/10/2005	12:03 PM	Hail	.75 in	

Historical Hail Events

Historically severe hail events have been reported along the interstate corridor in the southern half of the County and in the Kilgore Area. These are the areas with greatest population concentration in the County. It is assumed that there are other events in other parts of the County that are not reported.

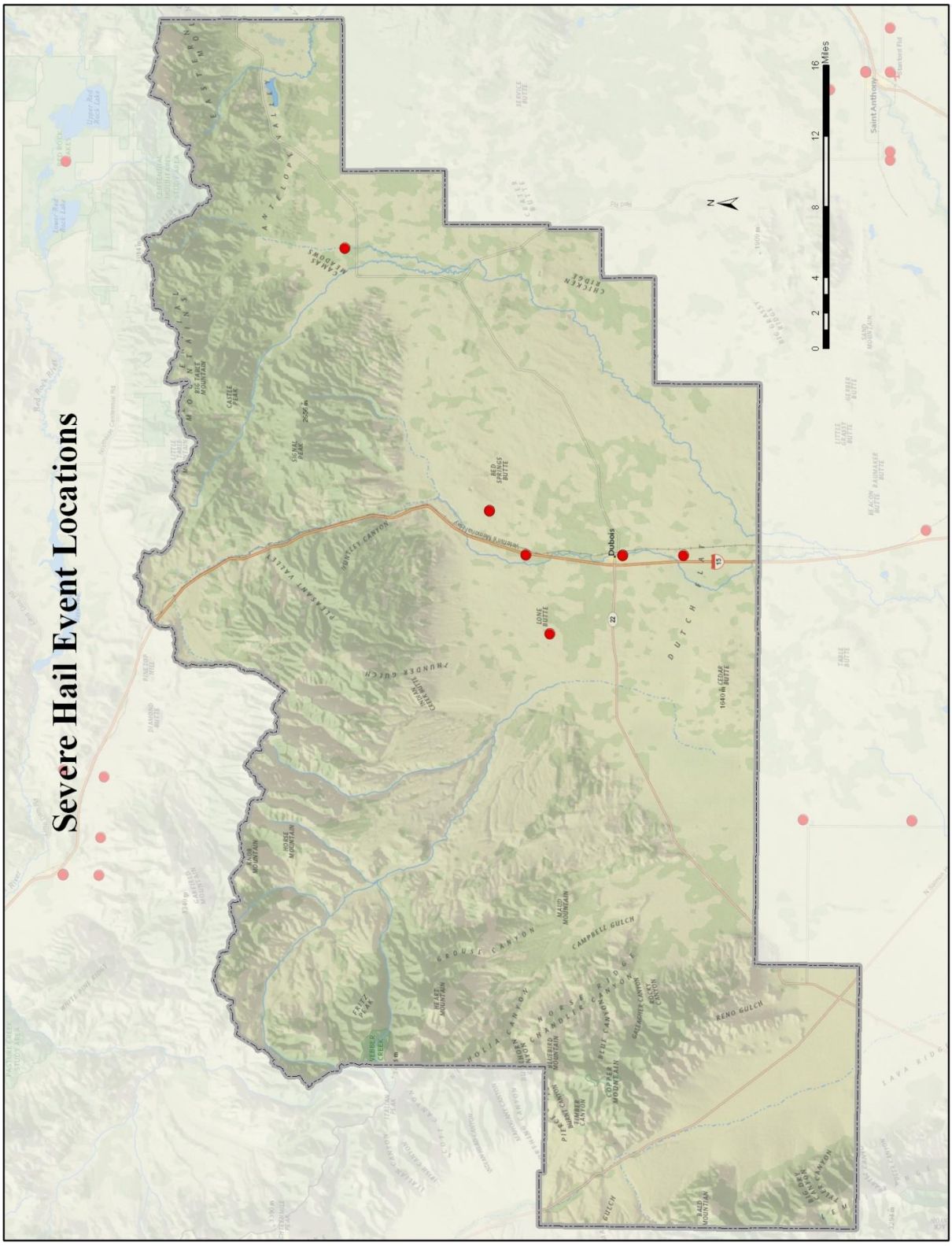
The return interval for severe hail events is 5-6 years in Clark County; there is a 17% annual chance of experiencing a severe hail event in the County. A total of $296,290 in property and crop damage was reported in the SHELDUS database.

Impacts

Damage from hail approaches $1 billion in each year in the United States. Much of the damage caused by hail is to crops. Even relatively small hail can cause tremendous damage to crops in a matter of minutes. Vehicles, roofs of buildings and homes, and landscaping are also frequently damaged by large sized hail[5].

Hail has been known to cause injury to humans, and occasionally has been fatal.

[5] NOAA National Severe Storms Laboratory. http://www.nssl.noaa.gov/primer/hail/hail_damage.html



Severe Hail Event Map

Loss Estimates

Losses from severe hail events in Clark County are usually centered in agriculture. Historically there has been $294,335 dollars of crop loss from these events. Over the past 52 years there has only been a total of $1,954 in property loss. The annualized loss for severe hail events is $5,700.

Hazard Evaluation

Hail		
Profile Category	**Rating**	**Description**
Historical Occurrence	3	High
Probability	4	High
Vulnerability	2	Limited
Spatial Extent	1	Negligible
Magnitude	2	Limited
Total	**12**	**Low**

Tornado

Description

The NWS describes tornado as, "a violently rotating column of air, usually pendant to a cumulonimbus, with circulation reaching the ground. It nearly always starts as a funnel cloud and may be accompanied by a loud roaring noise. On a local scale, it is the most destructive of all atmospheric phenomena." Like hail, most tornadoes are spawned by super cell thunderstorms. They usually last only a few minutes, although some have lasted more than an hour and traveled several miles. "Multiple tornadoes may occur during a single storm, resulting in highly destructive events. Damage is generally confined to a narrow path (approximately one-quarter mile)." [6]Wind speeds within tornadoes are estimated based on the damage caused, and expressed using the Enhanced Fujita (EF) Scale (Table 2.1.4)

F scale	Class	Wind speed		Description
		mph	km/h	
F0	**weak**	**65-85**	**105-137**	**Gale**
F1	**weak**	**86-110**	**138-177**	**Moderate**
F2	**strong**	**111-135**	**178-217**	**Significant**
F3	**strong**	**136-165**	**218-266**	**Severe**
F4	**violent**	**166-200**	**267-322**	**Devastating**
F5	**violent**	**> 200**	**> 322**	**Incredible**

Enhanced Fujita (EF) Scale for Estimation of Tornado Wind Speeds

http://www.srh.noaa.gov/srh/jetstream/mesoscale/tornado.htm

Idaho has relatively few tornadoes, averaging three reported per year between 1953 and 2012.Tornadoes of F2 strength or greater, are extremely rare in Idaho.

[6]As described in the State of Idaho Hazard Mitigation Plan 2010

Historic Frequencies

The following table shows the recorded tornado touchdown events recorded by the NWS in Clark County. There have been 6 recorded tornado occurrences in Clark County from 1956 – 2011.There have been no reported tornado events in the County since 2005.

Place	Date	Time	Event	Magnitude	Reported Damage
Clark	6/21/1964	2:00 PM	Tornado	F1	UNK
Clark	3/25/1991	5:00 PM	Tornado	F1	$25,000
Clark	6/15/1993	3:00 PM	Tornado	F0	UNK
Clark	6/5/1995	3:20 PM	Tornado	F0	$5,000
Dubois	6/30/1997	6:00 PM	Tornado	F0	$3,000
Dubois	5/9/2005	12:30 PM	Tornado	F0	UNK

Clark County Tornado Events

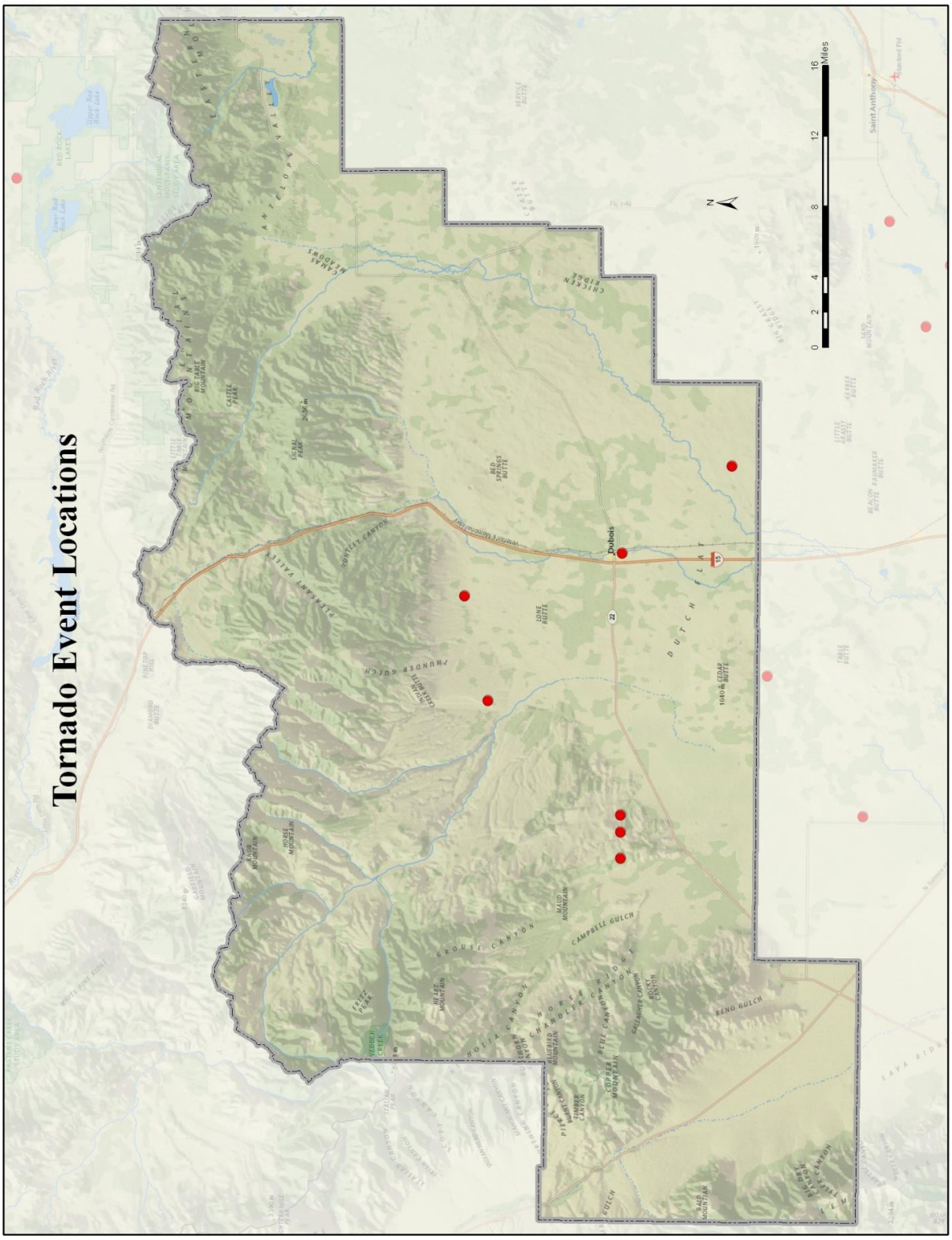
Based on the historic events, there is a 10.7% chance per year that a tornado will occur. The return interval is every 9years. There have been no reported injuries or deaths from tornadoes in Clark County.

Impacts

Loss of utilities (primarily due to fallen trees) is common following tornadoes and, depending on circumstances, communities might be deprived of almost any kind of goods and services including food, water, and medical care. Agriculturally, crop and livestock loss is also possible, as is loss of timber production.

Loss Estimates

Losses from tornado events are from property damage. During the past 56 years there has been a total of $33,000 in property damage attributed to tornadoes. The annualized loss for tornado events is $589.



Tornado Event Map

Hazard Evaluation

Tornado		
Profile Category	**Rating**	**Description**
Historical Occurrence	2	Medium
Probability	4	High
Vulnerability	1	Negligible
Spatial Extent	1	Negligible
Magnitude	3	Critical
Total	**11**	**Low**

Straight Line Wind

Description

The term "straight line wind" is used to describe any wind not associated with rotation, particularly tornadoes. Of concern is "high wind," defined by the NWS as, "Sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration."Like tornadoes, strong, straight line winds are generated by thunderstorms and they can cause similar damage.Straight line wind speeds can approach 150 mph, equivalent to those in an F3 tornado.

Historic Frequencies

The following table details Historic Wind Events as recorded in the SHELDUS and NWS Severe Storm Databases.

Place	Date	Time	Event	Magnitude	Reported Damages
Clark County	6/3/1956	5:37 PM	Tstm Wind	65kts	
Clark County	8/1/1956	7:30 PM	Tstm Wind	70kts	
Clark County	7/14/1957	12:29 AM	Tstm Wind	70kts	
Dubois	7/11/1995	3:00 PM	High Wind	Unknown	$50,000, 3 injuries
Dubois	8/14/1996	5:05 PM	Tstm Wind	58kts	
Dubois	4/14/2002	2:20 PM	Tstm Wind	69kts	
Clark County	6/4/2004	11:45 AM	Tstm Wind	50kts	
Dubois	7/31/2004	4:15 PM	Tstm Wind	53kts	
Dubois	8/2/2004	2:50 PM	Tstm Wind	54kits	
Clark County	6/16/2005	7:05 PM	Tstm Wind	55kts	
Dubois	8/10/2005	4:00 PM	Tstm Wind	53kts	
Dubois	8/4/2007	3:05 PM	Tstm Wind	60mph	
Clark County	5/12/2009	UNK	Wind	UNK	$6,800
Clark County	6/29/2011	UNK	Wind	UNK	$13,500

Clark County Straight Line Wind Events
*Tstm=Thunderstorm

Damaging straight line wind events occur frequently in the County. Historically, damages include downed trees, downed power lines, traffic disruption, and damage to structures. Damaging wind events have a return interval of 5.6 years. The annual probability of a damaging wind event in Clark County is 17.8%.

Impacts

The impacts of straight line winds are virtually the same as those from tornadoes with similar wind speeds. The damage is distinguishable from that of a tornado only in that the debris is generally deposited in nearly parallel rows. Downbursts are particularly hazardous to aircraft in flight.

Loss Estimates

Losses from straight line wind include downed power lines, damage to crops, and damage to personal property. Historically there has been $259,677 in property and crop damage during high wind events. $211,710 in property damage and $47,697 in crop damage have occurred. The annualized loss from these events is $4,637.

Hazard Evaluation

Straight Line Wind		
Profile Category	**Rating**	**Description**
Historical Occurrence	3	High
Probability	4	High
Vulnerability	3	Critical
Spatial Extent	3	Critical
Magnitude	3	Critical
Total	**16**	**High**

Severe Weather Hazard Evaluation

Repetitive Loss:

Severe Weather occurs frequently in Clark County, and it is assumed that there are repetitive losses especially caused by Straight Line Wind damage; however, this type of loss is not reported to a single point and thus is hard to track and quantify.

Hazard	Historical Occurrence	Probability	Vulnerability	Spatial Extent	Magnitude	Total	Rank
Extreme Heat	1	3	1	4	2	**11**	**L**
Lightning	2	4	1	1	3	**11**	**L**
Hail	3	4	2	1	2	**12**	**L**
Tornado	2	4	1	1	3	**11**	**L**
Straight Line Wind	3	4	3	3	3	**16**	**H**
Composite Ranking							
Severe Weather	3	4	2	2	3	**14**	**M**

Clark County Severe Hazard Ranking

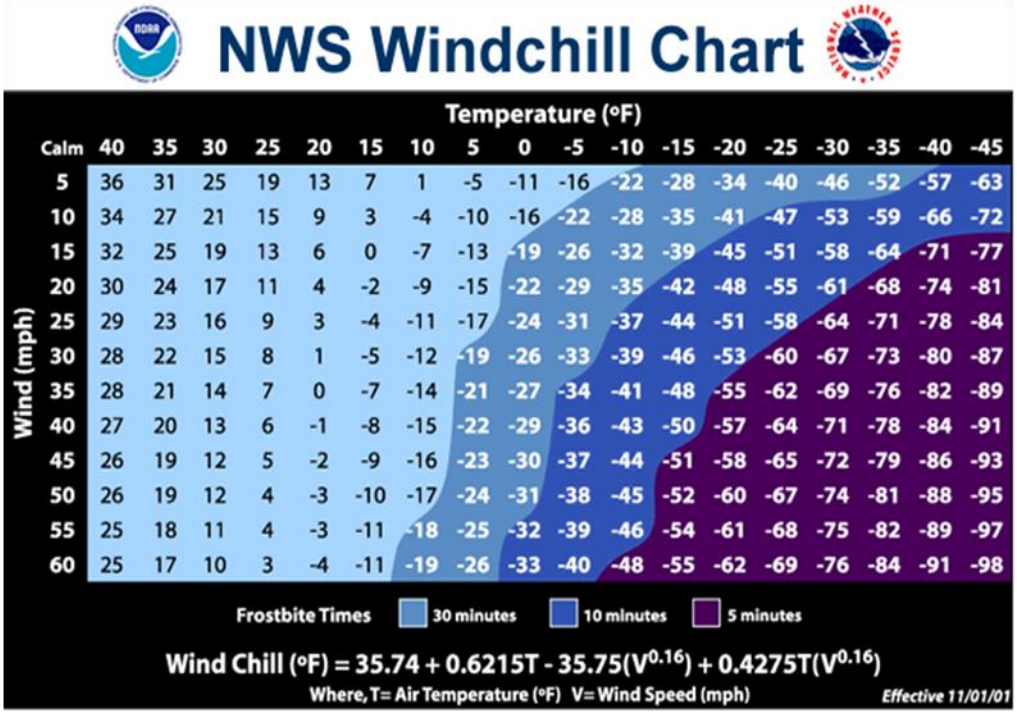
Severe Winter Storms

The Severe Winter Storms category includes extreme cold and winter storms. It should be noted that Straight Line Wind is also associated with Severe Winter Storms commonly referred to as Blizzard Conditions where snow is driven by wind causing drifting.

Extreme Cold

Description

"Extreme cold" is another of the terms describing hazards that must be defined relative to what is considered normal in a given locale. What might be considered extreme cold varies considerably in the State of Idaho where normal winter temperatures in the southwest are appreciably more moderate than those in the northwest and far north. Very cold temperatures become a particular hazard when accompanied by winds of 10 mph or greater. The NWS has developed a formula for calculating "wind chill" based on temperature and wind speed in this region, and issues wind chill advisories when the wind chill temperature is predicted to be -10°F or less with winds of 10 mph or higher for one hour or more. Wind chill warnings are issued when wind chill temperature will be -20°F or less with winds of 10 mph or higher for one hour or more. As with extreme heat, extreme cold is of greatest concern when the condition persists for an extended period of time.



National Weather Service Windchill Chart
http://www.weather.gov/om/windchill/index.shtml

Historic Frequencies

Extreme cold events occur in Clark County. Daily weather summaries were taken from the Dubois Experiment Station COOP Station near Dubois for a 64 year period (1948-2011).

The table below details the computed return interval of extreme cold events at the Dubois Experiment Station.

Return Period (years)	Probability (%)	Minimum Annual Temperature
1.05	95.2	-3
1.11	90.1	-4
1.25	80	-7
2	50	-13
5	20	-20
10	10	-23
25	4	-26
50	2	-27
100	1	-28
200	0.5	-28

Return Interval of Extreme Cold Events

For the study period the lowest daily minimum temperature is -31 degrees. The average yearly minimum temperature is -13 degrees. The return interval for extreme cold events exceeding -20 degrees is 5 years.

Impacts

Health effects of exposure to extreme cold include hypothermia and frostbite, both of which can be life-threatening. Infants and the elderly are most susceptible. In the United States, nearly 700 deaths are directly attributed to hypothermia annually. When temperatures reach -20 degrees Fahrenheit, a large amount of electrical consumption on the existing electric system occurs.

Loss Estimates

Extreme cold may cause loss of wildlife, vegetation, and kill livestock and other domestic animals. Economic loss may result from flooding due to burst pipes, and diminished business activity. River flooding may take place as a result of the formation of ice jams.

Hazard Evaluation

Extreme Cold		
Profile Category	**Rating**	**Description**
Historical Occurrence	2	Medium
Probability	3	Medium
Vulnerability	2	Limited
Spatial Extent	4	Catastrophic
Magnitude	2	Limited
Total	**13**	**Medium**

Winter Storms

Description

Severe Winter Storms are a significant risk to personal injury and property in all areas of the County. These storms may create conditions that disrupt essential regional systems, such as public utilities, telecommunications, and transportation routes. These storms may also produce rain, freezing rain, ice, snow, cold temperatures, and wind. Ice storms accompanied by high winds can have destructive impacts, especially to trees, power lines, and utility services.

The NWS describes "Winter Storm" as weather conditions that produce heavy snow or significant ice accumulations. For purposes of this analysis, Severe Winter Storm is defined as any winter condition where the potential exists for a blizzard (winds >= 35mph and falling/drifting snow frequently reduce visibility < ¼ mile, for 2 hrs or more) heavy snowfall (valleys 6 inches or more snowfall in 24 hrs; mountains 9 inches or more snowfall in 24 hrs), ice storm, and/or strong winds.

Blizzards are defined as having considerable falling and/or blowing snow that is combined with a sustained high wind, or frequent gusts of 35 mph or greater, often resulting in reduced visibility of less than one-quarter mile.

Historic Frequencies

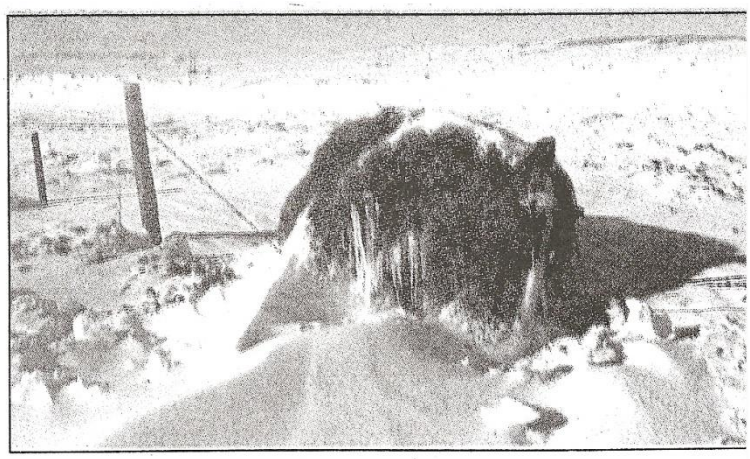
The return intervals for extreme winter storm events were calculated from the NWS Severe Storm Event Database and SHIELDUS entries. Unfortunately, wind data was not available from this weather station to include in this analysis. The table below details severe winter weather events that have occurred in Clark County from 1960 – 2011. It is noted that because weather events are not limited by political boundaries loss estimates may be skewed. Losses were divided among the affected counties generally. Severe winter weather events can last multiple days. The average duration of an event is 4 days.

According to the SHELDUS database severe winter events have occurred 27 times in the period 1960-2011. A severe winter storm event can be expected to occur at least once every 1.8 years. In most years that a damaging winter storm event occurred there were multiple events. During years in which an event occurs there is an average of 2.8 events that year. The years with the most events were 1971, 1989, and 1990; each having 7 severe winter storm events.

Winter storms occur fairly frequently in Clark County and have had some devastating consequences. One such storm occurred in February of 1989 and has been dubbed the "Siberian Express". The storm hit Clark County a day before it had been predicted by weather reports, and according to one rancher, it "killed everything in its path that didn't have shelter." The storm lasted for four days with sub-zero temperatures and winds of 40 to 50 mph creating a wind chill factor of 90-100 degrees below zero. Innumerable cattle, sheep, and horses were lost during the storm, and many animals died after due to stress, frostbite, bloat, abortions, and other storm related causes. Many herds were completely wiped out. Wildlife suffered equally including elk, moose, coyotes, snowshoe hares, and other small wildlife. Suffocation was one apparent cause of death as ice formed on the nostrils, eyes, and mouth areas. Snow and wind caused snowdrifts as high as 15 feet, stranding many people in their homes, and travelers on the roadways for the duration of the storm. Cecil D. Andrus, Governor of Idaho, declared Clark County a disaster.

Disaster aid sought

Snowdrifts bury herds



Post Register file photo

The return interval for 24 hour snowfall was calculated to understand the frequency of large snow events. Even though wind was not used in this analysis it is indicative of the return interval of severe winter storms.

Return Period (years)	Probability (%)	Maximum Annual 24 Hour Snowfall (in)
1.05	95.2	8
1.11	90.1	10
1.25	80	12
2	50	18
5	20	24
10	10	27
25	4	31
50	2	33
100	1	35
200	0.5	36

Return Interval of Severe Winter Storm Events

A 100 year snowfall event would dump 35 inches of snow in a 24 hour period. This combined with extreme cold and high winds would be a devastating event.

Impacts

The impacts of the very cold temperatures that may accompany a severe winter storm are discussed above. Other life threatening impacts are numerous. Motorists may be stranded by road closures or may be trapped in their automobiles in heavy snow and/or low visibility conditions. Bad road conditions cause automobiles to go out of control. People can be trapped in homes or buildings for long periods of time without food, heat, and utilities. Those who are ill may be deprived of medical care by being stranded or through loss of utilities and lack of personnel at care facilities. Use of heaters in automobiles and buildings by those who are stranded may result in fires or carbon monoxide poisoning. Fires during winter storm conditions are a particular hazard because fire service response is hindered or prevented by road conditions, and because water supplies may be frozen. Also, Disaster Services may not be available if telephone service is lost. People who attempt to walk to safety through winter storm conditions often become disoriented and lost. Downed power lines not only deprive the community of electricity for heat and light, but pose an electrocution hazard. Death and injury may also occur if heavy snow accumulation causes roofs to collapse.

Loss Estimates

Economic impacts arise from numerous sources including: hindered transportation of goods and services, flooding due to burst water pipes, forced closure of businesses, inability of employees to reach the workplace, damage to homes and structures, automobiles and other belongings damaged or destroyed by downed trees and branches, loss of livestock and vegetation, and many others.

From 1960 to 2012 there was $1.2 million (adjusted to 2011 dollars) reported in property loss due to severe winter storms. During the same time period there was $464,000 (adjusted to 2011 dollars) reported in crop damage. The annualized loss for severe winter storm events is $34,058.

Hazard Evaluation

Winter Storms		
Profile Category	**Rating**	**Description**
Historical Occurrence	3	High
Probability	4	High
Vulnerability	3	Critical
Spatial Extent	4	Catastrophic
Magnitude	2	Limited
Total	**16**	**High**

Severe Winter Storm Hazard Evaluation

Repetitive Loss:

Severe Winter Storms occur almost annually in Clark County and it is assumed that there are repetitive losses especially caused by Straight Line Wind damage; however, this type of loss is not reported to any single point and thus is hard to track and quantify.

Hazard	Historical Occurrence	Probability	Vulnerability	Spatial Extent	Magnitude	Total	Rank
Extreme Cold	2	3	2	4	2	**13**	**M**
Winter Storm	3	4	3	4	2	**16**	**H**
Composite Ranking							
Severe Winter Storms	3	4	3	4	2	**16**	**H**

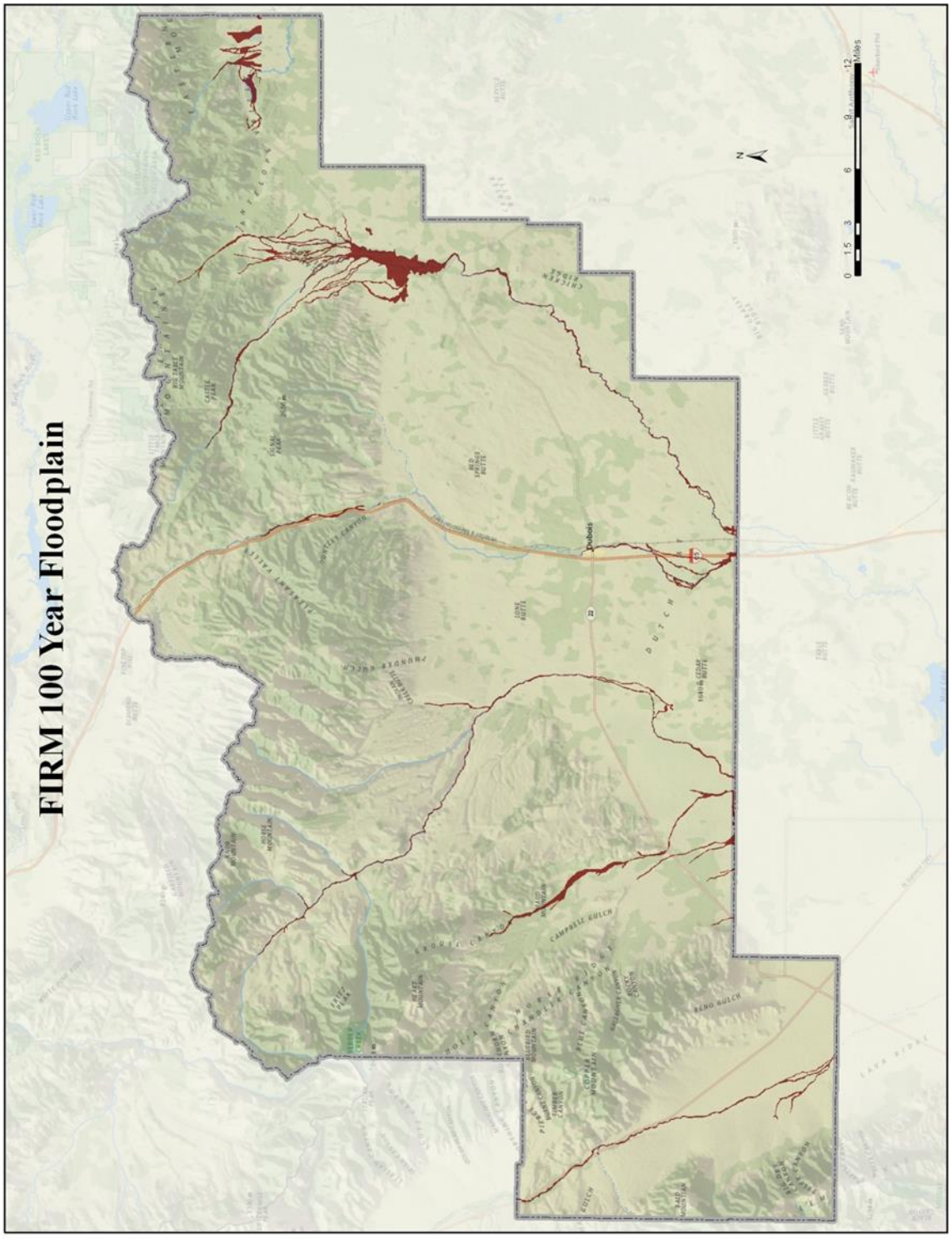
Clark County Severe Winter Storm Ranking

Flooding

Flooding is defined by NWS as "the inundation of normally dry areas as a result of increased water levels in an established water course."River flooding, the condition where the river rises to overflow its natural banks, may occur due to a number of causes, including prolonged general rainfall, locally intense thunderstorms, snowmelt, and ice jams. In addition to these natural events, there are a number of factors controlled by human activity that may cause or contribute to flooding. These include dam failure, levee failure, and activities that increase the rate and amount of runoff such as paving, reducing ground cover, and clearing forested areas. Flooding is a periodic event along most rivers with the frequency depending on local conditions and controls such as dams and levees. The land along rivers that is identified as being susceptible to flooding is called the floodplain. The Federal standard for floodplain management under the National Flood Insurance Plan (NIFP) is the "100-year floodplain."This area is chosen using historical data such that in any given year there is a one percent chance of a "Base Flood" (also known as "100-year Flood" or "Regulatory Flood"). A Base Flood is one that covers or exceeds the 100-year floodplain. In Idaho, flooding most commonly occurs in the spring of the year and is caused by snow melt. Floods occur in Idaho every one to two years and are considered the most serious and costly natural hazard affecting the State. In the twenty-five years from 1976 to 2000 there were five federal and twenty-eight state disaster declarations due to flooding. The amount of damage caused by a flood is influenced by the speed and volume of the water flow, the length of time the impacted area is inundated, the amount of sediment and debris carried and deposited, and the amount of erosion that may take place.

Flooding is a dynamic natural process. Along rivers, streams, and coastal bluffs a cycle of erosion and deposition is continuously rearranging and rejuvenating the aquatic and terrestrial systems. Although many plants, animals, and insects have evolved to accommodate and take advantage of these ever-changing environments, property and infrastructure damage often occur when people develop coastal areas, and floodplains and natural processes are altered or ignored.

Flooding can also threaten life, safety, and health and often results in substantial damage to infrastructure, homes, and other property. The extent of damage caused by a flood depends on the topography, soils and vegetation in an area, the depth and duration of flooding, velocity of flow, rate of rise, and the amount and type of development in the floodplain.



Clark County 100 Yr. Flood Plain

River Flooding

Description

River flooding, the condition where the river rises to overflow its natural banks, may occur due to a number of causes including prolonged, general rainfall, locally intense thunderstorms, snowmelt, and ice jams.

Historical Frequencies

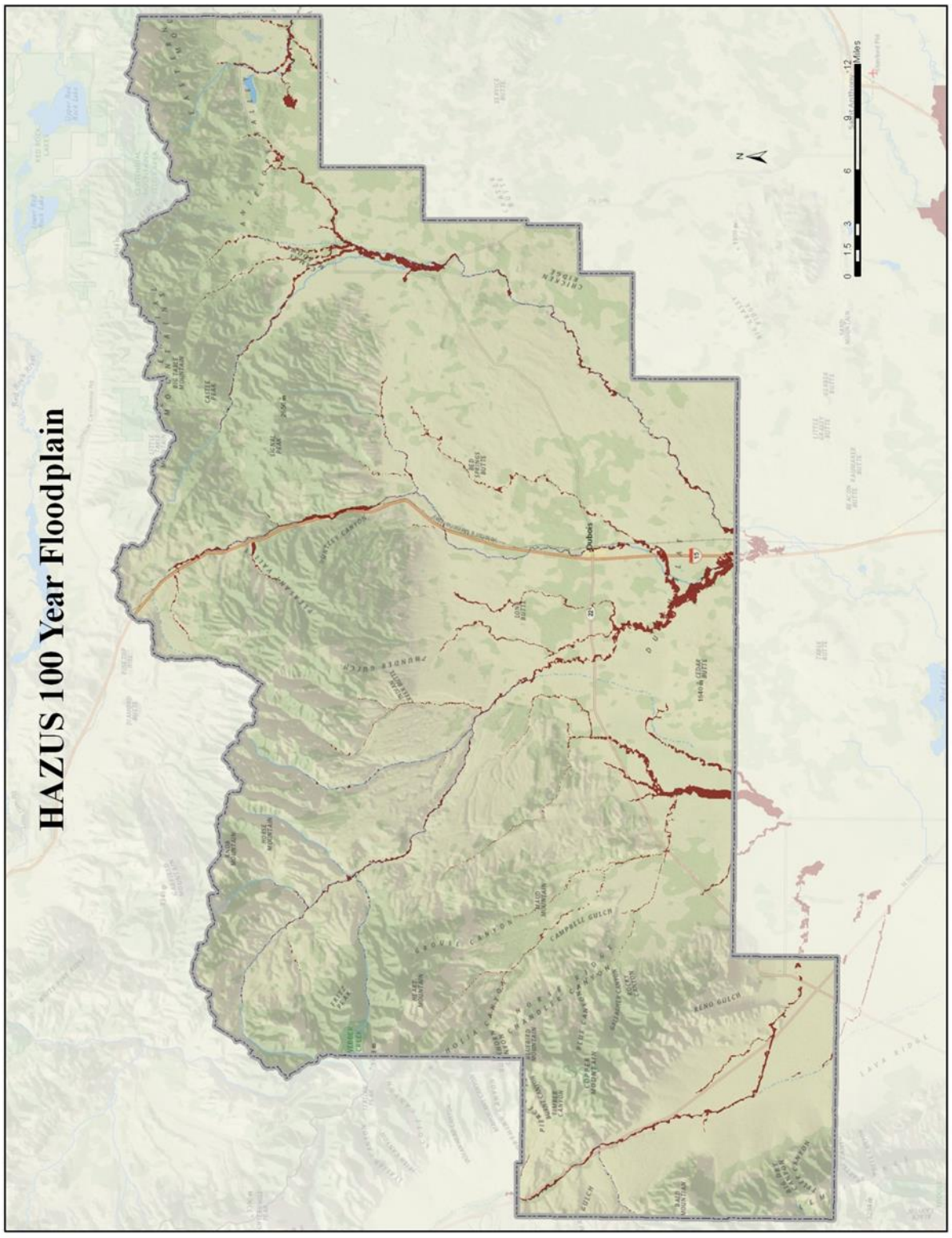
The following table shows recorded flood events in Clark County.

Place	Date	Time	Event	Magnitude/details
Clark County	2/10/1962		Flood	Rapid snowmelt and run off caused flooding damaging one home
Kilgore	5/1/2011		Flood	Flooding of pasture and agricultural fields occurred. Some roads in the Kilgore area were flooded and several roads were raised to avoid the flood waters.
Dubois	3/10/2012		Flood	Localized flooding occurred in Dubois from March 10th through the 17th caused by melting snow on frozen ground as well as ice jams in Beavercreek. Local flooding of streets occurred as well as some water in basements but substantial property damage was avoided.

Clark County Flood Events

Impacts

Human death and injury sometimes occur as a result of river flooding, but are not common. Human hazards during flooding include drowning, electrocution due to downed power lines, leaking gas lines, fires and explosions, hazardous chemicals, and displaced wildlife. Economic loss and disruption of social systems are often enormous. Floods may destroy or damage structures, furnishings, and business assets including records, crops, livestock, roads and highways, and railways. They often deprive large areas of electric service, potable water supplies, wastewater treatment, communications, and many other community services including medical care, and may do so for long periods of time.



Clark County HAZUS 100 Year Floodplain

The Kilgore area in Clark County has a history of flooding. Yearly floods occur during the early to mid-spring as the snow pack melts off. Depending on the temperature increases and the amount of snow pack present, flooding can last for up to one month.

The Kilgore Area is a large tourist destination. During the summer months it provides access to camping and fishing, and during the winter months it is a destination for winter recreationists, especially snowmobilers.

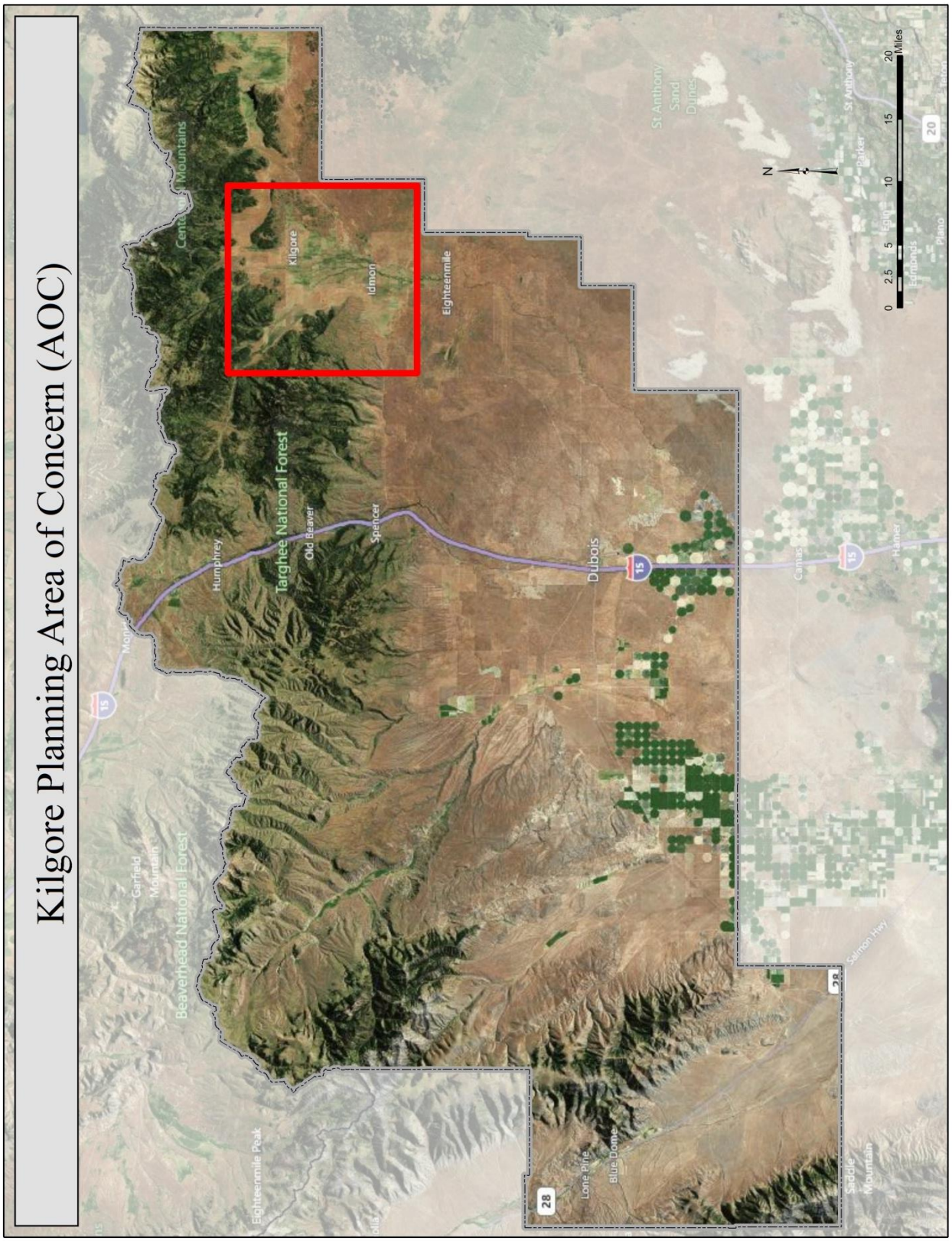
Because of the nature of alluvial fan flooding, it is difficult to estimate the flow rate for each small drainage in the basin. To understand the amount of water that flows through the area data was analyzed from the USGS stream gage on Camas Creek south of Kilgore. This location is after the confluence of multiple streams that flow through the valley.

Characteristic Name	Value	Units
Contributing Drainage Area	210	Square Miles
Drainage Area	228	Square Miles
Main Channel Length	24.2	Miles
Mean Basin Elevation	6943	Feet
Percent Forest	39.4	%
Percent Lakes & Ponds	0	%
Relief	3,642	Feet
Soil Infiltration	5.6	Inches
Steam Slope 10 & 85 Method	36.65	Feet per Mile
Mean Basin Slope	12.8	%

Basin Characteristics Summary Table

Peak-Flow Statistics	Value
2 Year	808 cfs
5 Year	1,310 cfs
10 Year	1,680 cfs
25 Year	2,180 cfs
50 Year	2,580 cfs
100 Year	2,990 cfs
250 Year	3,420 cfs
500 Year	4,020 cfs

Peak Flow Statistics Table



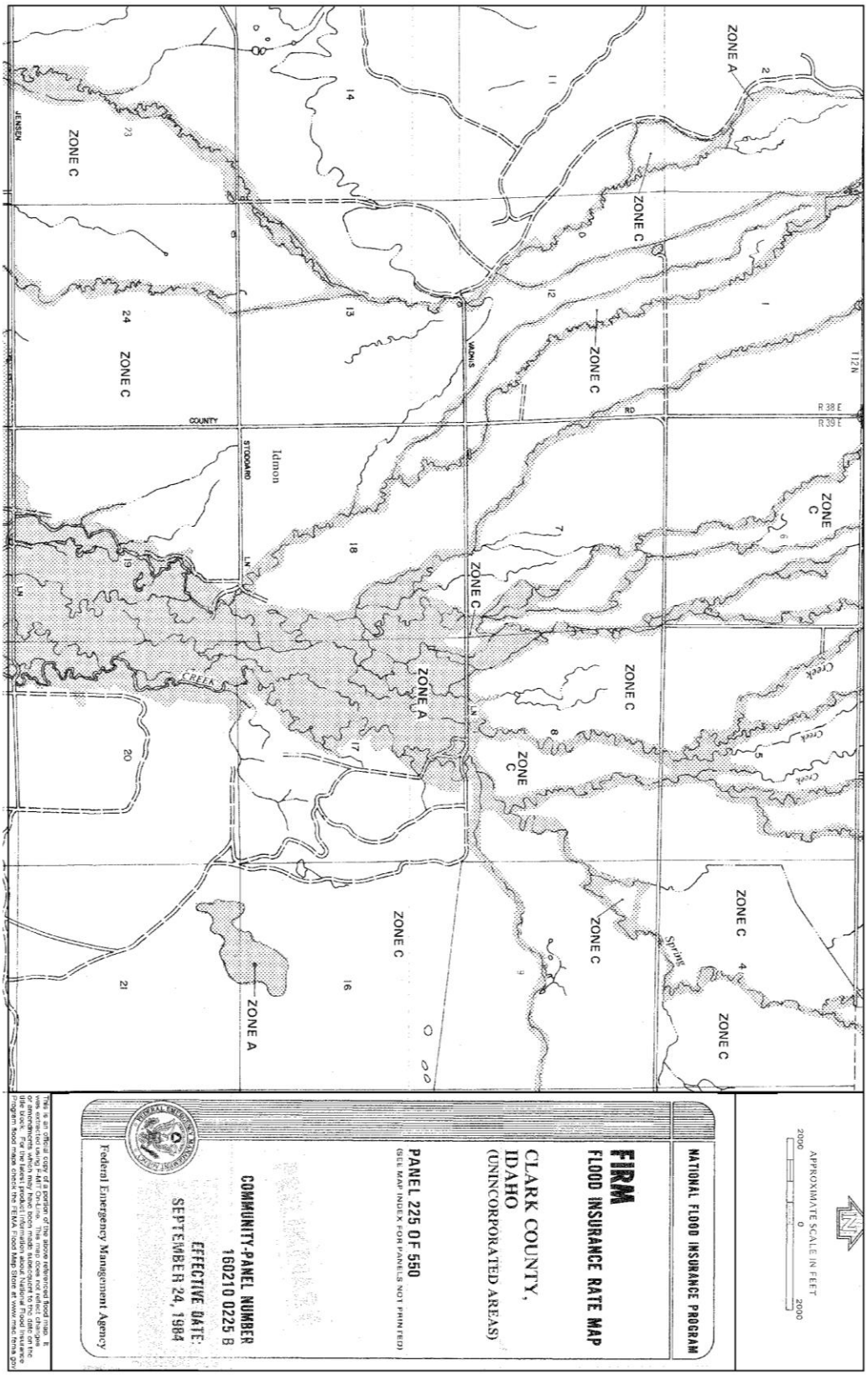
Kilgore Flooding Map

Alluvial Fan Flooding

Alluvial fans are deposits of rock and soil that have eroded from mountainsides and accumulated on valley floors in a fan-shaped pattern. The deposits are narrow and steep at the head of the fan, broadening as they spread out onto the valley floor. As rain runs off steep valley walls, it gains velocity, carrying large boulders and other debris. When the debris fills channels on the fan, floodwaters spill out and cut new channels. The process is then repeated, resulting in shifting channels and combined erosion and flooding problems over a large area. Alluvial fan flooding is most prevalent in the arid Western States.

Alluvial fan floods can cause greater damage than typical riverine flooding because of the high velocity of flow, the amount of debris carried, and the broad area affected. Floodwaters typically move at velocities of 15 to 30 feet per second (ft/s) – 5 to 10 meters per second – due to steep slopes and lack of vegetation. Human activities often exacerbate flooding and erosion problems on alluvial fans. Roads act as drainage channels, carrying high-velocity flows to lower portions of the fan, while fill, leveling, grading, and structures can alter flow patterns[7].

[7] This definition of alluvial fan flooding was taken from the State of Idaho Hazard Mitigation Plan 2010.



FIRM of Kilgore Area

Flooding in the Kilgore area occurs on a yearly basis during the spring runoff. The cause of the flooding is melting snow. On years where the snow comes off more quickly from the mountains, more flooding occurs, and rain on snow events are the most damaging.

There are no active stream gages in the basin, so a historic record of stream flow is not available. USGS regression equations were used to indicate the flow rate at a 500 year return interval for a benchmark. Flows across the basin range from 500 cfs to 1200 cfs at the 500 year interval.

The severity of the flooding varies from year to year, but the nature of the flooding every year has similar characteristics.

In the spring of 2011 an above normal flooding event occurred. Many roads in the area were not passable. Because of the alluvial fan and the flat nature of the terrain, water pools and does not drain, which prolonged the 2011 flood event.

When road crews were able to begin repair on the roads, they spent nearly three weeks repairing the damaged transportation routes.

The following images were taken during the 2011 flooding event; they show the nature of the damage that was done to roads, and a structure that was also damaged.

.

Loss Estimates

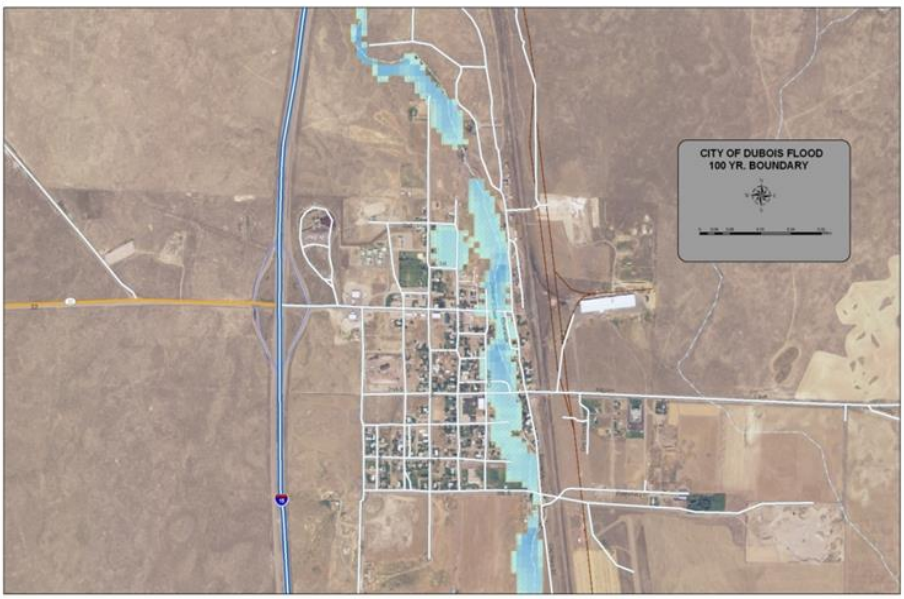
HAZUS estimates that about 9 buildings will be at least moderately damaged. All damage is to residential buildings. It is estimated no buildings will be completely destroyed.

HAZUS estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood,

brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 545 tons of debris will be generated. Of the total amount, Finishes comprises 40% of the total, Structure comprises 20% of the total, and Foundations comprise 40 % of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 22 truckloads (@25 tons/truck) to remove the debris generated by the flood.

HAZUS estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. HAZUS also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 18 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 11 people will seek temporary shelter in public shelters.



City of Dubois Flood Plain Map

The total economic loss estimated for the flood is $1.23M.

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were $1.11M; 10% of the estimated losses were related to the business interruption of the region. Residential occupancies made up 82.96% of the total loss.

