Albany County, Wyoming
Hazard Mitigation Plan

A plan to assist and reduce the possible effects of hazards in Albany County

Albany County Courthouse, Laramie Wyoming

Coordinated and prepared
By the
Albany County Emergency Management Agency
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Final with FEMA Revisions
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SPECIAL THANKS AND ACKNOWLEDGMENTS

The draft plan is a compilation drawn from many sources especially the Wyoming Geological Survey, (Jim Case), Albany County GIS, (Alan Frank) and Wyoming Office of Homeland Security. The plan is a result of the dedicated effort by Erin Denson in 2003 & Sandra Newland in 2009-10 of Albany County Emergency Management. Who have labored intensely to meet this deadline to produce a thorough document to base planning discussions upon.

Albany County EMA has also received outstanding assistance and support from the following in 2003 and 2009:

Cheryl Chesebro- Laramie Fire Department, Prevention
Dale Stalder-Laramie/Albany County Records and Communications/ Laramie Police
Forrest Selmer- University of Wyoming
Janice Gahagan- Albany County Chapter of the American Red Cross
Mark Ross- Union Pacific
Mike Moeller- Albany County School District #1
Rachel N. Toner- Wyoming State Geological Survey
Randy Vickers- Laramie Fire Department
Robert Juve- City of Laramie Public Works Management
Robert Kirkwood- Wyoming State Geological Survey
Susan Simpson- Albany County Public Library
Rich Emanuel- NWS Cheyenne
Troy Lane- University of Wyoming Police Department
Beth Young- Albany County PHRC
Mark holder- IMH
Rock River City Council
Albany County Sheriff's Department
Harold Newbrough with Carbon County Emergency Management
Seth Wittke- Wyoming State Geological Survey
Scott Davis- Albany County Fire Warden
Albany County Planning office- Doug Bryant for the use of the County Comprehensive Plan and maps
All County and City Fire Departments
City of Laramie Departments

EXECUTIVE SUMMARY/ PLAN DEVELOPMENT

Albany County has prepared the following plan with the assistance of the Wyoming Office of Homeland Security. Plan goals and mitigation actions were developed as the result of input from public meetings and discussions with each of the local governments in Laramie and Rock River. Preparing and implementing this plan will make the County more disaster-resistant in acknowledging potential hazards within the community. The

creation of the plan has allowed emergency personnel to become aware of concerns throughout the county and build better working relationships.

The original plan from 2003 was analyzed and reviewed in sections based off the crosswalk provided. Each section was looked at and evaluated on its current effectiveness. All of the sections got revised and updated with lots of additional research and information. Albany County EMA did the initial walk through revision and updated what they felt was necessary prior to presenting it to committees and the public. The 2009 review also included five more hazards to be addressed as threats to Albany County. After an initial draft was created it was provided to the communities within Albany County through LEPC, County Commissioner's Meetings, City Council Meetings, Library and Fire Department as well as posted on the City and County websites. The Jurisdictions of Laramie and Rock River were instrumental in developing major concerns with hazards in their respected areas. After planning meetings EMA would come back and update the plan accordingly for the next review date.

The local EMA was responsible for scheduling and conducting all revision work for the Hazard Mitigation Plan. The EMA office utilized its local resources of the fire departments, police, university, sheriff, and public health. Each entity in the City and County had opportunities to assist with the plan development as well as the public and citizens of Albany County. EMA corresponded with the Wyoming Office of Homeland Security for guidance and recommendations along the way. Neighboring jurisdictions provided tremendous assistance in reviewing Albany's County's Mitigation Plan and providing assistance as needed. Local communities and towns in Albany County participated in assisting with the revision process. We had several non-profit groups coordinate with the EMA office such as ARES/RACES, CERT, and the League of Women Voters. Community support was tremendous and much appreciated. The University of Wyoming's Geological department was instrumental in supporting and assisting in research efforts on past hazards in the County.

The jurisdictions of Laramie and Rock River as well as other communities in Albany County are vulnerable to a total of 14 natural hazards. The hazards of most concern to the County are blizzards, hazmat spills, wildland fires, pipeline hazards, flooding and terrorist attacks. For the hazards that were identified in the plan, projects were identified to help mitigate the effects of natural hazards within the county. The project types include education, prevention, protection, property protection, natural resource protection, structural hazards and coordination. Based on the hazards and local priorities eight goals were identified. The goals are as follows:

1. Improve notification procedures to individuals prior to threats of all types
2. Be prepared to respond effectively to severe winter storms and blizzards
3. Reduce the vulnerability for injury and loss of life from a hazardous material incident

4. Minimize the potential for loss or damage from catastrophic wildland fires and other types of fires
5. Reduce vulnerability to river flooding
6. Develop back-up systems for loss of power and/or communications during a disaster
7. Minimize potential for injury and loss of life from lightning and wind related events
8. Establish a highly functioning and effective Emergency Management program in Albany County

The 2003 version included three generalized goals:

1. Protect life and Property
    - Execute activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from hazards.
    - Improve hazard assessment information to make recommendations for new and for existing developments in areas vulnerable to hazards.
2. Public Awareness
    - Increase public awareness of the risks associated with hazards in the county.
    - Provide information on tools, partnerships, opportunities, and funding resources to assist in implementing mitigation activities.
3. Partnerships and Implementation
    - Strengthen communication and coordinate participation among and within public agencies, citizens, nonprofit organizations, business, and industry to gain a vested interest in implementation.
    - Encourage leadership within public and private sector organizations to prioritize and implement local, county, and regional hazard mitigation activities.

When the plan came up for renewal in 2009 the local LEPC and the participating public of Albany County chose to further develop these goals into eight key points listed above. The newly developed goals tie into the mitigation plans developed for the County in Chapter eighteen. The mitigation projects were based off of the eight goals listed above and include aspects from the 2003 goals as well.

The draft plan contains hazard identification and historical data analyses intended to be used as a basis for discussion in development of a completed plan. An initial problem analysis has been used to develop the first set of proposed action items. The goal of this draft plan is to provide the groundwork for a discussion, which is intended to culminate in a prioritization of action items with the eventual goal of reducing future loss through intervention and mitigation.

No planning effort, particularly in Wyoming, should ever proceed without recognition of the fact that any intervention will have an impact on the property rights of landowners. To be effective, the intervention proposed in planning must be balanced with a keen eye to cause and effect on property rights. Acceptance of need of mitigation efforts is only the first step in developing support of landowners. Without this support any planning effort will fail.

An example of this is building codes. There are no county adopted building codes and no enforcement of minimum building standards in the county. An action item is needed to mitigate the potential impact of many weather and seismic related events. The solution of mandating such a minimum standard will not be achievable without developing a strong support base for it in the community and by the most affected by it throughout rural Albany County.

WHO PARTICIPATING IN DEVELOPING THE PLAN?

The Albany County Hazards Mitigation Plan is the result of combined efforts between, public agencies, nonprofit organizations, the private sectors and regional and state organizations. Agencies included:
Albany County Assessor's Office- Grant Showacre and Deborah Smith
Albany County Chapter of the American Red Cross- Spencer Pollock
Albany County Commissioners
Albany County Emergency Management Agency- Sandra Newland and Chief Randy Vickers
Albany County GIS- Alan Frank
Albany County Local Emergency Planning Committee- See attached list
Albany County Planning- Stan Gibson and Doug Byrant
Albany County Public Health- Beth Young Mullins and Kate Chamberlin
Albany County Public Library- Susan Simpson
Albany County Sheriff's Office- Sheriff Jim Pond and Lieutenant Mike Garcia
Amteur Radio Emergency Services- David Young
City of Laramie Departments
Ivinson Memorial Hospital – Mark Holder
Jurisdiction of Rock River- Rock River City Council
Laramie County Emergency Management Agency- Rob Cleveland and Jeanine West
Laramie Fire Department- Shift Commanders Dan Johnson, Kyle Polidora, and Bret Vance
Laramie Police Department- Chief Dale Stalder, Commander Jeff Bury and Commander Mitch Cushman
Local Volunteer Fire Departments- All fire chiefs
Union Pacific
University of Wyoming various departments
University of Wyoming Physical Plant
University of Wyoming Police Department- Chief Troy Lane
Wyoming Department of Transportation- Tye Fix
Wyoming Geological Survey
Wyoming Office of Homeland Security- Carrie Chitty and Keith Harris