Losses associated with flooding in the Kilgore area of Clark County are generally tied to loss of transportation service and damage to roadways. A few abandoned outbuildings have been flooded, historically, but they pose little threat in the way of economic or social loss.

During the 2011 spring flooding one inhabited structure was affected, as well as a number of road crossings with an estimated loss of $20,000 to $50,000. Major transportation routes in the area carry anywhere from 300 to 500 trips per day during the summer months, and significantly less during the winter. Other roads in the area average 20 to 50 trips per day during the summer

months. Loss of service is the biggest loss that the County faces during flood events in the Kilgore Area. The major transportation routes through the area are also primary evacuation routes.

According to the Road and Bridge Supervisor, the following losses are incurred by his department at the specified return intervals during flood events in the Kilgore Area. This does not include loss of service costs.

Return Interval	1 Year	5 Year	10 Year	25 Year	50 Year
Number of Employees	3	4	4	4	5
Hours Per Employee	56	64	72	80	96
Total Employee Cost	$3,444	$5,248	$5,904	$6,560	$9,840
Gravel Cost	$12,000	$13,000	$14,000	$16,000	$20,000
Total Cost Per Event	$15,444	$18,248	$19,904	$22,560	$29,840

Unfortunately, HAZUS was unable to compile estimated losses for the area. Because of the alluvial fan and the complexity of the road crossings the results of HAZUS was $0 damage. From past experience it is evident that the model is flawed, especially when estimating losses in alluvial fan areas. HAZUS was able to delineate a floodplain based upon USGS regression equations and the topography. This 100 year floodplain was then overlain on top of the structure dataset and analyzed.

Upon visual inspection there are three (3) structures located in the HAZUS defined floodplain; all three are either sheds or barn. The estimated depth of flooding at these structures is 1-2 feet.

The estimated annual structural loss for a 100 year flood event in the Kilgore area is just under $100.

There are five mitigation projects that were identified in 2011 during the assessment of the Kilgore Area. The projects have been included in the mitigation strategy with project specifics found in Attachment 3.

Hazard Evaluation

This risk assessment and mitigation strategy should be used and referenced in other land use planning documents and the Road and Bridge Capital Improvement Plan.

Flash Flood		
Profile Category	**Rating**	**Description**
Historical Occurrence	2	Medium
Probability	4	High
Vulnerability	2	Limited
Spatial Extent	1	Negligible
Magnitude	2	Limited
Total	**11**	**Low**

Flash Flooding

Description

Flash flood is defined by NWS as, "A rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined flood level, beginning within six hours of the causative event (e.g., intense rainfall, dam failure, ice jam). Ongoing flooding can intensify to flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters." Flash floods differ from floods in the rapidity with which they develop. Floods generally develop over a period of several days, providing more warning time and time for preparation and evacuation. Flash floods occur with little or no warning. They may occur during thunderstorms due to rapid runoff from steep terrain, from areas where the soil is already saturated, or in urban areas where vegetation has been removed and pavement has replaced exposed soil. Flash floods may also arise as the result of dam failure or the breakup of ice jams.

Historic Frequencies

The following table shows recorded flash flood events for Clark County. No events have been recorded since 2001.

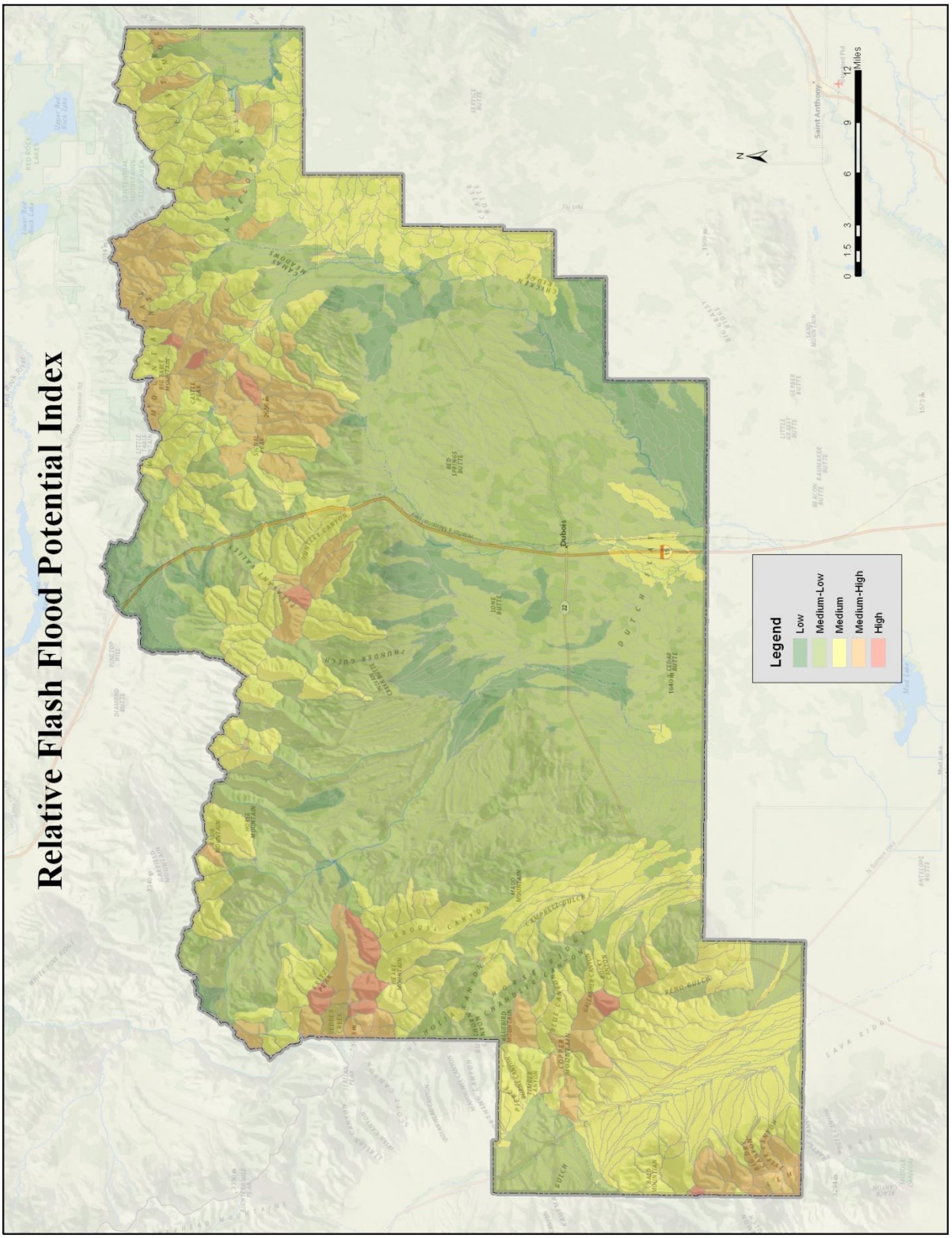
Place	Date	Time	Event	Magnitude/details
Spencer	7/7/2001	4:00 PM	Flash Flood	1.5-2 inches of rain in 2 hours caused localized flooding

Clark County Flash Flood Events

Although only one recorded event could be found, flash flood events do happen in Clark County. The lack of large urban areas decreases the impervious soil area, and therefore decreases the frequency of flash flood events. The majority of flash flood events come down intermittent stream drainages in the mountainous areas of the County.

Impacts

Because flash floods develop so rapidly, people on foot or in automobiles may be stranded or may be swept away and injured or drowned. They are characterized by high velocity water flow and large amounts of debris, both of which cause damage to or destroy structures and other objects in their path. Other impacts are discussed below under River Flooding.



Relative Flash Flood Potential Map

Loss Estimates

Losses from flash floods in Clark County include damage to critical infrastructure and structures. There are no homes located in high flash flood potential areas in Clark County. Losses are mostly associated with damage to transportation routes and loss of service along those routes. Annual losses are in the $10,000's.

Hazard Evaluation

Flash Flood		
Profile Category	**Rating**	**Description**
Historical Occurrence	2	Medium
Probability	4	High
Vulnerability	2	Limited
Spatial Extent	1	Negligible
Magnitude	2	Limited
Total	**11**	**Low**

Dam Failure

2012 Revision Summary: This hazard was added with this update.

Description

Dam failure is the unintended release of impounded waters. Dams can fail for one or a combination of the following reasons:

- Overtopping caused by floods that exceed the capacity of the dam
- Deliberate acts of sabotage
- Structural failure of materials used in dam construction
- Poor design and/or construction methods
- Movement and/or failure of the foundation supporting the dam
- Settlement and cracking of concrete or embankment dams
- Piping and internal erosion of soil in embankment dams
- Inadequate maintenance and upkeep

Failures may be categorized into two types: component failure of a structure that does not result in a significant reservoir release, and uncontrolled breach failure that lead to a significant release. With an uncontrolled breach failure of a manmade dam there is a sudden release of the impounded water, sometimes with little warning. The ensuing flood wave and flooding have enormous destructive power. The Idaho Department of Water Resources (IDWR) is responsible for dam safety in this State. The program is described as follows (from the "Dam Safety Program," IDWR web site[8]).

Dams 10 feet or higher or which store more than 50 acre feet of water are regulated by the Idaho Department of Water Resources (as are mine tailings impoundment structures). Idaho currently has 546 water storage dams and 21 mine tailings structures that are regulated by IDWR for

[8] http://www.idwr.state.id.us/water/stream_dam/dams/dams.htm

safety. The Dam Safety Section inspects these dams or tailings structures every other year unless one has a particular problem. Copies of all inspection reports for each of the dams and tailing structures are available at the IDWR State Office in Boise. Inspection reports are also available at the four IDWR Regional Offices for dams and tailing structures located in their specific regions.

Dam Classifications

Each dam inspected by Idaho Water Resources is given both a size and risk classification.

Size Classification:

Small – 3: Twenty (20) feet high or less and a storage capacity of less than one hundred (100) acre feet of water

Intermediate – 2: More than twenty (20) but less than forty (40) feet high or with a storage capacity of one hundred (100) to four thousand (4,000) acre feet of water

Large – 1: Forty (40) feet high or more with a storage capacity of more than four thousand (4,000) acre feet of water

Risk Classification

This classification is used by IDWR to classify potential losses and damages anticipated in down-stream areas that could be attributable to failure of a dam during typical flow conditions:

Low Risk – 3: No permanent structures for human habitation; Minor damage to land, crops, agricultural, commercial or industrial facilities, transportation, utilities, or other public facilities or values

Significant Risk – 2: No concentrated urban development, one (1) or more permanent structures for human habitation which are potentially inundated with flood water at a depth of two (2) ft. or less or at a velocity of two (2) ft. per second or less; Significant damage to land, crops, agricultural, commercial or industrial facilities, loss of use and/or damage to transportation, utilities, or other public facilities or values

High Risk – 1: Urban development, or any permanent structure for human habitation which are potentially inundated with flood water at a depth of more than two (2) ft. or at a velocity of more than two (2) ft. per second; Major damage to land, crops, agricultural, commercial or industrial facilities, loss of use and/or damage to transportation, utilities, or other public facilities or values

Name	Stream	Purpose	Risk Category	Size Category	Type	Storage Capacity (Acre Ft.)	Height (Ft.)
Sheridan	Sheridan/Dry Creek	I	2	2	Earth	3398	18
Paul	East Modoc Creek	L	3	3	Earth	50	22.5
Hagenbarth	Crooked Creek	I	3	2	Earth	60	12

Dams in Clark County
Source http://www.idwr.idaho.gov/water/stream_dam/dams/Dams.pdf

There are no Dams in Clark County that are a high risk.

Hazard Evaluation

Dam Failure		
Profile Category	**Rating**	**Description**
Historical Occurrence	1	Low
Probability	1	Rare
Vulnerability	1	Negligible
Spatial Extent	1	Negligible
Magnitude	1	Negligible
Total	**5**	**Low**

Geologic

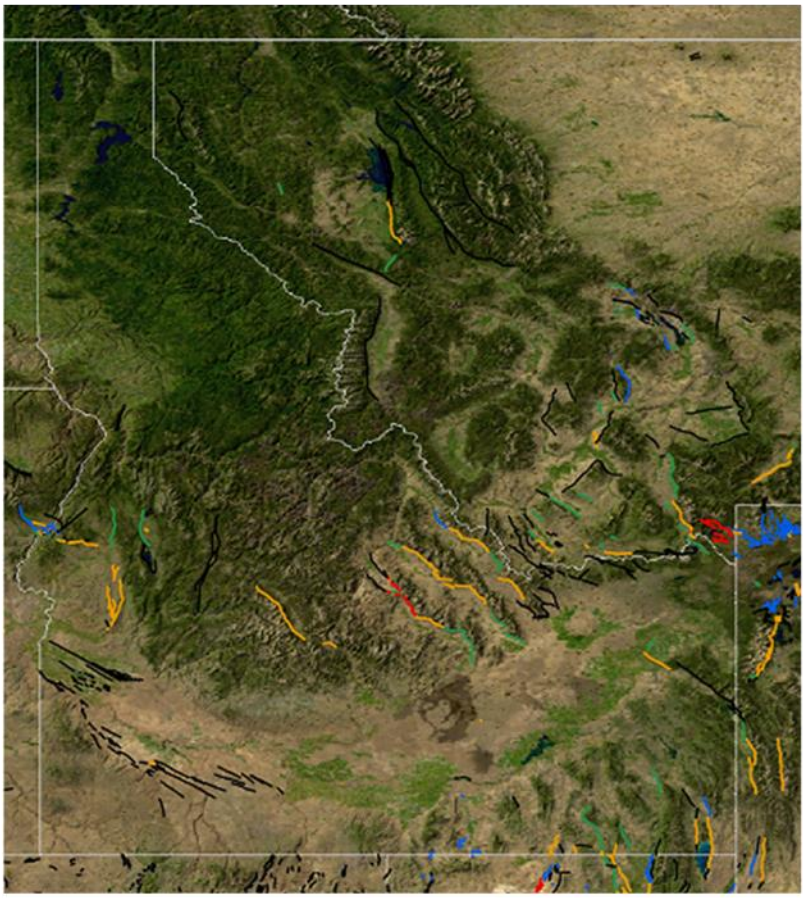
Geologic hazards are adverse conditions capable of causing loss of life and damage to property that involve the movement of geologic features or elements of the surface of the earth. There are a wide variety of such hazards that may be categorized as either sudden or slow phenomena. Slowly developing geologic hazards include soil erosion, sinkholes, and other ground subsidence, and migrating sand dunes. Only sudden geologic hazards will be considered in this planning and will be limited to earthquake and landslide/mudslide.

Earthquake

2012 Revision Summary: This section was updated with more historical earthquake information. The loss estimate section was also updated with HAZUS loss estimates.

Description

The U.S. Geological Survey (USGS) defines earthquake as: "Ground shaking caused by the sudden release of accumulated strain by an abrupt shift of rock along a fracture in the Earth, or by volcanic or magmatic activity, or other sudden stress changes in the Earth." The hazards associated with earthquake are essentially secondary to ground shaking (also called seismic waves) which may cause buildings to collapse, displacement or cracking of the earth's surface, flooding as a result of damage to dams or levees, and fires from ruptured gas lines, downed power lines, and other sources. Earthquakes cause both vertical and horizontal ground shaking which varies both in amplitude (the amount of displacement of the seismic waves) and frequency (the number of seismic waves per unit time), usually lasting less than thirty seconds.



Idaho Faults Map

Earthquakes are measured both in terms of their inherent "magnitude" and in terms of their local "intensity."

The magnitude of an earthquake is essentially a relative estimate of the total amount of seismic energy released and may be expressed using the familiar "Richter Scale" or using the "moment magnitude scale" now favored by most technical authorities. Both the Richter scale and the moment magnitude scale are based on logarithmic formulae, meaning that a difference of one unit on the scales represents about a thirty-fold difference in amount of energy released (and, therefore, potential to do damage).On either scale, significant damage can be expected from earthquakes with a magnitude of about 5.0 or higher. What determines the amount of damage that might occur in any given location, however, is not the magnitude of the earthquake but the intensity at that particular place. Earthquake intensity decreases with distance from the earthquake's "epicenter" (its focal point) but also depends on local geologic features such as depth of sediment and bedrock layers. Intensity is most commonly expressed using the "Modified Mercalli Intensity Scale." This measure describes earthquake intensity on an arbitrary, descriptive, twelve degree scale (expressed as Roman numerals from I to XII) with significant damage beginning at around level VII. Mercalli intensity is assigned based on eyewitness accounts. More quantitatively, intensity may be measured in terms of "peak ground acceleration" (PGA) expressed relative to the acceleration of gravity (g) and determined by seismographic instruments.

While Mercalli and PGA intensities are arrived at differently, they correlate reasonably well. While the locations most susceptible to earthquakes are known, there is little ability to predict an earthquake in the short term.

I. Instrumental	Generally not felt by people unless in favorable conditions.
II. Weak	Felt only by a few people at best, especially on the upper floors of buildings. Delicately suspended objects may swing.
III. Slight	Felt quite noticeably by people indoors, especially on the upper floors of buildings. Many do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to the passing of a truck. Duration estimated.
IV. Moderate	Felt indoors by many people, outdoors by few people during the day. At night, some awaken. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rock noticeably. Dishes and windows rattle alarmingly.
V. Rather Strong	Felt inside by most, may not be felt by some outside in non-favorable conditions. Dishes and windows may break and large bells will ring. Vibrations like large train passing close to house.
VI. Strong	Felt by all; many frightened and run outdoors, walk unsteadily. Windows, dishes, glassware broken; books fall off shelves; some heavy furniture moved or overturned; a few instances of fallen plaster. Damage slight.
VII. Very Strong	Difficult to stand; furniture broken; damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. Noticed by people driving motor cars.
VIII. Destructive	Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture moved.

IX. Violent	General panic; damage considerable in specially designed structures, well designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X. Intense	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundation. Rails bent.
XI. Extreme	Few, if any masonry structures remain standing. Bridges destroyed. Rails bent greatly.
XII. Cataclysmic	Total destruction – Everything is destroyed. Lines of sight and level distorted. Objects thrown into the air. The ground moves in waves or ripples. Large amounts of rock move position. Landscape altered, or leveled by several meters. In some cases, even the routes of rivers are changed.

Modified Mercalli Intensity Scale

Historic Frequencies

Earthquakes affecting Clark County occur frequently. The epicenter of an earthquake can occur in another county or state and still have devastating consequences in Clark County. The following summaries give the details of earthquakes that have been recorded as felt in Clark County.

October 19, 1935

Earthquake Location: Near Helena, MT

Earthquake Magnitude: 6.3

MMI Magnitude: Dubois – UNK, Spencer - UNK

General Summary: "This is the main earthquake of the 1935 series of shocks at Helena. Two people were killed by falling bricks, several were injured, and property damage was estimated at about $3 million. The earthquake damaged about 300 buildings, of which more than 200 lost their chimneys. Damage was most severe in 2 and 2 1/2-story brick houses on alluvial soil in northeast Helena, but severe damage also occurred in the southern business section of Helena. Downed chimneys and cracked plaster were common throughout the city, and in sections, almost all chimneys were destroyed. Gables commonly were damaged, regardless of the structural material used or the location of the building.

The most severely damaged structure in the area was the Helena High School, constructed a few months earlier, in August 1935. Many large buildings were damaged heavily, including the City Hall, Kessler Brewery, and St. Joseph's Orphanage, but damage was slight to structures on solid bedrock (e.g., the State Capitol, Federal Building, and St. Helena Cathedral). In general, wood buildings covered with wood siding and structures having a framework of reinforced concrete or steel sustained little damage. Tombstones in all the cemeteries in the area were twisted or overturned.

The ground cracks observed were shallow, narrow, surface cracks in alluvial material caused by shaking of the ground, and none represent slip along the fault plane. East of town, water flowed

from the cracks that formed in the ground. The largest crack, a maximum of 13 centimeters wide and 91 meters long, was observed on the gravel road leading into the Stanchfield Gun Club[9]."

October 31, 1935

Earthquake Location: Near Helena, MT

Earthquake Magnitude: 6.0

MMI Magnitude: Dubois – UNK, Spencer - UNK

General Summary: "This aftershock was almost as severe as the main tremor on October 19. Two people were killed at Helena, and about $1 million in property damage occurred, bringing the death toll from this series to four and the damage total to $4 million. (Ref. 512 reports a total of 6 deaths and $5.5 million damage). It intensified the damage in all the towns and damaged structures weakened by previous shocks. Most residents described it as sharper and more pronounced than the main earthquake on October 19[10]."

July 12, 1944

Earthquake Location: ~20 miles west of Custer, ID

Earthquake Magnitude: 6.1

MMI Magnitude: Spencer – 5, Kilgore – 6, Winsper - 5

General Summary: "An intensity VII earthquake occurred within the State on July 12, 1944. The Seafoam Ranger Station building shook so hard the occupants thought it was coming apart. Several people reported that the shaking was so violent they were unable to walk. Another observer reported that rocks rose at least a foot in the air and looked like a series of explosions up the hill. Part of the canyon wall collapsed near Lime Creek. Cracks opened 100 yards long in Duffield Canyon and cracks one to three inches across and several hundred yards long opened on the road below Seafoam. Two chimneys fell at Cascade. This shock was felt over 70,000 square miles, including all of central Idaho, and parts of Washington, Oregon, and Montana[11]."

November 23, 1947

Earthquake Location: ~25 miles WNW of West Yellowstone, MT

Earthquake Magnitude: 6.25

MMI Magnitude: Dubois – UNK, Spencer - UNK

General Summary: "Montana's strongest earthquake in more than a decade shook up a score of mining towns through the Rocky mountains early Saturday but only minor damage was inflicted.

Thousands of persons were awakened by the shock rumbling across western and central Montana at 2:36 a.m. (MST), and many fled their homes in panic, fearing a repetition of the disastrous 1935 temblor that caused widespread destruction throughout the state[12]."

[9] http://earthquake.usgs.gov/earthquakes/states/events/1935_10_19.php
[10] http://earthquake.usgs.gov/earthquakes/states/events/1935_10_31.php
[11] http://earthquake.usgs.gov/earthquakes/states/idaho/history.php
[12] http://www.seis.utah.edu/lqthreat/nehrp_htm/1947virg/n1947vi1.shtml#mqss

August 18, 1959

Earthquake Location: Near Hebgen Lake, MT

Earthquake Magnitude: 7.3

MMI Magnitude: Kilgore - UNK

General Summary: "This earthquake caused 28 fatalities and about $11 million in damage to highways and timber. It is characterized by extensive fault scarps, subsidence and uplift, a massive landslide, and a seiche in Hebgen Lake. A maximum MM intensity X was assigned to the fault scarps in the epicentral area. The instrumental epicenter lies within the region of surface faulting. Area of perceptibility, maximum intensity, and Richter magnitude all were larger for this earthquake than for any earlier earthquake on record in Montana (from May 1869)[13]."

August 30, 1962

Earthquake Location: Cache Valley, UT

Earthquake Magnitude: 5.7

MMI Magnitude: Humphrey – 3, Dubois - 5

General Summary: "An intensity VII earthquake occurred on August 30, 1962, in the Cache Valley area of Utah. Two large areas of land totaling four acres, five feet thick, slid 300 yards downhill at Fairview, Idaho, opening new springs. Plaster walls, and chimneys were cracked and a chimney fell at Franklin. Falling brick at the Franklin School cracked through the roof and plaster was cracked in every room. Additional damage occurred at Preston. This magnitude 5.7 earthquake was felt over an area of 65,000 square miles in five states and cause approximately $1 million in damage[14]."

October 21, 1964

Earthquake Location: Hebgen Lake, MT

Earthquake Magnitude: 5.8

MMI Magnitude: Dubois - 5

General Summary: This earthquake is documented as an aftershock of the 1959 Hebgen Lake Earthquake. No significant damage was reported.

June 28, 1965

Earthquake Location: Clarkston Valley, MT

Eartheuake Magnitude:6.6

MMI Magnitude: Dubois - 5

General Summary: "The most severe damage from this strong earthquake occurred in Gallatin County at Manhattan, Three Forks, Logan, and Lombard. Because no large cities were near the epicenter, property damage did not exceed $150,000.

[13]http://earthquake.usgs.gov/earthquakes/states/events/1959_08_18.php
[14]http://earthquake.usgs.gov/earthquakes/states/idaho/history.php

At Manhattan, the community high school and the grade school were both damaged severely, but reinforced concrete buildings were undamaged. Many chimneys were toppled.

At Three Forks, walls of the schoolhouse bulged on all sides, and its foundation and basement were damaged. A church, whose walls were not tied together by an upper floor, also sustained heavy damage. Later shocks demolished the walls. Almost all masonry buildings showed cracks and damage, but because most of the buildings were of frame construction, they sustained only cracks in plaster and some fallen chimneys.

At Logan, the poorly designed and constructed schoolhouse was damaged heavily. However, a large brick roundhouse sustained only a few cracks. As at Three Forks, most of the buildings at Logan were of frame construction and therefore sustained only cracks in plaster and destruction of chimneys[15]."

October 28, 1983

Earthquake Location: Near Borah Peak, ID

Earthquake Magnitude: 6.9

MMI Magnitude: Dubois - 5

General Summary: "The Borah Peak earthquake is the largest ever recorded in Idaho - both in terms of magnitude and in amount of property damage. It caused two deaths in Challis, about 200 kilometers northeast of Boise, and an estimated $12.5 million in damage in the Challis-Mackay area. A maximum MM intensity IX was assigned to this earthquake on the basis of surface faulting. Vibrational damage to structure was assigned intensities in the VI to VII range.

Spectacular surface faulting was associated with this earthquake - a 34-kilometer-long northwest-trending zone of fresh scarps and ground breakage on the southwest slope of the Lost River Range. The most extensive breakage occurred along the 8-kilometer zone between West Spring and Cedar Creek. Here, the ground surface was shattered into randomly tilted blocks several meters in width. The ground breakage was as wide as 100 meters and commonly had four to eight en echelon scarps as high as 1-2 meters. The throw on the faulting ranged from less than 50 centimeters on the southern-most section to 2.7 meters south of Rock Creek at the western base of Borah Peak[16]."

July 25, 2005

Earthquake Location: 15 Miles North-Northeast of Dillon, MT

Earthquake Magnitude: 5.6

MMI Magnitude: Dubois – 3.8

General Summary: "Items knocked off shelves at Dillon and Bozeman. Felt (VI) at Dillon and Twin Bridges; (IV) at Bozeman, Butte, Helena, Missoula and West Yellowstone; (III) at Billings, Great Falls, Kalispell and Livingston. Felt (IV) at Island Park and Salmon; (III) at Coeur d'Alene, McCall, Moscow, Rexburg and Sandpoint, Idaho. Also felt (III) at Pullman and

[15] http://earthquake.usgs.gov/earthquakes/states/events/1925_06_28.php
[16] http://earthquake.usgs.gov/earthquakes/states/events/1983_10_28.php

Spokane, Washington and in Yellowstone National Park, Wyoming. The quake was felt as far away as Seattle, Washington and Calgary, Alberta[17]."

February 4, 2006

Earthquake Location: 36 Miles East of Lima, MT

Earthquake Magnitude: 4.6

MMI Magnitude: Dubois – 3.3

General Summary: "A magnitude 4.6, intensity IV earthquake occurred 36 miles east of Lima, in extreme southwestern Montana, at 8:25 p.m. MST on February 4, 2006. Although this earthquake occurred in Montana, it was felt as intensity II in Jackson and intensity III in Wilson.

No damage has been reported in Wyoming (or Montana) from the earthquake. This earthquake was reported to the Wyoming State Geological Survey (WSGS) by the U.S. Geological Survey's (USGS) National Earthquake Information Center in Golden, Colorado. The USGS estimated the depth of the earthquake at about 5 kilometers (3.1 miles). The epicenter was located about 40 miles west of West Yellowstone and about 30 miles southwest of the site of the 1959 7.1-magnitude Hebgen Lake earthquake[18]."

April 5, 2011

Earthquake Location:

Earthquake Magnitude: 4.1

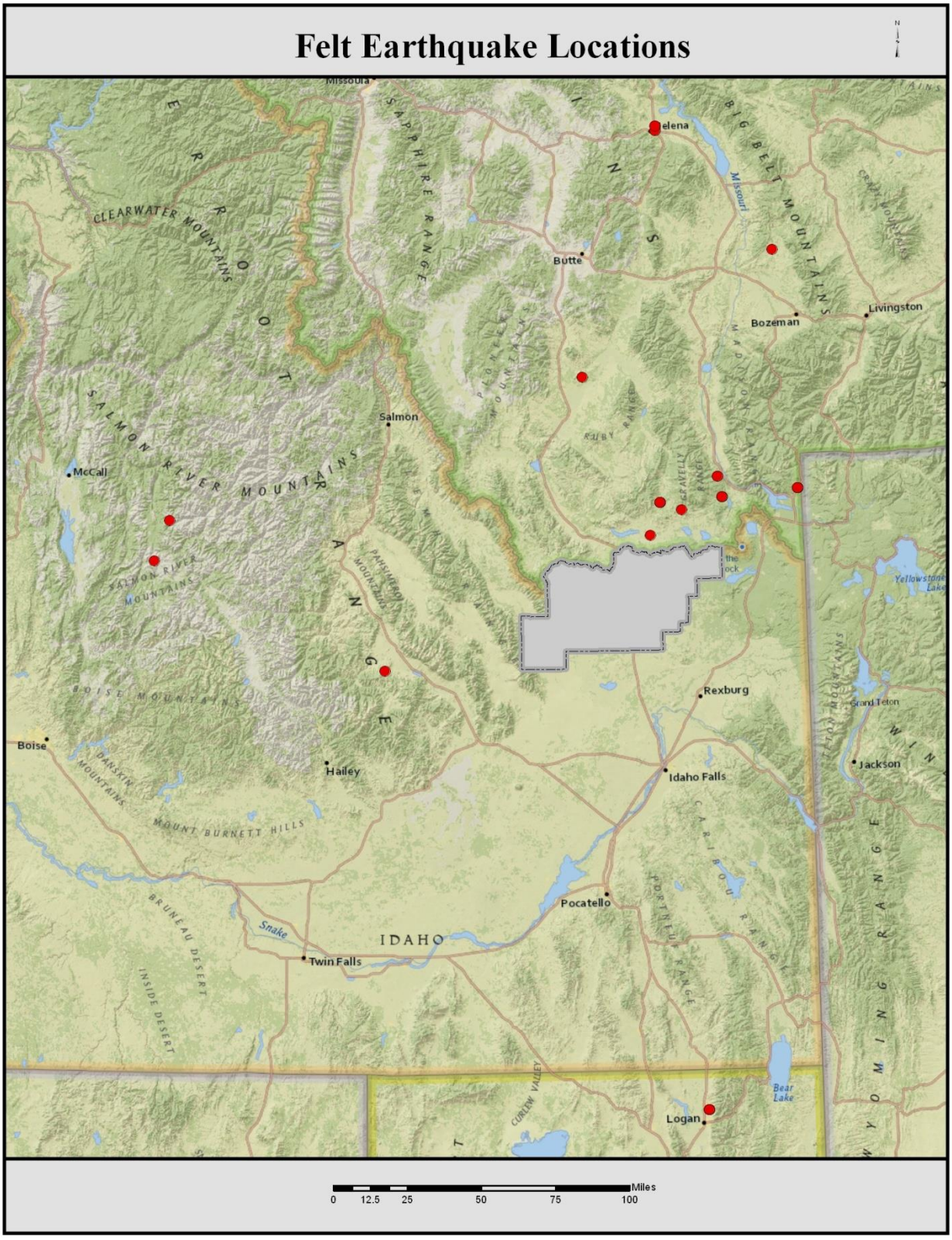
MMI Magnitude: Dubois – 2, Spencer 4.1

General Summary:

An extremely shallow but weak earthquake struck at the Montana / Idaho border.
The epicenter seems to be located in a wilderness area. Closest villages are Lima and Spencer 29 km (18 miles) NNE (15°) from Spencer, ID and 39 km (24 miles) E (93°) from Lima, MT

The USGAS reported that the earthquake was felt in the area however there was no significant damage reported.[19]

[17] http://earthquake.usgs.gov/earthquakes/eqinthenews/2005/usazad/#summary
[18] http://www.wsgs.uwyo.edu/public-info/news/2006/Feb06_2006.aspx
[19] http://earthquake-report.com/2011/04/05/earthquakes-list-april-5-2011/



Felt Earthquake Locations

Impacts

Earthquakes are capable of catastrophic consequences, especially in urban areas. Worldwide, earthquakes have been known to cost thousands of lives and enormous economic and social losses. In minor earthquakes, damage may be done only to household goods, merchandise, and other buildings' contents, and people are occasionally injured or killed by falling objects. More violent earthquakes may cause the full or partial collapse of buildings, bridges, and overpasses, and other structures. Fires due to broken gas lines, downed power lines, and other sources are common following an earthquake and often account for much of the damage. Economic losses arise from destruction of structures and infrastructure, interruption of business activity, and innumerable other sources. Utilities may be lost for long periods of time, and all modes of transportation may be disrupted. Disaster Services including medical may be both disabled and overwhelmed. In addition to broken gas lines, other hazardous materials may be released.

Loss Estimates

Estimated losses for earthquake events were estimated using HASUZ, FEMA's loss estimation methodology. HAZUS is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop earthquake losses at a regional scale. Using HAZUS three scenarios were developed to identify losses. Each scenario identifies a different probable earthquake location and magnitude.

The first scenario is a probabilistic magnitude 7 100 year event. It looks at the most probable earthquake location that has the capacity to produce a magnitude 7 event.

HAZUS estimates that about 12 buildings will be at least moderately damaged. This is over 1.00 % of the buildings in the region. It is estimated 0 buildings will be damaged beyond repair.

HAZUS estimates the number of leaks and breaks in the potable and wastewater systems. It is estimated that there will be 20 leaks and 5 breaks in the potable water system, and that there will be 10 leaks and 2 breaks in the wastewater system.

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 1,022) will seek temporary shelter in public shelters.

It is estimated that there will be no casualties in this scenario.

The total economic loss estimated for the earthquake is 0.50 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building related losses were 0.18 (millions of dollars); 21 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 74 % of the total loss.

The second scenario is an annual probabilistic earthquake. This looks at the annual probability of an earthquake.

HAZUS estimates that about 5 buildings will be at least moderately damaged. This is over 1.00 % of the buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair.

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 1,022) will seek temporary shelter in public shelters.

The total economic loss estimated for the earthquake is 0.33 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building related losses were0.01 (millions of dollars);19 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 73 % of the total loss.

The third scenario is a location based event. It is a magnitude 7 event on the Beaverhead Fault which runs along the western side of the County.

HAZUS estimates that about 13 buildings will be at least moderately damaged. This is over 1.00 % of the buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair.

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 1,022) will seek temporary shelter in public shelters.

The total economic loss estimated for the earthquake is 0.69 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the

earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building related losses were 0.19 (millions of dollars); 20 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 73 % of the total loss.

Hazard Evaluation

Earthquake		
Profile Category	**Rating**	**Description**
Historical Occurrence	2	Medium
Probability	2	Low
Vulnerability	4	Catastrophic
Spatial Extent	4	Catastrophic
Magnitude	3	Critical
Total	**15**	**High**

Landslide/Mudslide

Description

The term "landslide" encompasses several types of occurrence (including mudslides) in which slope-forming materials such as rock and soil move downward under the influence of gravity. Such downward movement may occur as the result of an increase in the weight of slope-forming materials, an increase in the gradient (angle) of the slope, a decrease in the forces resisting downward motion (friction or material strength), or a combination of these factors. Factors that may trigger a landslide include weather related events such as heavy rainfall (one of the most common contributors), erosion, and freeze-thaw weakening of geologic structures, and human causes such as excavation and mining, deforestation, vibration from explosions or other sources, and such geologic causes as earthquake, volcanic activity, and shearing or fissuring. The speed of descent ranges from sudden and rapid to an almost imperceptibly slow creep, where effects are only observable over a period of months or years.

Historic Frequencies

Although there are no reported large landslide events in Clark County, landslides do occur frequently in the back country, usually obstructing and damaging roadways. The landslide potential map in indicates that the mountain areas of Clark County have at least a medium potential. The only incorporated town near a potential landslide is Spencer.

Impacts

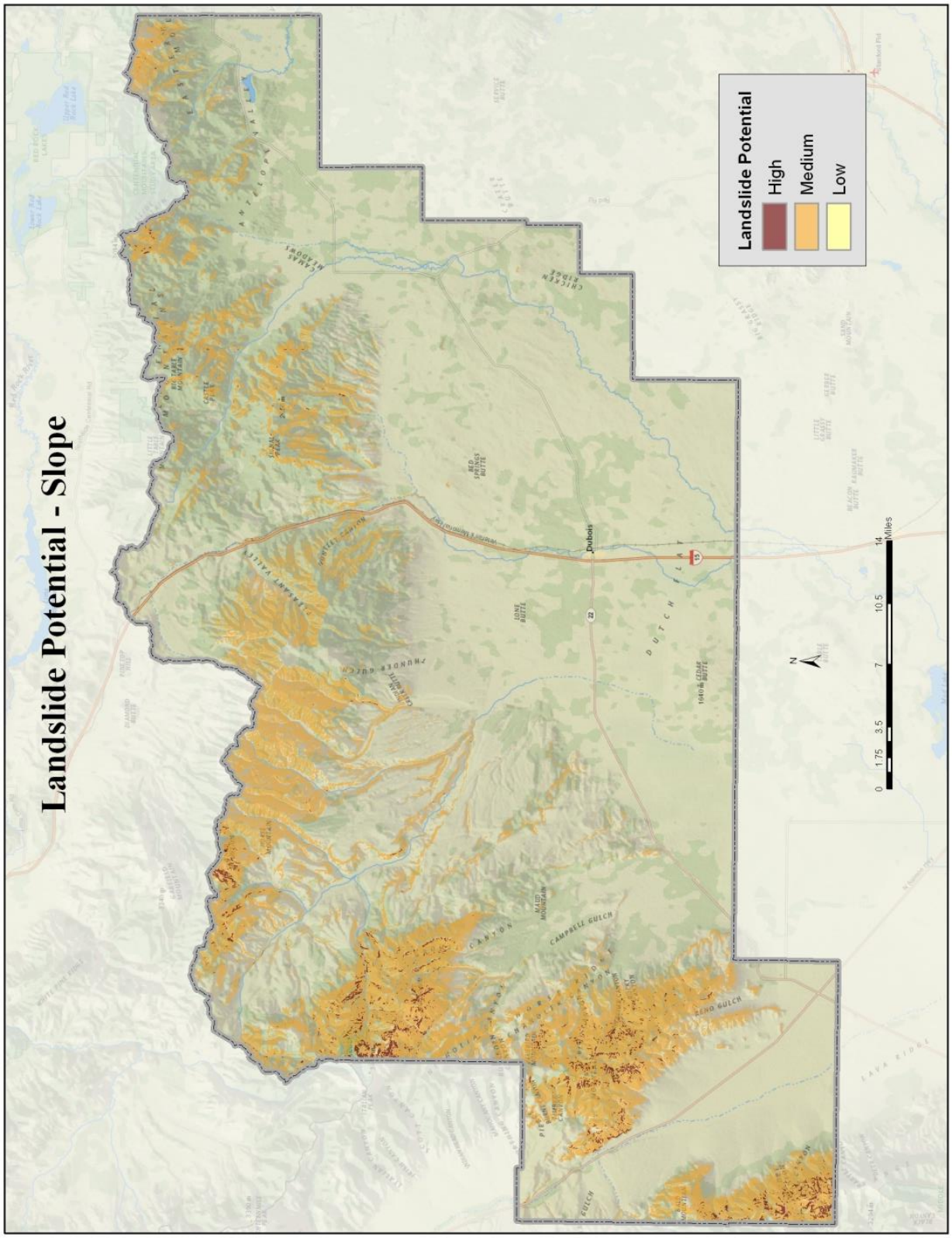
Some of the many direct and indirect impacts of landslides are:

- Human and animal deaths and injuries and resulting productivity losses
- Damage or destruction of structures
- Destruction or blockage of roadways and resulting transportation interruption
- Loss of, or reduced land usage
- Loss of industrial, agricultural and forest productivity
- Reduced property values in areas threatened by landslide

- Loss of tourist revenues and recreational opportunities
- Damage or destroyed infrastructure and utilities
- Damming or alteration of the course of streams and resulting flooding
- Reduced water quality

Loss Estimates

Clark County has 386 miles of roadway that could be potentially impacted or damaged in some manner by landslides. Most of these roads are in the back county. The County estimates that back county replacement value is $750,000 per mile. The total vulnerability based on that estimate would be $289.5 Million however, landslides are usually considered a local event and thus it is difficult to predict the actual repair or replacement costs for a single event.



Landslide Potential Map

Hazard Evaluation

Landslides		
Profile Category	**Rating**	**Description**
Historical Occurrence	1	Low
Probability	2	Low
Vulnerability	2	Limited
Spatial Extent	1	Negligible
Magnitude	1	Negligible
Total	**7**	**Low**

Snow Avalanche

Description

Snow avalanches are common in mountainous terrain where heavy snowfall accumulates on steep slopes. Avalanches generally occur on slopes between 30 and 45 degrees with 38 degrees being the "ideal" slope for development of avalanche conditions. They are often categorized as either "loose snow" or "slab" types. While the exact moment of an avalanche cannot be predicted, avalanche conditions are readily recognizable and avalanches tend to recur on the same slopes year after year.

Historical Frequencies

A search of avalanche reports was conducted and the following report was found.

On April 2, 2006 an avalanche in the mountains outside Spencer, ID caught 2 snowmobilers and killed one of them.

> "The Clark County Sheriff's office says Douglas Mitchel of Firth was found dead under seven feet of snow. The friend he was riding his snowmobile with was found alive soon after the accident. Search and Rescue says Mitchel and his friend were not wearing beacons at the time and that might have helped them find them sooner."

No other reports of avalanches were discovered. Clark County, especially in the Spencer and Kilgore areas, is a recreational hot spot during the winter months, which increases the risk of casualties due to avalanches.

Impacts

It is common for avalanche impacts to be somewhat limited. Because avalanches usually occur in remote areas, the most frequent victims are recreational users of the slopes on which they occur. Of those who die in avalanches, approximately one third of the deaths are as a result of trauma, while the remaining two thirds are from suffocation. Trauma may be the result of being carried into obstructions such as boulders and trees or over cliffs, or from rocks, trees, or large chunks of snow being carried downward at high speed. Avalanches may also damage or destroy structures, break power lines, block roadways and railroads, and damage trees and vegetation.

Loss Estimates

Snow Avalanches occur primarily in the back country of Clark County. As with Landslides, losses from Snow Avalanches come from damage to roadways and the resulting snow and debris removal costs.

Losses include clearing of transportation routes and casualties.

Hazard Evaluation

Avalanche		
Profile Category	**Rating**	**Description**
Historical Occurrence	2	Medium
Probability	3	Medium
Vulnerability	1	Negligible
Spatial Extent	1	Negligible
Magnitude	3	Critical
Total	**10**	

Other Natural Hazards

Wildfire

Description

Wildfire is defined by the USDA Forest service as, "A fire naturally caused or caused by humans, that is not meeting land management objectives."[20] It is generally thought of as an uncontrolled fire involving vegetative fuels, oxygen, and sufficient heat [21]occurring in wildland areas. Such fires are classified for hazard analysis purposes as either "Wildland" or "Wildland Urban Interface" fires. Wildland fires occur in areas that are undeveloped except for the presence of roads, railroads, and power lines, while Wildland Urban Interface fires occur where structures or other human development meets, or is intermingled with, the wildland or vegetative fuels. Wildland fire is currently considered a natural and necessary component of wildland ecology and, as such, is most often allowed to progress to the extent that it does not threaten inhabited areas or human interests and well-being. At the Wildland Urban Interface (WUI), vigorous attempts are made to control fires, but this becomes an increasingly difficult challenge as more and more development for recreational and living purposes takes place in wildland areas. Some wildland fires are ignited naturally (almost exclusively by lightning), but most ignitions are a result of human activities, either careless or intentional. The rapidity with which a wildland fire spreads and the intensity with which it burns is controlled by a number of factors including:

- Weather - wind speed and direction, temperature, precipitation
- Terrain – fires burn most rapidly upslope
- Type of vegetation
- Condition of vegetation - dryness
- Fuel load – the amount and density of vegetation
- Human attempts to suppress

In Idaho, fire was once an integral function of the majority of ecosystems. The seasonal cycling of fire across the landscape was as regular as the July, August, and September lightning storms plying across the canyons and mountains. Depending on the plant community composition, structural configuration, and buildup of plant biomass, fire resulted from ignitions with varying intensities and extent across the landscape. Shorter return intervals between fire events often resulted in less dramatic changes in plant composition[22]. The fires burned from 1 to 47 years apart, with most at 5- to 20-year intervals[23]. With infrequent return intervals, plant communities tended to burn more severely and are replaced by vegetation different in composition, structure, and age[24]. Native plant communities in this region developed under the influence of fire, and adaptations to fire, are evident at the species, community, and ecosystem levels. Fire history data (from fire scars and charcoal deposits) suggest fire has played an important role in shaping the vegetation in the Columbia Basin for thousands of years[25].

[20] http://www.fs.fed.us/fire/fireuse/education/terms/fire_terms_pg5.html
[21] As described in the State of Idaho Hazard Mitigation Plan 2010
[22] Johnson 1998
[23] Barrett 1979
[24] Johnson et al. 1994
[25] Steele et al. 1986, Agee 1993

Historic Frequencies

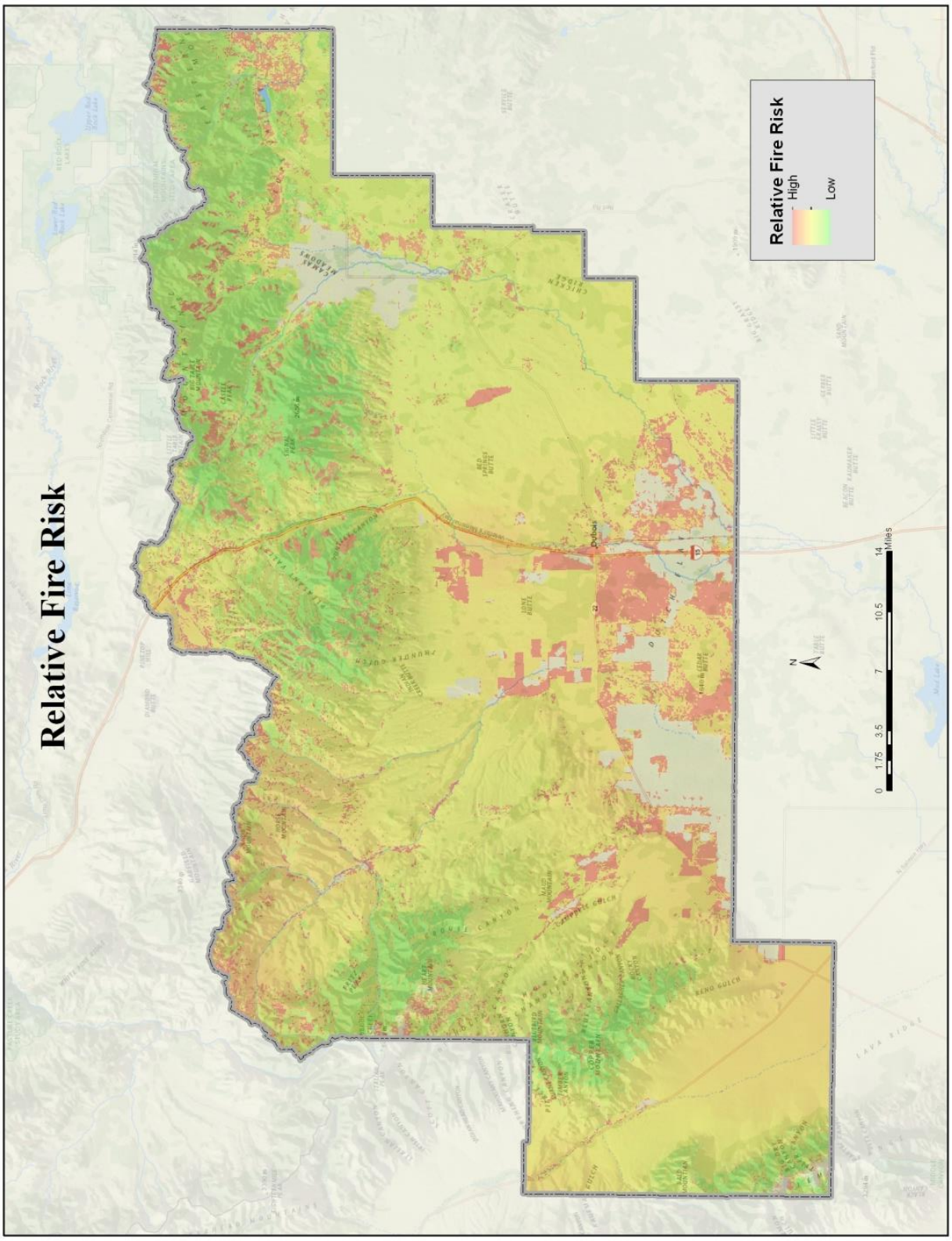
Wildfires occur frequently in Clark County. The following table details the return interval of wildfires by acreage burnt. A 10 year wildfire burns approximately 4,702 acres. The largest wildfire in the study period burned over 43,000 acres in 1981.