INITIAL ACTIONS TAKEN TO COMPLETE PLAN

June 2003	Albany County's Emergency Management Coordinator met with the Wyoming USGS representative to evaluate what needed to be done for the County's mitigation plan.
June 28, 2003	City Engineer, Information Systems Manager, County Assessor, County Planner, and University of Wyoming's Environmental and Health Personnel and Engineers met to discuss Mitigation Plan.
August 19, 2003	Meeting with USGS about hazards in Albany County.
September 30, 2003	Received PDMG notice.
October 24, 2003	Meeting with local radio stations, topic warning system issues, NWS and coordination.
November 2003	Attended Mitigation Planning Workshop in Casper (Mapping meetings with Alan Frank and Jim Case). Hazardous Materials in transportation Survey update completed. New City of Laramie Council Orientation
December 6, 2003	Mitigation Planning Workshop Lander developed mapping needs assessment.
December, 2003	Bioterrorism county plan draft developed (lead is Albany County Public Health).
December 12, 2003	Airport disaster and mitigation plan review and table top exercise.
December 17, 2003	County Commissioners approve MOU.
December 18, 2003	Met with (City of Laramie Community Services). Scheduled City Planning Commission Review of PDM Plan for March. West Nile Virus public hearing Planned for Feb 11.
December 2003	Terrorism annex to EOP draft submitted by LARC for review

	And comment
January 13, 2003	Local LEPC held. Set date to review plan
February 6, 2003	Meeting with County Planner
February 12, 2003	Meeting with USGS Rep. To discuss Mitigation Plan progress.
March 3, 2003	Public, LEPC, EDT plan review.
March 18, 2003	Meet with County Commissioners
February 6, 2009	Albany County EMA met with Carrie Chitty at WOHS to review requirements and evaluate what needed to be done for the County's mitigation plan. Chitty provided EMA with Crosswalk and general guidelines to begin revision.
March 18, 2009	Albany County EMA discussed Mitigation plan with NOAA and NWS Cheyenne and began to coordinate efforts to look at history of natural hazards in Albany County.
April 8, 2009	Albany County EMA attended the Planning Commissioner's meeting to discuss Mitigation Plan and gain support. Plan and expectation were presented and Commissioner's provided encouragement and support.
May 6, 2009	Albany County EMA held a public meeting in Laramie to review and gain perspective on what citizens were/are concerned about in Albany County. Citizens were asked about what concerns they had with hazards in Albany County. The 8 new goals were reviewed and input was created and prioritized. The attendance at this meeting was minimal.
May 18, 2009	Albany County EMA held a meeting with the League of Women Voters to gain their input and perspectives on the plan. The league provided a list of the hazards they were concerned with and helped to review the 8 new goals for the mitigation plan. A decent turnout at the meeting.
May 28, 2009	Albany County EMA attended a public meeting hosted by the League of Women Voters on "Emergency Services for Special Populations." The meeting also discussed the Multi-

	hazard mitigation plan. This was presented to the general public and input and assistance was requested. Copies were provided there and at the library. This was an excellent turn out with approximately 50 people present.
June 1, 2009	Albany County EMA attended Rock River City Council Meeting to present the Multi-Hazard Mitigation Plan for review and comment. Each Council member received a copy of the plan to review and provides commentary on, prior to approval. Rock River citizens in the audience were also able to pick up copies of the plan for review and comments.
June 8, 2009	Meeting with FEMA to discuss plan developments and Flood HAZUS analysis. EMA met with Carrie Chitty to review the Flood HAZUS analysis and how it fit into Albany County's Mitigation Plan.
June 25, 2009	Albany County EMA held public meeting to review the plan and the newly revised goals. Had same minimal attendance as previous meeting, but had returning citizens as well as new faces.
June 26, 2009	Rock River called with a few comments on how to tweak the Mitigation Plan to better fit the jurisdiction of Rock River. These changes were implemented into the plan prior to the July 7th approval.
July 7, 2009	Rock River City Council meeting to approve plan. Rock River mayor signed off on plan as well as other council members.
July 13, 2009	LEPC meeting to approve plan. Albany County Sheriff and other LEPC members also approved the plan at this time.
July 25, 2009	Albany County EMA submitted draft plan to State of Wyoming Office of Homeland Security for review then pass along to FEMA.
January 20, 2010	Albany County received FEMA revision crosswalk from Carrie Chitty at Wyoming Office of Homeland Security. Spoke with Chitty on guidance and began revision process.
March 10, 2010	Completion of revisions and re-submittal to State.