Return Period (years)	Probability (%)	Maximum Annual Wildfire Size (Acres)
1.05	95.2	0
1.11	90.1	0
1.25	80	1
2	50	25
5	20	704
10	10	4,702
25	4	39,647
50	2	167,549
100	1	638,916
200	0.5	2,257,304

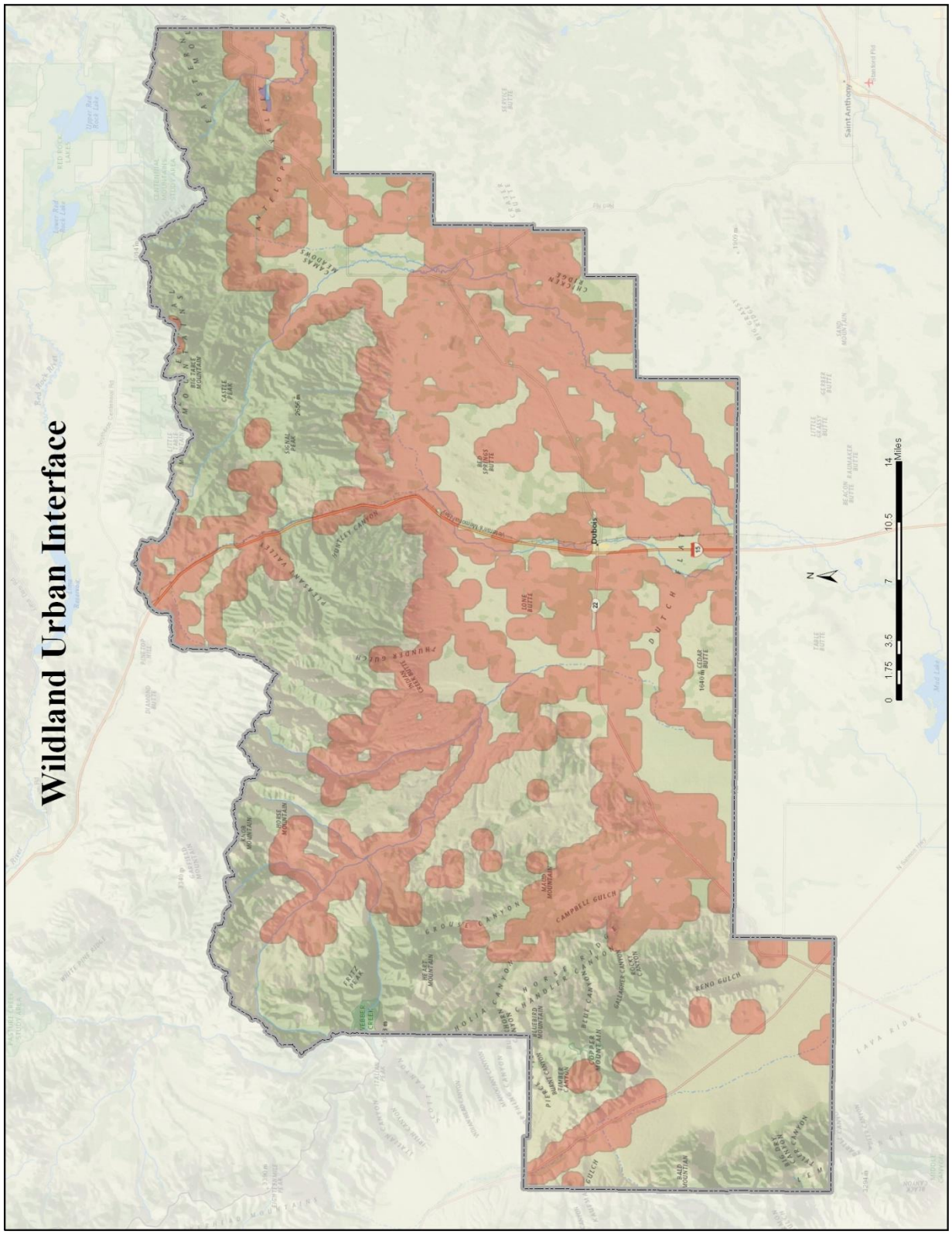
Wildfire Return Interval

The Relative Wildland Fire Risk (i.e., the likelihood that a given area will burn) was analyzed by integrating fire ignition data, fire weather data (e.g., temperature, humidity, wind), and potential rate-of-spread considering the dominant surface fuel model. It was assumed that areas were more likely to experience wildland fire if they were in locations having: (1) a higher ignition probability; (2) a higher frequency of extreme fire weather; and (3) fuels having higher rates-of-spread (ROS). All three variables contribute equally to burn probability. Also it was assumed that wildland fires do not occur on the following land cover classes: agriculture, rock, urban, and water. There were five classes rating relative wildland fire risk in Idaho from "low" to "high". Areas rated as "high" are likely to have more fire ignitions, higher rates of spread, and are relatively hotter, drier, and windier in August.

The relative fire risk in Clark County is shown in below.



Relative Fire Risk



Wildland Urban Interface Map

Impacts

Wildland fires threaten the lives of anyone in their path including hikers, campers, and other recreational users and, where suppression efforts are made, firefighters. Enormous volumes of smoke and airborne particulate materials are produced that can affect the health of persons for many miles downwind. Nearer to the fire, smoke reduces visibility, disrupting traffic, and increasing the likelihood of highway accidents. As a result of wildland fire there may be changes in water quality in the area, and erosion rates may increase along with increased rainfall runoff and flash flood threat, and decreased rainfall interception and infiltration. Indirect impacts include losses to tourism, recreational and timber interests, and loss of wildlife habitat. Wildland Urban Interface fires have most or all of the above impacts as well as those of structural fires including injury and loss of life, structures, and contents. Agricultural losses may also be sustained including livestock, crops, fencing, and equipment.

Loss Estimates

Losses from wildfire were calculated using the structures in the wildland urban interface (WUI) the total exposure. There are 153 structures in the WUI. Most of them are outbuildings, with about 20% being residential structures. There is $14,601,167 in structures in the WUI. The mean value of a structure is $6,871.

These structures are dispersed throughout the County, so it is improbable that they would all be affected by the same event. It is estimated that losses for a single event could run into the millions of dollars.

Hazard Evaluation

Wildfires		
Wildfire	**Rating**	**Description**
Historical Occurrence	3	High
Probability	4	High
Vulnerability	2	Limited
Spatial Extent	3	Critical
Magnitude	4	Catastrophic
Total	**16**	**High**

Vector Borne Diseases

"Vector-borne disease" is the term commonly used to describe an illness caused by an infectious microbe that is transmitted to people by blood-sucking arthropods. The arthropods (insects or arachnids) that most commonly serve as vectors include: 1.) blood sucking insects such as mosquitoes, fleas, lice, biting flies and bugs, and 2.) blood sucking arachnids such as mites and ticks. The term “vector” refers to any arthropod that transmits a disease through feeding activity.

Vectors typically become infected by a disease agent while feeding on infected vertebrates (e.g. birds, rodents, other larger animals, or humans), and then pass on the microbe to a susceptible person or other animal. In almost all cases, an infectious microbe must infect and multiply inside the arthropod before the arthropod is able to transmit the disease through its salivary glands. The most common vector-borne diseases in Idaho are carried by mosquitoes and ticks.

West Nile and other mosquito-borne viruses:

Description

West Nile virus (WNV) is transmitted to people, birds, and other animals by the bite of an infected mosquito. This virus can cause serious illness in people of any age, but especially in people over the age of fifty or those with other underlying medical conditions. The best form of protection is by avoiding mosquito bites.

West Nile virus infections occur in the summer and fall in Idaho when mosquitoes are active. WNV does not occur in northern states when it is too cool for mosquitoes to survive. In southern states with warmer climates and mosquitoes present year-round, the risk of infection may still be present in the winter months.

Historical Frequencies

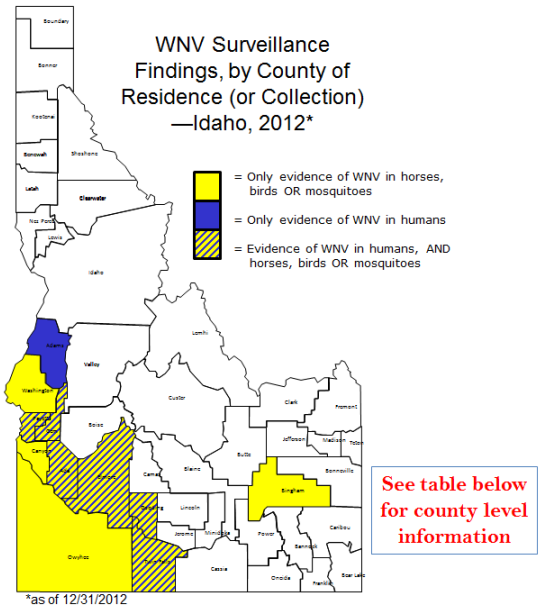
Locally-acquired mosquito-borne human infections were first recorded in Idaho in 2004. In 2006, Idaho led the nation in reports of human illness associated with WNV with 996 cases being reported to the State Health Department. In addition to infected people, WNV was also detected in 338 horses, 127 birds, and numerous mosquitoes. The table below details the reported number of West Nile cases in Clark County 2004-2011.

Date	Human	Horse/other mammal	Bird	Mosquitoes
2004	0	0	0	Not Tested
2005	0	0	0	Not Tested
2006	0	2	0	Not Tested
2007	0	0	0	Not Tested
2008	0	0	0	Not Tested
2009	0	0	0	Not Tested
2010	0	0	0	Not Tested
2011	0	0	0	Not Tested
2012	0	0	0	Not Tested

Reported Cases of WNV in Clark County

Impacts

Symptoms of West Nile virus may include a fever, headache, body aches, a rash, and swollen glands and may last for days or linger for weeks to months. Serious illness infecting the brain or spinal cord can occur in some individuals. Although anyone can experience the more severe form of the disease, it tends to occur in people over the age of 50, or those with other underlying medical conditions or weakened immune systems. The severe symptoms may include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness, and paralysis. These symptoms may last several weeks or more, and neurological effects may be permanent. Usually, symptoms occur from five to fifteen days after the bite of an infected mosquito. There is no specific treatment for infection, but hospitalization and treatment of symptoms may improve the chances of recovery for severe infections. There is no vaccine available for humans.



West Nile Surveillance Findings 2012

Loss Estimates

Losses brought about by the effects of West Nile Virus are centered on loss of income for those affected by the virus, as well as a loss of productivity by businesses. Death has occurred in Idaho from the West Nile Virus both in humans and animals.

Hazard Evaluation

West Nile Virus		
Profile Category	**Rating**	**Description**
Historical Occurrence	1	Low
Probability	2	Low
Vulnerability	1	Negligible
Spatial Extent	1	Negligible
Magnitude	1	Negligible
Total	**6**	**Low**

Lyme and other Tick-borne Diseases:

Tick-borne diseases, including Lyme disease and Rocky Mountain spotted fever are serious public health problems, infecting tens of thousands in the U.S. each year. The CDC is working closely with local communities, developing innovative control approaches, and researching improved diagnostics.[26]

[26] http://www.cdc.gov/ncezid/dvbd/

Historical Frequencies

Lyme disease information for Arizona, Idaho, Montana, Nevada, and Utah is very limited. The disease has been reported in all of these states but the numbers of cases have been few, either because the disease is indeed rare or reporting procedures are flawed.

Reporting requires meeting CDC testing criteria which are based on East Coast Lyme cases. The differing strains of Lyme disease found on the West Coast may make this reporting procedure of questionable value and misleading to both patients and physicians. For this reason, the relatively few CDC cases that have been reported for surveillance purposes are omitted.

Information provided by Idaho health care authorities is virtually nonexistent. Lyme disease and other tick borne infections are reportable in Idaho. It is presumed that Lyme cases must meet CDC testing criteria which results in very low numbers of reported cases.[27]

Common bullseye rash pattern associated with Lyme disease

Impacts

Lyme disease is the most common tick-borne disease in the Northern Hemisphere. *Borrelia* is transmitted to humans by the bite of infected ticks belonging to a few species of the genus *Ixodes* ("hard ticks"). Early symptoms may include fever, headache, fatigue, depression, and a characteristic circular skin rash called erythema migrans (EM). Left untreated, later symptoms may involve the joints, heart, and central nervous system. In most cases, the infection and its symptoms are eliminated by antibiotics, especially if the illness is treated early. Delayed or inadequate treatment can lead to the more serious symptoms, which can be disabling and difficult to treat.

Loss Estimates

Lyme disease occurs very infrequently however, for those individuals who contract the disease the losses of wages and the cost of requisite medical care can be significant.

Hazard Evaluation

Lyme Disease/Tick-borne Disease		
Profile Category	**Rating**	**Description**
Historical Occurrence	0	Low
Probability	2	Low
Vulnerability	1	Negligible
Spatial Extent	1	Negligible
Magnitude	1	Negligible
Total	**5**	**Low**

[27] http://lyme.kaiserpapers.org/lyme-disease-in-interior-western-states.html

H5N1 "Bird Flu"

The possibility that bird flu virus may mutate into a new form of human flu that would be easily spread person to person is of greatest concern. Some migratory waterfowl carry the H5N1 virus with no apparent harm, but transmit the virus to susceptible domestic poultry. The highly lethal H5N1 outbreak among domestic poultry is widespread and uncontrolled, and has directly infected a small number of humans. People who have close contact with infected birds or surfaces that have been contaminated with droppings from infected birds are at risk of becoming infected themselves.

Historical studies indicate that poultry consumption in infected areas is not a risk factor, provided the food was thoroughly cooked and the person was not involved in food preparation. Simply traveling to a country with ongoing outbreaks in poultry or sporadic human cases does not place a traveler at increased risk of infection, provided the person does not visit live poultry markets, farms, or other environments where exposure to diseased birds may occur. More than 200 million birds in affected countries have either died from the disease or were killed in order to try to control the outbreak.

Many Asian countries are currently dealing with bird flu outbreaks including Cambodia, China, Indonesia, Japan, Laos, South Korea, Thailand, and Vietnam. Bird flu continues to spread geographically from its original focus in Asia. Further spread of the virus along migratory routes of wild water fowl is anticipated. So far, there has been no sustained person-to-person spread of the disease. However, a few isolated cases of possible human-to-human spread between family members are currently under investigation.

World Map of Bird Flu-affected areas 2012

The reported symptoms of bird flu in humans range from typical influenza-like symptoms (e.g., fever, cough, sore throat, and muscle aches), to eye infections (conjunctivitis), pneumonia, acute respiratory distress, viral pneumonia, and other severe and life threatening complications. Diarrhea, vomiting, abdominal pain, chest pain, and bleeding from the nose and gums have also been reported as early symptoms in some cases. In many cases, health deteriorates rapidly leading to a high percentage of death in those infected.

Hazard Evaluation

H5N1 "Bird Flu"		
Profile Category	**Rating**	**Description**
Historical Occurrence	0	Low
Probability	1	Rare
Vulnerability	3	Critical
Spatial Extent	3	Critical
Magnitude	4	Catastrophic
Total	**11**	**Low**

Communicable Disease

Description

Epidemic is defined as a disease that appears as new cases in the human population at a rate, during a given time period and location, that substantially exceeds the number expected. It is, thus, a relative term and there is no quantitative criterion for designating a health crisis as an epidemic. In addition to its application to infectious diseases, the term is sometimes used to describe outbreaks of other adverse health effects, including those stemming from chemical exposure, sociological problems, and psychological disorders. A "pandemic" is a worldwide epidemic, while the term "outbreak" may be applied to more geographically limited medical problems as, for instance, in a single community rather than statewide or nationwide. The term "cluster" is often used with reference to non-communicable diseases.

Health agencies closely monitor for diseases having potential to cause an epidemic, and seek to develop immunizations and eliminate vectors. While this effort has been remarkably successful, there are many diseases of concern, and the HIV/AIDS pandemic is still not controlled despite more than 25 years of effort since recognition of the disease in 1981. When disease control efforts are relaxed, diseases controlled in the past can resurface and become an epidemic again (i.e. whooping cough).

Pandemic influenza versus regular influenza season

A flu pandemic has little or nothing in common with the annual flu season. A pandemic flu would be a new strain and a much more serious and contagious flu virus. Humans would have no natural resistance to a new strain of influenza. Also, there is a vaccine for seasonal flu, but there is no vaccine available at this time for a pandemic flu.

If a new, highly contagious strain of influenza began to infect humans, it would likely cause widespread illness and death within a matter of months, and could last up to two years. The Centers for Disease Control and Prevention (CDC) predict that as much as 25% to 30% of the U.S. population could be sick, hospitalized, and in many cases die as a result of severe illness.

Although the Federal government is stockpiling large quantities of medical supplies and antiviral drugs, no country in the world has enough anti-virals to protect their citizens. There currently is no vaccine to protect humans against a pandemic influenza virus; however, vaccine development efforts are under way to protect humans against the current H5N1 bird flu virus.

Severe Acute Respiratory Syndrome (SARS)

Severe acute respiratory syndrome (SARS) is a viral respiratory illness caused by a corona virus, called SARS-associated corona virus (SARS-CoV). SARS was first reported in Asia in February 2003. Over the next few months, the illness spread to more than two dozen countries in North America, South America, Europe, and Asia before the SARS global outbreak of 2003 was contained.

According to the World Health Organization (WHO), a total of 8,098 people worldwide became sick with SARS during the 2003 outbreak. Of these, 774 died. In the United States, only eight people had laboratory evidence of SARS-CoV infection. All of these people had traveled to other parts of the world with SARS. SARS did not spread more widely in the community in the United States.

In general, SARS begins with a high fever (temperature greater than 100.4°F [>38.0°C]). Other symptoms may include headache, an overall feeling of discomfort, and body aches. Some people also have mild respiratory symptoms at the outset. About 10 percent to 20 percent of patients have diarrhea. After 2 to 7 days, SARS patients may develop a dry cough. Most patients develop pneumonia.

The main way that SARS seems to spread is by close person-to-person contact. The virus that causes SARS is thought to be transmitted most readily by respiratory droplets (droplet spread) produced when an infected person coughs or sneezes. Droplet spread can happen when droplets from the cough or sneeze of an infected person are propelled a short distance (generally up to 3 feet) through the air and deposited on the mucous membranes of the mouth, nose, or eyes of persons who are nearby. The virus also can spread when a person touches a surface or object contaminated with infectious droplets and then touches his or her mouth, nose, or eye(s). In addition, it is possible that the SARS virus might spread more broadly through the air (airborne spread) or by other ways that are not now known.

Historic Communicable Disease Outbreak Events

The 1918 -1920 Spanish Flu:

The first cases of Spanish Flu were reported in Clark County (northwest of Boise) on September 30, 1918. Within three weeks, the disease was raging all across the State. The numbers of deaths in the State and in Clark County are unknown, but it is estimated that 675,000 Americans died during the epidemic and that 20 to 40 million died worldwide.

Asian Flu 1957 -1958:

First identified in China, this virus caused roughly 70,000 deaths in the United States during the 1957-58 seasons. Because this strain has not circulated in humans since 1968, no one under 30 years old has immunity to this strain.

Hong Kong Flu 1968-1969:

First detected in Hong Kong in early 1968 and spread to the United States later that year. The Hong Kong Flu killed about 34,000 people in the United States and one million people worldwide.

Swine Flu – 2009

Novel influenza A (H1N1) is a new flu virus of swine origin that was first detected in April, 2009. The virus is infecting people and is spreading from person-to-person, sparking a growing outbreak of illness in the United States. An increasing number of cases are being reported internationally as well.

It's thought that novel influenza A (H1N1) flu spreads in the same way that regular seasonal influenza viruses spread; mainly through the coughs and sneezes of people who are sick with the virus.

It's uncertain at this time how severe this novel H1N1 outbreak will be in terms of illness and death compared with other influenza viruses. Because this is a new virus, most people will not have immunity to it, and illness may be more severe and widespread as a result. In addition, currently there is no vaccine to protect against this novel H1N1 virus. The 2009 totals for cases and deaths in Idaho are as follows:

- Official Cases: 166
- Unofficial Cases: 1165
- Deaths: 22

The death rate per infection of confirmed cases for the United States was 9.39%. The death rate of confirmed cases in Idaho was 7.5%.

Impacts

The following are potential impacts from a worldwide pandemic event. The impacts in Clark County would be similar on a local level.

- Rapid Spread
- Health Care Systems Overloaded
- Medical Supplies Inadequate
- Economic and Social Disruption

Loss Estimates

Historically, epidemics have claimed far more lives than any other type of disaster. While modern epidemiology and medical advances make the decimation of populations much less likely, new forms of disease continue to appear. The potential, therefore, exists for epidemics to cause widespread loss of life and disability, overwhelm medical resources, and have tremendous economic impacts.

Hazard Evaluation

Communicable Disease		
Profile Category	**Rating**	**Description**
Historical Occurrence	1	Low
Probability	2	Low
Vulnerability	3	Critical
Spatial Extent	3	Critical
Magnitude	4	Catastrophic
Total	**13**	**Medium**

Technological (Manmade) Hazards

Structural Fire

Description

Structural fires produce high heat, toxic gases, and particulate material as smoke and soot. The heat produced or burning debris can, in turn, cause additional fires. Toxic gases and smoke are extreme hazards in the interior of burning structures and may also be a threat downwind of the structure. Where the building contents include toxic materials, the downwind threat can extend a mile or more. Burning structures may collapse, injuring persons inside or nearby, and floors or roofs may give way beneath those walking on them. Burning structures present electrical, explosion, and flashover hazards, and partially burned structures may, themselves, be physical hazards even after the fire is extinguished.

Historic Frequencies

Structure fires are extremely common in Clark County as they are across the nation.

The Clark County Fire Department keeps no official records on calls or events. It was estimated by the Clark County Emergency Manager that there is one (1) structure fire a year in the City of Dubois and one (1) in the County each year.

Impacts

Indirect dollar losses, as is often the case, may be much larger than direct losses. Costs also include those for development and enforcement of fire codes and maintaining fire response capabilities. Firefighters are, additionally, at risk from such hazards as physical exhaustion and cardiac stresses, heat exhaustion or heat stroke, acute and chronic health effects from toxic exposures, hearing damage, and injuries from many sources.

Loss Estimates

Losses from structural fires fall into two categories; the cost of response, and the cost of damage to property. Damage losses are estimated in the ~$200,000 range annually. Response costs are estimated at ~$75,000 annually.

Hazard Evaluation

Structure Fire		
Profile Category	**Rating**	**Description**
Historical Occurrence	1	Low
Probability	4	High
Vulnerability	1	Negligible
Spatial Extent	1	Negligible
Magnitude	2	Limited
Total	**9**	**Low**

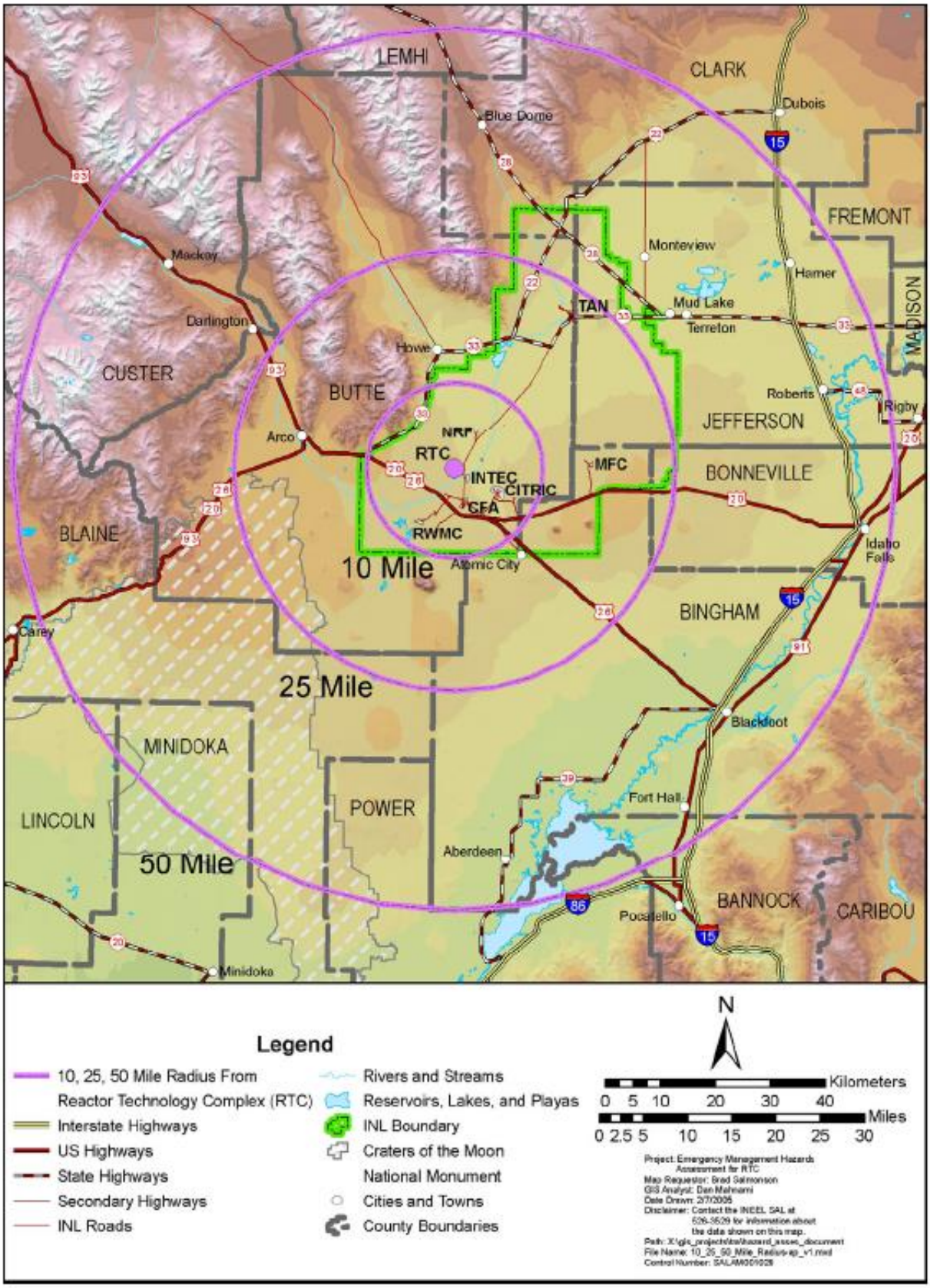
Nuclear Event

Description

A "nuclear event" is defined as an incident involving a nuclear reaction, nuclear fission, or nuclear fusion. Such an incident must involve "fissionable" materials, defined as materials containing isotopes with nuclei capable of splitting. Further, the most probable incidents involve "fissile" materials, defined as materials containing isotopes capable of sustaining a nuclear fission chain reaction. Such reactions release heat, radiation, and radioactive contamination in extremely large quantities relative to the amount of material reacting. Examples of nuclear events include nuclear weapons detonations, nuclear reactor incidents, and nuclear (fissile) material production, handling, or transportation incidents. A nuclear detonation as a part of an attack scenario is, perhaps, the ultimate technological disaster. The hazards are well-known and vividly described in FEMA publications[28]. They include shock wave, enormous heat, and the spread of fallout (radioactive contamination). Other nuclear events would not involve a nuclear blast, but still have the potential to produce widespread and long-term consequences as exemplified by the 1986 Chernobyl accident[29]. Of primary concern is the release of radioactive contamination in the form of airborne gases and particulate material. This radioactive material has the potential to travel great distances, and particulate material eventually is deposited in the environment and incorporated into the food chain. Such contamination may remain hazardous for many years. Direct radiation exposure is also a hazard in relatively close proximity to a nuclear event, as is exposure to high thermal energy. Nuclear events are virtually always caused by intentional or unintentional human actions.

The Idaho National Laboratory poses a credible hazard to southwestern parts of Clark County. The locations of the INL and of the RTC facility within the Site boundary are shown in the figure below. The table below also provides the Protective Action Distance for a radiological release from the RTC facility is given as 115 km (approximately 69 miles). This indicates a threat to crops and grazing lands in southwestern portions of Clark County.

[28] http://www.fema.gov/areyouready/nuclear_blast.shtm
[29] http://www.iaea.org/NewsCenter/Focus/Chernobyl/index.html



INL Protection Action Distances

INL Hazards Assessment Maximum Protective Action Distances (PAD)		
Facility	**Non-Rad PAD**	**Rad PAD**
Research Center (IRC)	0.1 km	None
Radioactive Waste Management Complex (RWMC)	None	15 km
Reactor Technology Complex (RTC)	7.8 km	115 km
Idaho Nuclear Technology and Engineering Center (INTEC)	1.6 km	16 km
Central Facilities Area (CFA)	0.5 km	None
Transportation	*	*
MATERIALS AND FUELS COMPLEX (MFC)	1.7 km	4.5 km
AREA NORTH (TAN)	**	0.03 km

* INL asserts that associated transportation activity is within "normal" limits for highway traffic and uses the DOT ERG for its planning basis.

** Unclear but well within INL Site boundary

INL Hazards Assessment Maximum Protective Action Distances
Source – U. S. Department of Energy Idaho Operations Office

Historical Frequencies

There are no recorded nuclear events in Clark County

Impacts

The ingestion pathway planning zone is the area within a 69-mile radius of Reactor Technology Complex that includes all food production, processing, and marketing facilities.

There are two types of responses meant to prevent or limit public exposure through the ingestion pathway:[30]

1. Preventive protective action - Actions taken by farmers to prevent contamination of milk, water, and food products (i.e. shelter dairy animals and put on stored feed and covered water).

2. Emergency protective actions – Actions taken by public officials to address contaminated milk, water, and food products, and divert such products from animal and human consumption (i.e., embargoes). The routes of ingestion are not as direct as those of the plume pathway. Ingestion exposure remains a longer-term problem because vegetables, fruit, trees, and grains may take up radio-nuclides from the soil. They may also be ingested by wild game and fish that may in turn, be eaten by humans.

[30] http://www.hsem.state.mn.us/uploadedfile/dir_hand/EMDH_C- 13_RadiologicalEmergencyPreparednessProgram.pdf

Loss Estimates

Indirect costs in such a situation would almost certainly exceed those of clean-up. In addition, because the stigma carried by radiation and radioactive with the general public, affected areas and persons may be shunned out of proportion with the actual hazard. In fact, the social and political impacts of a nuclear event may well greatly exceed any justifiable limits.

Hazard Evaluation

Nuclear Event		
Profile Category	**Rating**	**Description**
Historical Occurrence	0	Low
Probability	1	Rare
Vulnerability	2	Critical
Spatial Extent	3	Catastrophic
Magnitude	4	Catastrophic
Total	**10**	**Low**

Hazardous Material Event

Description

Substances that, because of their chemical or physical characteristics, are hazardous to humans and living organisms, property, and the environment are regulated by the U.S. Environmental Protection Agency (EPA) and, when transported in commerce, by the U.S. Department of Transportation (DOT). EPA regulations address "hazardous substances" and "extremely hazardous substances".

EPA chooses to specifically list hazardous substances and extremely hazardous substances rather than providing objective definitions. Hazardous substances, as listed, are generally materials that, if released into the environment, tend to persist for long periods of time and pose long-term health hazards for living organisms. They are primarily chronic, rather than acute health hazards. Regulations require that spills of these materials into the environment in amounts at or above their individual "reportable quantities" must be reported to the EPA. Extremely hazardous substances, on the other hand, while also generally toxic materials, are acute health hazards that, when released, are immediately dangerous to the life of humans and animals, as well as cause serious damage to the environment. There are currently 355 specifically listed extremely hazardous substances listed along with their individual "threshold planning quantities" (TPQ). When facilities have these materials in quantities at or above the TPQ, they must submit "Tier II" information to appropriate state and/or local agencies to facilitate emergency planning.

The Department of Transportation (DOT) regulations provide the following definition for the term "hazardous material":

> *Hazardous material* means a substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and has designated it as hazardous under section 5103 of Federal Hazardous Materials Transportation Law (49 U.S.C. 5103). The term includes hazardous

substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (see 49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions in part 173 of subchapter C of this chapter.

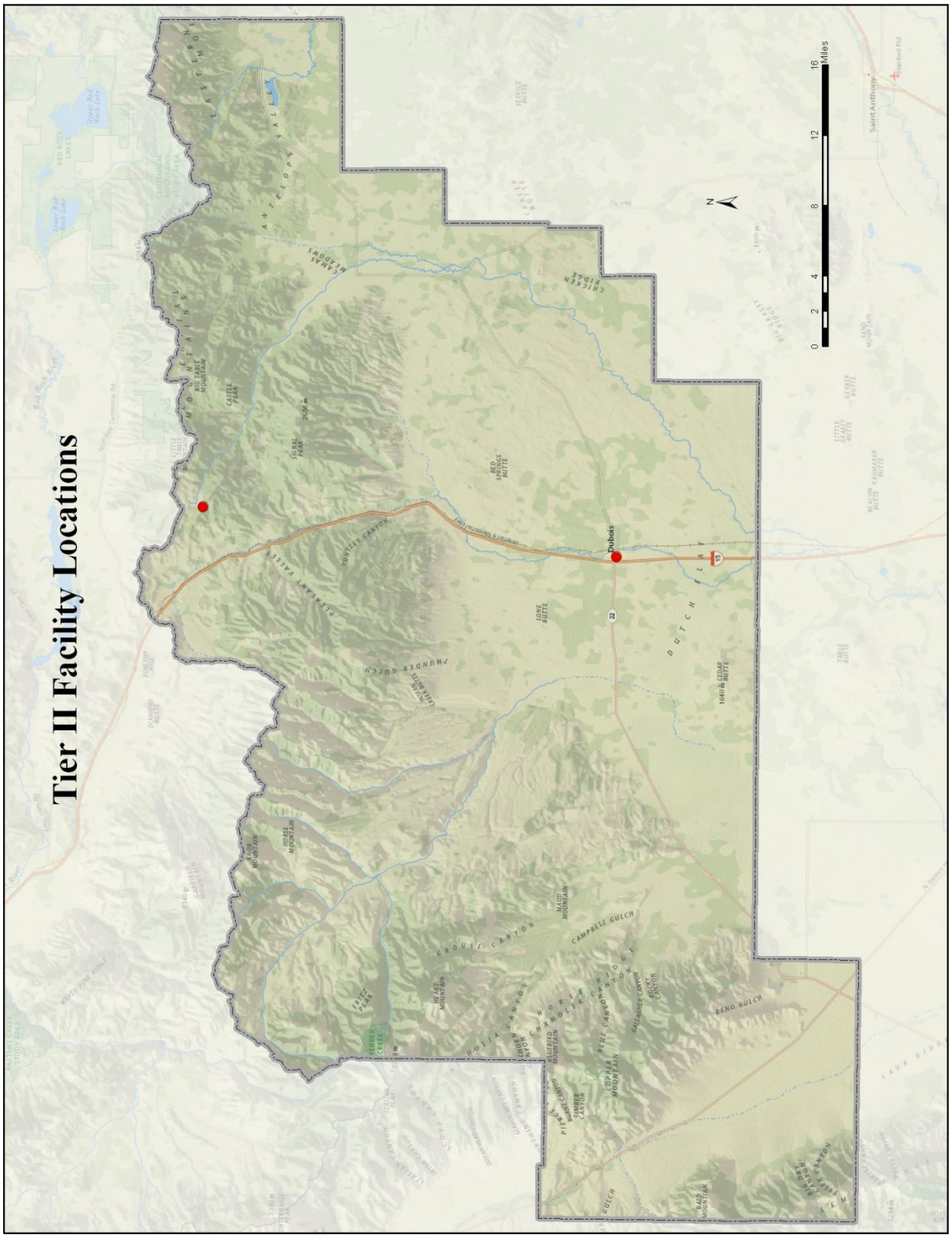
When a substance meets the DOT definition of a hazardous material, it must be transported under safety regulations providing for appropriate packaging, communication of hazards, and proper shipping controls.

In addition to Environmental Protection Agency (EPA) and DOT regulations, the National Fire Protection Association (NFPA) develops codes and standards for the safe storage and use of hazardous materials. These codes and standards are generally adopted locally and include the use of the NFPA 704 standard for communication of chemical hazards in terms of health, fire, instability (previously called "reactivity"), and other special hazards (such as water reactivity and oxidizer characteristics).

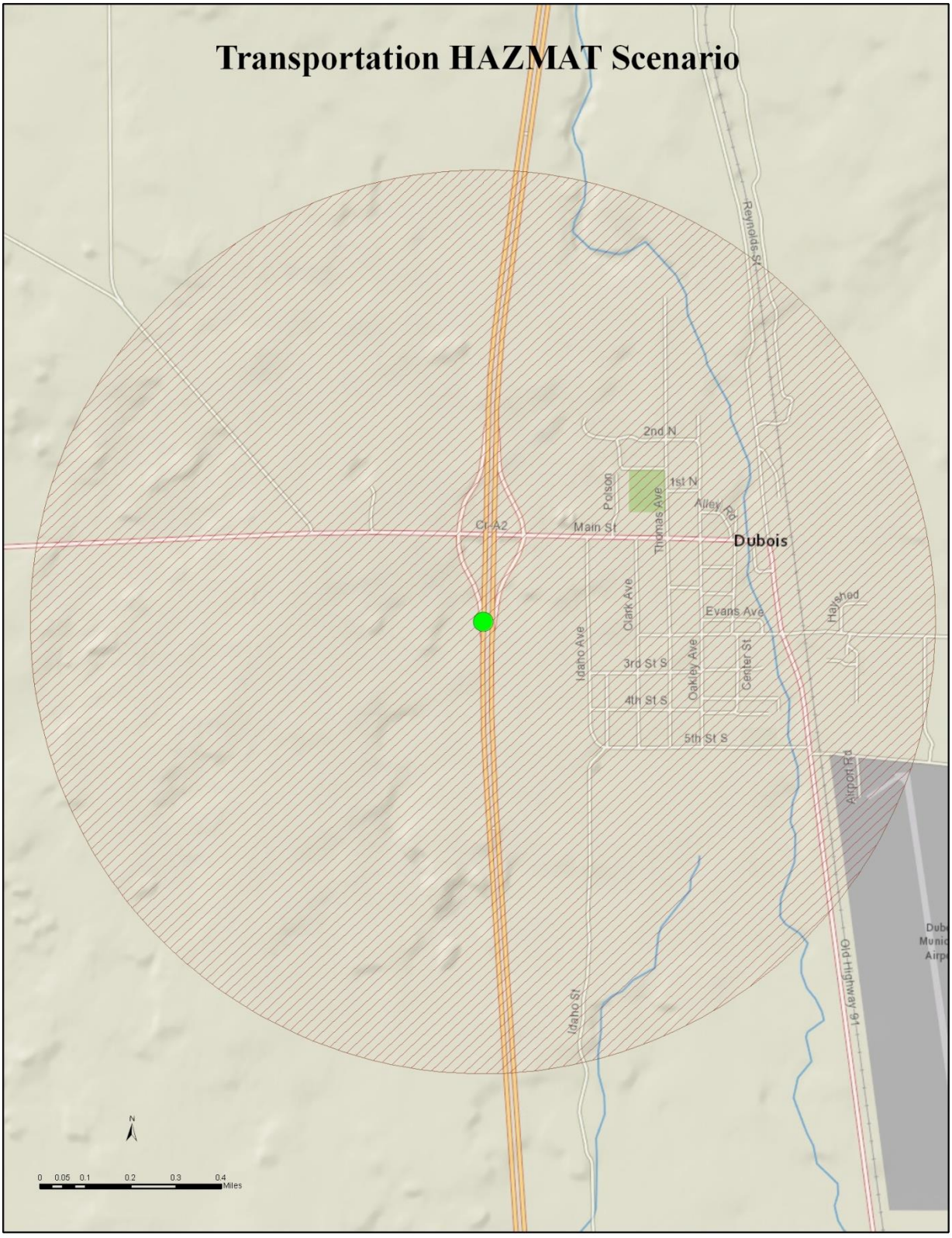
Diamond-shaped NFPA 704 signs ranking the health, fire, and instability hazards on a numerical scale from zero (least) to four (greatest), along with any special hazards, are usually required to be posted on chemical storage buildings, tanks, and other facilities. Similar NFPA 704 labels may also be required on individual containers stored and/or used inside facilities.
While somewhat differently defined by the above organizations, the term "hazardous material" may be generally understood to encompass substances that have the capability to harm humans and other living organisms, property, and/or the environment. There is also no universally accepted, objective definition of the term "hazardous material event." A useful working definition, however, might be framed as: Any actual or threatened uncontrolled release of a hazardous material, its hazardous reaction products, or the energy released by its reactions that poses a significant risk to human life and health, property, and/or the environment.

Facility Name	Street Address	Chemicals	PAD (ft)
Amps Substation	20 miles West of Dubois	Sulfuric Acid	150
ITD 2005-5C-Dubois	170 S. Idaho St	Diesel Fuel, Unleaded Gasoline	2,640
RDO Processing, LLC (formerly Blaine Larsen Farms)	72 Dehigh Road	Propane	5,280
Wagoner Oil Company	Reynolds Street	Diesel Fuel #1, Diesel Fuel #2, Unleaded Gasoline	2,640

Tier II Facilities



Clark County Hazardous Materials Facility PADs



Hazardous Materials Transportation Scenario

Historic Frequencies

The following table details the reported hazardous materials incidents that have occurred in Clark County for the years 2006 – 2012, a six year period.

Incident #	Date	Substance/Product Identification	Level
H-2008-00028	02/05/2008	Oil	Level I
H-2008-00332	12/01/2008	Diesel	Level I
H-2011-00132	07/01/2011	Mineral Oil	Regulatory
H-2012-00218	10/09/2012	Diesel	Level I- No Conference Call

Historic HazMat Incidents

Hazardous materials incidents occur frequently in Clark County.

Impacts

Because hazardous materials are so widely used, stored, and transported, a hazardous material event could take place almost anywhere. Further, many hazardous materials are used, stored, and transported in very large quantities so that the impact of an event may be widespread and powerful. Regulations and safety practices make such large scale events unlikely, but smaller scale incidents may have severe impacts including:

- Human deaths, injuries, and permanent disabilities
- Livestock/animal deaths
- Destruction of vegetation and crops
- Property damage and destruction
- Pollution of groundwater, drinking water supplies, and the environment
- Contamination of foodstuffs, property, land, and structures
- Temporary or long-term closure of transportation routes and/or facilities
- Loss of business and industrial productivity
- Utility outages
- Clean-up and restoration costs
- Losses and inconvenience due to evacuation
- Loss of valuable chemical product

A sample hazardous material transportation incident was used to show the potential impacts of this type of incident. The scenario is a transportation incident that occurs on I-15 at the Dubois Exit in the southbound lane. The default PAD for the scenario is 1 mile. The following impacts were calculated for this scenario:

- 56 Census Blocks Affected
- 681 People
- 268 Housing Units
- The Following Infrastructure:
    - Dubois Commercial District
    - Clark County Courthouse
    - Dubois City Hall
    - Dubois Municipal Airport

- Lindy-Ross Elementary School
- Clark County Junior/Senior High School

Loss Estimates

Losses due to the release of Hazardous Materials are linked specifically to two (2) areas: 1) Response, including evacuation, and 2) Clean Up. Releases of hydrocarbon fuels are a constant threat. Cleanup of these releases is the responsibility of the spiller. Response to releases is reimbursed to the responding jurisdiction by the Idaho Bureau of Homeland Security Hazardous Materials Division.

Hazard Evaluation

Hazardous Materials		
Profile Category	**Rating**	**Description**
Historical Occurrence	1	Low
Probability	2	Low
Vulnerability	2	Limited
Spatial Extent	2	Limited
Magnitude	3	Critical
Total	**10**	**Low**

Riot/Demonstration/Civil Disorder

Description

State of Idaho statutes define "riot" as follows (Idaho Statute 18-6401 – RIOT DEFINED):

> Any action, use of force or violence, or threat thereof, disturbing the public peace, or any threat to use such force or violence, if accompanied by immediate power of execution, by two (2) or more persons acting together, and without authority of law, which results in:
>
> (a) physical injury to any person; or
> (b) damage or destruction to public or private property; or
> (c) a disturbance of the public peace; is a riot.

Also defined in the statutes (Idaho Statute 18-8102 – DEFINITIONS) is "civil disorder":

> "Civil disorder" means any public disturbance involving acts of violence by an assemblage of two (2) or more persons which acts cause an immediate danger to or result in damage or injury to the property or person of any other individual.

The term "demonstration" is not defined in this context in the Idaho statutes but the following is given for "unlawful assembly" (Idaho Statute 18-6404 - UNLAWFUL ASSEMBLY DEFINED):

> Whenever two or more persons assemble together to do an unlawful act, and separate without doing or advancing toward it, or do a lawful act in a violent, boisterous, or tumultuous manner, such assembly is an unlawful assembly.

Riots are generally thought of as being spontaneous, violent events, whereas demonstrations are usually planned events and are usually intended to be non-violent. Riots seem often to be motivated by frustration and anger, usually over some real or perceived unfair treatment of some group. There are instances, however, where riots have begun during celebrations and other events where the only initiating factor seems to have been the gathering of a crowd of people. The potential for rioting, then, exists any time people gather, but a number of factors are associated with the increased probability one will occur including:

- Drug and alcohol use
- Youth of crowd members
- Low socio-economic status of members
- High level of emotions
- A history of rioting on the same or similar previous occasions
- Initiating event, person, or persons

Once violent or illegal activity is initiated, it escalates, possibly at least partly because of the perception that, because all are acting together, there is little probability that any given individual will be arrested or otherwise suffer consequences. Riots may range in scope from a very few people in a small area to thousands over an entire city. Once initiated, large riots are very difficult to suppress, particularly in the United States where law enforcement is constrained by constitutional guarantees, as well as personnel limits. Early and decisive action by law enforcement may be effective in suppressing a riot, but police actions may also lead to further escalation.

Historic Frequencies

There are no recorded riot events in Clark County.

Impacts

Riots may result in loss of life, injury, and permanent disability (to participants, bystanders, and law enforcement personnel), as well as looting, vandalism, setting of fires, and other property destruction. Law enforcement, emergency medical services and medical facilities, and personnel, firefighting, and other community resources may be overwhelmed and unavailable to the community at large. Transportation routes may be closed, infrastructure and utilities damaged or destroyed, and public buildings attacked, damaged, or destroyed. Social and psychological effects may also cause great impacts. Lingering fear and resentment can be long-lasting and can greatly impair the ability of a community to function politically, socially, and economically.

Loss Estimates

Clark County has experienced civil disobedience in the past that is believed to be tied to the logging and cattle industries. These events were fairly minor, but did incur losses.

Hazard Evaluation

Civil Disobedience		
Profile Category	**Rating**	**Description**
Historical Occurrence	1	Low
Probability	1	Rare
Vulnerability	1	Negligible
Spatial Extent	1	Negligible
Magnitude	1	Negligible
Total	**5**	**Low**

Terrorism

Description

Terrorism is an unlawful act under both Federal and State of Idaho statutes. Definitions are as follows:

U.S. Code : Title 18 : Section 2331. Definitions:

(5) the term "domestic terrorism" means activities that:
(A) involve acts dangerous to human life that are a violation of the criminal laws of the United States or of any State;
(B) appear to be intended
(i) to intimidate or coerce a civilian population;
(ii) to influence the policy of a government by intimidation or coercion; or
(iii) to affect the conduct of a government by mass destruction, assassination, or kidnapping; and
(C) occur primarily within the territorial jurisdiction of the United States.

Idaho Statute 18-8102 – DEFINITIONS

(5) "Terrorism" means activities that:
(a) Are a violation of Idaho criminal law; and
(b) Involve acts dangerous to human life that are intended to:
(i) Intimidate or coerce a civilian population;
(ii) Influence the policy of a government by intimidation or coercion; or
(iii) Affect the conduct of a government by the use of weapons of mass destruction, as defined in section 18-3322, Idaho Code.

The Federal Emergency Management Agency gives the following as general information on terrorism[31]:

"Terrorism is the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion, or ransom.

Terrorists often use threats to:

- Create fear among the public
- Try to convince citizens that their government is powerless to prevent terrorism
- Get immediate publicity for their causes

[31] http://www.fema.gov/hazard/terrorism/info.shtm

> Acts of terrorism include threats of terrorism, assassinations, kidnappings, hijackings, bomb scares and bombings, cyber-attacks (computer-based), and the use of chemical, biological, nuclear, and radiological weapons.
>
> High-risk targets for acts of terrorism include military and civilian government facilities, international airports and transportation centers, large cities, and high-profile landmarks. Terrorists might also target large public gatherings, water and food supplies, utilities, and corporate centers. Further, terrorists are capable of spreading fear by sending explosives or chemical and biological agents through the mail."

Acts of terrorism, then, are essentially the intentional initiation of the sorts of hazard events that have been discussed in previous sections.

Historic Frequencies

There are no recorded terrorism events in Clark County.

Impacts

Since the events of September 11, 2001, no citizen of the United States is unaware of the enormous potential impacts of terrorist acts. The emotional impacts of fear, dread, anger, outrage, etc., serve to compound the enormous physical, economic, and social damage. The continuing terrorist threat itself has a profound impact on many aspects of everyday life in this Country, and on the U.S. economy.

Loss Estimates

Specific loss estimates are not provided due to security policies.

Hazard Evaluation

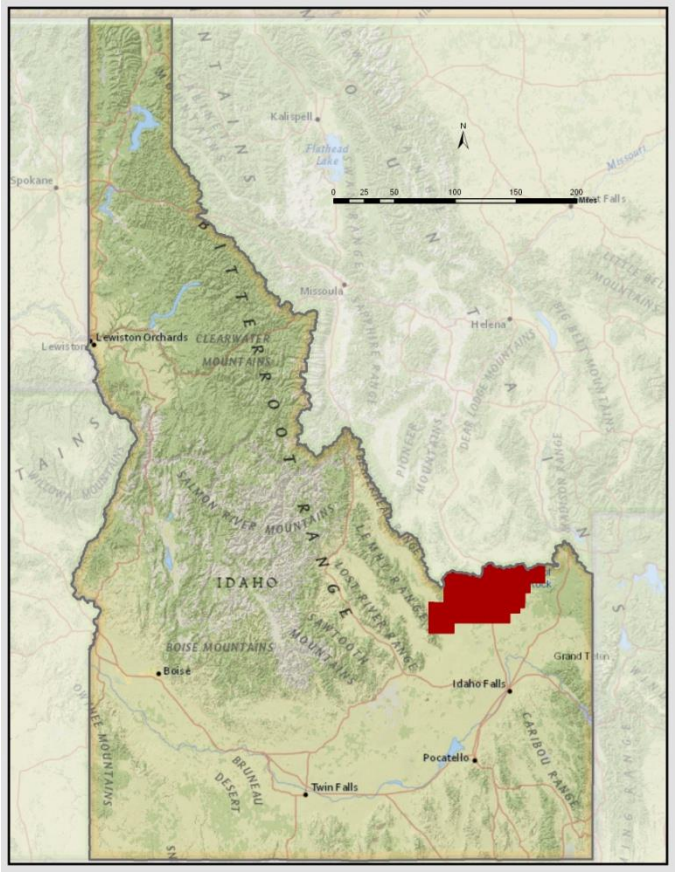
Terrorism		
Profile Category	**Rating**	**Description**
Historical Occurrence	0	None
Probability	1	Rare
Vulnerability	2	Critical
Spatial Extent	2	Limited
Magnitude	2	Limited
Total	**7**	**Low**

County Description

Clark County is the least populated county in Idaho, but very diverse geographically. There are two incorporated cities in Clark County: Dubois and Spencer. Other communities include Kilgore, Humphreys, Lidy Hot Springs, Lone Pine, Small, Edie, and Idmon. The County is considered 100% rural[32]. Farming and ranching is the main livelihood; however, due to the recreational opportunities available and the surrounding natural environment, summer homes are beginning to show up scattered throughout the County.

Location

Clark County is located in Eastern Idaho just south of the Continental Divide and contains 1,765 square miles or 1,129,408 acres[33]. Average elevation is 5,400 feet. It is bordered on the north by Montana, on the east by Fremont County, and on the south by Jefferson County. Butte County borders the southwest corner and Lemhi County borders the northwest corner.

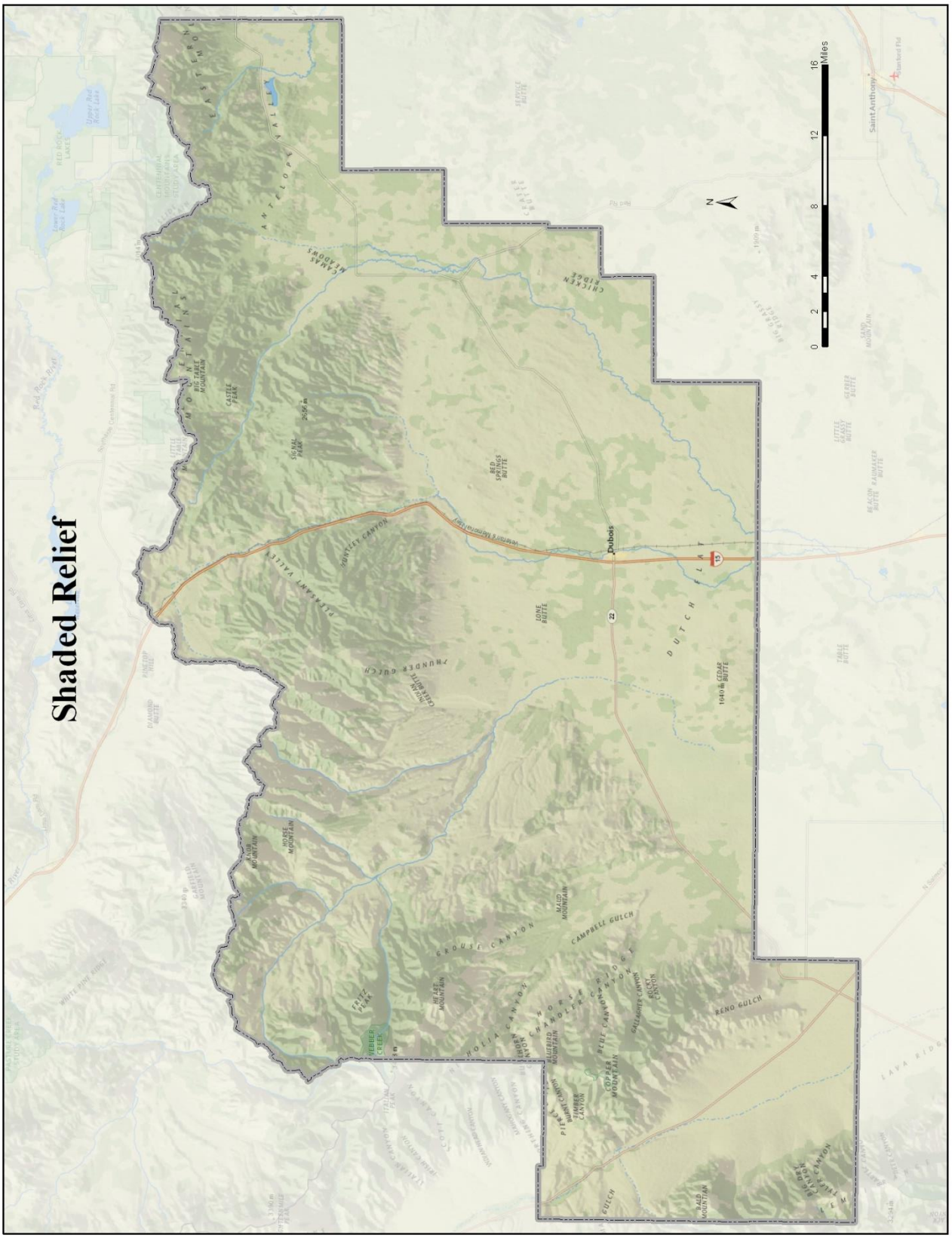


Clark County Location Map

Topography and Geography

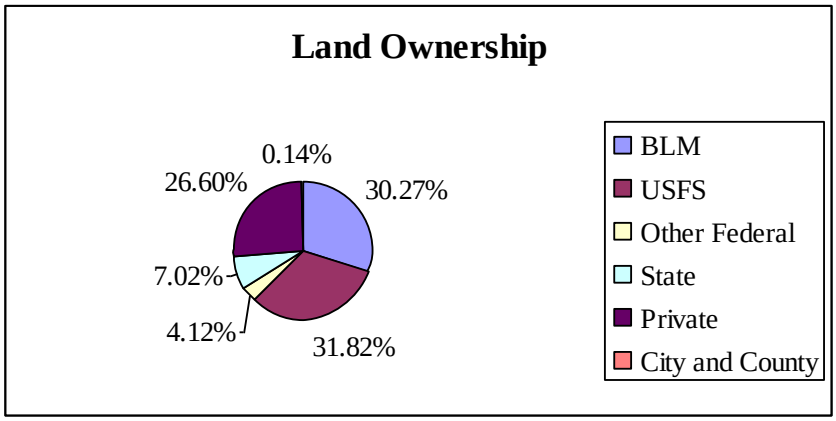
Topography in the County differs considerably from one end to the other. The south and south-east section of the County lie on the upper reaches of the Snake River Plain. This area is characterized by a gradually southwestward sloping land surface with foothills and bench lands adjacent to the plain. Conditions are semi-arid with sagebrush and grasses dominating the landscape. Most of the private land is located in this area. The western and northern boundaries are formed by the Centennial and Beaverhead Mountain ranges. The Continental Divide runs along these mountains and makes up the northern most boundary of the County. These mountains range from 6,000-10,000 feet and are characteristically more humid than the Snake River Plain. They have colder winters and cooler summers with more precipitation. The vegetation includes Douglas-fir and Lodge Pole Pine intermixed with sagebrush and grasses. Rocky outcrops are also found in this area[34]. The map below illustrates this topography.

[32] Idaho Commerce and Labor, 2001
[33] Idaho Commerce and Labor, 2001
[34] Clark County Comprehensive Plan, 1996-97


Shaded Relief
Dubois
Saint Anthony
0
2
4
8
12
16
Miles
N

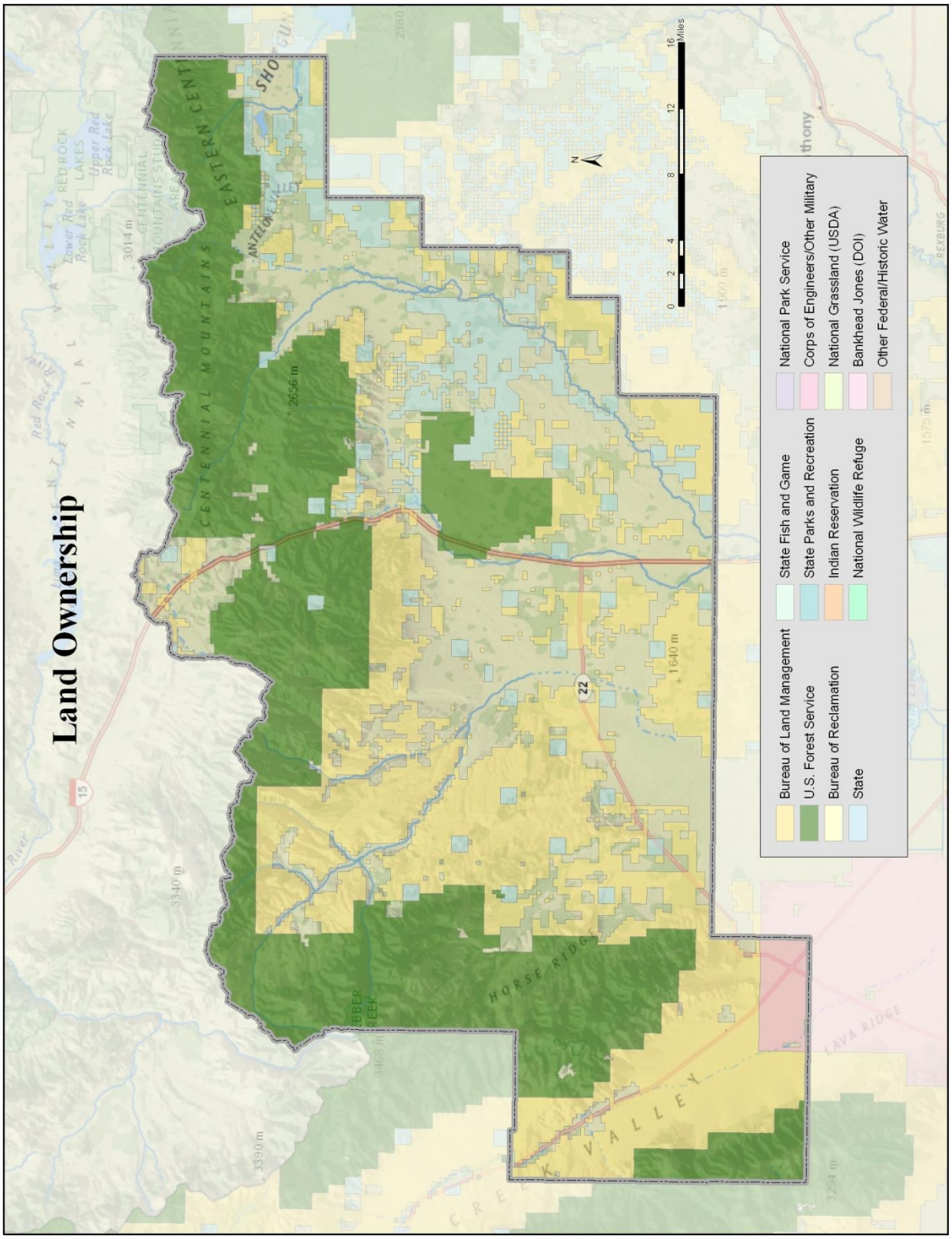
Landownership

The distribution of land ownership in the County is shown in the Figure below. Federal and State lands make up almost ¾ of the County. Private land is about ¼ of the County at 333,813 acres and the city and county lands are less than 1% at 1,604 acres[35].



Distribution of Land Ownership

[35] Idaho Commerce and Labor, 2001



Clark County Land Ownership

Land use and Natural Resources

Grazing is the dominant land use in Clark County, both on public and private lands. Other uses on private land include irrigated and dry crop lands (although this appears to be declining) pasture and alfalfa fields, forest, and recreation[36]. Other uses on public lands include forest, wildlife, recreation, and some cropland on state lands. The table below outlines major types of land use.

Land Use	Acres	Percent of Total
Urban Land	300	<.1%
Agriculture	83,200	7.4%
Rangeland	857,600	76.5%
Forest	174,300	15.5%
Water	700	.1%
Wetland	0	0%
Barren Land	5,200	.5%

Distribution of Land Use Type in Clark County

Source: Idaho Dept of Labor

The USDA also operates the United States Sheep Experiment Station (USSES) in Clark County. It was designated by US President Woodrow Wilson in 1916 and is located on 28,000 acres north of Dubois, employs approximately 40 people, and has 13 houses and trailers on site. The USSES currently has approximately 3,000 mature sheep, plus attendant young sheep of various ages. Including mature ewes and ewe lambs, lambing rates are approximately 170% and the total number of sheep soon after the end of the lambing period is approximately 6,500. The numbers of mature and young sheep retained vary according to research needs, but are not allowed to approach the carrying capacity. Sheep harvest most of their feed through grazing; however, harvested feeds (e.g., alfalfa hay, barley straw, small grains, corn, and various by-products) are used to formulate balanced diets to feed the sheep when they are in dry-lots[37].

There are some minerals and stones found and mined in the County such as thorium, sliver, uranium, lead, gold, copper, monazite, zinc, limestone, clay, gemstones, iron, antimony, stone, and rare earth's[38]. Opals are also mined in Clark County. The Spencer Opal Mine, an open pit mine, is the only area in North America where opals are plentiful enough to mine[39]. Phosphate rock is also a major commodity and contains fluorine, uranium, vanadium, and rare earths.

Recreation is fast becoming a popular activity in all seasons. Clark County offers snowmobiling, skiing, ice-skating, and sledding in the winter, and fishing, hunting, picnicking, rodeos, horseback riding, hiking, and many others in the spring, summer, and fall. The high mountains, clear streams, and a multitude of historical sites, like the Nez Perce battle grounds and Indian writings, bring many photographers and nature and history buffs to Clark County. It is also centrally located to other popular destinations. County Road A2 leaving Dubois to the east travels through Island Park to US Highway 20 which puts one within minutes of Yellowstone National Park. State Highway 22 leaves Dubois to the west and leads one to either Craters of the Moon National Monument to the south, or further west to the Sawtooth National Forest and Sun Valley, Idaho[40]. In the Medicine Lodge area, Medicine Lodge Buffalo Ranch offers a real ranch

[36]Comprehensive Plan for Clark County, 1996-97
[37] USDA, 2006
[38] Comprehensive Plan for Clark County, 1996-97
[39] Idaho Commerce and Labor, 2001
[40] Historical Society, 1985

vacation. Two outfitters are also located in the same area, Tomlinson's Silver Spur Outfitters and Heart Mountain Outfitters.

Lakes and Rivers

Water makes up less than 1% of total area. There are 4 lakes and reservoirs in Clark County. Gardner Lake and Three Mile Reservoir are located east of Spencer. Paul Reservoir is located northeast of Spencer close to the Montana border. Sheridan Reservoir, the largest body of water, is in the northeast corner of the County. There are also numerous creeks and streams located throughout the County including Birch Creek , Medicine Lodge Creek, Beaver Creek, Camas Creek, and others.

Geology

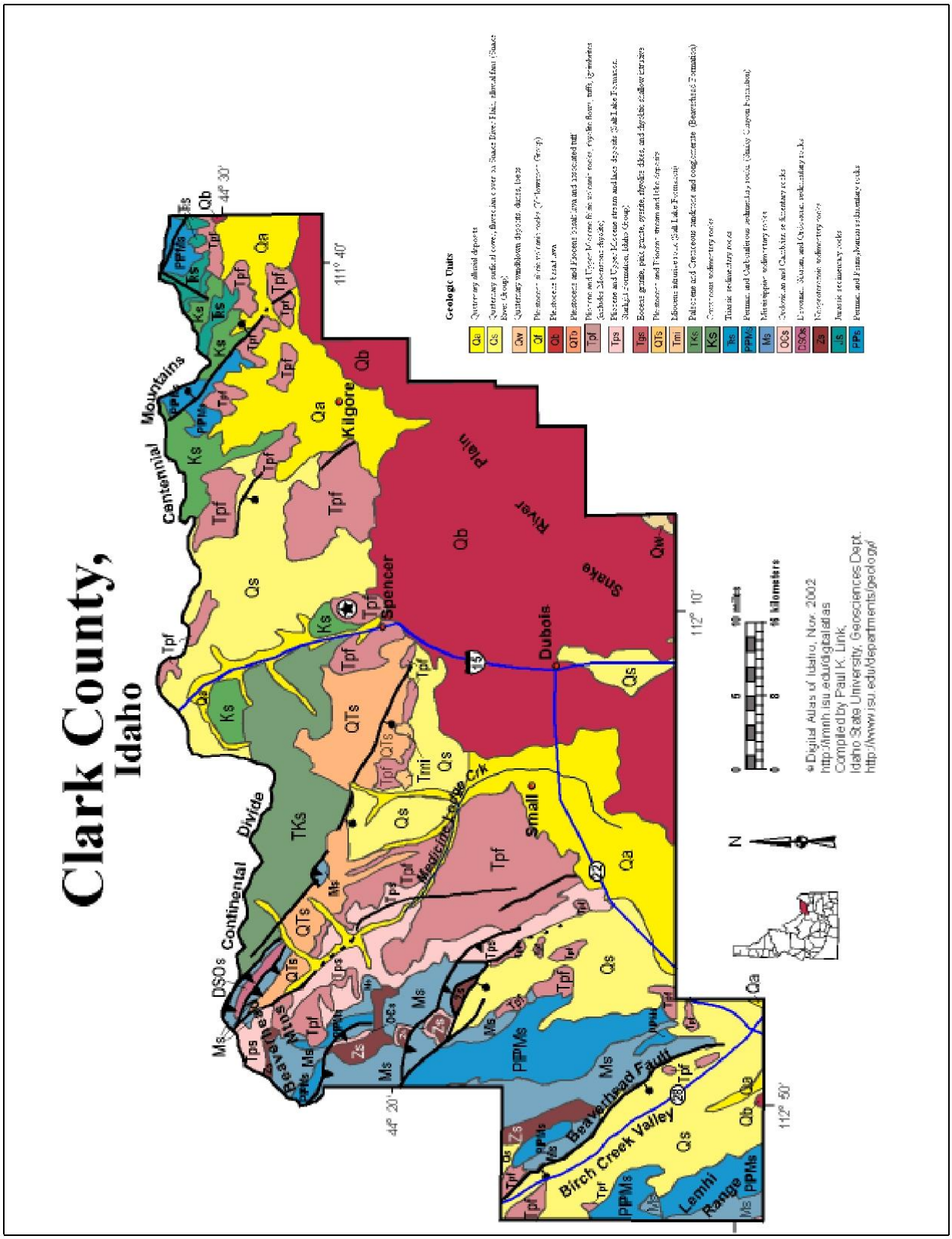
Clark County geology has been influenced by the two different topographical regions within the County. The southern portion, where the Snake River Plain extends to, is characterized by a belt of mafic volcanic flow and sedimentary rocks, shown as meta-siltstone on the map below. Most of this belt is composed of quaternary basalt flows covering tertiary rhyolites. These flows are extremely permeable and constitute the chief aquifers of the area.

The Central Rocky Mountains in the north and western areas of the County are made up of pre-tertiary sedimentary rocks that consist of tertiary rhyolites, pryoclastic rocks, and related rocks. These have a low permeability[41]. The map in below also shows the upper reaches of the mountains contain a large amount of sandstone, shale, and mudstone, along with a mixed eugeosyncline suggesting these mountains were formed from volcanic activity compressing and lifting the sedimentary rock.

Geothermal water is found in Clark County, and there are at least three known thermal hot springs. Lidy Hot Springs is located near the mouth of Warm Springs Valley and consists of three separate sources with discharges each of 250, 50, and 1799 gallons per minute. It is used for phosphate fertilizer processing. Big Springs is located on Warm Springs Creek, a tributary to Medicine Lodge Creek in the Beaverhead Mountains. It has a discharge of 50 gallons per minute and as of 1996 was not in use. Warm Springs has a discharge of 899 gallons per minute and is currently used for stock water. The temperature of these springs ranges from 73-124 degrees Fahrenheit[42].

[41] Comprehensive Plan for Clark County, 1996-97
[42] McLean, 2007; Comprehensive Plan for Clark County, 1996-97

Figure 2.5 Clark County Geology



Clark County Geology

Climate

The lowest average daily minimum temperature in Clark County is 19.8 degrees which occurs in February. The highest average daily maximum temperature is 67.4 degrees which occurs in August. Average annual total precipitation is 12.5 inches and average annual snowfall is 28 inches. The driest month is October and the wettest month is June. The following tables show the average maximum and minimum temperatures for two weather stations in Clark County located at Dubois and Kilgore.

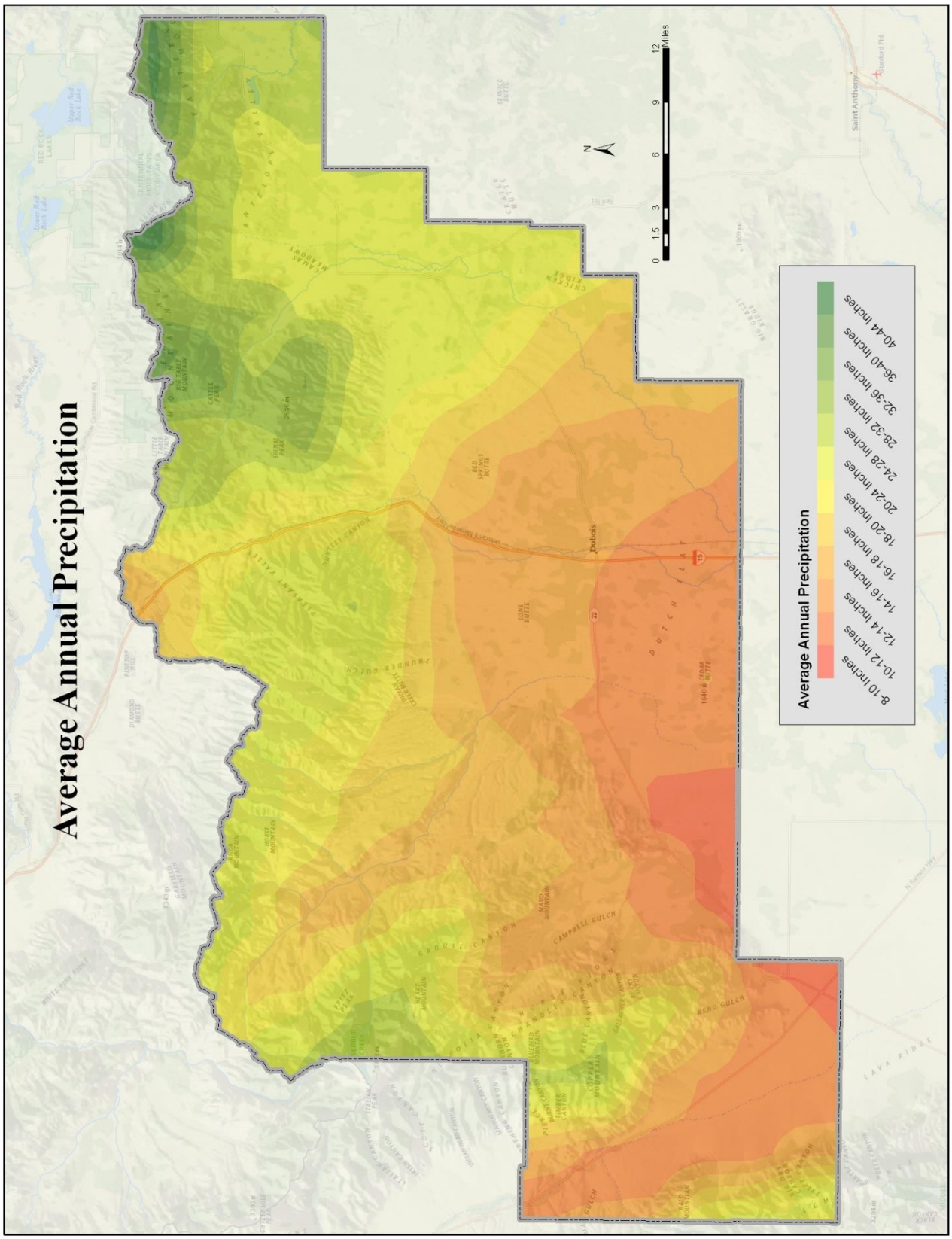
Average Maximum Temperature (F)												
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
27.2	31.9	40.2	54.6	65.5	74.4	85.4	83.8	72.8	58.4	39.8	29.7	55.3
Average Minimum Temperature (F)												
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
10.5	14.0	20.6	29.9	38.3	44.9	52.3	50.5	42.1	32.8	21.6	13.4	30.9

Average Maximum and Minimum Temperatures at Dubois, Idaho
Source: http://www.wrcc.dri.edu/summary/climsmid.html

Average Maximum Temperature (F)												
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
23.7	30.8	35.5	45.5	58.9	67.4	77.6	76.5	66.1	53.9	36.6	25.9	49.8
Average Minimum Temperature (F)												
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
1.9	5.0	8.3	20.5	30.8	37.3	40.6	39.3	31.9	24.2	15.5	4.0	21.6

Average Maximum and Minimum Temperatures at Kilgore, Idaho
Source: http://www.wrcc.dri.edu/summary/climsmid.html

Average sunshine days are 64 days and the last killing frost in the lower areas usually occurs in late May. The average frost free season at Dubois is 125 days. The mountain areas receive more than twice the precipitation than the areas of lower elevation, with some areas receiving almost four times that of the lower elevations.



Clark County Precipitation

Demographics

The population in Clark County has fluctuated during the last several decades. In 1960, the population was 915 which declined in 1970 to 741 and remained under 800 until the year 2000 when it grew to 1,022. However, in 2011 it declined to 949 making it the least populated county in Idaho[43]. The table below lists population trends for the two incorporated cities in Clark County.

	1990	2000	2005	2010	Change 2000-2005	Change 2000 - 2010
Dubois	420	647	642	677	- .7%	4.6%
Spencer	11	38	35	37	- 8%	-.3%

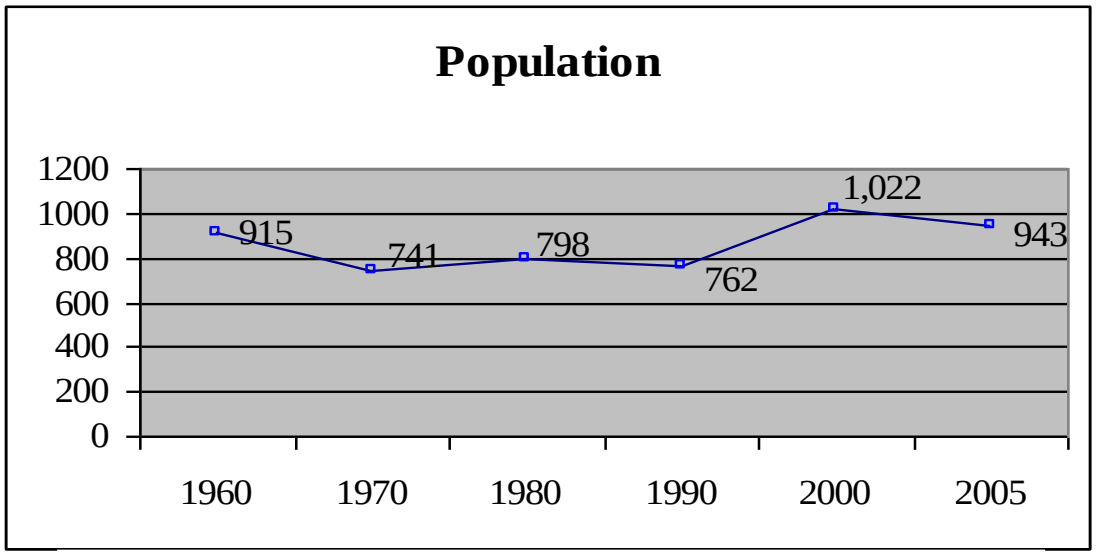
Population Trends for Incorporated Cities in Clark County
Source: Idaho Dept of Labor

Dubois saw a modest increase from 2000-2010; however, Spencer has stayed virtually unchanged. The County as a whole has declined by 7% since 2000. As of 2010 there were 538 housing units in the County, with 334 households. The median value of homes has increased in the last several years. In 1990 the median value was $37,300 and has increased to $64,600 in 2000 and was $82,800 for a 20 year increase of 220%.[44] There were 2 building permits issued in 2011 with 22 issued in 2012. The total amount of construction in 2012 totaled $1,118,456 which indicates that Clark County is at least adding or upgrading new housing units.

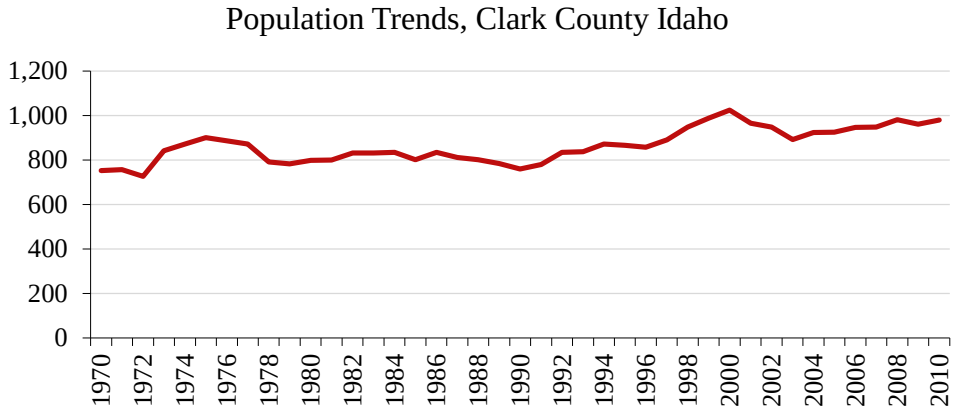
The racial and ethnic makeup of the County in 2010, according to the US Census Bureau, is listed in the table below. From the years 2000-2010 the Latino population has increased by 13.7% while the non-Latino population decreased by 13.5%[45].

The population has gotten younger since 1990. The median age in 2000 is 30.7 years, down from 33.5 years in 1990[46]. In 2010 persons 65 years old and older increased by 37.2% while all other age groups declined[47].

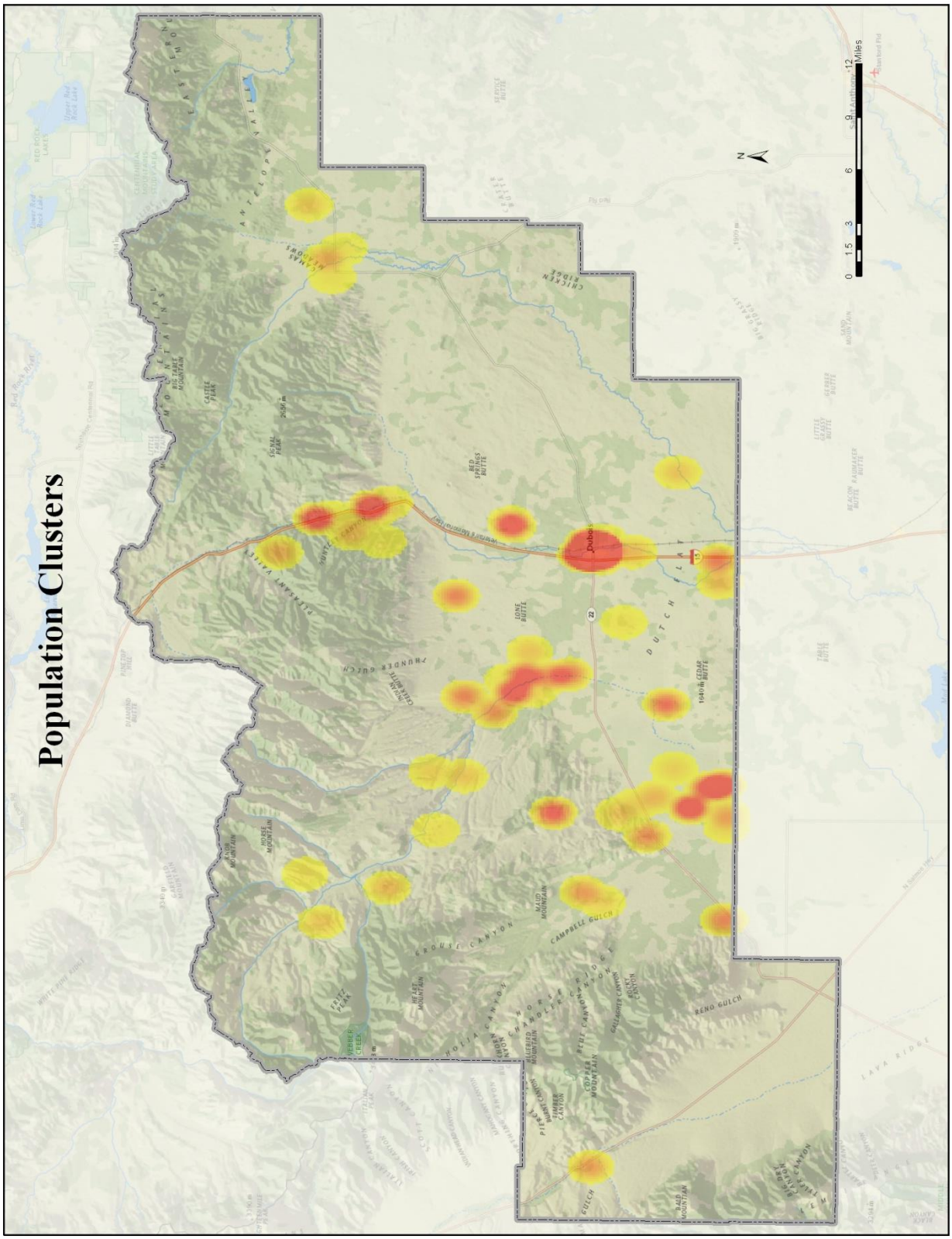
[43] ICL, 2001, US Census, 2007
[44] http://quickfacts.census.gov/qfd/states/16/16033.html
[45] http://censusviewer.com/county/ID/Clark
[46] Rasker, 2006
[47] http://censusviewer.com/county/ID/Clark



Population Trend for Clark County
Source: http://www.bea.gov



30 Year Population Trends for Clark County



Clark County Population Distribution

Critical Infrastructure

County Facilities

The Clark County government offices are housed in two buildings. The City/County building and the City/County Annex Building are both located in Clark County. Other buildings owned by Clark County include a community building, courthouse and jail, fire station, health department building, two road and bridge buildings (one is in Dubois and one in Kilgore), two shops, and a weed building. With the exception of the road and bridge building in Kilgore, all county buildings are located in Dubois.

Address & City	Occupancy Description	Total Value
420 W Main St., Dubois	City/County Annex	$175,733
Main St., Dubois	Fire Station	$100,000
799 Cemetery Rd., Dubois	Steel Shop	$750,000
Dubois	4-H Shelter	$30,900
	City/County Building	$33,990
	Community Building	$207,854
	Courthouse & Jail	$2,000,000
	Courthouse Generator Shed	$4,540
	Health Department	$96,643
	Road & Bridge Building	$14,832
	Shop	$62,315
	Weed Building	$21,630
Kilgore	Road & Bridge Building	$52,118
Total Value		**$3,550,555**

Clark County Facilities

Public Services and Facilities

With the exception of the County Sheriff's Office, Clark County does not provide any public services directly, nor does the County operate any sort of coordinating public service authority, although informal cooperative agreements have been established among certain districts. All of the County's necessary services are divided among individual public service districts and city offices. Near or within the boundaries of the areas of city impact, most services are provided by the cities or their respective service districts. In other unincorporated areas of the County, services are provided either by the various public service districts or individual landowners.

Sewer and Water

Within Clark County, the City of Dubois provides domestic water distribution and sewage collection and treatment. Beyond the boundaries of Dubois, water is supplied by individual wells, and sewage is treated by septic systems. For any parcel of land, sewer and water arrangements must meet the standards of the Idaho Department of Health. All septic systems, regardless of size or location, must be approved by the Eastern Idaho Health Department. In addition, standards may also be required by the Idaho Department of Water Resources and the Idaho Department of Environmental Quality.

The City of Dubois's public drinking water system consists of three ground water sources. The system serves approximately 300 people with about 219 connections. All three wells are located near the middle of the city of Dubois with Well #2 located adjacent to the Union Pacific Railroad.

There are approximately 12 public water systems in Clark County that serve businesses, recreation sites, etc.

Public Utilities

Rocky Mountain Power Company supplies electric distribution lines for all homes and commercial areas of the County.

Propane services are provided by private companies. There is no natural gas service in Clark County.

Mud Lake Telephone Cooperate Association Incorporated provides Telecommunications services in Clark County.

Transportation System

Roadways

Clark County maintains 364 total miles of road (98 miles of paved road, 214 miles of gravel road, and 52 miles of earth or unimproved road) and 83 bridges. The County has approximately 500 road signs, 600 culverts, and 9 railroad crossings to maintain. There are no traffic signals except a flashing warning signal at the intersection of Reynolds and 2nd South which is a Rail Road Warning Signal.

The budget for the Clark County Road and Bridge Department includes provisions for road grading, snow removal, patching, chip sealing, equipment, and new reconstructed bridges. Historically, funding sources have been 90 percent local and State (fuel tax), and 10 percent Federal. In recent years the annual operating budget for the Road and Bridge Department has been $800,000 and $850,000. About $220,000 is spent purchasing materials for road maintenance such as oil and gravel for chip sealing. The remainder of the budget is used for equipment, repairs, shop upkeep, and personnel.

Road Type	Length In Feet	Length in Miles
Interstate	196,169	37
Major Road	305,137	58
Local Road	15,769,461	2,987

Roadways in Clark County

The City of Dubois has approximately 9 miles of road (8.5 miles paved and the remaining gravel) and three bridges. The City has approximately 200 road signs, 20 culverts and 3 railroad crossings to maintain. The only traffic light is the flashing warning signal mentioned above at the intersection of Main Street and County Road A2. The City staff performs all maintenance, with the County Road and Bridge Department assisting in major projects with equipment and labor.

The City of Dubois has an annual street budget of $52,000. These funds are typically used to purchase road oil and other maintenance materials, and to pay staff salaries and benefits. The funding comes 100% from the State Fuel Tax.

The City of Spencer has only 3 miles of roadway, one quarter mile of which is paved (Main Street). All road maintenance and snow removal is provided by the County. The annual operating budget for the City of Spencer is $400.

Bridges

Clark County has 83 bridges, 17 of which are inspected by the Idaho Transportation Department. Three bridges have sufficiency ratings of less than 30, which place them in the critical condition category. Several county bridges are scheduled for replacement in the near future.

Owner	Route	Year Constructed	Total Value
City of Dubois	STC 6862;MAIN ST	1953	$2,164.16
	STC 6732;2ND SOUTH	1941	$1,231.20
	5TH SOUTH STREET	1955	$1,104.84
			4,500.20
Clark County R&B	STC 6805;E.KILGORE	1998	$1,571.72
	STC 6805	1969	$1,253.07
	STC 6805	1966	$981.56
	CO.RD;PLNG#0099	1946	$1,433.38
	CO.RD;OLD 91;PL#79	1936	$12,274.42
	SHEEP FARM ROAD	1947	$1,574.64
	CO.RD;PLNG#046A	1953	$1,331.64
	CO.RD;PLNG#046A	1953	$812.43

	CO.RD;PLNG#028A	1981	$968.44
	CO.RD;PLNG#032A	1961	$1,477.44
	STC 6760	1953	$1,708.94
	CO.RD;OLD 91;PL#79	1934	$18,851.29
			$44,238.96
Idaho Transportation Department	I 15 NB & SB	1965	$9,380.45
	I 15 NBL	1965	$4,354.56
	I 15 SBL	1991	$4,330.75
	I 15	1965	$8,620.67
	I 15 NBL	1969	$6,970.54
	I 15 SBL	1969	$6,970.54
	I 15	1969	$11,276.50
	I 15 NBL	1969	$6,548.69
	I 15 SBL	1969	$6,548.69
	I 15	1969	$9,818.17
	I 15	1966	$8,994.24
	I 15	1991	$5,645.05
	SH 22	1965	$10,870.20
	SH 28	1972	$1,539.97
	SH 28	1972	$1,241.41
	SH 28	1972	$1,539.97
	SHEEP FARM ROAD	1990	$12,486.47
		Subtotal State of Idaho	**$117,136.85**
		Total	**$165,876.01**

Bridges in Clark County

Airports

Airports are important public facilities in rural communities. They provide expanded local access, economic development opportunities, health and emergency landing capabilities, and recreational pilot access. The only public airport in Clark County is the Dubois Municipal Airport, which is located on the east side of Dubois at an elevation of 5,123 feet. Currently the unattended airport has a 4600 foot long by 100 foot wide dirt runway and a paved helicopter pad. There is no fuel or navigational aids available due to the lack of a fixed base of operations.

Railroads

Railroad traffic passes through Dubois 2 to 4 times daily. There is no set schedule. The track is referred to as the Pocatello-Clark Mainline.

Housing

Clark County had a total of 548 housing units with 323 of them occupied in 2011. Of those units 225 were vacant including 119 seasonal or recreational homes. The median year the structures were built on the east side of the County is 1949 and on the west side of the County 1975. Between 2005 and 2011, 32 units were added to the housing stock.[48]

Education Facilities

Clark County School District is the only school district in Clark County. The junior/senior high school is located in Dubois and houses grades 7-12 with approximately 93 students. The other school located in the district is Ross Elementary, located in Dubois.

Address	Description	Total Value
Center St., Dubois	High School	$5,660,709
	High School Shop Building	$350,000
Dubois	East Residence Garage	$4,000
	East Residence House	$46,000
	Elementary Building	$1,063,549
	STR Building Sport Field	$15,000
	West Residence Garage	$3,000
	West Residence House	$41,000
195 E 4th South, Dubois	Manufactured Home	$29,000
220 S. Oakley, Dubois	Oakley Elementary	$953,583
Total Value		**$8,165,841**

Schools in Clark County

Cultural and Historical Sites

Clark County contains many prehistoric and historic sites. Evidence shows human occupation of parts of Clark County as early as 10,000 years ago. These people were the forerunners to the Northern Shoshone and were mostly big game hunters. They used rock outcroppings to butcher and store meat. In later years, the Nez Perce Indians used the general area as a route between the Wallowa Valley and their buffalo hunting ground in Montana.

The area was well traveled by Indians, as well as early trappers, miners, and explorers. Medicine Lodge Canyon, Beaver Creek Canyon, and Monida Pass were all used to transport gold and other freight between the Montana Gold Fields and Utah.

According to the Idaho State Historic Preservation Office, Clark County has 35 architectural sites and 957 prehistoric/archaeological sites. These are sites with some historic value, but may not be included in the National Register of Historic Places. The following are listed on the National Register:

[48] Rasker, et al, 2013

- **Birch Creek Rock Shelters**(added 1974 - **Site** - #74000737) address restricted, Blue Dome
- **Camas Meadow Camp and Battle Sites**(added 1989 - **Site** - #89001081)
  E of Kilgore, Kilgore
- **Spencer Rock House** (added 1989 - **Building** - #89001991)
  Also known as **Hardy, Charles W., House; Centennial Mountain Lodge**
  Off US 91 at Huntley Canyon, Spencer
- **St. James' Episcopal Mission Church** (added 1993 - **Building** - #93000387)
  Also known as **St. Peter's Catholic Mission Church; Heritage Hall**
  Reynolds St. (Old Co. Hwy. 91), Dubois

Vulnerability Analysis

Clark County has three high hazards which impact the residents and the government owned infrastructure. As described in the risk assessment presented above, Clark County is situated in a high mountain desert region of eastern Idaho. The County is vulnerable to drought and the effects of drought which include wildfires. The County is sparsely populated; in fact it is the smallest population of any county in Idaho. Drought is mitigated in the County by the agricultural business through deep well irrigation and some irrigation in the early summer using run off from the Kilgore Basin. As noted in the FIRM and the HAZUS 100 year floodplain maps the Kilgore Basin experiences annual spring flooding. The floodwaters leave the Basin and travel through Dubois. Runoff water is captured, when available, and used to irrigate crops. Similarly, spring runoff in the Medicine Lodge area is captured and used, when available, for irrigation. There are only three (3) very small holding reservoirs in Clark County for irrigation.

Drought is a way of life for Clark County. The residents are very careful with the water that is available. Crops are planted with drought tolerance in mind. Drought impacts the County's weed control program. Weeds replace beneficial forms of vegetation during drought conditions. As weeds mature and dry out, their presence increases the risk of wildfires in the grazing and public land areas of the County.

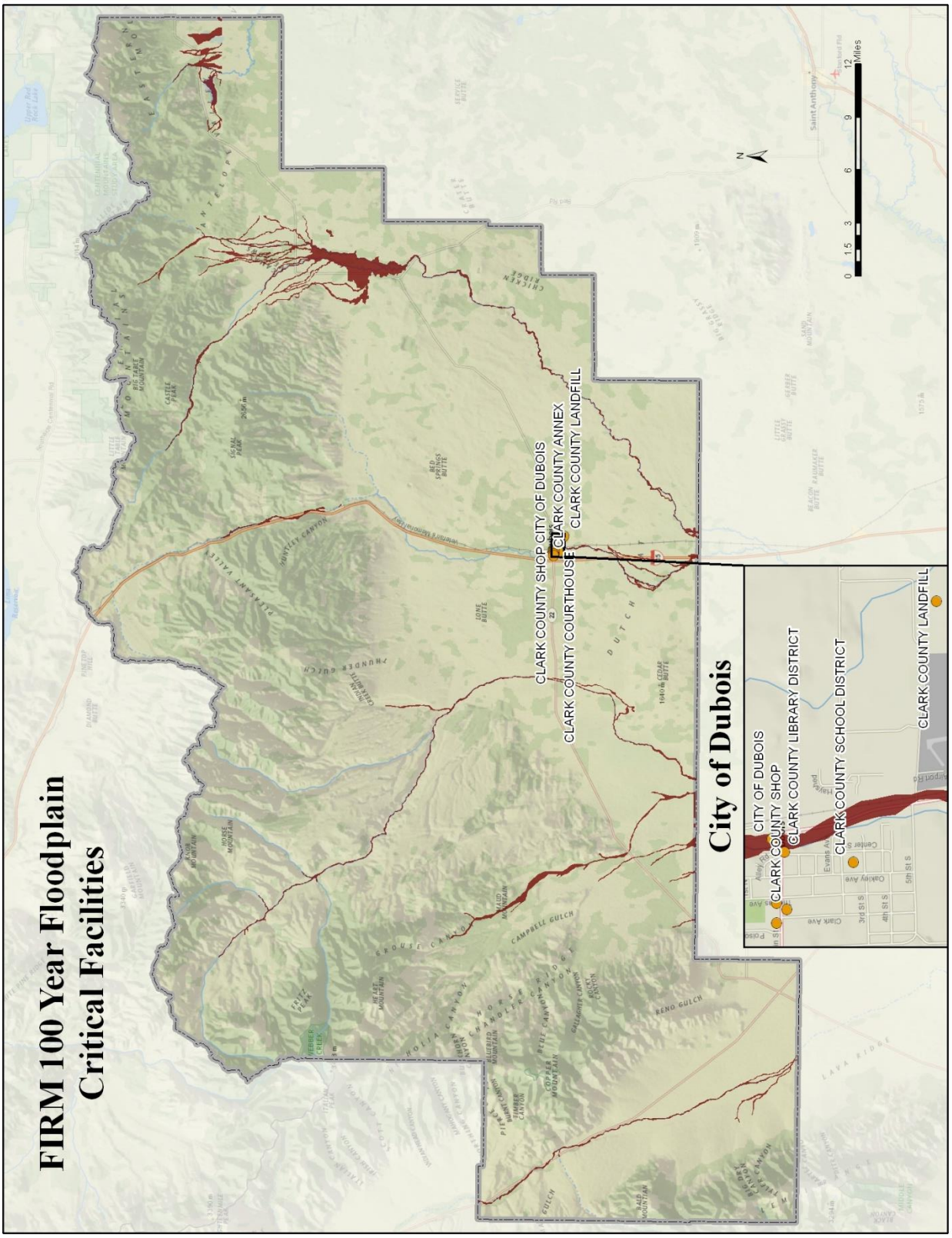
Critical Infrastructure is most vulnerable to flooding in Clark County. Bridges, roadways, and structures are at risk during spring runoff. As illustrated in FIRM and the HAZUS maps there is critical infrastructure in the form of County owned facilities in the City of Dubois which border the established floodplains. There is little impact from flash flooding on these facilities as illustrated in the Relative Flash Flood Potential Map.

The County owned facilities are vulnerable to wildfire; however, the County has taken measures to control the vegetation around its critical facilities based on historical frequencies and the high probability of a wildfire in any given area of the County annually. Other protective measures include the continuous summer spraying of roadsides to control vegetation and the mowing of dead vegetation along the roadsides throughout the County.

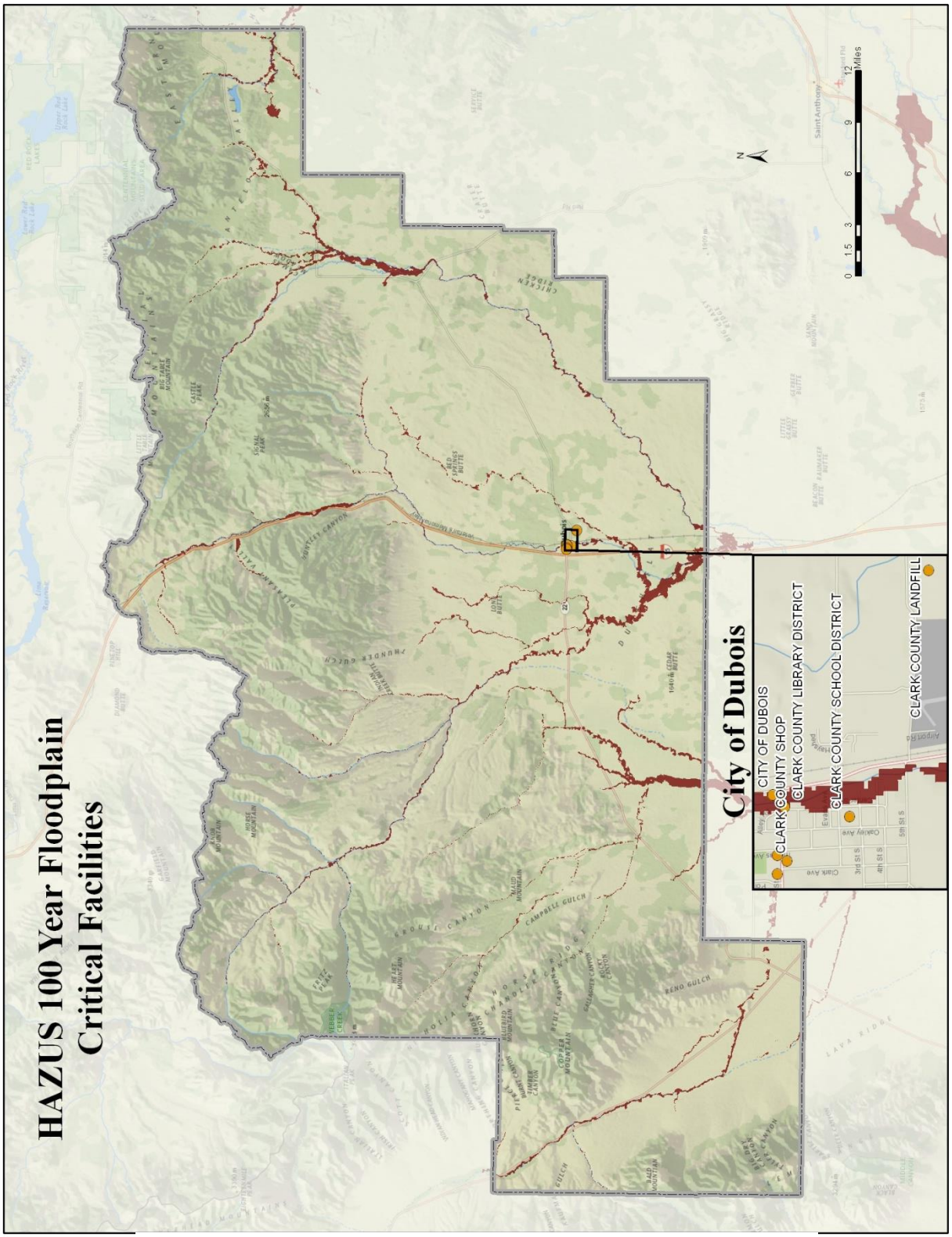
Severe Winter Weather is especially unpredictable in Clark County. As noted above, Clark County is situated in a high mountain desert; however, severe winter storms have and do occur in the County. There storms pose a particular harmful condition to grazing livestock. Grazing livestock, primarily cattle, is the primary economic base for Clark County. Severe winter storms, such as the 1989 storm described on page 48, can be particularly devastating.

The traveling public is also vulnerable to severe winter storms in Clark County. I-15 is the primary route from eastern Idaho and northern Utah to Montana and Canada. Frequently the interstate is closed over Monida Pass, requiring travelers to seek shelter in Dubois.