SCOPE AND ORGANIZATION OF THE PLAN

METHODOLOGY

Each of the hazards have been identified and documented separately in the draft as they pertain to Albany County. The draft will be submitted for review to the local community (planning commissions, local emergency preparedness committee), and state and federal emergency management for comment. A final, resulting discussion will be used to flush out the draft to its next phase for consideration of the promulgating authorities (County Commissioners, City Council, and Board of Trustees). The final adopted plan will include a feedback, review, and revision component to ensure it remains comprehensive. The plan will be made available to the public at all times and will be made readily available through the Public Library, Fire Department, City and County websites or by request.

PURPOSE

The objective of the Albany County Hazards Mitigation Plan is to protect citizens, critical facilities, infrastructure, private property and the surrounding environment from natural and manmade hazards. This objective can be achieved by identifying potential hazards in the county and establishing procedures that will mitigate the effects of the hazards.

SCOPE OF WHO THE MITIGATION PLAN AFFECTS

The Albany County Hazard Mitigation Plan affects unincorporated rural areas, incorporated rural areas, and incorporated urban areas of the county. This includes the jurisdictions of Laramie and Rock River as well as the unincorporated communities of Bosler, Buford, Buttes, Centennial, Garrett, Tie Siding and Woods Landing-Jelm. The plan provides a framework for planning against hazards in the county. The plan can be used as a foundation for local mitigation plans and partnerships for the towns in the county. The jurisdictions of Laramie and Rock River were involved in the plan with the intention of approving it upon completion. Other participating entities and communities were invited to participate but not allowed to approve the plan.

AUTHORITY: STATE AND FEDERAL SUPPORT FOR PLAN

All mitigation is local, and the primary responsibility for development and implementation of risk reduction strategies and policies lies with local jurisdictions. Local jurisdictions, however, are not alone. Resources exist at the state and federal

levels. Numerous state and federal agencies have a role in hazards and hazard mitigation such as the:

- Wyoming Office of Homeland Security (WOHS) guidance for County plans.
- Wyoming Geological Survey (WGS)
- Wyoming Highway Ports of Entry
- United States Forest Service-

These agencies play a crucial role in assisting Albany County in mitigation efforts and come into play if the County ever has to declare a disaster or request funding from the State or Federal counterparts.

DEFINITION OF TERMS

EDT- Exercise Design Team
EMA- Emergency Management Agency
EOP- Emergency Operations Plan
IBC- International Building Code
LARC- Laramie/Albany County Records and Communications
LEPC-Local Emergency Planning Committee
LFD- Laramie Fire Department
NWS- National Weather Service
PDM- Pre Disaster Mitigation
PDMG-Pre Disaster Mitigation Grant
UBC- Uniform Building Code
USGS- United States Geologic Survey
WOHS- Wyoming Office of Homeland Security

REVIEW AND INCORPORATION OF EXISTING PLANS AND STUDIES

Albany County utilized several plans in the development of the Mitigation update from within the county and throughout Wyoming. Albany County consulted numerous plans and databases while developing the hazards histories and risk assessments. The State of Wyoming Multi- Hazard Mitigation Plan was consulted to ensure consistency with this plan. Full citations for sources used by WOHS are available from WOHS. The following sources by author and general topic were consulted in the plan.

- Brazee and cloud, Seismicity, 1960
- Bureau of Land Management, Wildland Fire
- Campbell, Geological Hazards, 1985
- Campbell, Seismicity, 1987
- Case, James – Various publications on Geological Hazards
- Casper Star Tribune- Various dates
- Christiansen, 2001
- Coffman and Von Hake, Seismicity, 1975

- FEMA- National Flood Insurance Program Community Status Block
- FEMA- NFIP Flood Insurance Rate Maps
- Geomatrix, Seismicity, 1988
- HAZUS
- Kirkham and Rogers, Seismicity, 1985
- Laramie Republican and Laramie Daily Boomerang – various dates
- Murphy and Cloud, Seismicity, 1954
- National Weather Service, National Climate Data Center
- National Weather Service, National Severe Storms Lab
- Neumann, Seismicity, 1940
- Reagor, Stover, Algermissen, 1985
- SHELDUS
- Shepherd Miller, Seismicity, 1966
- U.S. Army Corp of Engineers, Dam inspection program, 1981
- U.S. Bureau of Reclamation, Inundation Maps
- USDA Forest Service, Avalanche Center, Salt Lake City, UT.
- USDA Forest Service, Bridget-Teton National Avalanche Center
- U.S. Geological Survey – Various
- U.S. Geological Survey National Earthquake information Center
- U.S. Geological Survey, National Seismic Hazard Mapping Project
- Varnes, Geological Hazards, 1978
- Wald, Et.al, Peak Ground Acceleration, 1999
- Wells and Coopersmith, Seismicity, 1994
- Wyoming Agricultural Statistics, USDA 2003
- Wyoming Department of Environmental Quality, Abandoned Mine Lands Program
- Wyoming State Engineer's Office, Dam Inspection Program
- Wyoming State Forester, Wildland Urban Interface Hazard Assessment
- Wyoming Climate Atlas
- Wyoming State Emergency Response Commission 2004 Annual Report
- Wyoming State Geological Survey