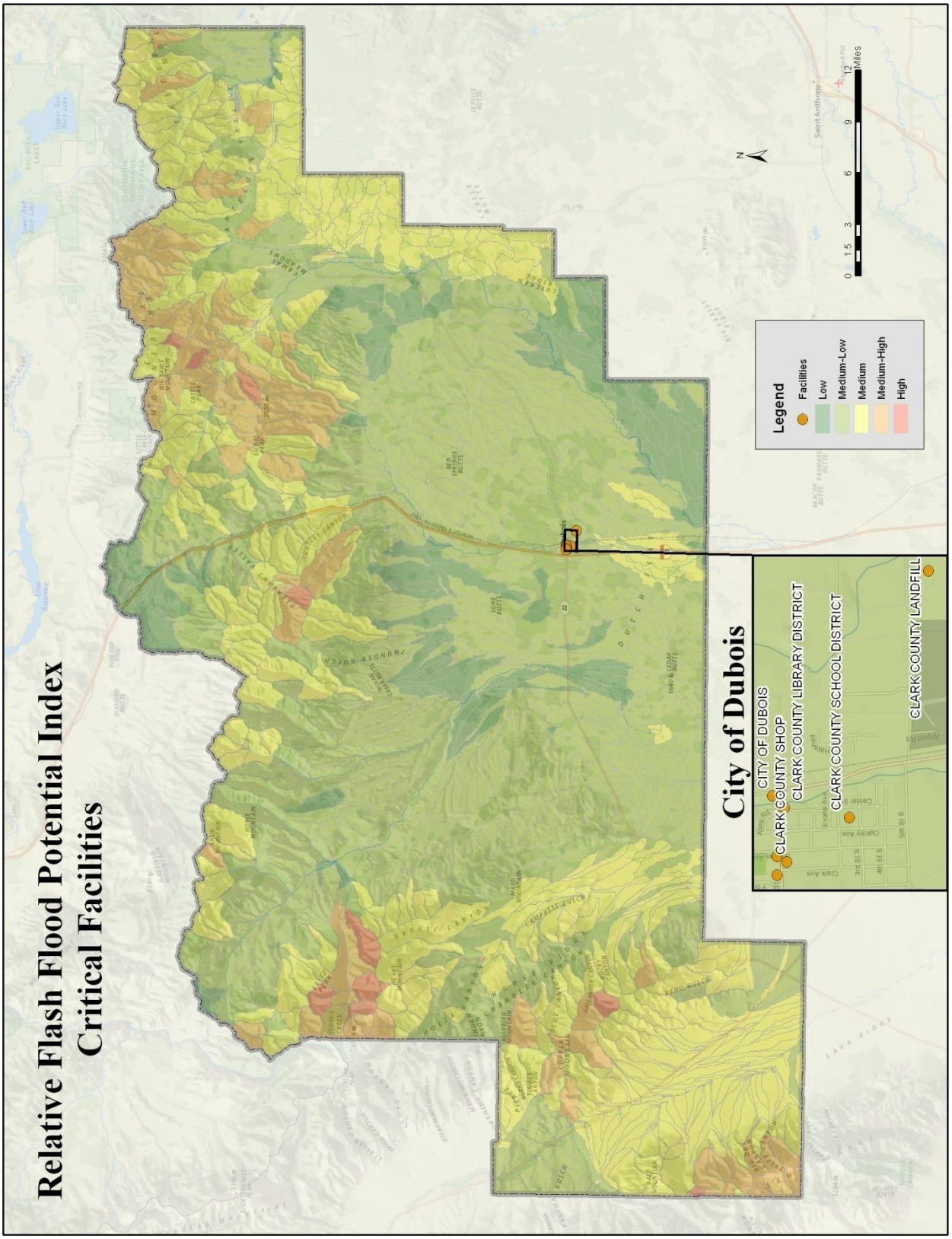
Interstate 15 and the Union Pacific Railroad's main line to Montana cross Clark County. The Cities of Dubois and Spencer have been created in close proximity to these two critical transportation corridors. Hazardous Materials are transported on these routes. The County, anywhere along these two routes, is vulnerable to hazardous materials releases. For the most part the population is very sparse along the rail and I-15, with the exception of the City of Dubois and the City of Spencer. The populations in both of these two locations are vulnerable to hazardous materials releases.



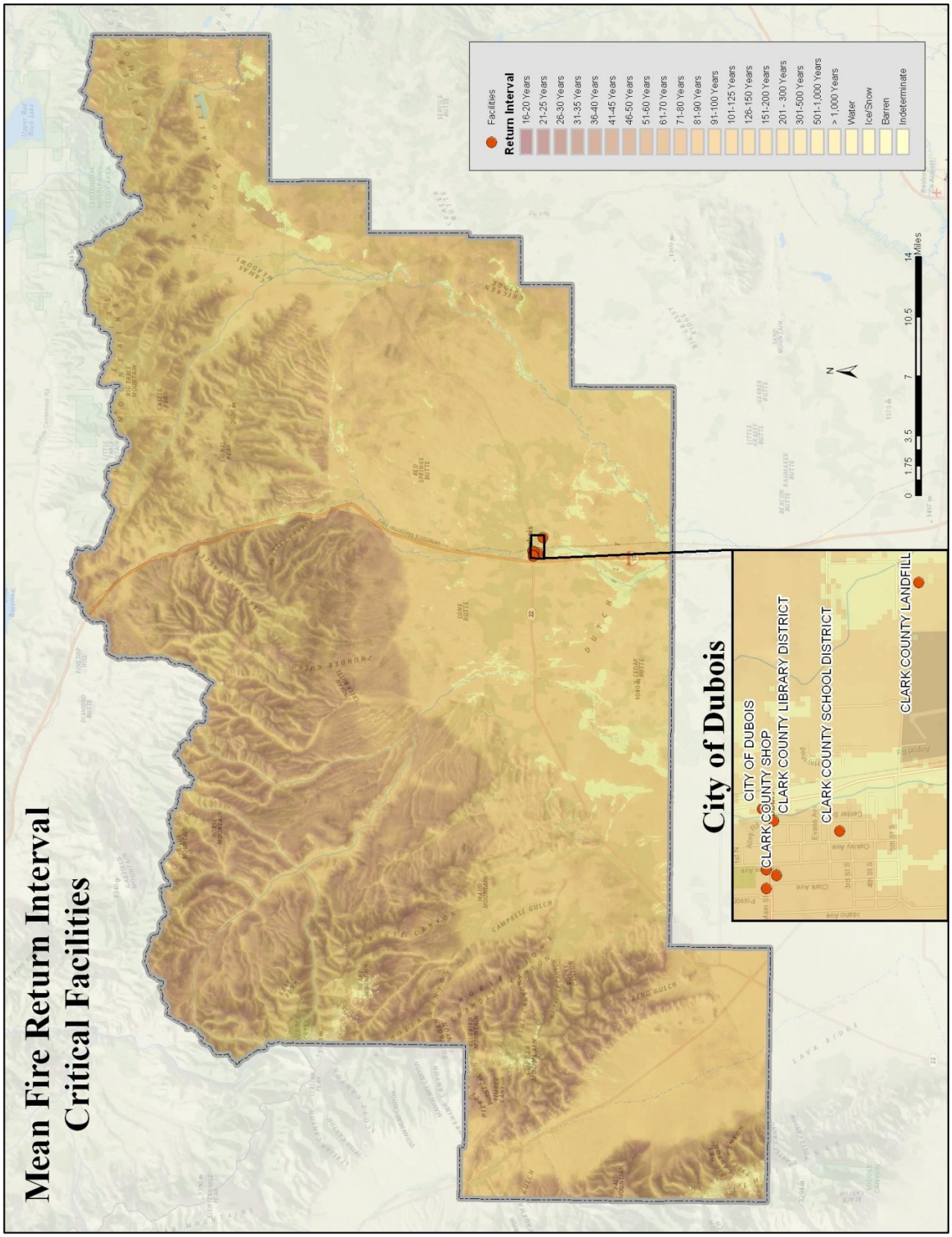
FIRM 100 Year Floodplain / Critical Facilities



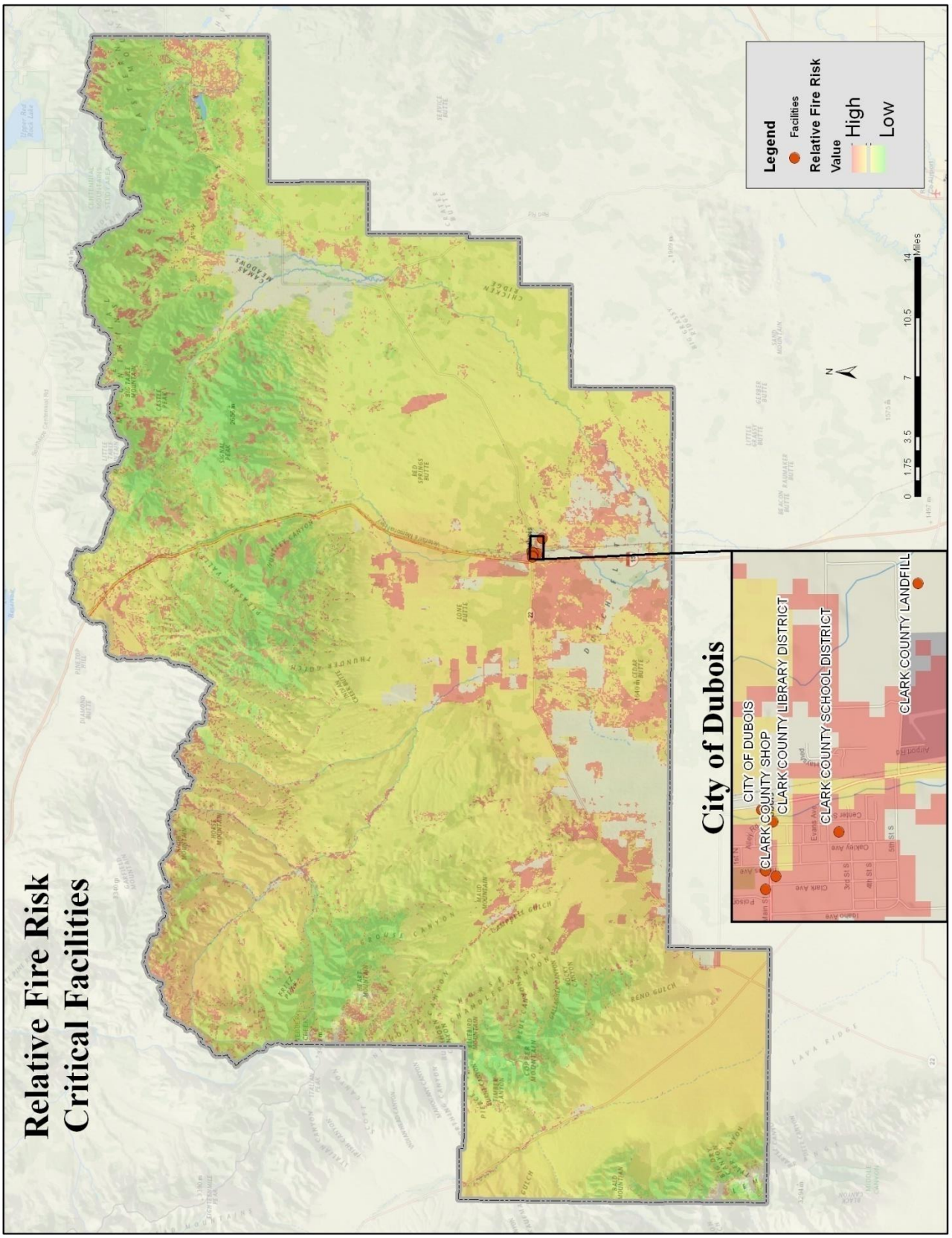
HAZUS 100 Year Floodplain / Critical Facilities



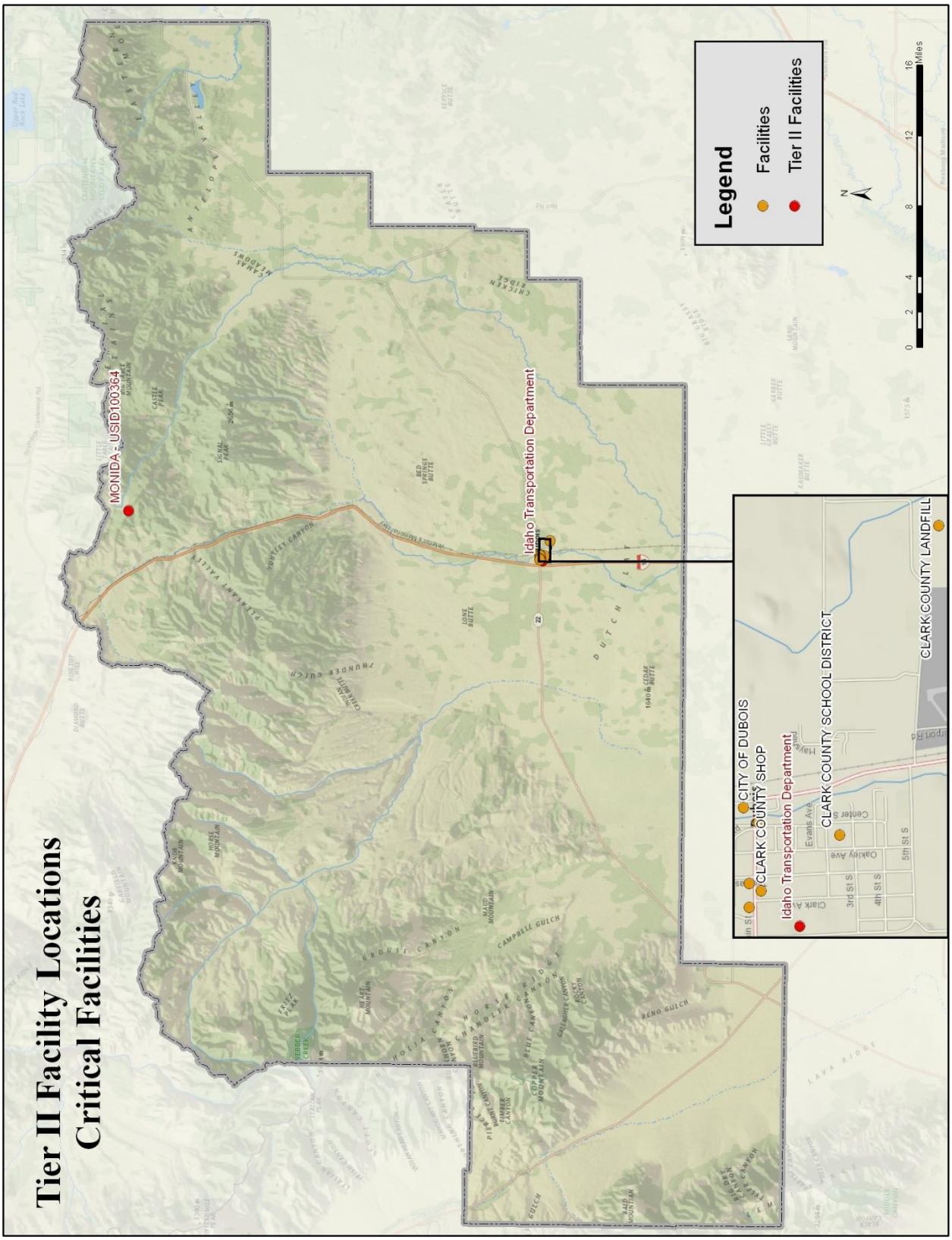
RFFPI / Critical Facilities



Mean Fire Return Interval / Critical Facilities



Relative Fire Risk / Critical Facilities



Tier II Facility / Critical Facilities

2008 Risk Rankings

Frequency	Magnitude (Low) 1	Magnitude (Medium) 2	Magnitude (High) 3
(Low) 1	Extreme Heat Dam Failure	Epidemic Landslide	Nuclear Terrorism
(Medium) 2	Riot/Demonstration/Civil Disobedience Tornado	Drought	Earthquake
(High) 3	Snow Avalanche River/Stream Flooding Hail Lightning Straight Line Wind West Nile Virus	Structure Fire Flash Flood	Wildfire Winter Storm Extreme Cold Hazardous Materials

2013 Hazard Assessment Ranking

	Historical Occurrence	Probability	Vulnerability	Spatial Extent	Magnitude	Total
Drought	3	4	4	4	2	17
Severe Winter Storms	3	4	3	4	2	16
Wildfire	3	4	2	3	4	16
Earthquake	2	2	4	4	3	15
Severe Weather	3	4	2	2	3	14
Stream Flooding	2	2	3	3	3	13
Communicable Disease	1	2	3	3	4	13
Flash Flood	2	4	2	1	2	11
Bird Flu	0	1	3	3	4	11
Hazardous Materials	1	2	2	2	3	10
Nuclear Event	0	1	2	3	4	10
Structure Fire	1	4	1	1	2	9
Landslide	1	2	2	1	1	7
Terrorism	0	1	2	2	2	7
West Nile	1	2	1	1	1	6
Civil Disobedience	1	1	1	1	1	5
Lyme Disease	0	2	1	1	1	5
Dam Failure	0	1	1	1	1	4

Participation Jurisdiction Risk Rankings

Dubois Idaho

The City of Dubois is the County seat for Clark County Idaho. The population in 2010 was 677 people. The City was named for Fred Dubois, the State's prominent politician in its early years. Dubois came to Idaho in 1880 and was the State's first U. S. Senator serving from two consecutive terms, 1891-1907.

The City of Dubois has an elevation of 5,148 feet and covers an area of 2.5 square miles. The median age in the City in 2010 was 32.3 years. The gender makeup is 51.6% males and 48.4% females.

	Historical Occurrence	Probability	Vulnerability	Spatial Extent	Magnitude	Total
Severe Winter Storms	3	4	3	4	3	17
Severe Weather	3	4	3	4	3	17
Drought	3	4	3	4	2	16
Wildfire	3	4	2	3	4	16
Earthquake	2	2	4	4	3	15
Stream Flooding	3	3	3	2	3	14
Communicable Disease	1	2	3	3	4	13
Hazardous Materials	1	3	3	3	3	13
Flash Flood	2	3	2	2	2	11
Bird Flu	0	1	3	3	4	11
Nuclear Event	0	1	2	3	4	10
Structure Fire	1	4	1	1	2	9
Terrorism	0	1	2	2	2	7
West Nile	1	2	1	1	1	6
Lyme Disease	0	2	1	1	1	5
Landslide	0	1	1	1	1	4
Dam Failure	0	1	1	1	1	4
Civil Disobedience	0	1	1	1	1	4

As described in the County's Vulnerability Analysis, drought and the effects of drought are particularly harmful to the City of Dubois, as well as the rest of the County. The City increased is water storage capacity in the last five years and has sought continued improvement with a goal of not only providing potable water service to the residents, but to also improve wildfire protection.

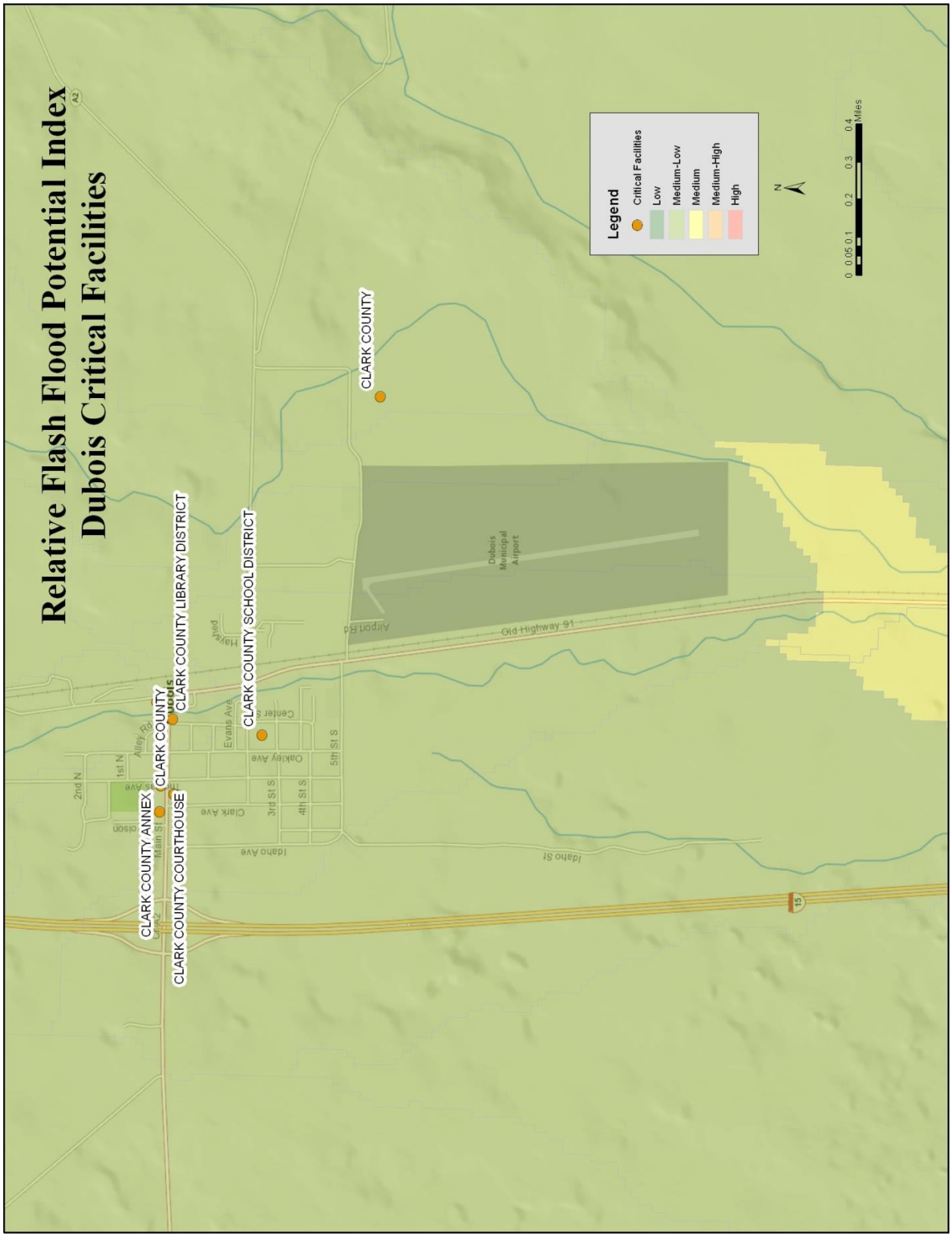
The City's water system is vulnerable to the extreme cold temperatures that come with severe winter weather. Much of the City sits on a basalt formation which is difficult to remove in sufficient depths to get the water and sewer lines below the "frost" line. Significant damage occurs when then lines freeze. Water services can be cut off to residents for days as the lines are thawed.

All County owned facilities are located in the City of Dubois. The City's facilities for the most part are co-located with the County's. The City water system, pump house, and storage tanks are

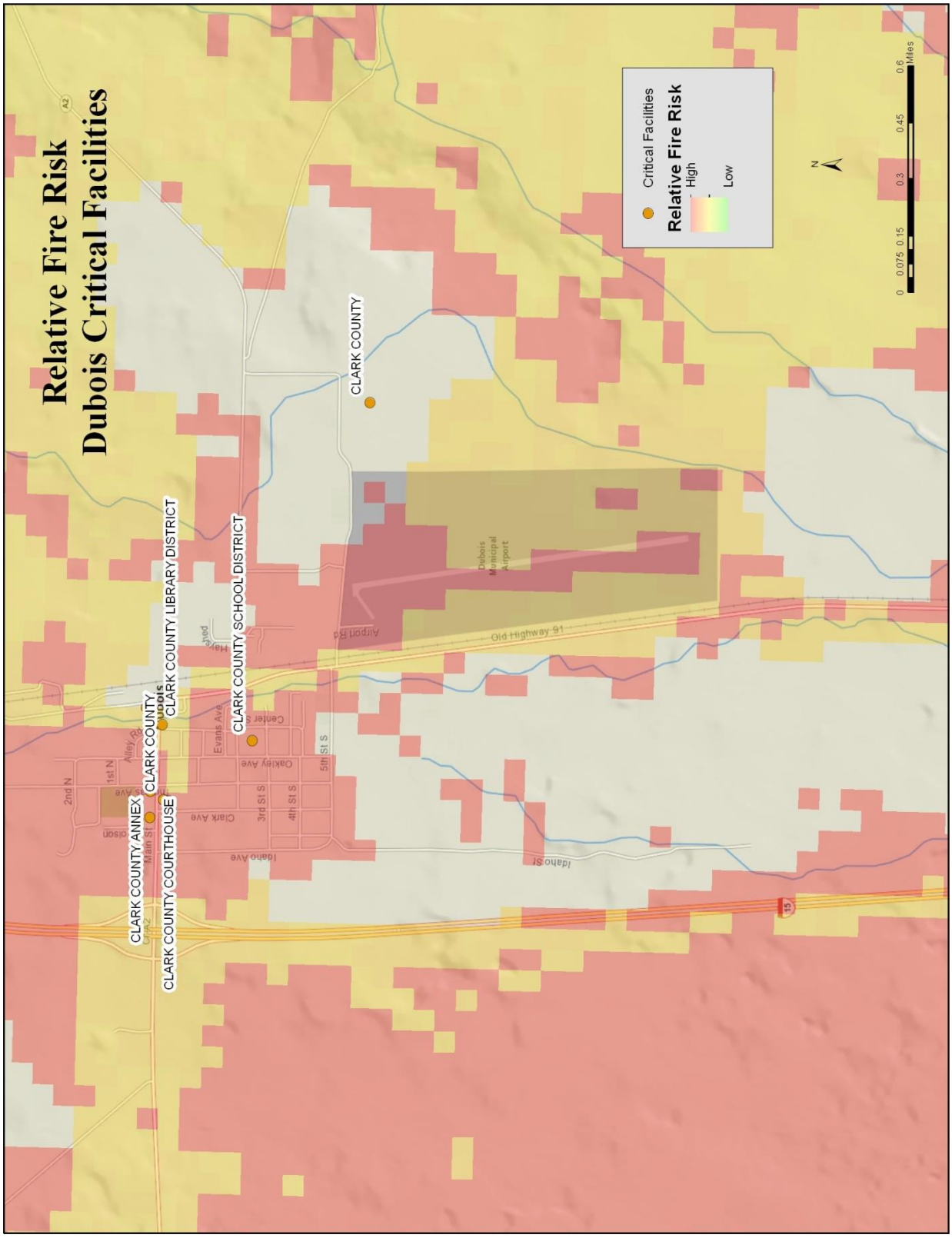
located in the 100 year FIRM floodplain. The City Water System as currently designed is vulnerable to flooding.

The City of Dubois is located between I-15 to the West and the Union Pacific Railroad on the East. The entire City is vulnerable to hazardous materials releases from materials being transported on these two major transportation systems.

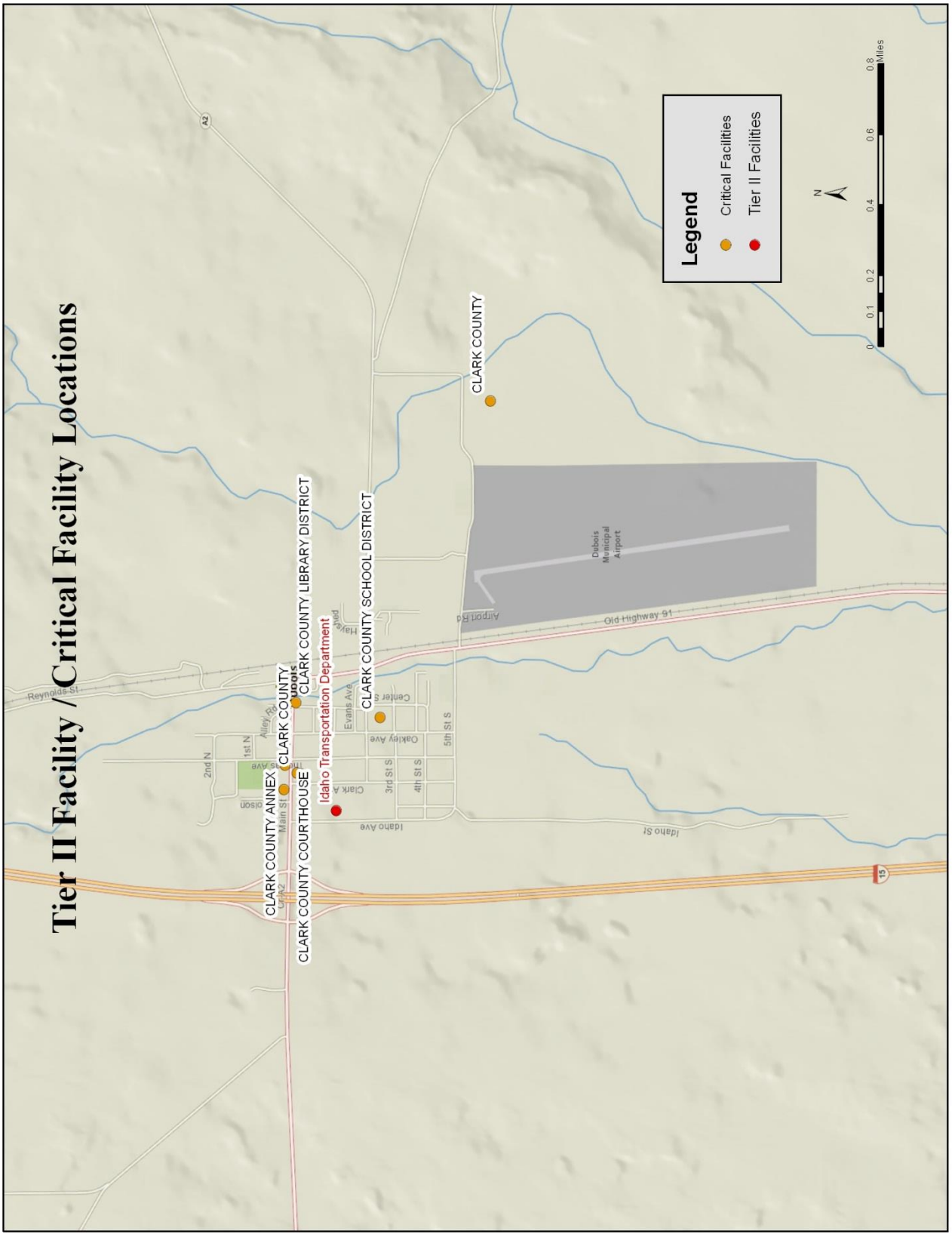
FIRM 100 Year Floodplain / Critical Facilities within Dubois



FIRM 100 Year Floodplain / Critical Facilities within Dubois



Relative Fire Risk/ Critical Facilities within Dubois



Tier II Facility/ Critical Facilities within Dubois

Spencer Idaho

The City of Spencer is a small community in Clark County Idaho. The population was 37 people in 2010. The City is noted as the "Opal Capital of America". The opal mine is located 5-6 miles out of town. The City has a total of 1.12 square miles of land. The median age of the City residents in 2010 was 54.3 years. The gender makeup is 62.2% male and 37.8% female. The racial makeup of the city is 100% white.

	Historical Occurrence	Probability	Vulnerability	Spatial Extent	Magnitude	Total
Wildfire	3	4	3	3	4	17
Severe Winter Storms	3	4	3	4	2	16
Drought	3	4	2	4	2	15
Earthquake	2	2	4	4	3	15
Severe Weather	3	4	2	2	3	14
Communicable Disease	1	2	3	3	4	13
Hazardous Materials	1	3	3	3	3	13
Flash Flood	2	4	2	2	2	12
Bird Flu	0	1	3	3	4	11
Landslide	1	2	3	2	2	10
Stream Flooding	1	2	2	2	2	9
Structure Fire	1	4	1	1	2	9
Terrorism	0	1	2	2	2	7
West Nile	1	2	1	1	1	6
Nuclear Event	0	1	1	2	2	6
Lyme Disease	0	2	1	1	1	5
Dam Failure	0	1	1	1	1	4
Civil Disobedience	0	1	1	1	1	4

Spencer has a population of 37 residents; however, of those 37 only 14 live in the City year round. Spencer is vulnerable to severe winter storms which is why the population declines during the winter months. Blowing and drifing snow and extreme cold temperatures contibute to the annual out migration. Spencer has no City infrastructure except a few streets which are maintained under contract by Clark County.

Spencer is extremely vulnerable to wildfire. The residents of Spencer are very committed to maintaining firewise conditions on their properties.

Note:

Ciritical Infrastructure Mapping was not completed for the City of Spencer as it has no public services or critical infrastructure.

Section 3: Mitigation Strategy

Capabilities Assessments

Agency Name (Mission/Function	Programs, Plans, Policies, Regulations, Funding, ,or Practices	Effect of Loss Reduction*			Comments
		Support	Facilitate	Hinder	
Clark County Emergency Management	Clark County Emergency Operations Plan Clark County Multi-Jurisdiction All Hazard Mitigation Plan	X	X		
Clark County Planning and Zoning	Clark County Comprehensive Plan Clark County Development Code	X	X		Covers the County, the City of Dubois and the City of Spencer

Clark County Capabilities Assessment

*Definitions:
Support: Programs, plans, policies, regulations, funding, or practices that help the implementation of mitigation actions
Facilitate: Programs, plans, policies etc. that make implementation actions easier
Hinder: Programs, plans, policies, etc., that pose obstacles to implementation of mitigation actions

Land Use Planning and Development

2012 Revision Summary: This section was added to meet the FEMA requirements of examination of the relationship between the mitigation plan and land use planning activities in the County.

The State of Idaho Local Land Use Planning Act (LLUPA), first adopted in 1975 by the Idaho Legislature, (Idaho Code § 67-6508) mandates that all cities and counties develop a Comprehensive Plan. The Code identifies the chapters that should be placed in the plan. The Code does not tell local governments how the plan should be developed, where they should get their information or documentation on how the plan should be assembled. That is the responsibility of each jurisdiction. The fifteen chapters of the Comprehensive Plan work as one, but in order for the reader to focus on similar subject matter, subsections were established. The subsections are developed to focus on subjects that interact more with each other.

This chapter of the Clark County Multi-Jurisdiction All Hazard Mitigation Plan examines the relationship between land use documents, such as the jurisdictions' Comprehensive Plans and Land Use Ordinances, and Mitigation Planning activities undertaken in the past and proposed for the future in Clark County. Each of the participating jurisdictions' land use documents has been reviewed.

Transportation Planning in Clark County is documented in the Clark County Transportation Plan. Projects from that Plan were included in the 2008 version of the Clark County Multi-Jurisdiction All Hazard Mitigation Plan. The Transportation Plan has not been updated since that time.

Jurisdiction	# Building Permits (BP)	# BP in Floodplain	# BP in WUI	# BP in Other Hazard Areas	Comments
Clark County	13	3	10	0	3 Structures in the Kilgore Floodplain
City of Dubois	11	0	0	0	None
City of Spencer	3	0	3	0	None

Clark County Development Impacts

The table above provides a listing of the number of building permits issued since 2009 and provides an analysis of the number of buildings that have been added to hazard areas within the jurisdiction. The addresses for each building permit were mapped using Geographical Information System (GIS) technology and juxtaposed against the hazard areas analyzed in Section 2. The increase of hazard vulnerability is quantified by the number of new structures in the hazard zone.

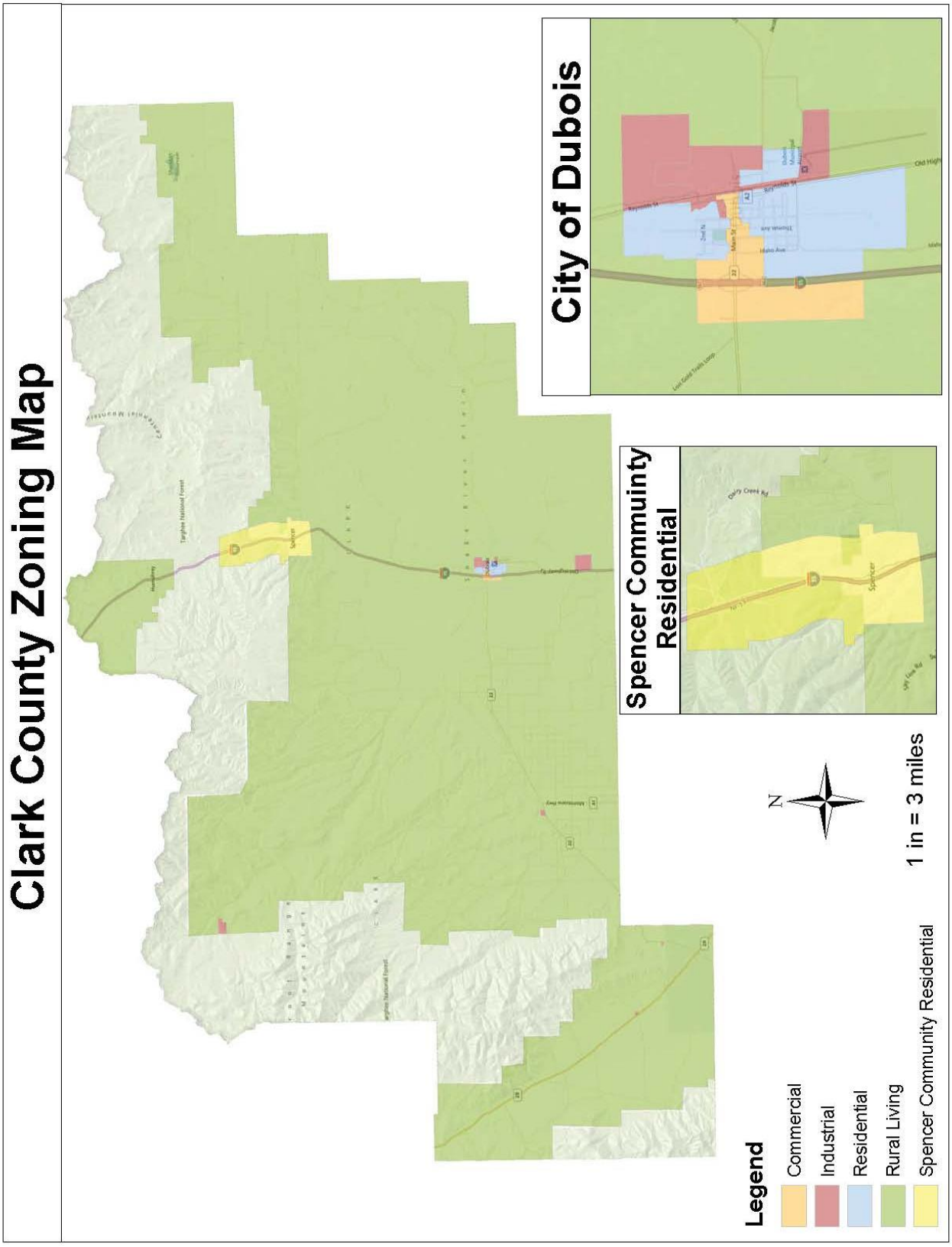
Clark County

The Clark County Comprehensive Plan covers the County, the City of Dubois, and the City of Spencer, and serves as the County's overall planning tool or blueprint for the community's future. The associated Development Code is the formal codification of land use policies in Clark County and the Cities of Dubois and Spencer. The Comprehensive Plan establishes policies to help the County grow and develop. The Plan meets the requirements of the State of Idaho Local Land Use Planning Act as codified in Idaho Code § 67-6508. The Plan is based on the premise that if citizens of Clark County know what they want to do, in regard to land use planning, the Plan provides a better prospect of arriving there. The Plan indicates, in a general way, how the County, in and outside of city limits, should develop in the next ten years. The Comprehensive Plan therefore is a roadmap, or a framework, for land use decision making in the County and the Cities.

The Land Uses addressed in the Clark County Comprehensive Plan include rural living, residential, commercial, and industrial. The plan covers all land use within the County regardless of City limits. The County Planning and Zoning Commission conducts joint planning with the incorporated cities and the County.

The County and Cities adopted the International Building Code in 2010 and has an active building inspection program provided under contract with Jefferson County Idaho's Building Official. The Planning and Zoning Ordinances are aligned with the land use policies of the Comprehensive Plan and Clark County Multi-Jurisdiction All Hazard Mitigation Plan.

The Hazardous Areas Component of the Plan is covered in Section 12. This section is a summary of the 2008 Clark County All Hazard Mitigation Plan.



Clark County Zoning Map

NFIP Continuity Strategy

Clark County participates in the National Flood Insurance Program. The Clark County Floodplain Administrator is the Clark County Emergency Manager. The County Floodplain Administrator is responsible for Clark County and the City of Dubois. Clark County does not have a Community Rating System designation. Clark County has one community within the 100 year floodplain hazard area, the City of Dubois. Clark County has no communities under suspension or revocation of participation in the NFIP[49]. The City of Spencer does not participate in the NFIP and is not in a mapped floodplain.

NFIP Participation Category	Clark County
Date Participating in Regular Phase of NFIP	9/24/84
Participating in CRS (class)	Not Participating
Date of current FIRM	9/24/84
Number of NFIP Policies	3
Are FIRMs digital or paper	Paper
Insurance in Force (Total coverage)	25,000
Total Premiums	956
Number Claims Paid	0
$ Total Claims Paid	0
# Substantial Damage Claims	0
Rep Loss Properties	0
Severe Rep Loss Properties	0

Clark County adopted a revised Floodplain Ordinance with the codification of their new Development Code that restricts new construction in designated floodplain areas. The Ordinance, which covers the City of Dubois and the City of Spencer, as well as the County, was adopted in 2010. The City of Dubois was successful in their National Flood Insurance Program (NFIP) re-admittance application in 2011. The City of Spencer has not applied to participate in the NFIP.

Clark County FIRM maps were last updated in 1984. These maps are the basis of their ordinance.

[49]IDWR 2004

Goals

AHMP Goals describe the broad direction that Clark County agencies, organizations, and citizens will take to select mitigating projects which are designed specifically to address risks posed by natural and manmade hazards. The goals are stepping-stones between the mission statement and the specific objectives developed for the individual mitigation projects.

Severe Weather

- Clark County will develop methods to mitigate the losses due to severe weather in the County.

Objectives:

- Improve the Safety of County Roads and Bridges
- Develop Methods to Reduce Straight Line Wind Damage
- Develop Methods to Respond to Drought Conditions

Flooding

- Clark County will continue to participate in the National Flood Insurance Program and develop actions that will reduce the damage to County infrastructure due to flash and stream flooding.

Objectives:

- Improve Drainage Systems

Geological

- Clark County will reduce potential damage to County infrastructure and structures through implementation of earthquake mitigation techniques.

Objectives:

- Priority should be given to schools, public buildings, community evacuation and assessable sites
- Clark County will reduce the potential damage to property from Landslides by adopting codes and standards for construction in landslide prone areas.

Objectives:

- Protect County Roads

Wildfire

- Clark County will reduce the losses caused by wildfire by continuing the Wildland Urban Interface Mitigation Program.

Objectives:

- Improve access to areas prone to Wildland Fire
- Improve Hazard Communications Tools
- Reduce flammable fuels immediately adjacent to roads in high risk areas
- Conduct Fuel Reduction Projects

- Ensure coordination of WUI Fire Mitigation Projects
- Develop Additional Water Supplies for Fire Protection
- Update and Improve Road Signing and Rural Addressing
- Improve WUI Area Administrative Controls

Biological

- Clark County seeks to reduce the exposure of humans and animals to the West Nile Virus.

Objectives:

- Protect Citizens through Education

Structural Fire

- Clark County will seek to reduce losses from Structure fires.

Objectives:

- Encouraging private property owners improve property protection systems

Nuclear Event

- Clark County will continue to work to reduce the risk of Nuclear Events in the County.

Objectives:

- Work with INL to understand the risk posed from operations

Terrorism

- Clark County will identify measure to protect critical County infrastructure and facilities from potential terror incidents.

Objectives:

- Identify and protect potential terrorism targets

Participating Jurisdiction Goals

City of Dubois

Severe Weather

- The City of Dubois will develop methods to protect the life safety of its citizens from harm due to severe weather events.

Objectives:

- Protect isolated individuals from Severe Winter Storms and Extreme Cold
- Establish a Food Supply for Shelters
- Protect City Infrastructure
- Maintain Water Supplies

Flooding

- The City of Dubois will begin participation in the National Flood Insurance Program and develop actions that will reduce the damage to City property and infrastructure due to flooding.

Objectives:

- Protect Property and Infrastructure

Geological

- The City of Dubois will reduce potential damage to City infrastructure and structures through implementation of earthquake mitigation techniques.

Objectives:

- Protect Library Patrons from tipping shelves and falling books

Wildfire

- The City of Dubois will reduce the losses caused by wildfire by continuing the Wildland Urban Interface Mitigation Program.

Objectives:

- Conduct Fuel Reduction Projects
- Develop Additional Water Supplies for Fire Protection

Structural Fire

- The City of Dubois will seek to reduce losses from Structure fires through working with private property owners to ensure that smoke alarms and fire extinguishers are located in each residence.

Objectives:

- Ensure that all structures have minimum detection and protection devices

City of Spencer

Severe Weather

- The City of Spencer will develop methods to protect the life safety of its citizens from harm due to severe weather events.

Objectives:

- Protect isolated individuals from Severe Winter Storms and Extreme Cold

Flooding

- The City of Spencer will investigate participation in the National Flood Insurance Program and develop actions that will reduce the damage to property and infrastructure due to flooding.

Objectives:

- Protect Property

Wild/Structure Fire

- The City of Spencer will seek to reduce losses from Wild/Structure fires.

Objectives:

- Ensure that all structures have minimum detection and protection devices
- Increase Fire Water Supplies
- Protect New Structures

2013 Mitigation Projects

The following projects were developed by the Clark County Mitigation Committee and represent a range of projects which, if implemented, would address the hazards analyzed in Section 2. Note that specific attention was paid to each of the high ranked hazards to ensure there were mitigation actions or projects identified to address those hazards.

Goal	*Objective*	*Project*	*Responsible Entity*	*Order of Magnitude Cost & Planning Horizon*
		Weather		
Clark County will develop methods to mitigate the losses due to severe weather in the County.	Improve the Safety of County Roads and Bridges	Construct Recreational Parking Areas	Road and Bridge	ROM - $25,000 2009 – Identify Parking Area and Engineer Solution 2014 – Seek Funding 2015– Construct
		Place Seasonal Road Signage	Road and Bridge	ROM - $10,000 2014 – Install Signs
	Develop Methods to Reduce Straight Line Wind Damage	Plant Living Windbreaks/Snow Fences	Private Property Owners	ROM - $8/FT 2015– Identify at-risk Areas 2016 – Develop Agreements with Landowners 2017 – Seek Funding and Plant Fences
		Develop secondary supply of electrical power	Disaster Coordinator/Rocky Mountain Power	ROM - $10,000,000 2015– Begin Discussions with Rocky Mountain Power and Regional Users. 2016 – Design System and develop cost estimate 2017 – Seek Funding 2018 – Begin Construction
	Develop Methods to Respond to Drought Conditions	Develop a County-Wide Drought Response Plan	Emergency Manager	ROM – 10,000 2014 – Identify SHGP Planning Funds
		Flood		
Clark County will continue to participate in the National Flood Insurance Program and develop actions that will reduce the damage to County	Improve Drainage Systems	Replace the undersized culvert at the West Fork of Three Mile Creek Crossing	Clark County Road and Bridge Department	ROM - $120,000 2014 – Apply for FEMA PDM funding to replace culverts. Group with replacements on Rattle Snake Creek Project 2015 – Begin Project. Seek LHTAC funds to assist in match for the project.

infrastructure due to flash and stream flooding.			2016– Grant Closeout
	Replace the undersized culvert at the Rattle Snake Creek Crossing	Clark County Road and Bridge Department	ROM – $110,000 2015 – Apply for FEMA PDM funding to replace culverts. Group with replacements on West Fork Three Mile Project 2016 – Begin Project. Seek LHTAC funds to assist in match for the project. 2017 – Grant Closeout
	Replace the undersized culvert at the West Antelope Valley Culvert Crossing	Clark County Road and Bridge Department	ROM - $100,000 2016 – Apply for FEMA PDM funding to replace culverts. Group with replacements on East Antelope and Hilman Lane projects. 2017 – Begin Project. Seek LHTAC funds to assist in match for the project. 2018 – Grant Closeout
	Replace the undersized culvert at the East Antelope Valley Culvert	Clark County Road and Bridge Department	ROM - $94,000 2016 – Apply for FEMA PDM funding to replace culverts. Group with replacements on West Antelope and Hilman Lane projects. 2017 – Begin Project. Seek LHTAC funds to assist in match for the project. 2018 – Grant Closeout
	Replace the undersized culvert at the Hilman Lane Crossing	Clark County Road and Bridge Department	ROM - $84,000 2016 – Apply for FEMA PDM funding to replace culverts. Group with replacements on East and West Antelope projects. 2017 – Begin Project. Seek LHTAC funds to assist in match for the project. 2018 – Grant Closeout

Geological				
Clark County will reduce potential damage to County infrastructure and structures through implementation of earthquake mitigation techniques.	Priority should be given to schools, public buildings, community evacuation and assessable sites	Develop a listing of schools and public buildings that need to seismically retrofitted	Emergency Manager	ROM - $50,000 2016 – Seek Funding to evaluate structures. 2017 – Develop prioritize list of buildings to be retrofitted
		Earthquake Protection or Hardening the Clark County EOC the County Jail, The Clark County 911 Dispatch Center, Community Center and the County Court House	Emergency Manager/Sheriff/ Commissioners	ROM - $250,000 2020- Seek Funding to conduct conceptual hardening designs. 2021 – Conduct Designs and Benefit Cost Analysis. Apply for HMA Funding 2022 – Protect Buildings as designed and funded
		Harden County Radio Communications Sites	Emergency Manager/Sheriff	ROM - $50,000 2014 – Conduct Design and Benefit Cost Analysis Apply for HMA Funding 2015 – Implement Design

	Wildfire			
Clark County will reduce the losses caused by wildfire by continuing the Wildland Urban Interface Mitigation Program.	Improve access to areas prone to Wildland Fire	Develop a listing of roads, bridges, cattle guards, culverts, and other limiting conditions and incorporate improvements into the Highway District Transportation Plans	Fire District/Road and Bridge	ROM - $150,000 plus annual maintenance cost. 2014– Develop a LHTAC Grant to evaluate all roadways in the County. Determine Priority actions. 2014 – Ongoing: Repair or Replace damaged culverts, bridges etc.
	Improve Hazard Communications Tools	Use GIS Technology to Link Red Zone Data to Landowner Parcel Maps	Fire District/Assessor	ROM - $25,000 2016 – Seek Funding 2017 – Link Data
	Reduce flammable fuels immediately adjacent to roads in high risk areas	Develop a standard practice for roadside vegetation management in the WUI	Fire District/Road and Bridge	ROM - $15,000 2015 – Seek Funding from County to develop ordinance. 2015 – Adopt Ordinance
	Conduct Fuel Reduction Projects	Develop wildfire fuel breaks around CRP Land	Fire District	ROM - $50,000 2014 – Identify Remaining CRP Land 2015 – Work with Property Owners and NRCS/USDA to seek funding 2016 – Install fire breaks
	Ensure coordination of WUI Fire Mitigation Projects	Organize a group to jointly apply for grants and other funding avenues to implement WUI Fire Mitigation Actions	Disaster Coordinator/County Clerk	No Cost 2014 – Develop standard as part of WUI Planning ongoing effort
	Develop Additional Water Supplies for Fire Protection	Develop an agreement with developers and rural private landowners for access to and use of water sources for fire protection	Fire District	ROM - $5000 2015 – Seek Funding from BHS SHSP and develop standard agreement and requirements. 2016 – Execute Agreements
	Update and Improve Road Signing and Rural Addressing	Install Road Signs as prescribed by NFPA Standards	Road and Bridge	In Progress

Wildfire				
	Improve WUI Area Administrative Controls	Designate Wildland Urban Interface in the County Comprehensive Plan as a Special Land Use category	P & Z Administrator	ROM - $2,000 2017 – Include in Comprehensive Plan update
		Develop and Adopt a WUI Ordinance	P & Z Administrator	ROM - $5,000 2016 – Seek Funding from County to develop ordinance. 2017 – Adopt Ordinance
Structure Fire				
Clark County will seek to reduce losses from Structure fires.	Encouraging private property owners improve property protection systems	Install Smoke Detectors and Fire Extinguishers in all Residences	Fire District	ROM - $8,000 2013– Seek Funding for the Assistance to Fire Fighters Safety Grant Program 2014 – Distribute Detectors
Nuclear				
Clark County will continue to work to reduce the risk of Nuclear Events in the County.	Work with INL to understand the risk posed from operations	Develop an ingestion pathway protection program	Emergency Manager/INL Public Safety	No Cost 2013 – Invite INL Safety Liaison and INL Oversight Public Information Officer to LEPC Meetings to provide education

Terrorism				
Clark County will identify measure to protect critical County infrastructure and facilities from potential terror incidents	Identify and protect potential terrorism targets	Conduct a County Terrorism assessment	Emergency Manager	ROM - $5000 2014 – Work with LEPC to conduct assessment
		Protect Critical Infrastructure based on the assessment	Emergency Manager	Insufficient Data to estimate cost. 2014 – Develop a listing of critical infrastructure to be protected. 2015– Seek Funding to design and engineer protection alternatives. 2016 – Conduct Engineering 2017 – Seek Funding to Implement Solutions. 2018 – Begin Implementation

City of Dubois

Goal	Objective	Project	Responsible Entity	Order of Magnitude Cost & Planning Horizon
		Weather		
The City of Dubois will develop methods to protect the life safety of its citizens from harm due to severe weather events.	Protect isolated individuals from Severe Winter Storms and Extreme Cold	Identify Evacuation Shelters Equip with Emergency Generators	Mayor/ Emergency Manager	No Cost 2013 – Work with City Council, Church, and volunteer organizations.
		Pre-install emergency generator connections to Shelter	Mayor/ Emergency Manager	ROM - $1000 2013 – Install Connections for Regional Generator
		Install Shortwave Radio for communications during isolated periods	Mayor/County Emergency Manager	ROM - $1000 2014– Seek Funding 2015 – Install Radio
		Develop a capability to purify and test water during periods of isolation	Mayor/County Emergency Manager	ROM - $1000 2014– Seek Funding from CHC Foundation 2015 – Purchase Equipment
	Establish a Food Supply for Shelters	Develop Protocols to Purchase Food during Sheltering Events	Mayor/ Emergency Manager	No Cost 2014 – Work with City Council, Church, and volunteer organizations
	Protect City Infrastructure	Protect the City Water Supply Lines from Freezing	Mayor/Public Works	ROM - $500,000 2014 :Identify Areas to protect 2015 Apply for funding 2016 – Lower Waterlines
	Maintain Water Supplies	The City will develop a Yard Watering Ordinance which regulates water usage during drought conditions	Mayor/City Council	ROM – No Cost 2014 – Develop Ordinance

Geological				
The City of Dubois will reduce potential damage to City infrastructure and structures through implementation of earthquake mitigation techniques.	Protect Library Patrons from tipping shelves and falling books	Place restraining hardware on the City Library Shelves. Place retaining bars or trim along the front to the book shelves	City Librarian	ROM - $10,000 2015– Seek funding in City budget and install hardware
Wildfire				
The City of Dubois will reduce the losses caused by wildfire by Continue the Wildland Urban Interface Mitigation Program.	Conduct Fuel Reduction Projects	Develop a fire break around the City of Dubois	Fire District	ROM - $25,000 2014 – Seek Funding from BLM 2015 – Plant Fire Break
	Develop Additional Water Supplies for Fire Protection	Develop an agreement with developers and private landowners for access to and use of water sources for fire protection	Emergency Manager /Fire District	ROM - $5000 2015 – Seek Funding from BHS SHSP and develop standard agreement and requirements. 2016 – Execute Agreements
Structure Fire				
The City of Dubois will seek to reduce losses from Structure fires.	Ensure that all structures have minimum detection and protection devices	Encourage private property owners to install and maintain smoke detectors on all levels of the residences and to place detectors in all bedrooms	Fire District	ROM - $10,000 2013 – Seek Funding for the Assistance to Fire Fighters Safety Grant Program 2014 – Distribute Detectors

Flooding				
The City of Dubois will continue participation in the National Flood Insurance Program and develop actions that will reduce the damage to City property and infrastructure due to flooding.	Protect Bridges	Replace the Bridge on 5th West	Mayor/Public Works	In Process

City of Spencer

Goal	*Objective*	*Project*	*Responsible Entity*	*Order of Magnitude Cost & Planning Horizon*
		Weather		
The City of Spencer will develop methods to protect the life safety of its citizens from harm due to severe weather events.	Protect isolated individuals from Severe Winter Storms and Extreme Cold	Identify Evacuation Shelters Equip with Emergency Generators	Emergency Manager	No Cost 2014 – Work with City Council, Church, and volunteer organizations
		Wild/Structure Fire		
The City of Spencer will seek to reduce losses from Wild/Structure fires.	Ensure that all structures have minimum detection and protection devices	Encouraging private property owners to install and maintain smoke detectors on all levels of the residences and to place detectors in all bedrooms	Emergency Manager	ROM - $2,000 2013 – Seek Funding for the Assistance to Fire Fighters Safety Grant Program 2014 – Distribute Detectors
	Increase Fire Water Supplies	Develop an agreement with developers and private landowners for access to and use of water sources for fire protection	Fire District	ROM - $5000 2015 – Seek Funding from BHS SHSP and develop standard agreement and requirements. 2016 – Execute Agreements

Goal	Objective	Project	Responsible Entity	Order of Magnitude Cost & Planning Horizon
	Protect New Structures	Continue Firewise Practices and provide education to new landowners	Emergency Manager	ROM – No Cost Ongoing – Provide Education to new development
		Flooding		
The City of Spencer will investigate participation in the National Flood Insurance Program and develop actions that will reduce the damage to property and infrastructure due to flooding	Protect Property	Install a drainage way from the Sprayberry/Lent Pond that drains into Camas Creek	Emergency Manager	ROM - $25,000 2015 – Seek funding to install drainage way

2013 Mitigation Projects Analyses - STAPLEE

During the preparation of the Clark County Local Plan Review Crosswalk the AHMP Committee reviewed the following criteria item determined that the priority ranking was being done correctly.

"C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))"

During the development of the 2008 Clark County All Hazard Mitigation Plan the projects were prioritized based primarily on Cost Benefit approach, as that is typically how projects are funded and it was in line with the Guidance. The 2011 guidance says the following:

"The plan must demonstrate when prioritizing hazard mitigation actions that the local jurisdictions considered the benefits that would result from the hazard mitigation actions versus the cost of those actions. The requirement is met as long as the economic considerations are summarized in the plan as part of the community's analysis. A complete benefic-cost analysis is not required. Qualitative benefits (for example, quality of life, natural and beneficial values, or other "benefits") can also be included in how actions will be prioritized."

The new guidance states:

"b. At a minimum, this list of prioritized projects will be based on a process that results in identification of cost effective hazard mitigation projects with public input, including:

i. An analysis of proposed mitigation projects focused on several key areas, ***including but not limited to: economic (including benefits and cost), engineering, technical, legal, environmental, social, and political feasibility. Selected options that will best fit the community's needs and meet most or all aspects of the feasibility analysis."***

The Committee reviewed the FEMA Mitigation Planning How to Guides which suggested the **STAPLEE Method** to complete the prioritization process. The AHMP Committee chose to organize a small subcommittee of the AHMP Committee who understand a wide range of the issues, i.e., social, technical, political, economic, etc. and score the projects using a weighted, (as suggested in the how to guide) STAPLEE Criteria. The following provides an illustration of the scoring sheet and weighting. On August 22, 2013 the subcommittee met and scored the projects then gave each a ranking of High (H), Medium (M), or Low (L).

STAPLEE Criteria	**S** (Social)	**T** (Technical)	**A** (Administrative)	**P** (Political)	**L** (Legal)	**E** (Economic)	**E** (Environmental)
Considerations → **for Alternative Actions** ↓	Community Acceptance Effect on Segment of Population • •	Technical Feasibility Long-term Solution Secondary Impacts • • •	Staffing Funding Allocated Maintenance/ Operations • • •	Political Support Local Champion Public Support • • •	State Authority Existing Local Authority Potential Legal Challenge • • •	Benefit of Action Cost of Action Contributes to Economic Goals Outside Funding Required • • • •	Effect on Land/ Water Effect on Endangered Species Effect on HAZMAT/ Waste Sites Consistent with Community Environmental Goals Consistent with Federal Laws • • • • •

A three member subcommittee from the Clark County AHMP Committee met on August 22, 2013 to prioritize the Clark County Projects based on the STAPLEE Criteria presented above. Those participating in the scoring included:

Russ Kerr – Clark County Emergency Manager/Floodplain Manager

Boyd Eddins – Clark County Chief Deputy Sheriff

Kerri Ellis – Clark County Planning and Zoning Administrator/Economic Development Director

Prioritization scoring for the City of Dubois and the City of Spencer was conducted by the individual Mayors and City Councils. A simple high, medium, low score was given for each project based on local needs and estimated benefit to the community.

Project	Hazard	Rank
Install Road Signs as prescribed by NFPA Standards	Wildfire	H
Construct Recreational Parking Areas	Severe Winter Weather	H
Place Seasonal Road Signage	Severe Winter Weather	H
Plant Living Windbreaks/Snow Fences	Severe Winter Weather	H
Harden County Radio Communications Sites	Earthquake	H
Install Smoke Detectors and Fire Extinguishers in all Residences	Structure Fire	H
Replace the undersized culvert at the West Fork of Three Mile Creek Crossing	Flood	H
Replace the undersized culvert at the Rattle Snake Creek Crossing	Flood	H
Replace the undersized culvert at the Hilman Lane Crossing	Flood	H
Replace the undersized culvert at the West Antelope Valley Culvert Crossing	Flood	H
Replace the undersized culvert at the East Antelope Valley Culvert	Flood	H
Develop a County-Wide Drought Response Plan	Drought	H
Designate Wildland Urban Interface in the County Comprehensive Plan as a Special Land Use category	Wildfire	M
Develop an agreement with developers and private landowners for access to and use of water sources for fire protection.	Wild/Structure Fire	M
Develop a listing of roads, bridges, cattle guards, culverts, and other limiting conditions and incorporate improvements into the Highway District Transportation Plans	Wildfire	M
Use GIS Technology to Link Red Zone Data to Landowner Parcel Maps	Wildfire	M
Conduct a County Terrorism assessment.	Terrorism	M
Protect Critical Infrastructure based on the assessment.	Terrorism	M
Develop wildfire fuel breaks around CRP Land	Wildfire	M
Develop a listing of schools and public buildings that need to seismically retrofitted	Earthquake	L
Earthquake Protection or Hardening the Clark County EOC the County Jail, The Clark County 911 Dispatch Center, Community Center and the County Court House.	Earthquake	L
Develop a standard practice for roadside vegetation management in the WUI	Wildfire	L
Develop and Adopt a WUI Ordinance	Wildfire	L
Develop an ingestion pathway protection program with INL	Nuclear	L
Develop secondary supply of electrical power	Severe/Severe Winter Weather	L
Organize a group to jointly apply for grants and other funding avenues to implement WUI Fire Mitigation Actions	Wildfire	L

Dubois Project Ranking		
Project	**Hazard**	**Rank**
Replace the Bridge on 5th West	Flood	H
Protect the City Water Supply Lines from Freezing	Severe Winter Weather	H
Increase water supply and pressure in the City's Water System	Wild/Structure Fire	H
Pre-install emergency generator connections to Shelter	All Hazards	M
The City will develop a Yard Watering Ordinance which regulates water usage during drought conditions	Drought	M
Develop a capability to purify and test water during periods of isolation.	All Hazards	M
Identify Evacuation Shelters Equip with Emergency Generators	All Hazards	M
Develop an agreement with developers and private landowners for access to and use of water sources for fire protection	Wild/Structure Fire	M
Develop a fire break around the City of Dubois	Wildfire	M
Install Shortwave Radio for communications during isolated periods	All Hazards	L
Develop Protocols to Purchase Food during Sheltering Events	All Hazards	L
Encouraging private property owners to install and maintain smoke detectors on all levels of the residences and to place detectors in all bedrooms	Structure	L
Place restraining hardware on the City Library Shelves. Place retraining bars or trim along the front to the book shelves	Earthquake	L

Spencer Project Ranking		
Project	**Hazard**	**Rank**
Install a drainage way from the Sprayberry/Lent Pond that drains into Camas Creek	Flood	H
Continue Firewise Practices and provide education to new landowners	Wildfire	H
Develop an agreement with developers and private landowners for access to and use of water sources for fire protection.	Wild/Structure Fire	H
Identify Evacuation Shelters Equip with Emergency Generators.	All Hazards	M
Encouraging private property owners to install and maintain smoke detectors on all levels of the residences and to place detectors in all bedrooms	Wild/Structure Fire	M

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Section 4: Plan, Review, Evaluation, and Implementation

The Clark County Multi-Jurisdiction All Hazard Mitigation Plan 2013 is a complete revision of the 2008 Clark County All Hazard Mitigation Plan. The entire Hazard and Vulnerability Assessment was updated. The hazard ranking was changed and a new format deployed that ranks the hazards according to five indices, 1) historical occurrence, 2) probability, 3) vulnerability, 4) spatial extent, i.e. the extent impact based on geography, and 5) the magnitude which looks specifically at the loss of life, injuries, and economic impact. The Plan format was changed to match the FEMA Local Plan Crosswalk Guidance.

The revision was under the direction of the Clark County All Hazard Mitigation Planning Committee. Community involvement took two forms, 1) an electronic based community questionnaire, and 2) invitation to attend the joint City/County local elected official's briefings. There was limited community participation; however, Clark County is the most sparsely populated County in the State of Idaho.

Mitigation Actions have been reviewed and a status provided by the Mitigation Committee. Goals and Objectives developed in the initial planning process were maintained and additional mitigation actions added to the Plan. The mitigation actions were reviewed and analyzed using the STAPLEE Method with each action given H, M, or L ranking.

The Plan, as developed, is much more user friendly, and designed specifically to enhance implementation. The jurisdictions have completed many of the mitigation actions and, as funding is available, additional mitigation actions will be addressed.

Mitigation Project Status

The following listing shows the priority mitigation actions for each jurisdiction identified in the 2008Clark County All Hazard Mitigation Plan. The status column indicates if the project is completed or not, and what roadblocks are slowing progress of each project. Those projects that are not completed or underway, but are deemed feasible, have been integrated into the current project listing. Those projects that are not feasible have been removed from the mitigation project listing.

Uncompleted projects were moved forward to the 2013 Mitigation Project Listing and prioritized.

2008 Mitigation Project Status Report

Goal	*Objective*	*Project*	*Responsible Entity*	*Status*
Clark County will develop methods to mitigate the losses due to severe weather in the County.	Improve the Safety of County Roads and Bridges	Construct Recreational Parking Areas	Road and Bridge	Complete
		Place Seasonal Road Signage	Road and Bridge	Complete

	Develop Methods to Reduce Straight Line Wind Damage	Plant Living Windbreaks/Snow Fences	Private Property Owners	Move to 2013 List
		Develop secondary supply of electrical power	Disaster Coordinator/Rocky Mountain Power	Move to 2013 List
Flood				
Clark County will continue to participate in the National Flood Insurance Program and develop actions that will reduce the damage to County infrastructure due to flash and stream flooding.	Improve Drainage Systems	Develop a Culvert Maintenance Program	Road and Bridge	In Progress
	Promoting insurance coverage for severe weather events	Establish a National Flood Insurance Program for areas prone to flash flooding including the Cities of Dubois and Spencer	P & Z Administrator	Complete
2011 Kilgore Floodplain Mitigation Projects				
Clark County will continue to participate in the National Flood Insurance Program and develop actions that will reduce the damage to County infrastructure due to flash and stream flooding.	Improve Drainage Systems	Replace the undersized culvert at the West Fork of Three Mile Creek Crossing	Clark County Road and Bridge Department	Move to 2013 List
		Replace the undersized culvert at the Rattle Snake Creek Crossing	Clark County Road and Bridge Department	Move to 2013 List
		Replace the undersized culvert at the West Antelope Valley Culvert Crossing	Clark County Road and Bridge Department	Move to 2013 List
		Replace the undersized culvert at the East Antelope Valley Culvert	Clark County Road and Bridge Department	Move to 2013 List

		Replace the undersized culvert at the Hilman Lane Crossing	Clark County Road and Bridge Department	Move to 2013 List
		Geological		
Clark County will reduce potential damage to County infrastructure and structures through implementation of earthquake mitigation techniques.	Ensure enforcement of seismic building code provisions in the International Building Code as adopted	Adopt the International Building Code County wide. Revise the Comprehensive Plan to so indicate	P & Z Administrator	Complete
	Priority should be given to schools, public buildings, community evacuation and assessable sites	Develop a listing of schools and public buildings that need to seismically retrofitted	Emergency Manager	Move to 2013 List
		Earthquake Protection or Hardening the Clark County EOC the County Jail, The Clark County 911 Dispatch Center, Community Center and the County Court House	Emergency Manager/Sheriff/Commissioners	Move to 2013 List
		Harden County Radio Communications Sites	Emergency Manager/Sheriff	Move to 2013 List
	The media can raise awareness about earthquakes by providing important information to the community	Publish a special section in newspapers with emergency information on earthquakes	Emergency Manager	Canceled – this project was to be completed with BHS on the 25th Anniversary of the Borah Peak Earthquake but was overcome by other planning events.

		Geological		
Clark County will reduce the potential damage to property from Landslides by adopting codes and standards for construction in landslide prone areas.	Reduce Potential Damage to Structures in Landslide Prone Areas	Revise the County Subdivision Ordinance to restrict building in areas prone to land/mud slides	P & Z Administrator	Complete
		Wildfire		
Clark County will reduce the losses caused by wildfire by continuing the Wildland Urban Interface Mitigation Program.	Adopt and enforce applicable components of NFPA Code 1144 that addresses the unique needs of Clark County	Develop a Wildland Fire Ordinance which establishes the road widths, access, water supply, and building regulations suitable to ensure new structures can be protected	P & Z Administrator/Fire District	Complete
	Improve access to areas prone to Wildland Fire	Develop a listing of roads, bridges, cattle guards, culverts, and other limiting conditions and incorporate improvements into the Highway District Transportation Plans	Fire District/Road and Bridge	Move to 2013 List
		Standardize roadway/street widths for improved access in Wildfire Areas	Road and Bridge	Complete
	Improve Hazard Communications Tools	Use GIS Technology to Link Red Zone Data to Landowner Parcel Maps	Fire District/Assessor	Move to 2013 List
	Reduce flammable fuels immediately adjacent to roads in high risk areas	Develop a standard practice for roadside vegetation management in the WUI.	Fire District/Road and Bridge	Move to 2013 List

		Geological		
	Conduct Fuel Reduction Projects	Develop wildfire fuel breaks around CRP Land	Fire District	Move to 2013 List
	Ensure coordination of WUI Fire Mitigation Projects	Organize a group to jointly apply for grants and other funding avenues to implement WUI Fire Mitigation Actions	Disaster Coordinator/County Clerk	Move to 2013 List
	Develop Additional Water Supplies for Fire Protection	Develop an agreement with developers and rural private landowners for access to and use of water sources for fire protection	Fire District	Move to 2013 List
	Update and Improve Road Signing and Rural Addressing	Install Road Signs as prescribed by NFPA Standards	Road and Bridge	In Progress
	Improve WUI Area Administrative Controls	Designate Wildland Urban Interface in the County Comprehensive Plan as a Special Land Use category	P & Z Administrator	Move to 2013 List
		Develop and Adopt a WUI Ordinance	P & Z Administrator	Move to 2013 List
		Revise the County Subdivision Ordinance to require dual access in all subdivisions	P & Z Administrator	Complete
		Install a reverse calling capability to warn citizens of hazardous events	Emergency Manager/Sheriff	Complete

Biological				
Clark County seeks to reduce the exposure of humans and animals to the West Nile Virus by maintain an active "fight the bit" public education program.	Build knowledge of West Nile Virus in the general public	Maintain an active "fight the bite" public education program	Health District/Emergency Management	Ongoing/Complete
Structure Fire				
Clark County will seek to reduce losses from Structure fires.	Encouraging private property owners improve property protection systems	Install Smoke Detectors and Fire Extinguishers in all Residences	Fire District	Move to 2013 List
	Develop Additional Water Supplies for Fire Protection	Develop an agreement with developers and private landowners for access to and use of water sources for fire protection	Fire District	Move to 2013 List

Nuclear				
Clark County will continue to work to reduce the risk of Nuclear Events in the County.	Work with INL to understand the risk posed from operations.	Develop an ingestion pathway protection program	Emergency Manager/INL Public Safety	Move to 2013 List
Hazardous Materials				
Clark County will identify hazardous materials transported through the County.	Protect County residents from the effects of Hazardous Materials	Conduct a hazardous materials flow study for Interstate 15 and the railroad line running through the County	Emergency Manager	Complete
Civil Disobedience				
Clark County will develop methods to identify and report Civil Disobedience activities.	Citizen recognition of Civil Disobedience	Conduct a public education program to assist the citizens of the County in recognizing and reporting civil disobedience events to County Law Enforcement	Sheriff's Office	Canceled – The Sheriff felt this project was unnecessary.
Terrorism				
Clark County will identify measure to protect critical County infrastructure and facilities from potential terror incidents	Identify and protect potential terrorism targets	Conduct a County Terrorism assessment	Emergency Manager	Move to 2013 List
		Protect Critical Infrastructure based on the assessment	Emergency Manager	Move to 2013 List
Other				
Integrate Hazard Mitigation Programs	Improve Land Use Planning	Revise Hazardous Areas Section in the County Comprehensive Plan	P & Z Administrator	Complete
		Align the Hazard Ranking in the Comprehensive Plan with the AHMP	P & Z Administrator	Complete

		Align the Hazard Ranking in the Emergency Operations Plan with the AHMP	Emergency Manager	Complete

City of Dubois

Goal	*Objective*	*Project*	*Responsible Entity*	*Status*
The City of Dubois will develop methods to protect the life safety of its citizens from harm due to severe weather events.	Protect isolated individuals from Severe Winter Storms and Extreme Cold	Identify Evacuation Shelters Equip with Emergency Generators	Mayor/ Emergency Manager	Move to 2013 List
		Pre-install emergency generator connections to Shelter	Mayor/ Emergency Manager	Move to 2013 List
		Install Shortwave Radio for communications during isolated periods	Mayor/County Emergency Manager	Move to 2013 List
		Develop a capability to purify and test water during periods of isolation	Mayor/County Emergency Manager	Move to 2013 List
	Establish a Food Supply for Shelters	Develop Protocols to Purchase Food during Sheltering Events	Mayor/ Emergency Manager	Move to 2013 List

Goal	*Objective*	*Project*	*Responsible Entity*	*Status*
The City of Dubois will begin participation in the National Flood Insurance Program and develop actions that will reduce the damage to City property and infrastructure due to flooding.	Promoting insurance coverage for severe weather events	Establish a National Flood Insurance Program for areas prone to flash flooding including the City of Dubois	Mayor/P & Z Administrator	Complete
The City of Dubois will reduce potential damage to City infrastructure and structures through implementation of earthquake mitigation techniques.	Protect Library Patrons from tipping shelves and falling books	Place restraining hardware on the City Library Shelves. Place retaining bars or trim along the front to the book shelves	City Librarian	Move to 2013 List
	Protect Infrastructure	Replace the City's Water Tower	Mayor/City Public Works	Complete
The City of Dubois will reduce the losses caused by wildfire by continuing the Wildland Urban Interface Mitigation Program.	Conduct Fuel Reduction Projects	Develop a fire break around the City of Dubois	Fire District	Move to 2013 List
	Develop Additional Water Supplies for Fire Protection	Develop an agreement with developers and private landowners for access to and use of water sources for fire protection	Emergency Manager /Fire District	Move to 2013 List
The City of Dubois will seek to reduce losses from Structure fires.	Ensure that all structures have minimum detection and protection devices	Encouraging private property owners to install and maintain smoke detectors on all levels of the residences and to place detectors in	Fire District	Move to 2013 List

Goal	Objective	Project	Responsible Entity	Status
		all bedrooms		
	Increase Fire Water Supplies	Develop an agreement with developers and private landowners for access to and use of water sources for fire protection	Fire District	Move to 2013 List
		Increase water supply and pressure in the City's Water System	Mayor/Public Works	Move to 2013 List
		Upgrade the Fire Hydrants in the City of Dubois	Mayor/Public Works/Fire District	Complete

City of Spencer

Goal	Objective	Project	Responsible Entity	Status
The City of Spencer will develop methods to protect the life safety of its citizens from harm due to severe weather events.	Protect isolated individuals from Severe Winter Storms and Extreme Cold	Identify Evacuation Shelters Equip with Emergency Generators	Emergency Manager	Move to 2013 List
The City of Spencer will seek to reduce losses from Structure fires.	Ensure that all structures have minimum detection and protection devices	Encouraging private property owners to install and maintain smoke detectors on all levels of the residences and to place detectors in all bedrooms	Emergency Manager	Move to 2013 List

Goal	*Objective*	*Project*	*Responsible Entity*	*Status*
	Increase Fire Water Supplies	Develop an agreement with developers and private landowners for access to and use of water sources for fire protection	Fire District	Move to 2013 List.

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Plan Adoption

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

FEMA

August 6, 2014

Honorable William Frederiksen
Honorable Greg Shenton
Honorable Todd Shenton
Clark County Commissioners
P.O. Box 205
Dubois, Idaho 83423

Dear Commissioners Frederiksen, Shenton, and Shenton:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) has approved the ***Clark County Hazard 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 through August 5, 2019:

Clark County **City of Dubois** **City of Spencer**

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. Approved mitigation plans may be eligible for points under the National Flood Insurance Program's Community Rating System (CRS). Additional information regarding the CRS can be found at www.fema.gov/business/nfip/crs.shtm or through your local floodplain manager.

Over the next five years, we encourage your communities to follow the plan's schedule for its monitoring and updating, 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 Carey, Director
Mitigation Division

Enclosure

cc: Mark Stephensen, Idaho Bureau of Homeland Security

BH:bb

www.fema.gov

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CLARK COUNTY IDAHO
MULTI-JURISDICTIONAL
ALL HAZARD MITIGATION PLAN
PROMULGATION OF ADOPTION

Be it known that the Clark County Idaho Board of County Commissioners do hereby approve the Adoption of the Clark County Idaho Multi-Jurisdictional All Hazard Mitigation Plan and direct its implementation through the Clark County All Hazard Mitigation Planning Committee.

Be it also known that the Board of County Commissioners hereby directs the Emergency Management Coordinator, to continue to lead the implementation of this Plan as the Clark County All Hazard Mitigation Committee Chair.

This Plan has been developed in the interest of providing all hazard mitigation protection to populations living in Clark County and the incorporated Cities within its boundary. Through adoption of this Plan, all county and city agencies are requested to develop directives, Standing Operating Procedures, checklists, or other supplemental guidance to insure its maximum effectiveness.

Clark County Commissioner — Date: 4-14-14

Clark County Commissioner — Date: 4-14-14

Clark County Commissioner — Date: 4-14-14

Attest:

Clark County Clerk — Date: 4-14-2014

Endorsed:

Emergency Manager — Date: 4-14-2014

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NOTICE OF ENDORSEMENT AND PARTICIPATION IN THE CLARK COUNTY MULTI-JURISDICTION ALL HAZARD MITIGATION PLAN

I, Randy Mead, Mayor for the City of Dubois do hereby endorse and agree to participate in the implementation of the Clark County Multi-Jurisdiction All Hazard Mitigation Plan as it applies to the City of Dubois.

DATED this 15 day of April, 2014

CITY OF DUBOIS

By: _____

Mayor

Received by the City Clerk this 15 day of April 2014

Signature: Lisa Sherton

Clerk Lisa Sherton

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NOTICE OF ENDORSEMENT AND PARTICIPATION IN THE CLARK COUNTY MULTI-JURISDICTION ALL HAZARD MITIGATION PLAN

I, Lyle Holden, Mayor for the City of Spencer do hereby endorse and agree to participate in the implementation of the Clark County Multi-Jurisdiction All Hazard Mitigation Plan as it applies to the City of Spencer.

DATED this 8TH day of July, 2014

CITY OF SPENCER

By: Lyle Holden

Mayor

Received by the City Clerk this 8th day of July 2014

Signature:

Clerk

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Attachments

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Attachment 1 AHMP Committee Meetings

January 24, 2013

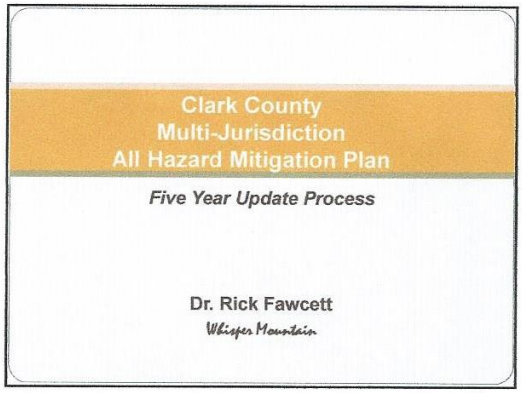
The first meeting of the Clark County Multi-Jurisdiction All Hazard Mitigation Plan Committee was held in Dubois, Idaho at the City Building on January 24, 2013 at 4:00 pm. The meeting was called to order by Mr. Russ Kerr who explained to those in attendance that the purpose of the meeting was to update Clark County's existing plan to be in compliance with FEMA. He then turned the time over to Dr. Rick Fawcett of Whisper Mountain Professional Services, Inc., the contractor hired by the County to update the plan. Rick reminded the committee the purpose of the Plan is to save lives and reduce the loss of public and private property. Dr. Fawcett gave a power point presentation identifying past and current known risks to the County. He explained how the risks are ranked for magnitude and frequency in the past and how the new method better identifies those risks specific to Clark County.

Discussion was then opened up to the committee to discuss current risks. One of the greatest risks to the City of Dubois is the flooding through the Smalls; some ground and creek stabilization has been done to date to mitigate that flooding. A grant to replace the bridge has been applied for. The ability to run water continuously through the sewer plant to keep it from freezing was discussed. Cost has been the issue preventing it from being done in the past. Dr. Fawcett said they would look at the Cost Benefit Analysis from incidents of the water freezing in the past in terms of man-hours, water loss, replacement of pipes, etc. to see if the project would pay back. Burrowing rodents were discussed as a current problem to canal erosion.

Dr. Fawcett thanked those in attendance and set a date for February 28, 2013 for the next meeting.

Clark County
AHMP Committee Members
Attendance Roster
January 24, 2013

Agency	Representative	Position	Phone	Email
Emergency Management / EMS	Russ Kerr		374-5317	clarkco1@mudlake.net
CLARK AND COUNTY ROAD AND BRIDGE / SOLID WASTE	KEVIN HATHAWAY		374-5408 (208) / 709-6705	cerb@mudlake.net
BHS	Mike Clements		589-0754	mclements@BHS.Idaho.Gov
Clark County	Tod Slade		374-5813	
City of Dubois	Randy Mead		374-6517	rmead@mudlake.net
Eco Dev Planning & Zoning	Kerri Ellis		374-5808	cceecodev@mudlake.net
Clark County Commission	Bill Frederiksen		374-5373	
CLARK COUNTY SHERIFFS OFFICE	JEFFREY MACMANUS			
Clark County Extension	Laurie Small		374-5405	clark@uidaho.edu



Why - Multi-Jurisdiction AHMP

- Required by FEMA under the Disaster Act of 2000 so that Jurisdictions are eligible to receive Post Disaster Mitigation Funding, Pre-Disaster Mitigation Funding and Flood Mitigation Assistance Funding
  - If jurisdictions are not part of an approved AHMP they cannot receive federal funding for *post* disaster mitigation funding – participating in the AHMP is like an insurance policy.
  - If jurisdictions are not part of an approved AHMP they are not eligible for pre-disaster mitigation project grants.
  - If jurisdictions are not part of an approved AHMP they are not eligible for Flood Mitigation Assistance Projects even if they participate in the National Flood Insurance Program (NFIP). These grants are funded by portions of the NFIP Premiums – not participating means *your* portions of those premiums are going to some other jurisdiction.

AHMP Update Process

- Begin 2 Year Prior to Expiration Date
- Develop a Hazard Mitigation Assistance Sub Grant Application and Submit to BHS
  - Grant Requirements
    - Complete a FEMA e Grants Online Sub Application
    - Ensure that County and Cities are currently participating in the National Flood Insurance Program (to be eligible)
    - Developed a detailed Scope of Work outlining the Review and Update Process and provided it in the application
    - Invited *Participating Jurisdictions* to submit a letter of participation. This is to ensure that the Multi-Jurisdiction element of the Plan is maintained and that *all* jurisdiction in the County have been given an opportunity to participate.
    - A detailed budget was developed and placed in the application. The federal portion of the project is funded at 75%. A 25% soft match is required
    - The County submitted a letter detailing how the 25% match will be provided. The majority of the match comes from your participation and County and City property and infrastructure data which we will and have requested.

AHMP Update Process (Continued)

- Submit eGrants Sub Application to BHS
- BHS reviews application, comments are addressed, BHS approves the County's Sub Application
- BHS Ranks all Sub Applications according to benefit and submits the State Grant which encompasses all local government sub grants to FEMA Region 10.

AHMP Update Process (Continued)

- 1 Year Prior to Plan Expiration Date
- FEMA Region 10 awarded HMA Grant to State of Idaho BHS
- BHS awarded HMA Sub Grants to Clark County
- Clark County has Contracted with Whisper Mountain to begin Update.
- Whisper Mountain Begins AHMP Update.

AHMP Update Process (Continued)

- Year 0 Plan Expiration
- Clark County Submits revised Multi-Jurisdictional Plan to BHS for review
- BHS Submits revised Plan to FEMA Region 10 for Review
- Participating Jurisdictions Sign Letters of Endorsement
- Clark County Adopts Plan
- FEMA Region 10 Approves Plan
- Plan is good for another 5 years

Update Time Line – Due in 2010 Based on a 2013 Plan Adoption

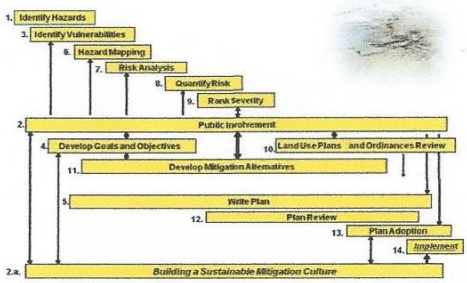
2011 - HMA Sub Grant Application 2 Years Prior to Expiration

2012 - HMA Sub Grant Award 1 Year Prior to Expiration

12 Month Update Process

2013 - Submit Plan to BHS and FEMA for Approval Year of Expiration

AHMP Update Process



Immediate Steps

- Update Hazard Analysis
- Update Property and Infrastructure Values
- Conduct an *"electronic"* Community Survey
- Beginning in April – Local Elected Official Briefings

Actions by Committee

- Take Public Survey
- Review Goals and Objectives on Handout
- Example: Goal

Decrease flood damage to public and private non-structural systems and structures throughout the County.

Objectives:

- Increase property owners' mitigation actions
- Improve the County's readiness to protect property during a flood event
- Improve the City's storm water system
- Improve floodplain management

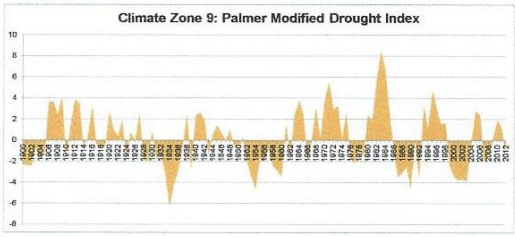
Actions by Committee

- Identify Status of 2008 Projects
- Identify New Mitigation Projects
  - Focuses on Prevention and Protection
  - *Where is their repetitive damage – especially minor flooding*
- Data we need! (Please help)
  - Past Disaster Declarations
  - Pictures of past incidents

Risk Assessment

- Natural Hazards
  - Weather:
    - Drought
    - Extreme Heat
    - Extreme Cold
    - Severe Winter Storm
    - Severe Weather
    - Lightning
    - Hail
    - Tornado
    - Straight Line Wind
  - Flooding
    - Flash Flooding
    - River Flooding
    - Dam Failure
- Geologic:
  - Earthquake
  - Landslide/Mudslide
  - Snow Avalanche
- Wildfire
- Burrowing Rodents
- Biological
  - Epidemic/Pandemic
- Technological (Manmade) Hazards
  - Structural Fire
  - Hazardous Material Event
  - Riot/Demonstration/Civil Disorder
  - Nuclear
  - Terrorism

Drought



Extreme Cold

Return period (yr)	Annual Probability	Annual Minimum Temperature
1.05	95.2%	-3
1.11	90.1%	-4
1.25	80%	-7
2	50%	-13
5	20%	-20
10	10%	-23
25	4%	-26
50	2%	-27
100	1%	-28
200	0.5%	-28

Severe Winter Storms

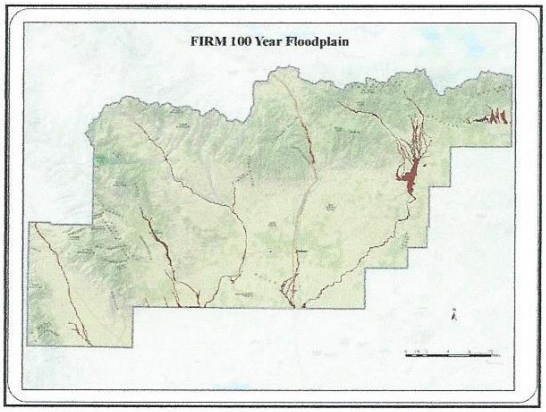
Return Period	Annual Probability	24 Hour Snowfall
1.05	95.2	8
1.11	90.1	10
1.25	80	12
2	50	18
5	20	24
10	10	27
25	4	31
50	2	33
100	1	35
200	0.5	36

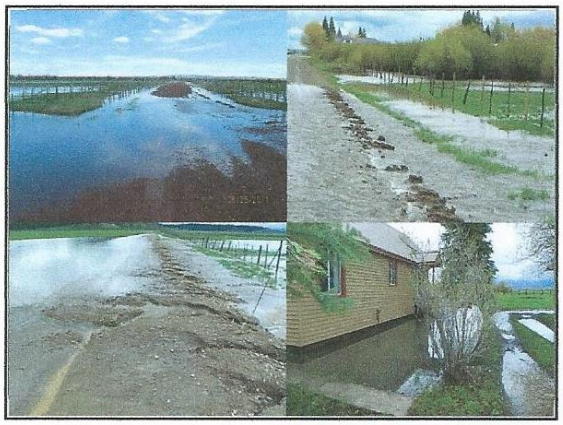
Severe Hail

Date	Location	Property Damage	Size
7/18/1967	Clark		1.75 in
7/16/1970	Clark		.75 in
6/5/1995	Port of Entry	$5,000	1.50 in
6/5/1995	Dubois		.75 in
8/7/1997	Dubois		.75 in
9/1/2000	Dubois		1.25 in
8/27/2002	Kilgore		1.00 in
8/10/2005	Dubois		.75 in

Straight Line Wind

Date	Location	Magnitude	Description
6/3/1956	Clark	65kts	
8/1/1956	Clark	70kts	
7/14/1957	Clark	70kts	
7/11/1995	Dubois	Unknown	$50,000, 3 injuries
8/14/1996	Dubois	58kts	
4/14/2002	Dubois	69kts	
6/4/2004	Central Portion	50kts	
7/31/2004	Dubois	53kts	
8/2/2004	Dubois	54kits	
6/16/2005	Small	55kts	
8/10/2005	Dubois	53kts	
8/4/2007	Dubois	60mph	
5/12/2009	Clark County	UNK	$6,800
6/29/2011	Clark County	UNK	$13,500





Peak Flow Statistics – Kilgore Area

Peak-Flow Statistics	Value
2 Year	808 cfs
5 Year	1,310 cfs
10 Year	1,680 cfs
25 Year	2,180 cfs
50 Year	2,580 cfs
100 Year	2,990 cfs
250 Year	3,420 cfs
500 Year	4,020 cfs

What Does Flooding Cost?

Return Interval	1 Year	5 Year	10 Year	25 Year	50 Year
Number of Employees	3	4	4	4	5
Hours Per Employee	56	64	72	80	96
Total Employee Cost	$3,444	$5,248	$5,904	$6,560	$9,840
Gravel Cost	$12,000	$13,000	$14,000	$16,000	$20,000
Total Cost Per Event	$15,444	$18,248	$19,904	$22,560	$29,840

Next Steps

- Complete Hazard Analysis
  - Flooding
  - Geological
  - Hazardous Materials
- Present Hazard Severity Ranking – Jurisdiction Approval
- Status Existing Projects
- Review Goals and Objectives
- **Identify Projects to *Prevent and Protect***
- Submit Plan for State Review
- Submit Plan to FEMA for Approval

February 28, 2013

The second meeting of the Clark County Multi-Jurisdiction All Hazard Mitigation Plan Committee was held in Dubois, Idaho at the City Building on February 28, 2013 at 4:00 pm. The meeting was called to order by Mr. Russ Kerr who explained to those in attendance that the purpose of the meeting was to update Clark County's existing plan to be in compliance with FEMA. He then turned the time over to Dr. Rick Fawcett of Whisper Mountain Professional Services, Inc., the contractor hired by the County to update the plan. Rick reminded the committee the purpose of the Plan is to save lives and reduce the loss of public and private property. Dr. Fawcett gave a power point presentation identifying past and current known risks to the County. He showed how the risks are ranked for magnitude and frequency and how the new method better identifies those risks specific to Clark County today based on historical and actual events.

Discussion was then opened up to the committee to discuss any risks they personally perceived. It was mentioned there is still a need for signs in the City for better location identification for emergency services.

Past disasters mentioned by the committee were severe winter storms (1989 particularly severe), wildfire, drought, and hazardous materials spills. It was also mentioned that the City of Dubois has a City Flood Insurance Resolution. Dr. Fawcett said he would check to see if Clark County and the City of Dubois have National Flood Insurance.

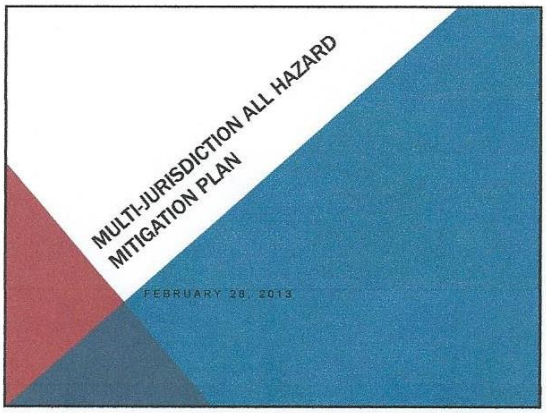
Members of the committee were encouraged to review the old plan and also to think of any current conditions that pose a risk to the County that would be good mitigation projects. The next meeting would be a review of those projects and any changes to the ranking of the risks based on the past study of events in Clark County.

Dr. Fawcett thanked those in attendance and set a date for completion around the end of August.

Clark County
AHMP Committee Members
Attendance Roster
February 28, 2013

Agency	Representative	Position	Phone	Email
Civil Defense	Russ Kerr	Emer. Mngr.	208-374-5397	clarkco1@mudlake.net
PLANNING & ZONING	Kerri Ellis	Administrator	374-5808	cczcode@mudlake.net
Sheriff	Bart May	Sheriff	374-5403	clarkso@mudlake.net
Sheriff	Boyd Eddins	Chief Deputy	374-5403	clarksobe@yahoo.com
City	Randy Mead	Mayor	374-6517	rmead@mudlake.net

* *Highlited Attendees not counted as Match*



STATUS

- Added new data to Section 2 Community Description
- Trying to get more participation on Community Survey
- Modifying Hazard Analysis Process
- Updated Section 5 Community Planning
- Updated Current Projects

2008 HAZARD ANALYSIS PROCESS

Magnitude of Natural Disasters

Value	Reconstruction Assistance From	Geography (Area) Affected	Expected Bodily Harm	Loss Estimate Range	Population Sheltering Required	Warning Lead Times
1	Family	Parcel	Little to No Injury / No Death	$1000s	No Sheltering	Months
2	City	Block or Group of Parcels	Multiple Injuries with Little to No Medical Care / No Death	$10,000s	Little Sheltering	Weeks
3	County	Section or Numerous Parcels	Major Medical Care Required / Minimal Death	$100,000s	Sheltering Requiring Neighboring Counties Help	Days
4	State	Multiple Sections	Major Injuries / Requires Help from Outside County / A Few Deaths	$1,000,000s	Long Term Sheltering Effort	Hours
8	Federal	County Wide	Massive Casualties / Catastrophic	$10,000,000s	Relocation Required	Minutes

	Frequency
Ranking	Description
HIGH	Multiple Times a Year to 2 Years
MEDIUM	3 to 20 Years
LOW	20 Years to Historic Occurrence

2008 HAZARD ANALYSIS

		Magnitude		
		(Low)	(Medium)	(High)
		1	2	3
Frequency	(Low) 1	Extreme Heat Dam Failure	Epidemic Landslide	Nuclear Terrorism
	(Medium) 2	Riot/Demonstration/Civil Disobedience Tornado	Drought	Earthquake
	(High) 3	Snow Avalanche River/Stream Flooding Hail Lightning Straight Line Wind West Nile Virus	Structure Fire Flash Flood	Wildfire Winter Storm Extreme Cold Hazardous Materials

REVISED HAZARD ANALYSIS PROCESS

Historical Occurrence

Rating	Adjective Description	Number of Historical Occurrences (within 50 years)
1	Low	• 5 or few occurrences
2	Medium	• 6-9 occurrences
3	High	• More than 10 occurrences

Probability

Rating	Likelihood	Frequency of Occurrence
1	Rare	• Probability of occurrence = one chance in the next 50+ years
2	Low	• Probability of occurrence = at least one chance in the next 25-50 years
3	Medium	• Probability of occurrence = at least one chance in the next 10-25 years
4	High	• Probability of occurrence = at least one chance in the next 1 to 10 years

REVISED HAZARD ANALYSIS PROCESS

Vulnerability

Rating	Magnitude	Percentage of People and Property Affected
1	Negligible	• Less than 5%
2	Limited	• 5% to 10%
3	Critical	• 10% to 25%
4	Catastrophic	• More than 25%

Spatial Extent

Rating	Magnitude	Percentage of jurisdiction affected
1	Negligible	• Less than 10%
2	Limited	• 10% to 25%
3	Critical	• 25% to 50%
4	Catastrophic	• More than 50%

REVISED HAZARD ANALYSIS PROCESS

Magnitude

Rating	Likelihood	Characteristics
1	Negligible	• Few if any injuries or illness • Minor quality of life lost with little or no property damage • Brief interruption of facilities/services less than 4 hrs
2	Limited	• Minor injuries and illness • Minor or short term property damage that does not threaten structural stability • Loss of essential facilities and services for 4 to 24 hours
3	Critical	• Serious injury and illness • Major/ long term property damage; threatens structural stability • Shutdown of essential facilities and services for 24 to 72 hours
4	Catastrophic	• Multiple deaths • Property destroyed or damaged beyond repair • Complete shutdown of essential facilities/services for 3+ days.