The Albany County Emergency Operations Plan was included where applicable as well as information from the census, economic information, and maps and geographic was consulted and incorporated as appropriate. It is the goal of Albany County EMA to begin updating and revising the Emergency Operations Plan at the completion of this plan.

The 2003 version of the Hazard Mitigation plan was utilized and incorporated in other plans throughout the county, following its adoption. The Albany County Comprehensive plan utilized studies and maps from the 2003 Hazard Mitigation plan. The 2009-10 versions will be used to update the other plans in the County and provide a guideline to

other future endeavors. Albany County Emergency Management will coordinate this effort. Much of the information, such as the risk assessment gained from the 2009-10 updated versions was incorporated into the process of revising the Emergency Operations Plan. The LEPC will review other county plans to ensure that coordination is made and information is utilized.

PARTICIPATION BY LOCAL JURISDICTIONS

The two jurisdictions in Albany County, of Laramie and Rock River were given the opportunity to participate in the planning process as were the unincorporated communities of Bosler, Buford, Buttes, Centennial, Garrett, Tie Siding, and Woods Landing. The plan throughout the creation process was available on the County and City websites for review and comment. Neighboring communities such as Carbon and Laramie Counties served as reviewers of the plan and assisted in its completion. The plan was made available to anyone who asked as well as being placed at the library and fire department for review. Public meetings were held to allow citizens of Albany County to come in and comment on the plan and its development. Attendance was limited, but feedback from our website postings seemed beneficial. Albany County EMA also advertised the plan in the paper and several calls were received off of that advertisement. At the meetings citizens worked with EMA to prioritize hazardous conditions in Albany County that they were concerned with. The public also had the opportunity to ask questions and provides comments on any portion of the plan. Several copies were handed out in hardback and electronic formats.

Participation occurred in the following ways:

- By participating in public meetings held in two communities across the county,
- By providing information on critical infrastructure, and facilities,
- By meeting with EMA at council and commission meetings,
- By providing feedback on draft goals,
- By providing specific project ideas for their communities and the County,
- By reviewing and commenting on the draft plan, and
- By adopting the plan.

PLANNING PROCESS

Albany County is committed to emergency planning to avoid and mitigate the effects of hazards. Albany County has an active Local Emergency Planning Committee (LEPC) that meets regularly to address and work on alleviating or reducing potential hazards in the County. The Albany County LEPC was formed prior to 1988 and has been active since. The committee is comprised of citizens in the county who have roles in emergency services, law enforcement, business, The University of Wyoming, The City Council, The County Commissioners, volunteer agencies, and public health. The Albany County Exercise Design Team, which consists of representatives from the city, county, business,

and volunteer groups meets regularly and carries out an aggressive exercise program that trains emergency responders to manage and control various hazard situations which can occur in Albany County. In the planning process for the multi-hazard mitigation plan, all previous plans in the County were reviewed an incorporated where appropriate.

The Local Emergency Planning Committee membership includes as of July 2009

Jim Pond, Chairman Albany County Sheriff	**Harold Colby, Vice Chairman** Laramie Street Dept.	**Jeff Bury, Secretary** Laramie Police Dept.
Jean Allais County Health Officer	John Benedik UW Environmental Health & Safety	David Blaylock Kinder Morgan
Carol Bartholomew Rock River Councilwoman	Tim Chesnut Albany County Commissioner Chairman	Scott Davis Albany County Fire Warden/
Adam Vernati Albany County Red Cross	Paul Curby Union Pacific Railroad	Dave Davenport Union Pacific Railroad
Sandra Newland Albany County EMA	Beth Young Albany County Public Health	Pat Gabriel Albany County Commissioner
Mark Holder Ivinson Memorial Hospital	Beau Bruanberger Western Research Institute	Fred Homer Council Member City of Laramie
Mike Johnson Wyoming Highway Patrol	Kim Keeling UP Chemical Transport Safety	Jerry Kennedy Albany County Commissioners
Tim McGary Wyoming Dept. of Transportation	Mike Moeller Albany County School District #1	Dale Stalder Laramie Police Chief
Jennifer O'Malley Laramie Environmental Health	Tom Martin Interfaith Good Samaritan	Bob Park Pacific Power