REVISED HAZARD ANALYSIS PROCESS

Natural Hazards Qualitative Risk Assessment EXAMPLE

	Historical Occurrence	Probability	Vulnerability	Spatial Extent	Magnitude	Total	Rank
Flood	3	4	3	3	3	16	H
Earthquake	3	3	3	3	3	15	H
Severe Storm	3	4	2	2	3	14	H
Wildland Fire	3	4	1	2	3	13	H
Volcano	1	1	2	2	2	8	M
Landslide	3	3	2	1	2	11	M
Avalanche	3	4	1	1	1	10	M
Drought	1	2	1	1	2	7	L

Example

CATEGORICAL RISK RANKING

	Historical Occurrence	Probability	Vulnerability	Spatial Extent	Magnitude	Total
Drought	3	4	4	4	4	17
Extreme Heat	1	3	1	4	2	11
Extreme Cold	2	3	2	4	2	13
Severe Winter Storms	3	4	3	4	3	16
Lightning	2	4	1	1	3	11
Hail	3	4	2	1	2	12
Tornado	2	4	1	1	3	11
Straight Line Wind	3	4	3	3	3	16
Flash Flood	2	4	2	1	2	11
Stream Flooding						
Dam Failure	1	1	1	1	1	5
Earthquake	2	2	4	4	3	15
Landslide	1	2	2	1	1	7
Wildfire	3	4	2	3	4	16
West Nile	1	2	1	1	1	6
Lyme Disease	1	2	1	1	1	6
Bird Flu	1	1	3	3	4	12
Communicable Disease	1	2	3	3	4	13
Structure Fire	1	4	1	1	2	9
Nuclear Event	1	1	3	4	4	13
Hazardous Materials	1	2	2	2	3	10
Civil Disobedience	1	1	1	1	1	5
Terrorism	1	1	3	2	2	9

TOTAL SCORE

Dam Failure	1	1	1	1	1	5
Civil Disobedience	1	1	1	1	1	5
West Nile	1	2	1	1	1	6
Lyme Disease	1	2	1	1	1	6
Landslide	1	2	2	1	1	7
Terrorism	1	1	3	2	2	9
Structure Fire	1	4	1	1	2	9
Hazardous Materials	1	2	2	2	3	10
Extreme Heat	1	3	1	4	2	11
Flash Flood	2	4	2	1	2	11
Lightning	2	4	1	1	3	11
Tornado	2	4	1	1	3	11
Bird Flu	1	1	3	3	4	12
Hail	3	4	2	1	2	12
Nuclear Event	1	1	3	4	4	13
Communicable Disease	1	2	3	3	4	13
Extreme Cold	2	3	2	4	2	13
Earthquake	2	2	4	4	3	15
Severe Winter Storms	3	4	3	4	3	16
Straight Line Wind	3	4	3	3	3	16
Wildfire	3	4	2	3	4	16
Drought	3	4	4	4	2	17

PROBABILITY

Dam Failure	1	1	1	1	1	5
Civil Disobedience	1	1	1	1	1	5
Terrorism	1	1	3	2	2	9
Bird Flu	1	1	3	3	4	12
Nuclear Event	1	1	3	4	4	13
West Nile	1	2	1	1	1	6
Lyme Disease	1	2	1	1	1	6
Landslide	1	2	2	1	1	7
Hazardous Materials	1	2	2	2	3	10
Communicable Disease	1	2	3	3	4	13
Earthquake	2	2	4	4	3	15
Extreme Heat	1	3	1	4	2	11
Extreme Cold	2	3	2	4	2	13
Structure Fire	1	4	1	1	2	9
Flash Flood	2	4	2	1	2	11
Lightning	2	4	1	1	3	11
Tornado	2	4	1	1	3	11
Hail	3	4	2	1	2	12
Severe Winter Storms	3	4	3	4	3	16
Straight Line Wind	3	4	3	3	3	16
Wildfire	3	4	2	3	4	16
Drought	3	4	4	4	2	17

MAGNITUDE

Dam Failure	1	1	1	1	1	5
Civil Disobedience	1	1	1	1	1	5
West Nile	1	2	1	1	1	6
Lyme Disease	1	2	1	1	1	6
Landslide	1	2	2	1	1	7
Terrorism	1	1	3	2	2	9
Extreme Heat	1	3	1	4	2	11
Extreme Cold	2	3	2	4	2	13
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Flash Flood	2	4	2	1	2	11
Hail	3	4	2	1	2	12
Drought	3	4	4	4	2	17
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Earthquake	2	2	4	4	3	15
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Straight Line Wind	3	4	3	3	3	16
Bird Flu	1	1	3	3	4	12
Nuclear Event	1	1	3	4	4	13
Communicable Disease	1	2	3	3	4	13
Wildfire	3	4	2	3	4	16

COMPARISON

TOTAL SCORE	HISTORICAL OCCURRENCE
Communicable Disease	Earthquake
Earthquake	Hail
Severe Winter Storms	Severe Winter Storms
Straight Line Wind	Straight Line Wind
Wildfire	Wildfire
Drought	Drought

COMPARISON

MAGNITUDE	PROBABILITY
Severe Winter Storms	Drought
Straight Line Wind	Lightning
Bird Flu	Tornado
Nuclear Event	Severe Winter Storms
Communicable Disease	Straight Line Wind
Wildfire	Wildfire

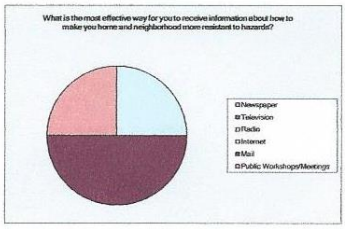
PUBLIC SURVEY

Blizzards/Ice Storms/Winter Storms	**8**
Hail	1
Storm Water Erosion	0
Hazardous Materials	1
Dam Failure	0
Land Subsidence (e.g. sinkhole)	0
Drought	**5**
Landslide/Mudslide	0
Earthquake	4
Lightning	0
Expansive Soils	0
Nuclear	2
Extreme cold	**4**
Terrorism (bombs/biological/chemical)	0
Extreme Heat	0
Tornadoes	0
Fires	**5**
Volcanoes	1
Air Quality	1
Flooding - Canal	3
Flooding - Flash (ravine)	0
Wildland fires	**7**
Insect Infestations	0
High Wind/Wind Storms	**4**
Other (please specify)	0

COMPARISON

PUBLIC SURVEY	HISTORICAL OCCURRENCE
Winter Storms	Earthquake
Wildland Fires	Hail
Drought	Severe Winter Storms
Structure Fires	Straight Line Wind
High Winds	Wildfire
Extreme Cold	Drought

COMMUNITY SURVEY



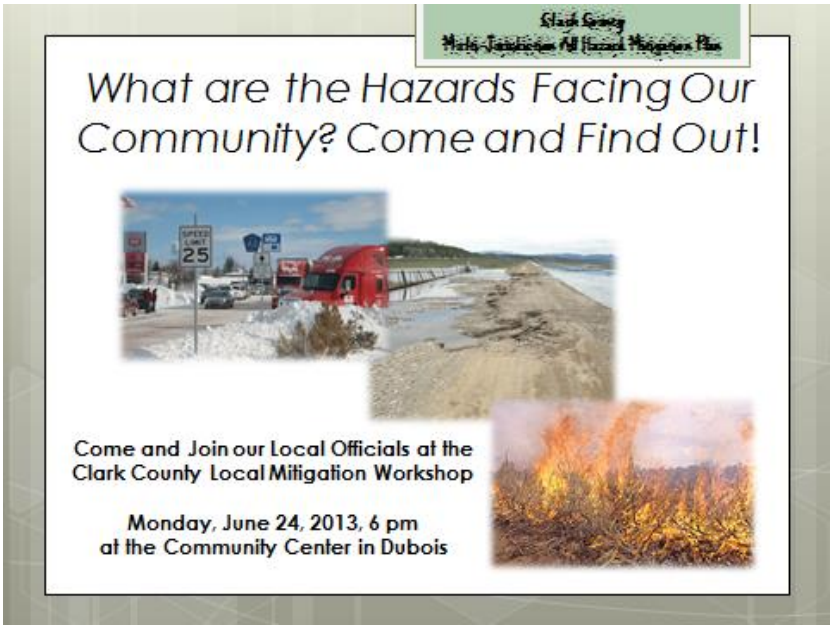
NEXT STEPS

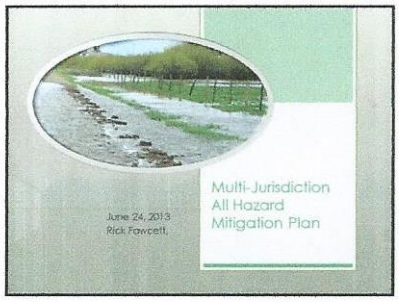
More Participation in Community Survey
Add Projects
Accept Goals and Objectives
Public Meeting ???
Briefing to City Council and Commissioners
Review of Plan
Submittal to BHS and FEMA for approval
Adoption of Plan

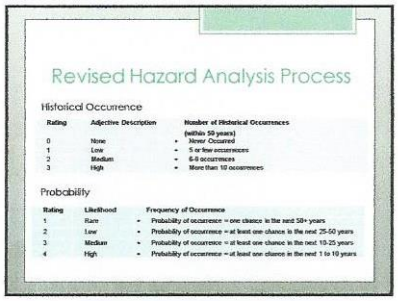
Joint Public Meeting

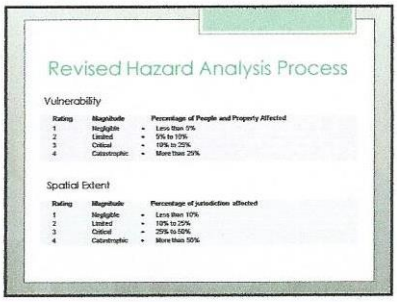
Dr. Rick Fawcett, President of Whisper Mountain Professional Services, Inc. met with the representatives from Clark County and the City of Dubois. The City of Spencer was invited to attend but no one came to represent Spencer. The purpose of the meeting was to inform elected officials and the general public of the update to the County Multi-Jurisdiction All Hazard Mitigation Plan to bring it to conformity with FEMA guidelines. He emphasized the purpose of the Plan is to save lives and reduce the loss of private and public property through pre-disaster mitigation. Dr. Fawcett presented a Power Point presentation on how the Plan was updated, the resulting risk assessment, and how the Plan would be reviewed.

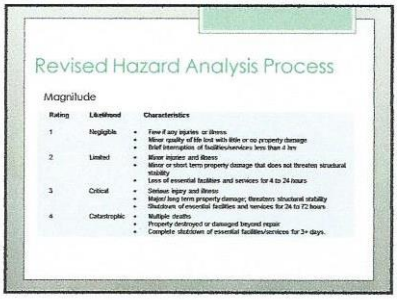
Agency	Representative	Position
Clark County Emergency Management/EMS	Russ Kerr	Manager
City of Dubois	Kerri Ellis	Council Member
City of Dubois Fire Department	Troy Stone	Chief
Clark County Sheriff	Bart May	Sheriff
Clark County Commissioners	Wm Fredericksen	Commissioner

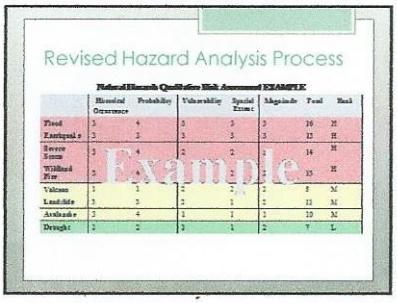


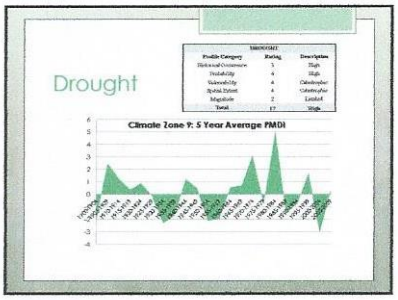

Multi-Jurisdiction
All Hazard
Mitigation Plan
June 24, 2013
Rick Fawcett


Revised Hazard Analysis Process
Historical Occurrence
Rating
Adjective Description
Number of Historical Occurrences (within 50 years)
0 None - Never Occurred
1 Low - 5 or few occurrences
2 Medium - 6-9 occurrences
3 High - More than 10 occurrences
Probability
Rating
Likelihood
Frequency of Occurrence
1 Rare - Probability of occurrence = one chance in the next 50+ years
2 Low - Probability of occurrence = at least one chance in the next 25-50 years
3 Medium - Probability of occurrence = at least one chance in the next 10-25 years
4 High - Probability of occurrence = at least one chance in the next 1 to 10 years

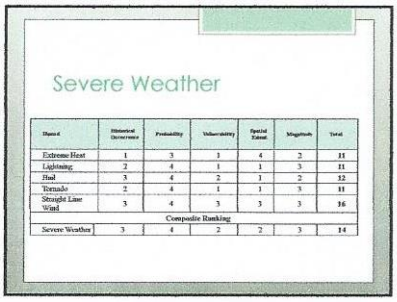

Revised Hazard Analysis Process
Vulnerability
Rating
Magnitude
Percentage of People and Property Affected
1 Negligible - Less than 5%
2 Limited - 5% to 10%
3 Critical - 10% to 25%
4 Catastrophic - More than 25%
Spatial Extent
Rating
Magnitude
Percentage of jurisdiction affected
1 Negligible - Less than 10%
2 Limited - 10% to 25%
3 Critical - 25% to 50%
4 Catastrophic - More than 50%

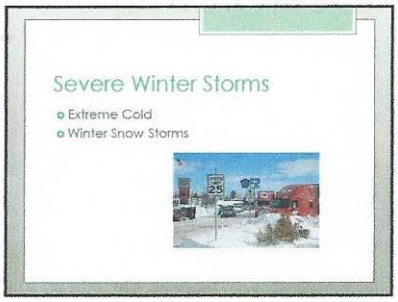

Revised Hazard Analysis Process
Magnitude
Rating
Likelihood
Characteristics
1 Negligible - Few if any injuries or illness
- Minor quality of life lost with little or no property damage
- Brief interruption of facilities/services less than 4 hrs
2 Limited - Minor injuries and illness
- Minor or short term property damage that does not threaten structural stability
- Loss of essential facilities and services for 4 to 24 hours
3 Critical - Serious injury and illness
- Major/ long term property damage; threatens structural stability
- Shutdown of essential facilities and services for 24 to 72 hours
4 Catastrophic - Multiple deaths
- Property destroyed or damaged beyond repair
- Complete shutdown of essential facilities/services for 3+ days.


Revised Hazard Analysis Process
Example


Drought
Climate Zone 9: 5 Year Average PMDI


Severe Weather
Extreme Heat
Lightning
Hail
Tornado
Straight Line Wind
Clark County has a 17.9% chance of Wind Damage in any given year


Severe Weather
Hazard
Historical Occurrence
Probability
Vulnerability
Spatial Extent
Magnitude
Total
Extreme Heat 1 3 1 4 2 11
Lightning 2 4 1 1 3 11
Hail 3 4 2 1 2 12
Tornado 2 4 1 1 3 11
Straight Line Wind 3 4 3 3 3 16
Composite Ranking
Severe Weather 3 4 2 2 3 14


Severe Winter Storms
Extreme Cold
Winter Snow Storms

Severe Winter Storms

Return Period (years)	Probability (%)	Maximum Annual 24 Hour Snowfall (in)
1.05	95.2	8
1.11	90.1	10
1.25	80	11
2	50	15
5	20	20
10	10	27
25	4	31
50	2	33
100	1	35
700	0.5	36

Severe Winter Storms

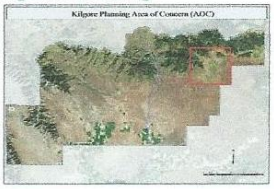
Hazard	Occurrence (Duration)	Probability	Vulnerability	Spatial Extent	Magnitude	Total
Extreme Cold	2	3	2	4	2	13
Winter Storm	3	4	3	4	2	16
Composite Ranking						
Severe Winter Storms	3	4	3	4	2	16

River/Stream Flooding

River/Stream Flooding

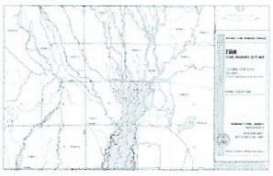
River/Stream Flooding

Kilgore Flooding



Historical Kilgore Flooding

Kilgore Basin



Kilgore Basin Characteristics

Characteristic Name	Value	Units
Contributing Drainage Area	210	Square Miles
Drainage Area	228	Square Miles
Main Channel Length	24.2	Miles
Mean Basin Elevation	4943	Feet
Percent Forest	39.4	%
Percent Lakes & Ponds	0	%
Relief	3,642	Feet
Soil Infiltration	5.6	Inches
Stream Slope 10 & 85 Method	36.65	Feet per Mile
Mean Basin Slope	12.8	%

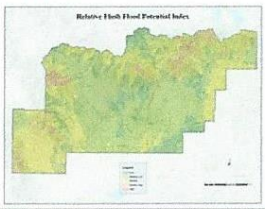
Loss Estimate - Kilgore

Return Interval	1 Year	5 Year	10 Year	25 Year	50 Year
Number of Employees	3	4	4	4	5
Hours Per Employee	56	64	72	80	96
Total Employee Cost	$3,444	$5,248	$6,904	$8,560	$9,840
Gravel Cost	$12,000	$13,000	$14,000	$14,000	$20,000
Total Cost Per Event	$15,444	$18,248	$19,904	$22,560	$29,840

Loss Estimate Floodplain

- 9 Buildings Moderately Damaged
- 545 Tons of Debris
- 18 People Displaced
- Building Related Loss $1.1M
- Total Loss $1.23M

Flash Flood



Earthquake

Earthquake Loss Estimates

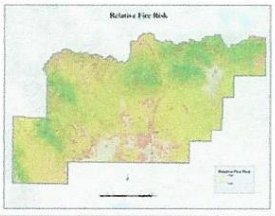
- Magnitude 7.0 Earthquake in the Region
- 12 Buildings Moderately Damaged
- No Buildings Damaged Beyond Repair
- 20 Leaks and 5 Breaks in Water System
- 10 Leaks and 2 Breaks in Sewer System
- No Casualties
- Building Loss $180,000
- Total Loss $500,000

Landslides

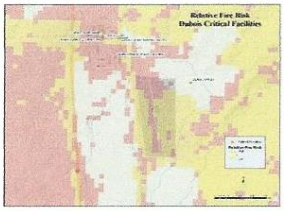
Wildfire

Return Period (years)	Probability (%)	Maximum Annual Wildfire Size (Acres)
1.05	95.2	0
1.11	90.1	0
1.25	80	1
2	50	25
5	20	704
10	10	4,702
25	4	39,647
50	2	167,549
100	1	638,916
200	0.5	2,257,304

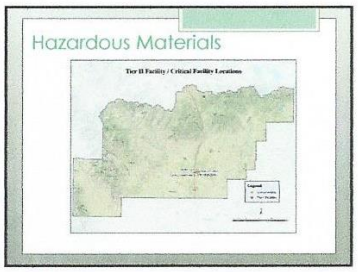
Wildfire

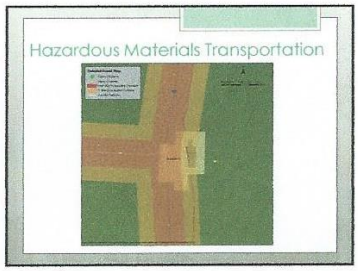


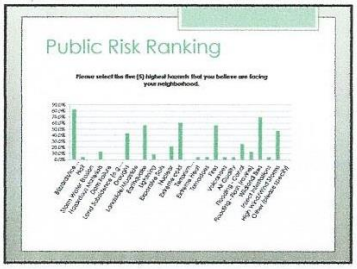
Wildfire

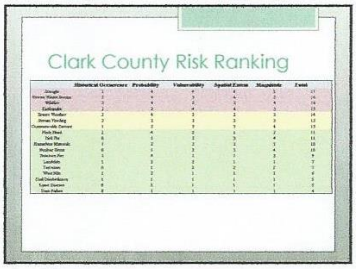


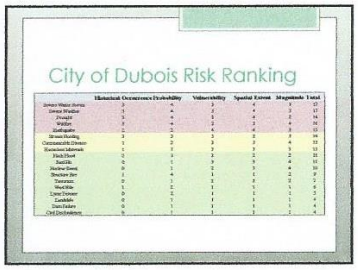

Nuclear Event

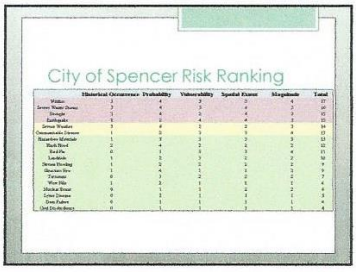

Hazardous Materials


Hazardous Materials Transportation


Public Risk Ranking


Clark County Risk Ranking


City of Dubois Risk Ranking


City of Spencer Risk Ranking

January 9, 2014

The City of Spencer was provided a briefing on the Clark County Multi-Jurisdiction All Hazard Mitigation Plan and the risk ranking for the City of Spencer. Attending the meeting were members of the City Council, the Mayor, and citizens of the community. There were 6 of the 14 permanent residents of the City of Spencer in attendance. Also attending were the Clark County Emergency/Floodplain Manager and the Clark County Planning and Zoning Administrator.

Dr. Rick Fawcett provided a briefing on the Plan and went over the process of developing the Plan as well as the hazard analysis process and the resulting risk rankings for the City of Spencer. The City Council concurred with the rankings as provided.

Mayor Holden discussed recent flooding that occurred in Spencer. The flooding was caused by the over topping of the Spayberry/Lent Pond which is filled year round by a small creek. The Mayor suggested a project to improve the overflow from the Sprayberry/Lent Pond into the creek below the Pond. He felt that this would reduce annually flooding caused by ice backing up on the outlet of the Pond.

Dr. Fawcett discussed the existing projects that the City has proposed. The Council decided to move the project forward to the new Plan revision. There was discussion around the fire wise measures taken in the community to protect structures from wildfire. The consensus was to continue the practices and that they had been very effective.

City of Spencer
Elected Officials/Public Meeting
Attendance Roster
January 9, 2014

Agency	Representative	Position
CLARK County EMERGENCY MNGMT	Russ Kerr	E.M.
Spencer City Council	Lyle Holdan	MAYOR
Spencer City Council	Tuck May	Council member
Spencer City Council	Sandy McClure	Council member
C.C. Planning & Zoning	Keeri Ellis	P&Z Administrator
City of Spencer	Eric Ford	Clerk
"	Mary Edwards	Citizen
"	Ted Edwards	Citizen

CITY OF SPENCER ELECTED OFFICIALS BRIEFING

Clark County
Multi-Jurisdiction All Hazard Mitigation Plan

January 9, 2014

All Hazard Mitigation Planning

- Hazard mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazardous event. Hazard mitigation results in long-term, cost-effective, and environmentally-conscious reduction of hazard vulnerability. ***The goal of hazard mitigation is to save lives and reduce property damage.*** This, in turn, can reduce the enormous cost of disasters to property owners and all levels of government. In addition, hazard mitigation can protect critical community facilities, reduce exposure to risk, and minimize community disruption.

Multi-Jurisdiction Plan

- Participating Jurisdictions
  - Clark County
  - Dubois
  - Spencer

Hazards Analyzed

Natural Hazards
- Weather:
  - Severe Weather
    - Extreme Heat
    - Lightning
    - Hail
    - Straight Line Wind
    - Tornado
  - Severe Winter Storm
    - Extreme Cold
  - Drought
- Flooding:
  - Flash Flood
  - River Flooding
  - Dam Failure
- Geologic:
  - Earthquake
  - Landslide/Mudslide
- Other:
  - Wildfire
  - Biological
    - Vector Borne Diseases
    - Human Borne (Communicable) Disease

Technological (Manmade) Hazards
- Structural Fire
- Nuclear Event
- Hazardous Material Event
- Riot/Demonstration/Civil Disorder
- Terrorism

Ranking Criteria

Historical Occurrence - Number of historical occurrences within a community

Rating	Adjective Description	Number of Historical Occurrences (within 50 years)
0	None	Never Occurred
1	Low	5 or few occurrences
2	Medium	6-9 occurrences
3	High	More than 10 occurrences

Probability - Likelihood of the hazard occurrence, sometimes without regard to hazard history

Rating	Likelihood	Frequency of Occurrence
1	Rare	Probability of occurrence = one chance in the next 50+ years
2	Low	Probability of occurrence = at least one chance in the next 25-50 years
3	Medium	Probability of occurrence = at least one chance in the next 10-25 years
4	High	Probability of occurrence = at least one chance in the next 1 to 10 years

Examples:

Historical Occurrence:

Place	Date	Time	Event	Magnitude/details
Spencer	7/7/2001	4:00 PM	Flash Flood	1.5-2 inches of rain in 2 hours caused localized flooding

Probability:

Return Period (years)	Probability (%)	Maximum Annual 24 Hour Snowfall (in)
1.05	95.2	8
1.11	90.1	10
1.25	80	12
2	50	18
5	20	24
10	10	27
25	4	31
50	2	33
100	1	35
200	0.5	36

Severe Winter Storm Events

Ranking Criteria

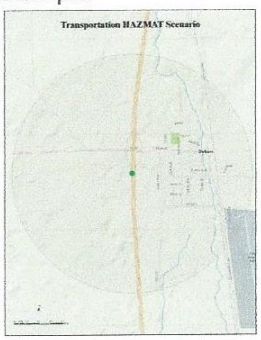
Vulnerability - Percentage of people and property that would be affected by the hazard event.

Rating	Magnitude	Percentage of People and Property Affected
1	Negligible	Less than 5%
2	Limited	5% to 10%
3	Critical	10% to 25%
4	Catastrophic	More than 25%

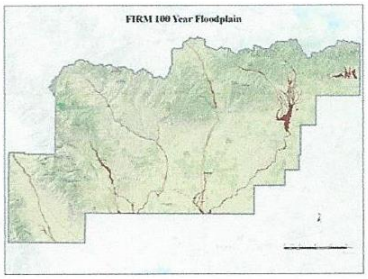
Spatial Extent - The geographic area of the community that might be impacted.

Rating	Magnitude	Percentage of jurisdiction affected
1	Negligible	Less than 10%
2	Limited	10% to 25%
3	Critical	25% to 50%
4	Catastrophic	More than 50%

Vulnerabilities - Example



Spatial Extent - Example



Ranking Criteria

Magnitude (Severity of Impact) - Assessment of severity in terms of fatalities, injuries, property/economic losses

Rating	Likelihood	Characteristics
1	Negligible	Few if any injuries or illness Minor quality of life lost with little or no property damage Brief interruption of facilities/services less than 4 hrs
2	Limited	Minor injuries and illness Minor or short term property damage that does not threaten structural stability Loss of essential facilities and services for 4 to 24 hours
3	Critical	Serious injury and illness Major/ long term property damage; threatens structural stability Shutdown of essential facilities and services for 24 to 72 hours
4	Catastrophic	Multiple deaths Property destroyed or damaged beyond repair Complete shutdown of essential facilities/services for 3+ days.

Example - Magnitude

Clark County has 386 miles of roadway that could be potentially impacted or damaged in some manner by landslides. Most of these roads are in the back county. The County estimates that back county replacement value is $750,000 per mile. The total vulnerability based on that estimate would be $289.5 Million however, landslides are usually considered a local event and thus it is difficult to predict the actual repair or replacement costs for a single event.

Hazard Ranking City of Spencer

	Historical Occurrence	Probability	Vulnerability	Spatial Extent	Magnitude	Total
Wildfire	3	4	3	3	4	17
Severe Winter Storms	3	4	3	4	2	16
Drought	3	4	2	4	2	15
Earthquake	2	2	4	4	3	15
Severe Weather	3	4	2	2	3	14
Communicable Disease	1	2	3	3	4	13
Hazardous Materials	1	3	3	3	3	13
Flash Flood	2	4	2	2	2	12
Bird Flu	0	1	3	3	4	11
Landslide	1	2	3	2	2	10
Stream Flooding	1	2	2	2	2	9
Structure Fire	1	4	1	1	2	9
Terrorism	0	1	2	2	2	7
West Nile	1	2	1	1	1	6
Nuclear Event	0	1	1	2	2	6
Lyme Disease	0	2	1	1	1	5
Dam Failure	0	1	1	1	1	4
Civil Disobedience	0	1	1	1	1	4

City of Spencer Projects

Goal	Objective	Project	Responsible Entity	Order of Magnitude Cost & Planning Horizon
The City of Spencer will develop methods to protect the life safety of its citizens from harm due to severe weather events.	Protect isolated individuals from Severe Winter Storms and Extreme Cold	Identify Evacuation Shelters Equip with Emergency Generators	Emergency Manager	No Cost 2014 – Work with City Council, Church, and volunteer organizations
The City of Spencer will seek to reduce losses from Structure fires.	Ensure that all structures have minimum detection and protection devices	Encouraging private property owners to install and maintain smoke detectors on all levels of the residences and to place detectors in all bedrooms	Emergency Manager	ROM - $2,000 2013 – Seek Funding for the Assistance to Fire Fighters Safety Grant Program 2014 – Distribute Detectors
	Increase Fire Water Supplies	Develop an agreement with developers and private landowners for access to and use of water sources for fire protection	Fire District	ROM - $5000 2015 – Seek Funding from IHS SHSP and develop standard agreement and requirements 2016 – Execute Agreements

Next Steps:

- Add Projects
- Review Planning Documents – New Development?
- Plan Review online
- Adopt Plan by Resolution

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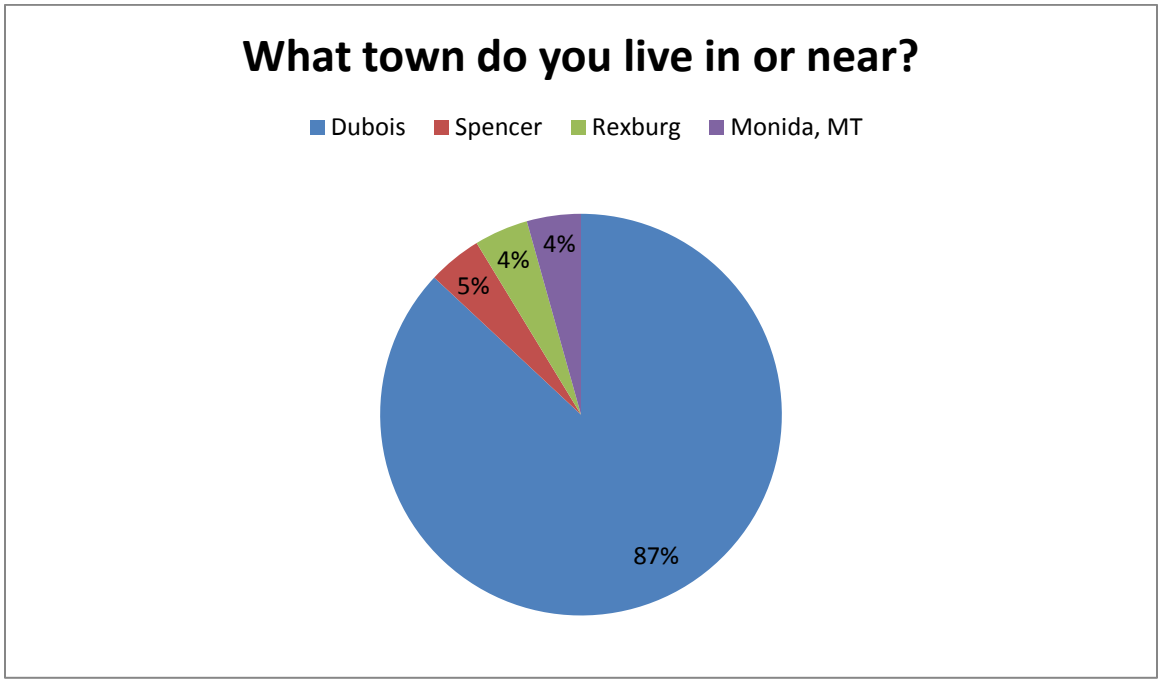
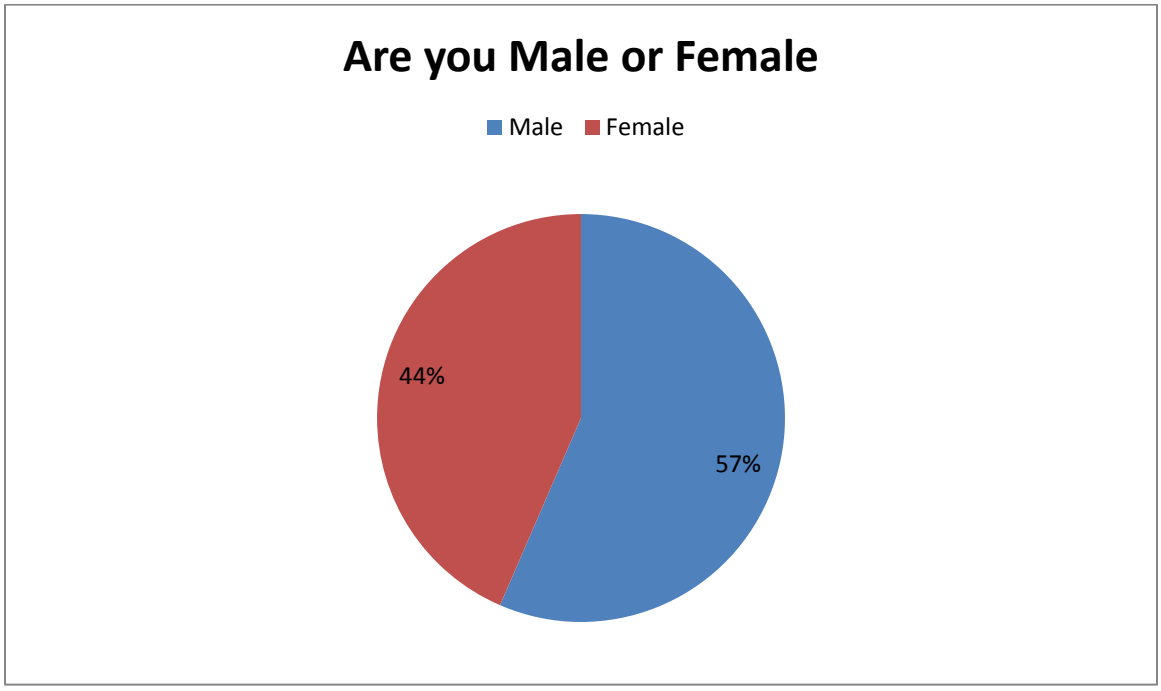
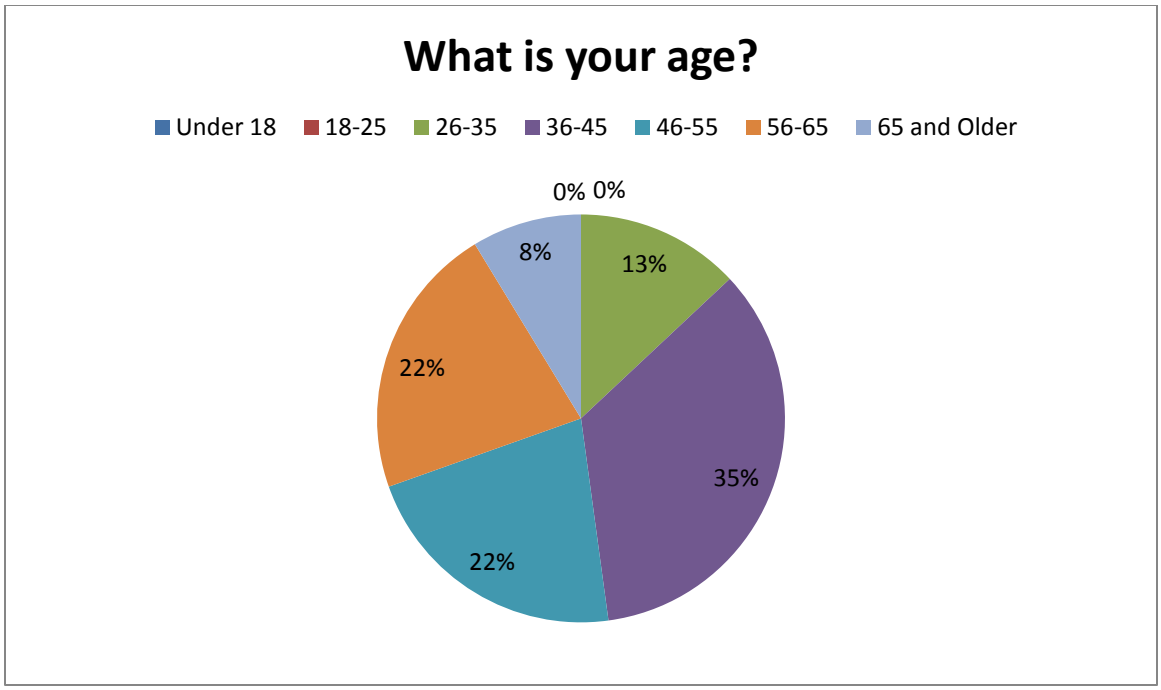
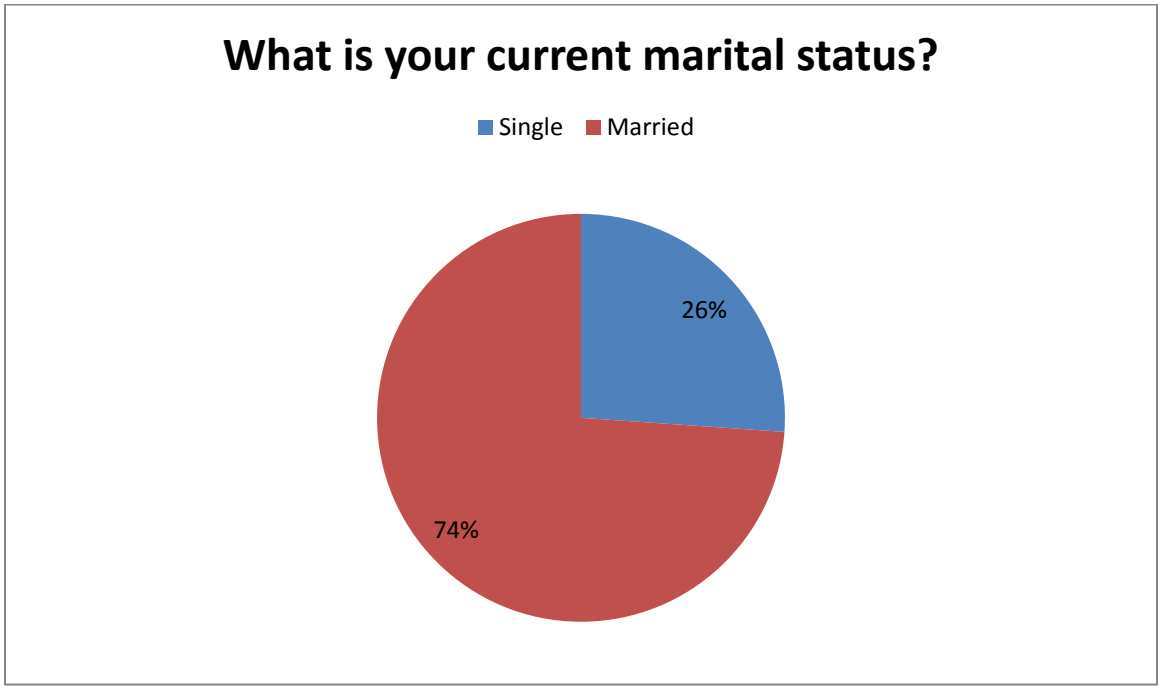
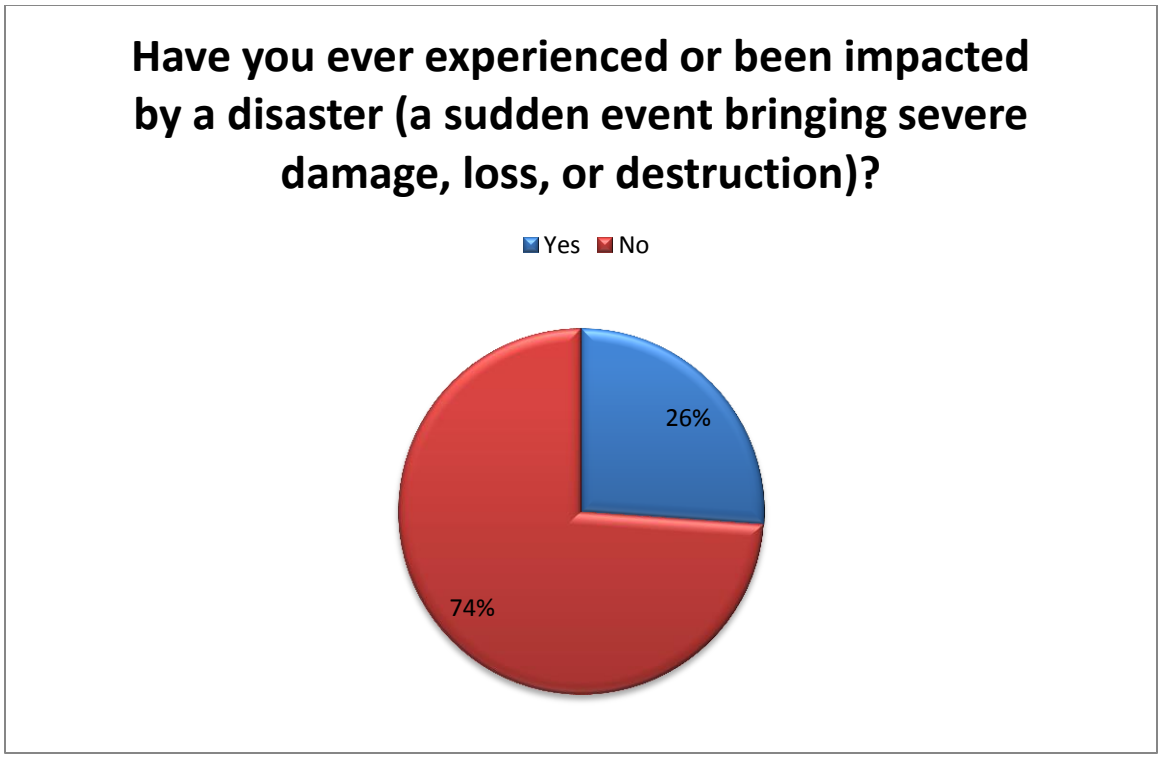
Attachment 2 Clark County Public Questionnaire Results

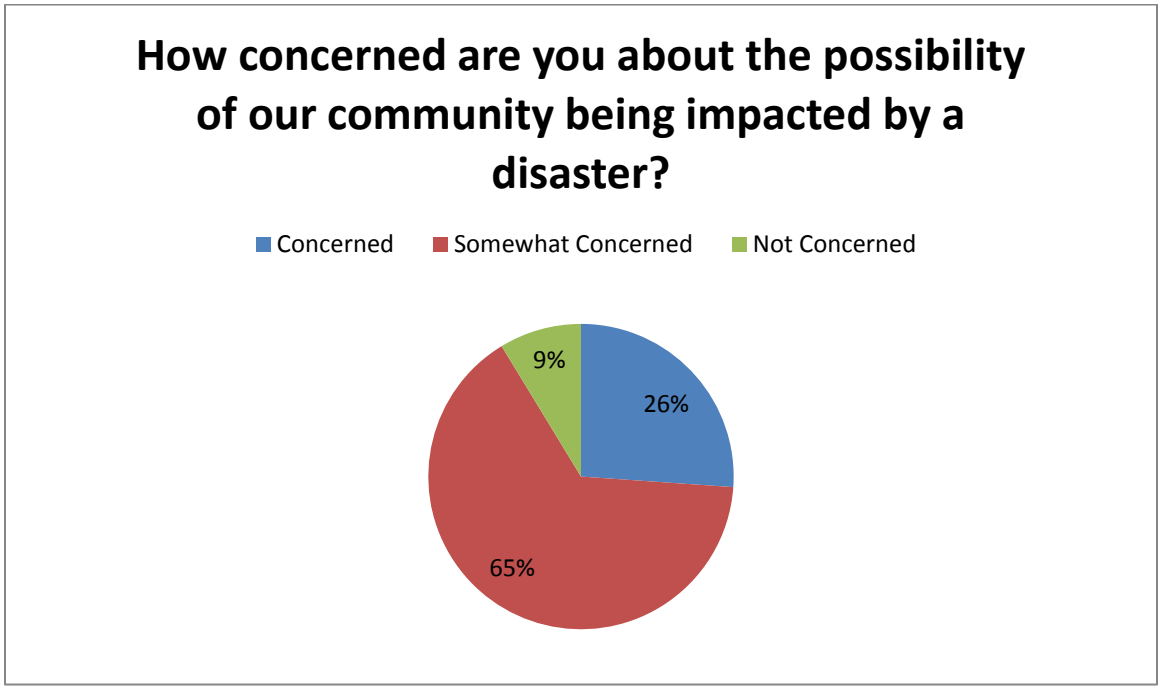


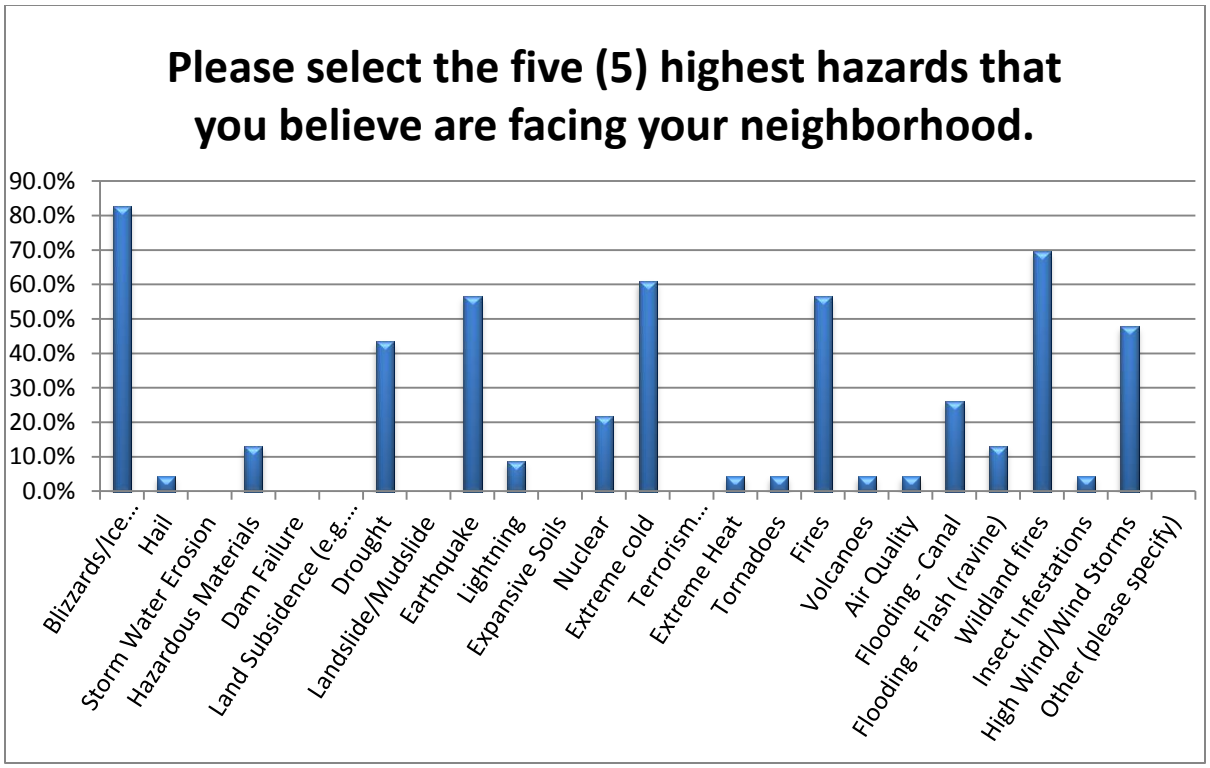


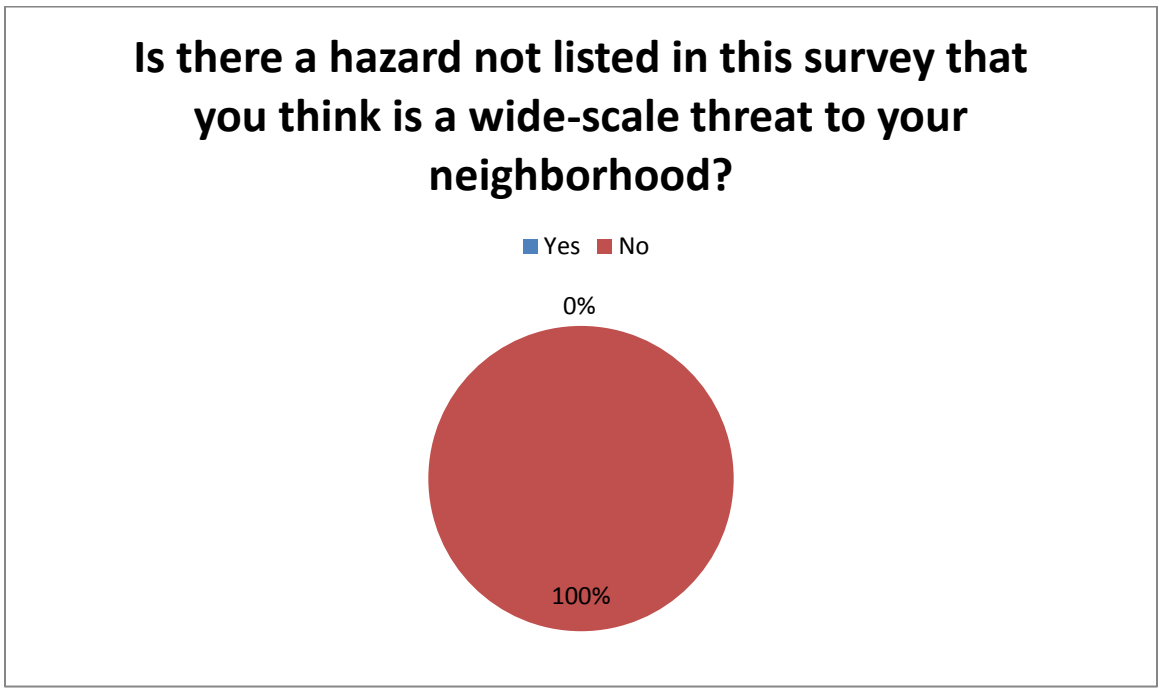

What is your age?
Under 18
18-25
26-35
36-45
46-55
56-65
65 and Older
0% 0%
8%
13%
22%
35%
22%

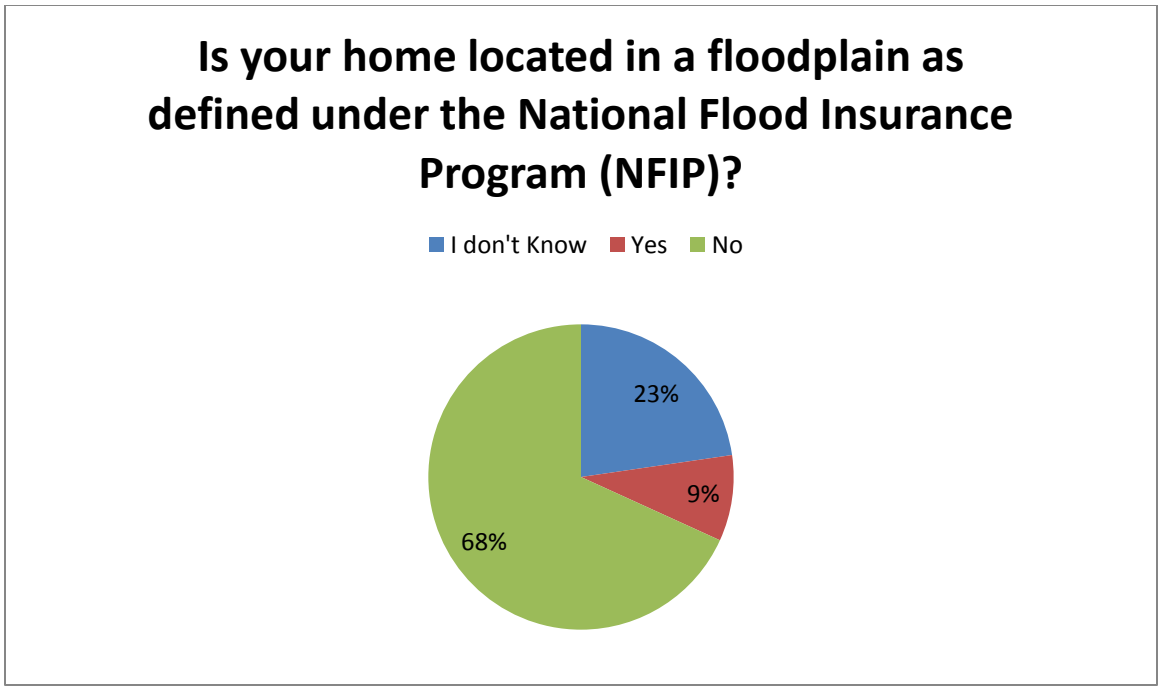

What is your current marital status?
Single
Married
26%
74%

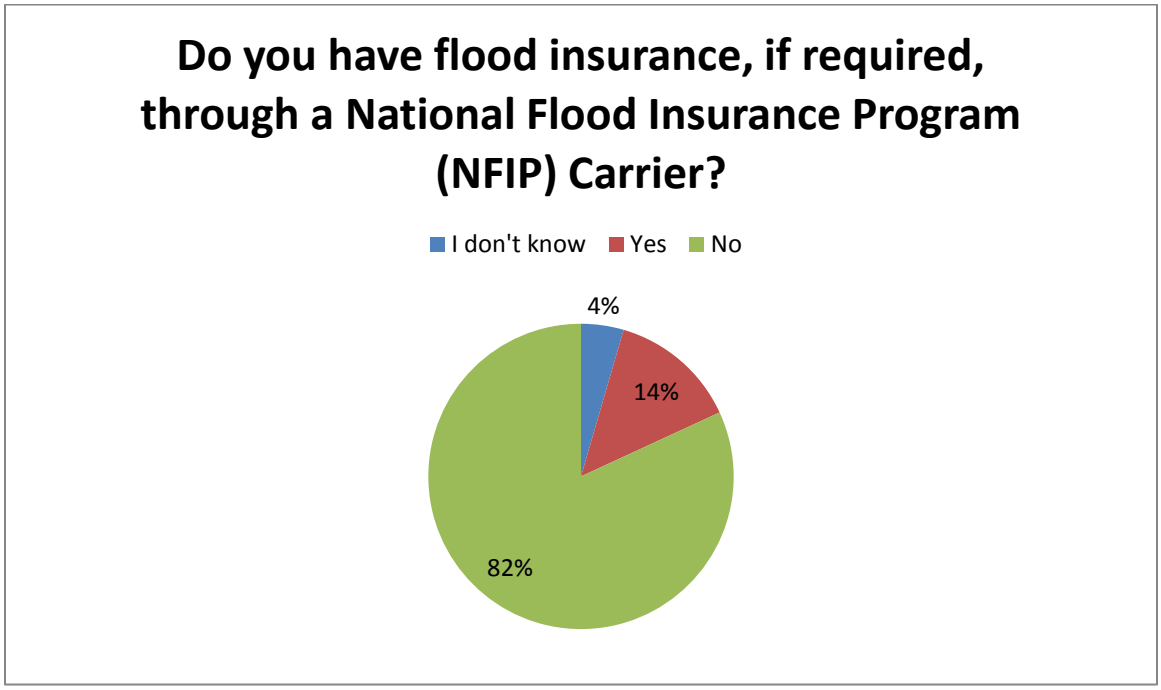

Have you ever experienced or been impacted by a disaster (a sudden event bringing severe damage, loss, or destruction)?
Yes
No
26%
74%