Jan Warren Quest Communications	Bill Sansing Mountain Cement Company	Mitch Cushman Laramie Police – LARC
T.J. Poll Peak Wellness Center	Randy Vickers, Fire Chief EMA Coordinator	Sam Vieyara Mayor, City of Rock River
Tye Fix Wyoming Dept. of Transportation	Kevin White UW Police Department	Becky Bond Sinclair Pipeline
Derek Mickelson Wyoming Dept. of Transportation	Bill Wright ARES	
Steve Atkins Mountain Cement Safety Manager		

PUBLIC INVOLVEMENT PROCESS 2009

Members of the public, businesses, not for profits, and other interested parties had multiple opportunities to participate in plan development. These opportunities occurred during formally noticed public meetings, city council and county commissioners meetings and the LEPC meeting in July 2009. Notification was also placed in the Laramie Boomerang on the draft process occurring, this information can be found in Appendix B.

COUNTY PROFILE

Albany County is located in the Southeast corner of Wyoming. As of 2000, the population was 32,014, with 13,269 households, and 7,006 families residing in the county. However, the latest census population estimate (2006) is 30,360, a 5.2 % decrease from 2000. This perceived decline in population does not reflect a change in new business start-ups, construction, or rural development. Albany County also has a transient population due to students at both the University and WyoTech that are not accounted for.

Laramie is the largest incorporated municipality in the county with an approximate population of 27,000. Rock River, the other incorporated municipality, has a population

of 235. The state's only four-year university, the University of Wyoming, is located in Laramie and has an approximate student population of 11,000.

Albany County encompasses a total area of 4,309 square miles with 4,273 square miles being land, 36 square miles being water. Within its boundaries lie the jurisdictions of Laramie and Rock River. Albany County is also home to Bosler, Buford, The Buttes, Centennial, Garrett, Tie Siding, and Woods Landing-Jelm.

Table 1.1 Populations of Incorporated Communities as of April 1, 2000 Census	
Town/City	**Population**
Bosler	0
Buford	2
Buttes	31
Centennial	191
Garrett	20
Laramie	27,204
Rock River	235
Tie Siding	23
Woods Landing - Jelm	100

U.S. Census Bureau (Census.gov)

Albany County has a diverse geographical make-up. Two main mountain ranges in the county are the Laramie Mountains in the eastern part and the Snowy Range Mountains to the west. Grassy plains separate the two mountain ranges. The Laramie River is the major stream in the county. There are dams located at Rob Roy Reservoir, Lake Owen Reservoir, Lake Hattie Reservoir, Wheatland Reservoir #2 and #3, and Twin Buttes Reservoir. Chapter eleven discusses dams in Albany County in more detail. The topography ranges from open, high elevation basins and desert land to pine covered mountains. Pine trees in the mountains are currently experiencing severe beetle kill.

According to the most recent figures available on County Business Patterns from the U.S. Census Bureau (2000), there were 14,217 business establishments in Albany County. The total annual payroll of the employee's for this establishment was $492,349,000 in 2000. The sector with the most business establishments in the County was the Services Industry (5,580) followed by Retail Trade (3844); Finance, Insurance, Real Estate (1,482), and Construction (1,110). The Per Capita income in the county in 2005 was $24,732. The average household size in 2005 was 2.13 persons. The median age was 26.9, lower than the national average of 36.4. Also in 2005, 13.3% of individuals were below the poverty level. (http://factfinder.census.gov)

Interstate I-80 passes through the county running east-west. State Highway 287 runs from the south into Colorado and US 30 runs north into Carbon County, Wyoming. The Union Pacific Railroad runs North and South with US 30 and US 287. Several underground pipelines that transport various products including natural gas, diesel fuel, fuel oil, gasoline, and crude oil can be found across the county. More information on the specific pipelines that run through Albany County can be found in Appendix E.