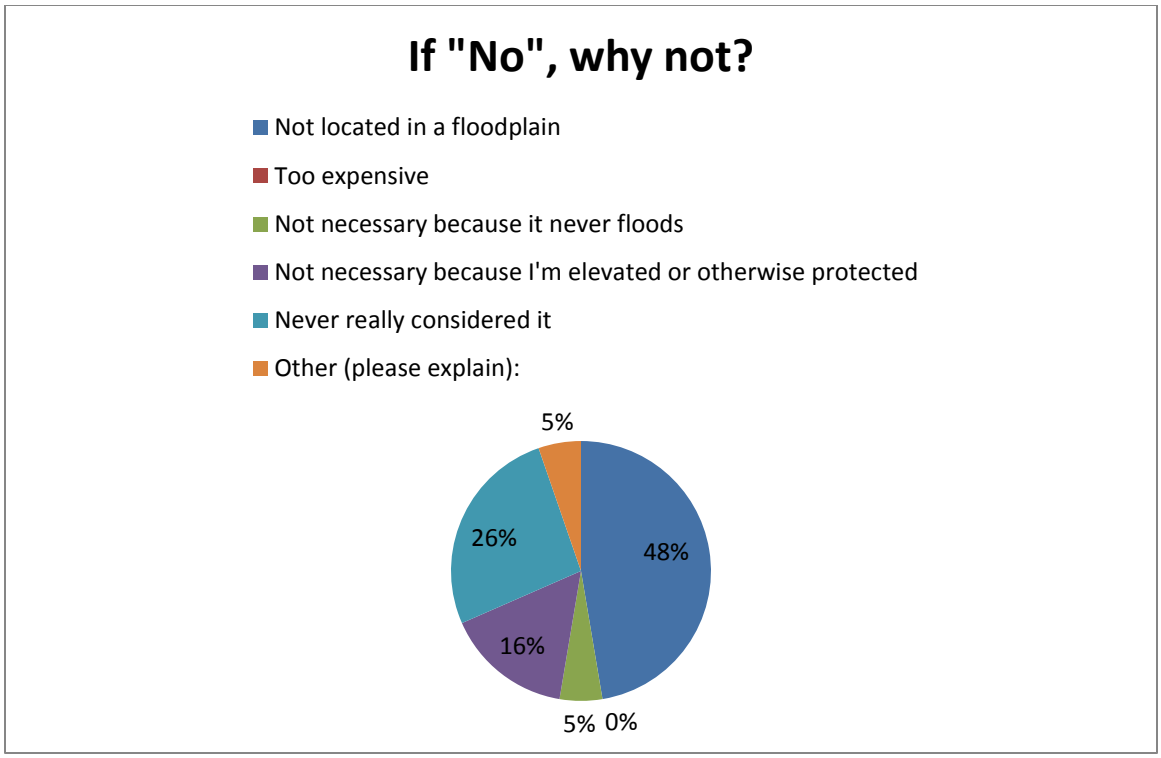

How concerned are you about the possibility of our community being impacted by a disaster?
Concerned
Somewhat Concerned
Not Concerned
9%
26%
65%

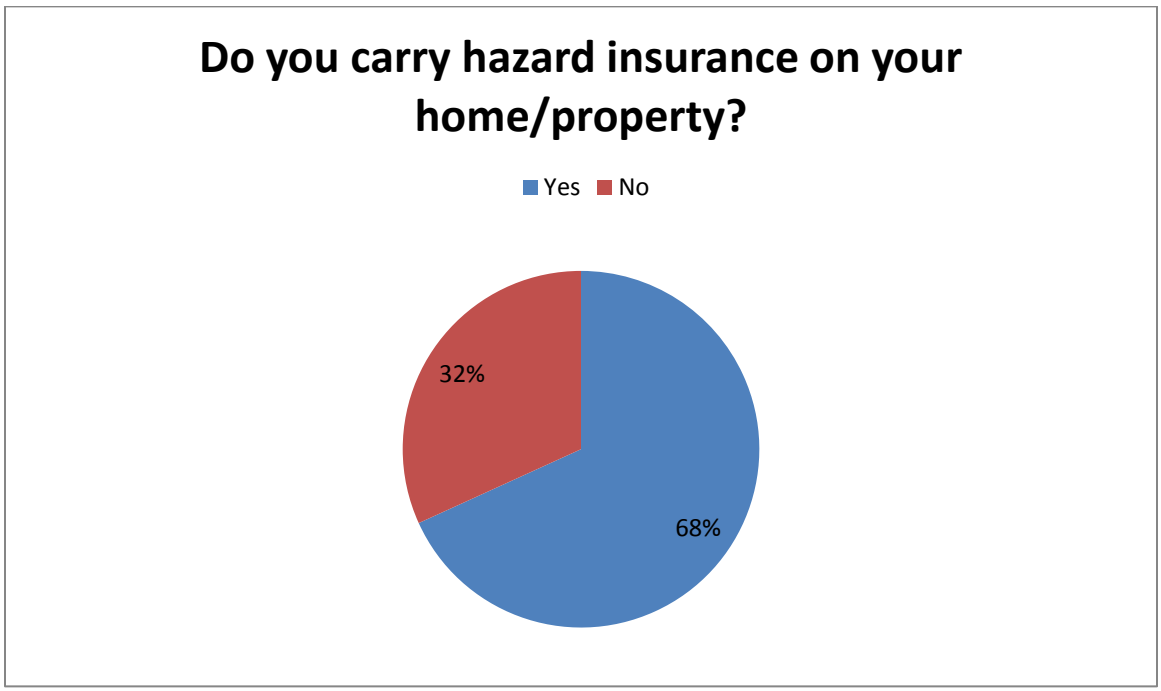

Please select the five (5) highest hazards that you believe are facing your neighborhood.
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Blizzards/Ice...
Hail
Storm Water Erosion
Hazardous Materials
Dam Failure
Land Subsidence (e.g....
Drought
Landslide/Mudslide
Earthquake
Lightning
Expansive Soils
Nuclear
Extreme cold
Terrorism...
Extreme Heat
Tornadoes
Fires
Volcanoes
Air Quality
Flooding - Canal
Flooding - Flash (ravine)
Wildland fires
Insect Infestations
High Wind/Wind Storms
Other (please specify)

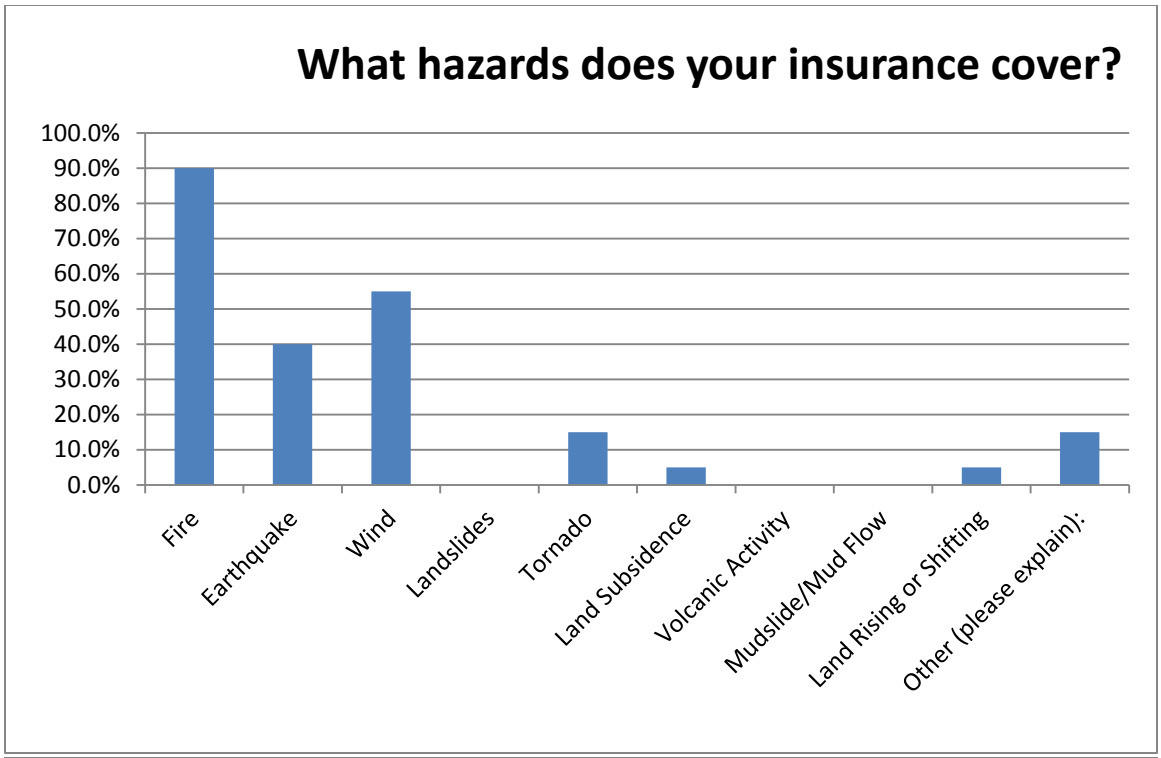

Is there a hazard not listed in this survey that you think is a wide-scale threat to your neighborhood?
Yes
No
0%
100%

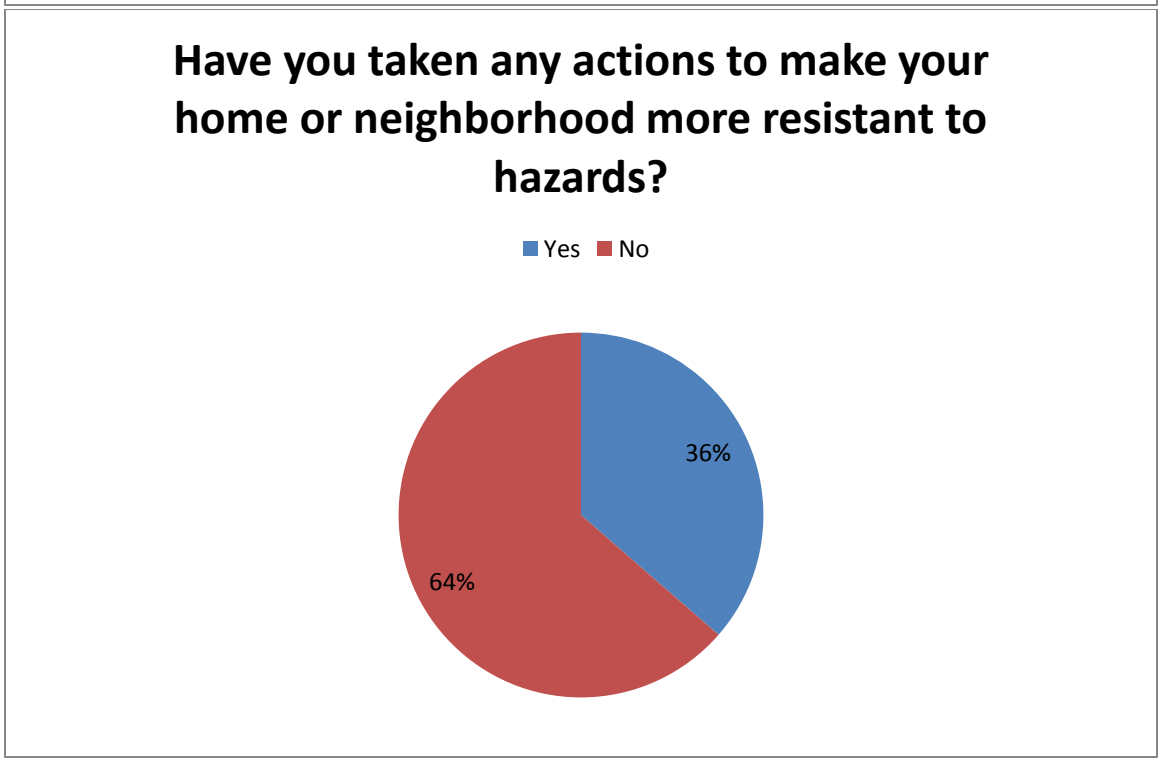

Is your home located in a floodplain as defined under the National Flood Insurance Program (NFIP)?
I don't Know
Yes
No
23%
9%
68%


Do you have flood insurance, if required, through a National Flood Insurance Program (NFIP) Carrier?
I don't know
Yes
No
4%
14%
82%


If "No", why not?
Not located in a floodplain
Too expensive
Not necessary because it never floods
Not necessary because I'm elevated or otherwise protected
Never really considered it
Other (please explain):
5%
48%
26%
16%
5%
0%


Do you carry hazard insurance on your home/property?
Yes
No
32%
68%

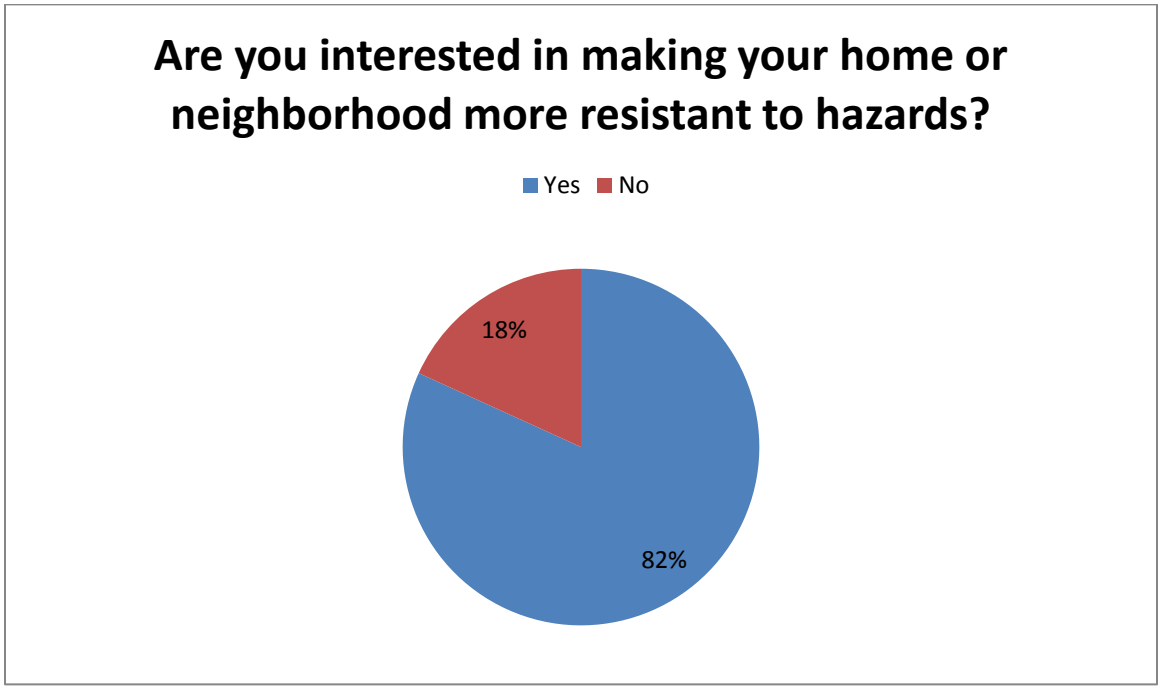


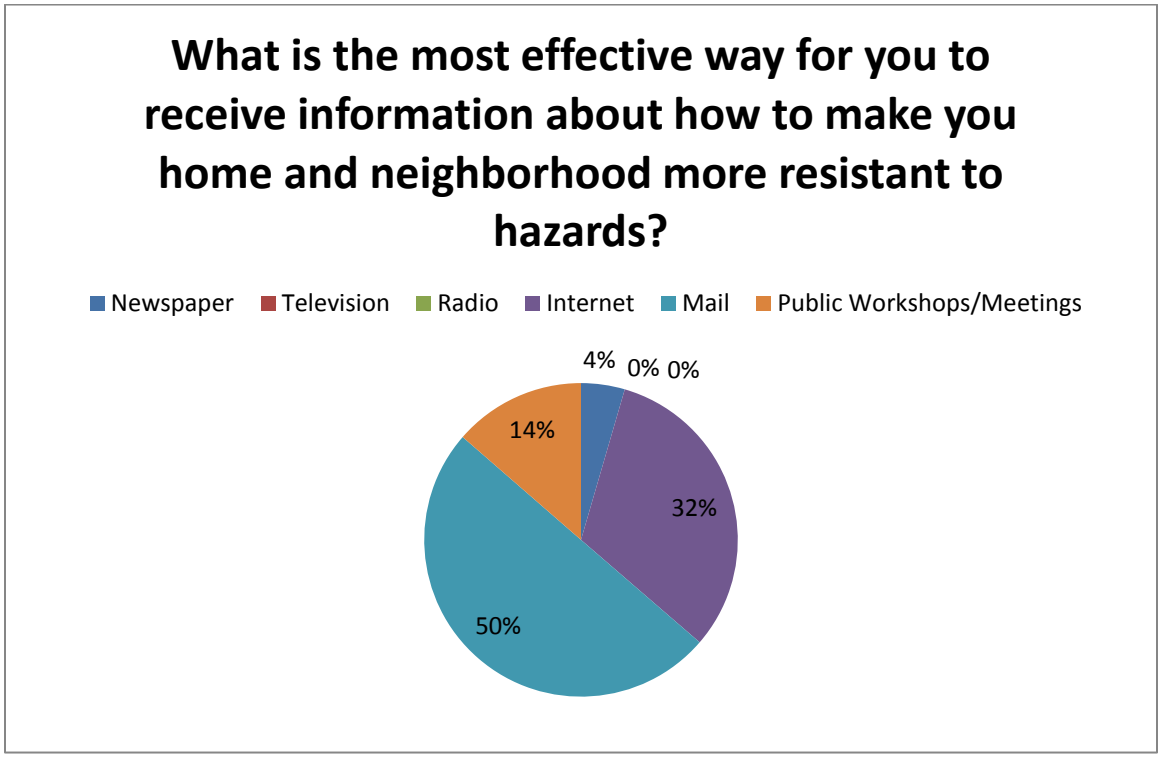


- Eat off pastures around house to prevent fires.
- clean up dry grass all the way a round my house
- Place straw around likely areas where pipes have or might freeze in winter.
- Fire guard around property
- Bought a generator. Built a berm surrounding my home. Installed a wood stove, water storage

tanks, and built with fire resistant materials.

- Fire extinguishers, reduce dry vegetation





- **In your opinion, what are some steps your county and/or city governments could take to reduce or eliminate risk of future hazard damages in your neighborhood?**

  - Smoke alarms and fire extingishers in each home.
  - I'm not sure you can reduce or eliminate most risks. You can prepare on how to respond when an event happens and aid in lessening the impact on residents.
  - work twogether and not point figgers at each other like fredrickson
  - mitigation planningfire zone buffers around outskirts of town
  - Most of the risks are natural occurences and would be difficult to plan for.
  - Clean the creek channels out wene needed--Snow and ice build up--Have sand bags avalible
  - Install storm drainage system. Plant wind breaks. Build fire breaks. Put in water storage tanks. Make them in-line so if they are not needed, water continues through, but can be shut off with water in them in case of water emergency.
  - Monitor the river area in the winter.
  - Create a fire break between homes and grassy lands near homes.
  - Education
  - Community awareness
  - Risk Assessment then follow up with projects to reduce risk.
  - reduce dry vegetation to fuel wildfires
  - Not sure.
  - Education

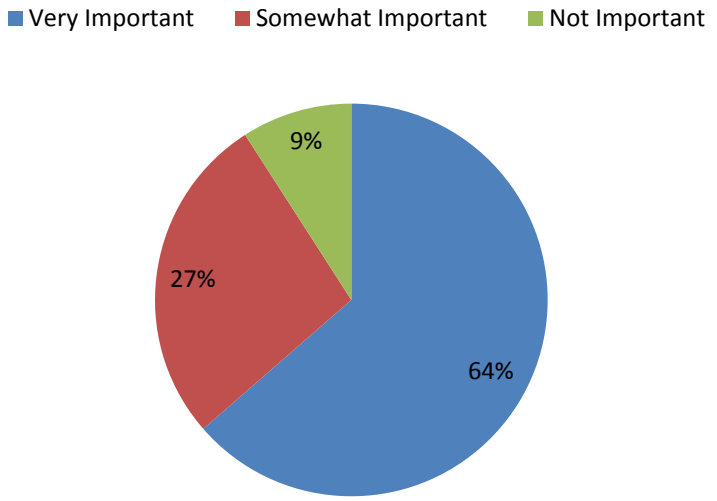
Are there any suggestions that you have for projects that your county and/or city government could do to reduce the risk and/or damage caused by a hazard?

  - Food & water stored in case of emergency
  - Besides having everyone live in a bubble, no.
  - think a head not after
  - no
  - No. This survey shows that city/county leadership is being very pro-active already.
  - Monitor new building regulations to prepare for earthquake.
  - see #17
  - MORE MEETINGS
  - Home care
  - I think the Beaver Creek that runs through Dubois should be cleaned up. Trees trimmed and perhaps add fill to banks.
  - emergency power during blizzards
  - Not sure.

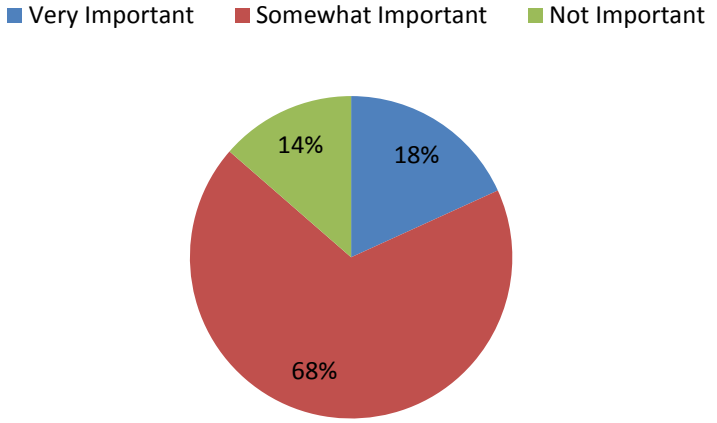
Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important?

  - There needs to be more community involvement and more communication to residents on what the plans are in the event of a disaster.
  - info on stuff four every one
  - The only problem I see is that we have grants to study the problem but no money to fix the problem.
  - I'll think about it.

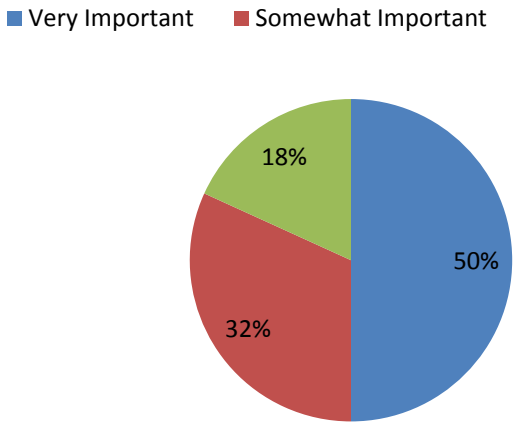
PREVENTION: Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include planning and zoning, building codes, open space preservation, and floodplain regulations.



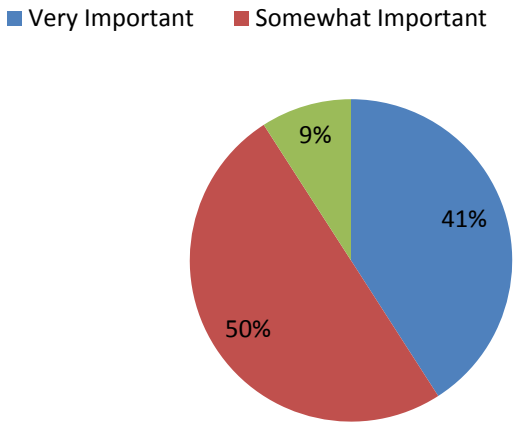
PROPERTY PROTECTION: Actions involve modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevation, structural retrofits, and storm shutters.



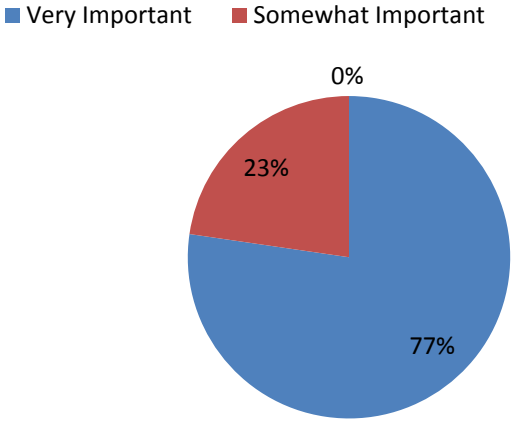
NATURAL RESOURCE PROTECTION: Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural systems. Examples include: floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest



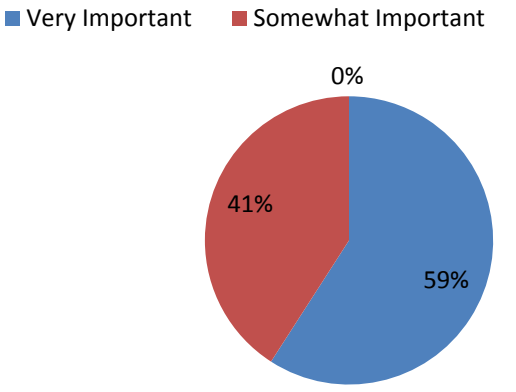
STRUCTURAL PROJECTS: Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, canals, detention/retention basins, channel modification, retaining walls, and storm sewers.



EMERGENCY SERVICES: Actions that protect people and property during and immediately after a hazard event; examples include warning systems, evacuation planning, emergency response training, and protection of critical emergency facilities or systems.



PUBLIC EDUCATION AND AWARENESS: Actions to inform citizens about hazards and the techniques they can use to protect themselves and their property. Examples include outreach projects, school education programs, library materials, and demonstration events.



Attachment 3 Kilgore Floodplain Mitigation Projects

Mitigation Strategy

This study evaluated flood mitigation for five road crossings consisting of seven culverts along road corridors in the areas of Spencer and Kilgore in Clark County, Idaho. Documentation provided by Clark County for the spring 2011 runoff and forensic field observations in the summer of 2011 indicate flooding and erosion at the five road crossings. Survey data was collected August 17, 2011 to define existing conditions. Drainage characteristics and existing culvert capacity were determined and options evaluated for upgrading the existing culverts. See the following figure for locations of the five crossings. The mitigation projects identified in this section should follow the prioritization schema found in Section 5 of this plan.

Two general upgrade options were considered for each of the crossings. First, increased culvert sizes or multiple culverts were considered without modification to the existing road, provided the existing road elevation yields adequate structural cover for the culvert. Second, road elevations at the culverts were increased by up to 2 feet where minimum existing culvert cover is inadequate or other conditions governed the need to elevate the road.

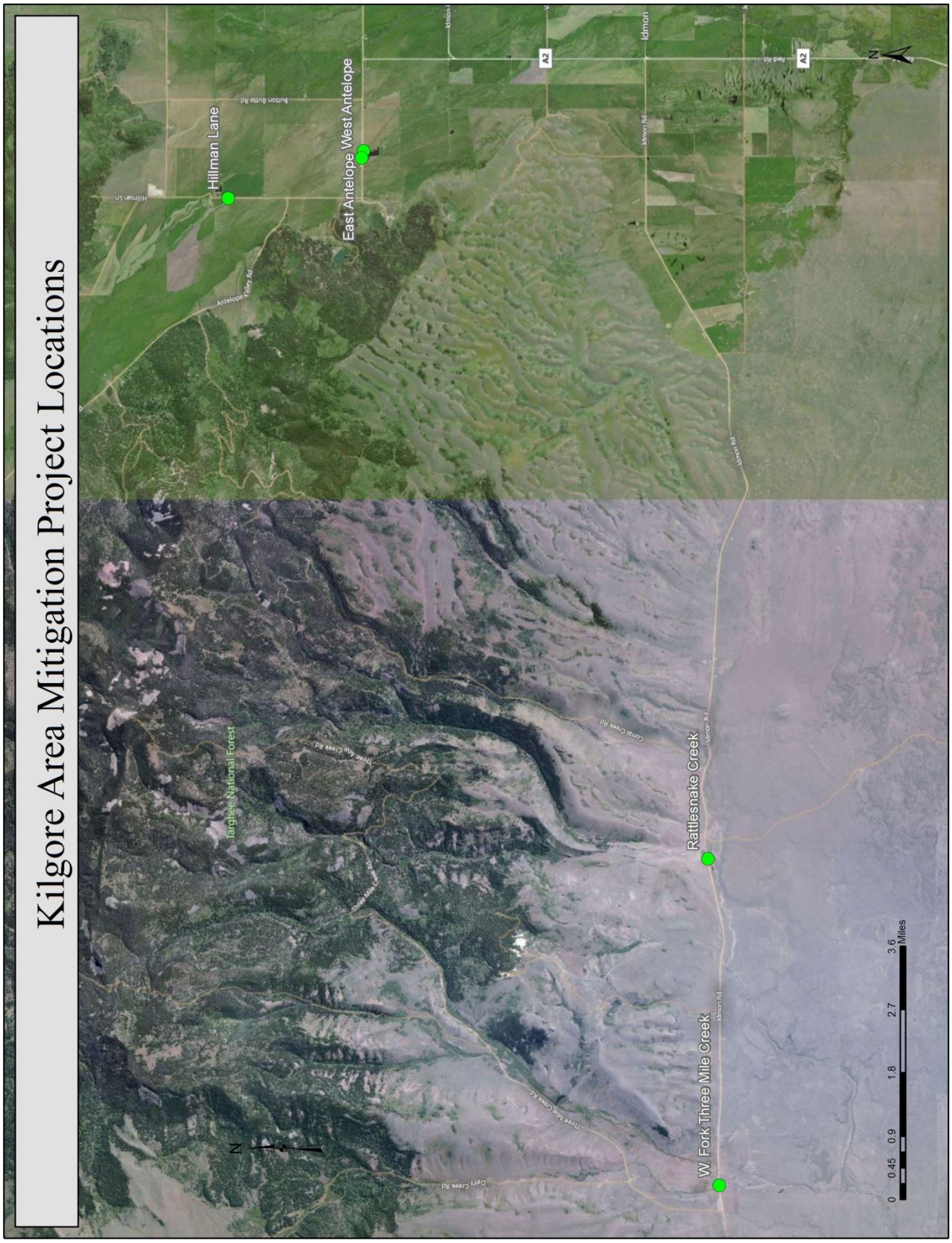
Raising the road 2 ft at selected culverts is expected impact approximately 500 to 600 lineal ft of road based on an estimated speed of 45 mph to accommodate AASHTO standards for vertical curves. The vertical curves allowed for a maximum of 2 ft of road grade increase at the selected culverts with decreasing road heights extending away from the culverts.

For purposes of cost estimates that involved raising the road, it was assumed the existing road provided a suitable base and little to no over-excavation was required. Final design should include geo-technical verification or modification of this assumption. Also, road base and surface quantities were estimated using an average fill height of 50% of the maximum fill height over the estimated length of fill. The base course was assumed to be 2/3 of the average thickness with the remainder being the gravel surface.

Most of the recommended culverts require a minimum of 12-inches of cover. This study adopts 18-inches as a minimum to allow some margin of additional protection and flexibility for maintenance including road grading. A similar 6” margin of protection was implemented where larger culverts require 18-inches of minimum cover.

Multiple barrel arch culverts were used to increase capacity where contributing channels were sufficiently wide. Multiple barrel arch culverts were used in place of single, low-rise structural plate culverts that require a separate foundation and erosion protection.

Headwalls with aprons and cut-off walls are proposed for the entrance and exit of all culvert upgrades to provide improved hydraulics and mitigate erosion. Riprap armoring is anticipated at the slope transition into the headwalls and channel inverts for erosion protection. Upgrades include varying levels of re-grading and armoring of borrow ditches and particularly where lateral flow to the culverts is conveyed in the borrow ditch.



Project Locations Map

Field observations verified the transport of significant quantities of sediment as is typical on alluvial fan channels. Sediments apparent in the channels and culverts were generally sands, gravels, and rocks up to a few inches in size. Some larger transported rocks were observed but were not typical. Sediment transport, when combined with velocities in the range of 7 to 10 feet per second at culvert capacity, indicate the potential for abrasion of culverts. All proposed culvert upgrades include a budgetary allocation for concrete invert pavement to mitigate abrasion. This approach was considered cost effective compared to concrete box culverts.

There are no known established or regulatory flow rates for the drainages contributing to the culvert crossings. Estimates of flows in contributing channels were made to provide a point of reference for the existing and upgraded culvert capacities. USGS regression equations were used to estimate channel flows where basin parameters were within applicable ranges. The USGS regression equations are not directly applicable to some of the basin characteristics in the study area. In particular, inter-connected drainages on alluvial fans, interaction of shallow groundwater and porous streambeds, and rain-on-snow events could lead to peak flows at the upper range of, or in excess of, flows predicted by the regression equations. Therefore, the maximum flows provided by the regression equations at the 500-year return interval are used as a point of reference.

This study does not recommend the 500-year event as a design flow. Final design should include analysis of culvert flow depths and freeboard under the design flow requirements of the local jurisdiction.

Channel data was used where available to develop an independent estimate of peak flows for comparison to the USGS regression equations. Estimates based on channel data provide approximate flows at bank-full and incipient road overtopping conditions.

Culvert capacity was estimated using incipient road overtopping as a uniform standard to compare existing and upgraded culverts. Flooding conditions in the Spring of 2011, as photo-documented by Clark County personnel, demonstrate road overtopping at various depths and locations. Actual flows at culvert crossings with road overtopping were presumably higher than those predicted herein but do not provide a reliable or uniform standard to assess capacity due to unknown water elevations.

Increased culvert capacity, and higher road elevations where recommended, are expected to reduce the potential for road overtopping. However, road overtopping could occur, particularly outside the limits of road re-construction where flow could bypass the culvert altogether. Detailed analysis of where, how much, and at what elevation, any overtopping or bypass may occur is beyond the scope of this study.

In those cases, the upgraded culvert was reviewed in the context of equivalent bypass capacity which is defined as follows. Bypass is potential flow around the existing culvert at a relatively low elevation portion of the road at some distance away from the culvert when the water elevation is just beginning to overtop the existing road at the existing culvert. Equivalent bypass capacity for the upgraded culvert is the flow through the upgraded culvert with the incoming water surface equal to the road elevation prior to raising the road. Equivalent bypass capacity of the upgraded culvert was developed for comparison to the existing culvert capacity at incipient road overtopping at the existing road grade.

Environmental permitting may be required for the proposed flood mitigation projects and environmental review is recommended. Much of the field observed vegetation that could be impacted by construction appears to be upland vegetation and may not be jurisdictional wetlands. However, selected culverts are adjacent to excavated water bodies with fringe vegetation that may be regulated. Channels adjacent to the culverts exhibit the characteristics of a mean high water mark but do not appear to be continuously flowing and may not be regulated for stream alteration.

Because of the flat nature of the landscape the mitigation projects outlined below will not alter the floodplain below each project. These projects are designed to protect the transportation infrastructure.

Mitigation Projects

West Fork Three Mile Culverts

The West Fork Three Mile Culverts are a dual culvert crossing of the west fork of Three Mile Creek on the gravel Spencer-Kilgore Road, approximately 2.5 miles east of Spencer. The westerly of the two culverts is a 35 ft long, 7 ft diameter circular metal culvert sloped at 1.49% with less than 18 inches of road cover. The easterly of the two culverts is a 49 ft long, 3 ft diameter circular corrugated metal pipe (CMP) sloped at 1.77% with approximately 5 ft of road cover. Both culverts project from the fill slope without headwalls and there is riprap of varying size and coverage. The downstream (south) invert of the 7 ft culvert is 0.74 ft higher than the 3 ft culvert and the upstream (north) invert of the 7 ft culvert is 0.4 ft higher than the 3 ft culvert.

Field observations show the downstream invert of the 3 ft culvert was submerged less than 0.5 ft under the backwater of a pond located south of the road. Analysis of existing and upgraded culvert capacity included estimated backwater effects of the pond.

There is also a 2 ft diameter culvert crossing of the east fork of Three Mile Creek approximately 800 ft to the east of the west fork culverts. Aerial photography and field observations indicate the borrow ditch on the north side of the road provides connectivity between the west and east fork culverts. The west fork culverts have significantly higher capacity than the east fork culvert and probably result in considerable flow in the north borrow ditch from the

east fork toward the west fork culverts. Moreover, the road grade slopes from east to west and indicates the borrow ditch does as well.

Capacity of the existing west fork culverts was determined to be approximately 342 cfs, comprised of 263 cfs for the 7 ft culvert and 79 cfs for the 3 ft culvert. For reference, the 500-year return interval flow predicted by USGS regression equations is 300 cfs with as much as 813 cfs at the upper end of the 90-percent confidence limit. The entire 14 square mile basin for Three Mile Creek was used in the regression equations because of the borrow ditch flow.

The recommended upgrade takes advantage of the height of the existing culverts to increase capacity without raising the road. The recommended upgrade consists of dual 103x71 inch arch pipes with finish road elevations at existing road grades. The dual arch pipes require 18 inches of minimum cover and an additional 7 inches of cover could be achieved to provide for flexibility in road maintenance.

The existing dual culverts on the west fork provide sufficient existing inlet width to allow for dual arch pipes and achieve significant increased capacity. The dual arch pipes yield a capacity of 818 cfs compared to the existing culvert capacity of 342 cfs.

The estimated cost of the recommended culvert upgrade is $120,000 and includes improvements to the existing north borrow ditch to increase conveyance capacity as a relief ditch for the east fork Three Mile Creek road crossing. Improvements to the ditch include widening the cross section to the full available width at the fence line and installation of riprap for erosion protection.

West Fork Three Mile Culverts	Total Culvert Capacity (cfs)
Existing: 7 ft Pipe (west) and 3 ft Pipe (east)	342
Recommended Upgrade: Dual 103 X 71 inch Arch Pipes	818

The recommended upgrade does not include raising the road because the resulting wider fill section would encroach into the relatively narrow 8 to 12 ft width between the existing road and fence line where the north borrow ditch is located. Reduction in capacity of the north borrow ditch would increase flood hazards between the east fork and west fork culverts because of the limited capacity of the east fork culvert. Raising the road does not appear necessary in view of capacity increases in the recommended upgrade.

Rattlesnake Creek Culvert

The Rattlesnake Creek Culvert crosses Rattlesnake Creek on the gravel Spencer-Kilgore Road, approximately 5.5 miles east of Spencer. The crossing includes a 28 ft long, single 5x3 ft CMP arch culvert sloped at 0.96% with headwalls on the upstream (north) and downstream (south) sides. Cover for the existing pipe is less than 1ft and the concrete headwalls are deteriorated. The existing culvert capacity is approximately 88 cfs. For reference, the 500-year return interval flow predicted by the USGS regression equations is 344 cfs in the 12 square mile drainage area. A crude analysis of the channel upstream of the culvert crossing indicates a bank-full capacity of 240 cfs and about 275 cfs at incipient road overtopping.

With existing culvert cover at less than 1 foot, options for increasing capacity are limited without raising the road. Field observations during dry conditions did not reveal clear evidence of significant lateral flow in the borrow ditches toward the culvert crossing although some lateral flow undoubtedly occurs. This observation, in combination with the variable 15 to 30 ft width between the toe of road slope and existing fence line, indicates additional road fill slope width can be accommodated. Raising the road 2 ft is estimated to expand the fill slope a maximum of 6 ft on each side of the road with less encroachment further from the culverts.

The recommended upgrade takes advantage of the relatively wide channel to increase capacity. Raising the road 2 ft allows for use of triple 77 inch x 52 inch arch culverts. The triple culverts, with a conservative 3 ft of separation, total approximately 25 ft wide and are larger than the downstream channel bottom width of 14 ft but less than the upstream channel bottom width of 30 ft. The triple culverts fit within the limiting downstream channel bank width of 35 ft without the need for significant channel improvements.

Capacity with the triple arch culverts is 509 cfs with an equivalent bypass capacity of 320 cfs. The bypass capacity accommodates estimated flows in the channel. The estimated cost of the upgrade is $111,000.

Rattlesnake Creek Culvert	Total Culvert Capacity (cfs)
Existing: 5ft x 3ft Arch Pipe	88
Recommended Upgrade: Raise Road 2ft, Triple 77x52 inch Arch Pipes	509

Other upgrades considered but not recommended are as follows. Dual 77 inch x 52 inch arch culverts were compared to the recommended triple culverts. Total width of the dual culverts is approximately 16 ft, slightly larger than the downstream channel bottom width of 14 ft. Capacity with the dual arch culverts is 340 cfs. Equivalent bypass capacity with the dual arch culverts is 214 cfs and does not accommodate the estimated channel flows. The estimated cost of the dual culvert configuration is approximately $15,000 less than the recommended triple culverts.

The wide channel and shallow cover suggests an alternative upgrade consisting of one or more concrete box culverts with a load-bearing top as the road surface to eliminate the need to raise the road. One or more box culverts with an equivalent open area of 14 ft x 3ft would increase the crossing capacity to 259 cfs. However, wide and shallow box culverts are not amenable to

maintenance where deposition is expected. The estimated cost of the box culvert alternative is at least as much as the estimated cost of the recommended upgrade and provides less capacity.

West Antelope Valley Road

The first of two crossings evaluated on Antelope Valley Road is located between Hillman Lane and Button Butte Road, approximately 0.4 miles east of Hillman Lane and 1.9 miles west of Kilgore. The crossing consists of a single 32 ft long, nominal 5x3 ft arch CMP culvert sloped at 0.49% that is projecting from fill. There is approximately 3 ft of road cover at the culvert. The culvert ends are damaged and exhibit a reduced flow area. Estimated capacity of the existing culvert is less than 100 cfs.

Inspection of aerial photography indicates the drainage area for the west Antelope crossing is limited because the defined channel persists for a relatively short ½mile upstream. However, the alluvial fan nature of the channel morphology indicates the west Antelope crossing carries a portion of the runoff from West Camas Creek and Crab Creek during peak flow periods. The USGS regression equations indicate combined West Camas Creek and Crab Creek flows in excess of 1200 cfs at the 500-year interval. A crude analysis of the channel upstream of the west Antelope crossing yields 370 cfs for bank-full capacity and flows in excess of 500 cfs at incipient road overtopping.

The recommended upgrade takes advantage of the existing culvert cover and channel width and preserves conveyance of lateral flow in the borrow ditch. Existing cover allows for an increase in culvert height to approximately 52-inches. The existing channel bottom is at least 28 ft wide and allows for triple arch culverts at 77-inches wide with 3ft of separation. The triple 77x52 inch arch culverts provide 528 cfs capacity. The estimated cost of the upgrade is $101,000.

Aerial photography and field observations reveal another channel approximately 200 ft west of the west Antelope crossing. The additional channel appears to act as a side or overflow channel to both the west Antelope crossing and another culvert crossing of Antelope Valley Road approximately 350 ft to the west. Existing road elevations increase approximately 1ft from the west Antelope culvert to the point at which the side channel enters the borrow ditch and indicate most of the side channel flow is conveyed as lateral flow in the borrow ditch to the west Antelope crossing. Consistent with this observation is the fact there is notable erosion along the north edge of the borrow ditch and at the existing fence line. The recommended upgrade includes a budgetary allowance for rehabilitation and armoring of the borrow ditch. Rehabilitation will include placing fill and riprap at the fence line.

West Antelope Culvert	Total Culvert Capacity (cfs)
Existing: 5ft x 3ft Arch Pipe	<100
Recommended Upgrade: Triple 77x52 inch Arch Pipes	528

Other alternative upgrades considered but not recommended are as follows. Dual 77x52 inch arch culverts would reduce construction costs by an estimated $15,000 but would provide less capacity, at 352 cfs. The dual culverts do not accommodate the estimated bank-full channel inflow.

Raising the road would allow for dual 103x71 inch arch culverts with a total capacity of 714 cfs. However, the equivalent bypass capacity is less than the capacity of the recommended upgrade at similar cost. In addition, the majority of flow in the borrow ditch is located in a relatively narrow 10 to 15 ft width from the toe of road slope to the fence line. Fill slopes caused by raising the road would encroach into the borrow ditch and reduce ditch capacity.

East Antelope Valley Road

The east Antelope Valley Road crossing is located approximately 0.5 miles east of the West Antelope Valley Road crossing, 0.1 miles west of Button Butte Road, and 1.4 miles west of Kilgore. The existing dual crossing is skewed to the road because of the channel alignment and both culverts have less than 1 ft of road cover.

The existing easterly culvert is an approximately 46 ft long, 3ft diameter circular CMP pipe. The upstream invert is 2.2 feet lower than the downstream invert (adverse slope of -4.8%) and the downstream invert is 2.5 ft above the downstream bottom of ditch.

The existing westerly culvert is approximately 45 ft long, sloping at 0.48% with variable diameter and material. The downstream (south) end appears to have a nominal 48 to 52 inch diameter CMP pipe end section. The upstream (north) end is cast or ductile iron with reduced end diameter at approximately 48-inch. The Clark County culvert inventory indicates a 55 inch barrel diameter. The culvert was modeled as a 4 ft diameter culvert because of the reduced inlet diameter.

Capacities of the existing 4 ft and 3 ft diameter circular CMP culverts were respectively calculated as 74 and 23 cfs, for a total combined capacity of 97 cfs.

Drainage area for the east Antelope crossing appears to be limited because the defined channel persists for a relatively short 0.7 miles upstream. However, the alluvial fan nature of the larger drainage basin indicates the east Antelope crossing carries a portion of runoff from West Camas Creek during peak flow periods. A crude analysis of the channel upstream of the east Antelope crossing yields 113 cfs for bank-full capacity and flows in excess of 200 cfs at incipient road overtopping.

The recommended upgrade includes raising the road 18-inches to remedy the limited structural cover at the existing culverts. The existing road grades also exhibit a sag (low spot) of about 0.7 ft located approximately 100 ft west of the existing culverts. Raising the road will reduce the potential for bypass flow at the sag. On the other hand, existing road grades exhibit a high point at the culverts so increases in road elevation and culvert height need to be balanced against the potential for bypass flow.

Installation of dual 77x52-inch arch culverts, in combination with raising the road 18-inches, yields a capacity of 338 cfs. Equivalent bypass capacity is in the range of 173 cfs to 277 cfs and accommodates the estimated capacity of the incoming channel. The estimated cost of the recommended upgrade is $93,000.

East Antelope Culvert	Total Culvert Capacity (cfs)
Existing: 4 ft Pipe (west) & 3 ft Pipe (east)	97
Recommended Upgrade: Raise Road 18-inches, Dual 77x52 inch Arch Pipes	338

Hillman Lane

The Hillman Lane culvert crossing is approximately 1.4 miles north of Antelope Valley Road. The existing culvert is a single 26 ft long, nominal 5x3 ft CMP arch pipe. Survey data indicates the arch pipe has a 32 inch rise. The existing road elevations provide less than 1 ft of cover.

The Clark County culvert inventory indicates a second culvert approximately 40 ft to the south along Hillman Lane. The second culvert is 3 ft in diameter but is noted in the County inventory as in poor condition with a hole in the top. Aerial photography illustrates the 3 ft culvert receives water from a side channel, or a relief channel, for the main channel inlet to the 5x3 culvert. The 3 ft culvert was neglected for purposes of capacity analysis because if its distance from the 5x3 culvert and because of the split channel configuration.

The existing culvert capacity is approximately 65 cfs. The channel inlet to the culvert has a limited length but is part of the alluvial fan system of West Camas Creek with a 500-year return interval flow in excess of 1000 cfs from the USGS regression equations. A crude analysis of the inlet channel at the culvert indicates a bank full capacity of 85 cfs and flows over 120 cfs at incipient road overtopping.

The limited road cover at the existing culvert constrains options for upgrading capacity without raising the road. The recommended upgrade includes raising the road 2 ft at the culvert location to gain cover and culvert height. Dual 71x47 inch culverts with 3 ft of separation can be accommodated by the approximate 16 ft bank width of the channel but will require transitioning the approximate 9 ft width of the channel bottom. Use of dual 71x47 inch culverts yields an upgraded capacity at incipient road overtopping of 275 cfs. Equivalent bypass capacity is up to 173 cfs and accommodates the estimated inlet channel capacity. The estimated cost of the upgrade is $84,000.

Hillman Lane Culvert	Total Culvert Capacity (cfs)
Existing: 3 x 5 ft Arch Pipe	65
Recommended Upgrade: Raise Road 2 ft, Dual 71x47 inch Arch Pipes	275

An alternative considered but not recommended was to utilize dual culverts and not raise the road. The existing road grade allows for an arch culvert with a rise of 29 inches while maintaining minimum cover at 12 inches with no margin of safety. The upgraded capacity is 75 cfs, little more than the existing capacity.

Future Mitigation Projects

The recommended upgrades gain significant capacity but are not represented as a full and final remedy of potential flooding. Peak flows higher than those estimated herein may occur. Sediment transport and deposition may reduce culvert capacity and ongoing maintenance is to be expected.

The culverts are located on road corridors that exhibit the broad floodplain characteristics of the base of alluvial fans, and particularly so at the Antelope Valley Road and Hillman Lane culverts. The inter-connected channels have drainages that are not well defined or separated by valleys and ridges. Consequently, the roads are located on broad floodplains with multiple culvert crossings and subject to overtopping during sufficiently high flows.

One additional measure to reduce road overtopping potential is to elevate significant lengths of road above estimated or observed flood levels. Field observations and topographic analysis indicate that approach could result in elevating at least two miles of road adjacent to the two Antelope Valley Road crossings considered in this study. Additional effort may be required to upgrade most or all of approximately 10 additional culverts in the extended elevated road to accommodate alternate flow paths on the alluvial plain. Borrow ditches would also need to be upgraded to restore or improve capacity that would be reduced due to a wider road section after elevating the road grade. Impacts to private property and acquisition of right of way are both possible. Elevating an extended section of road may be appropriate as the next phase of flood mitigation. However, the cost for this next phase would exceed, and possibly be two times as much as, the total estimated cost for all mitigation projects discussed in this study.

The seven existing culverts at five road crossings analyzed herein do not pass estimated flow rates in the contributing drainages, have exhibited insufficient capacity during recent flood events, or otherwise have structural problems. Upgrade options are proposed to significantly increase culvert capacities. The upgrades involve replacing existing culverts with larger and multi-barrel culverts, elevating the road where necessary, and re-grading borrow ditches where there is evidence of lateral flow toward the culverts. The proposed work may require environmental permitting. Estimated costs of the five upgrades are in the range of $84,000 to $120,000 each and total $508,000.

Mitigation Roadmap

Benefit Cost Analyses (BCA's) were run on each of the projects identified in this plan to determine if they are cost effective (according to FEMA's model). The resultant Benefit Cost Ratios (BCR's) are as follows:

- East Antelope Valley Culvert Replacement: BCR = 1.42
- Hillman Lane Culvert Replacement: BCR = 1.45
- Rattlesnake Creek Culvert Replacement: BCR = 1.53
- West Antelope Valley Culvert Replacement: BCR = 2.43
- West Fork Three Mile Culvert Replacement: BCR = 1.40

All of the projects are cost effective.