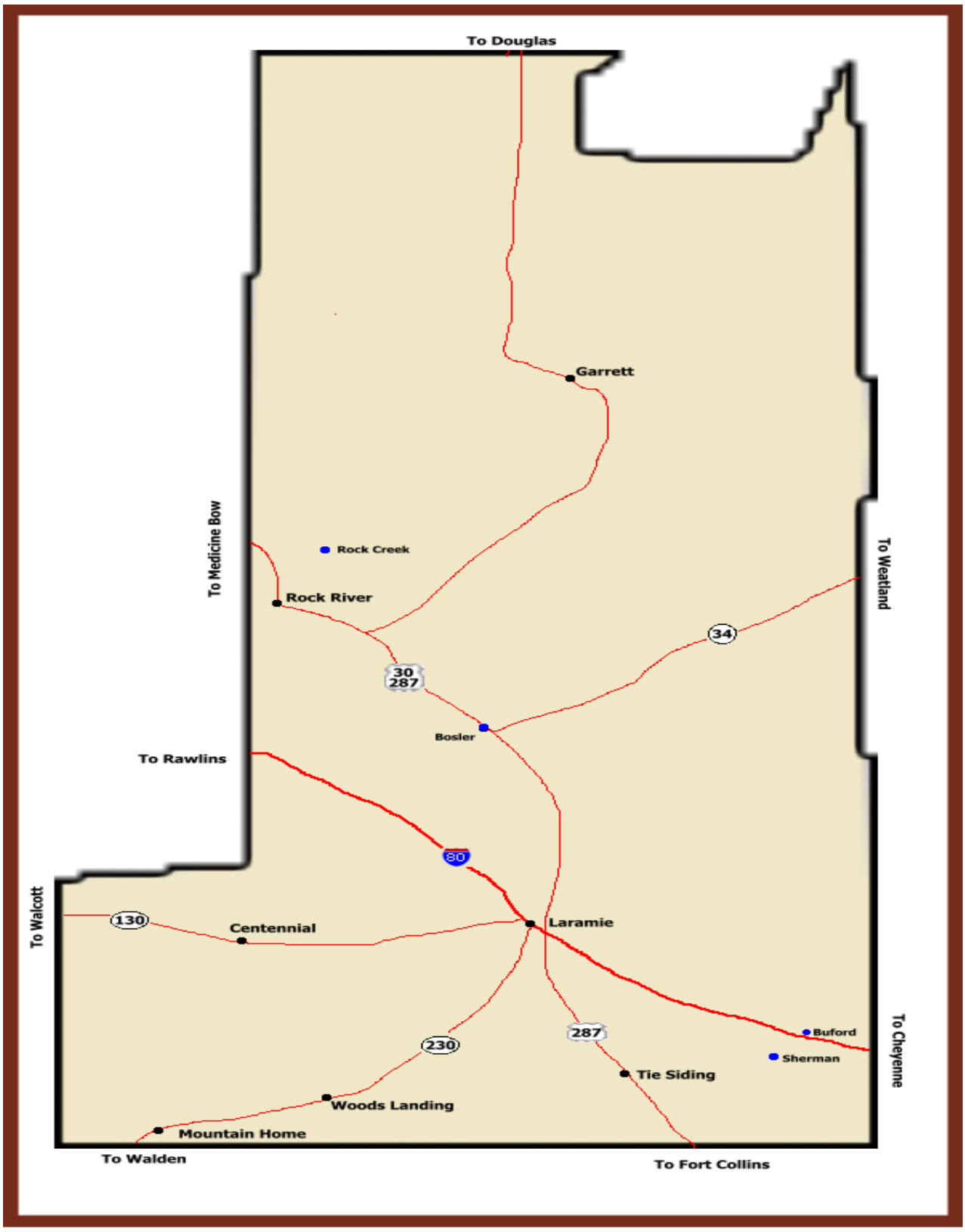


Figure 1.1 Albany County Map

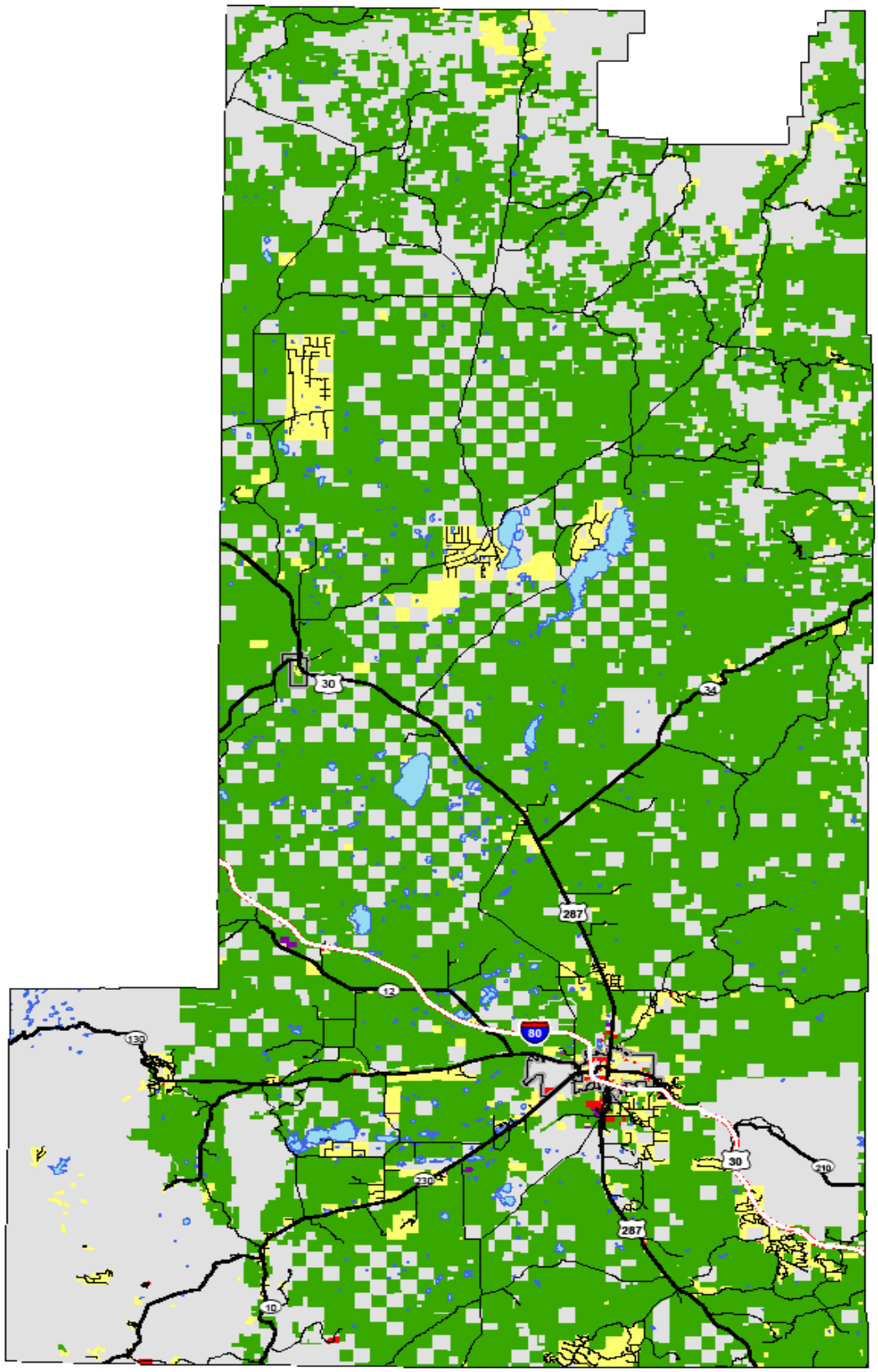
VULNERABILTY OF FUTURE BUIDLINGS

The following information was obtained by talking with the Albany County Planner, Doug Bryant and by accessing the Albany County Comprehensive Plan. The Comprehensive Plan is used by other agencies, such as water districts and school districts, to plan for future facilities.

Albany County currently does not regulate buildings in the city of Laramie to have any disaster precautions. However, the city and county do regulate building in the flood plains. In flood plains, builders must build up to a minimum elevation or not build in areas that are known to be 100 year flood zones. These building codes are in the comprehensive plan, adopted August 2008, but no efforts have been made toward adoption. New buildings and construction is limited along the Laramie River due to the potential of flooding.

A complete copy of the Albany County Comprehensive Plan can be found at www.co.albany.wy.us under the planning department. Albany County EMA also keeps a hardcopy in the office for those wishing to view the plan.

There are existing infrastructures that are more of a concern to the community then the future buildings that are being built to code. We have several older buildings and structures such as Clark St. Bridge that need to be repaired and brought up to code. The county needs to identify and inventory buildings, critical facilities, transportation, utilities, communications, hazardous materials facilities, and hospital, fire and police departments. This is included in the county's goals under the emergency management section.



MAP 1.2
EXISTING LAND USE

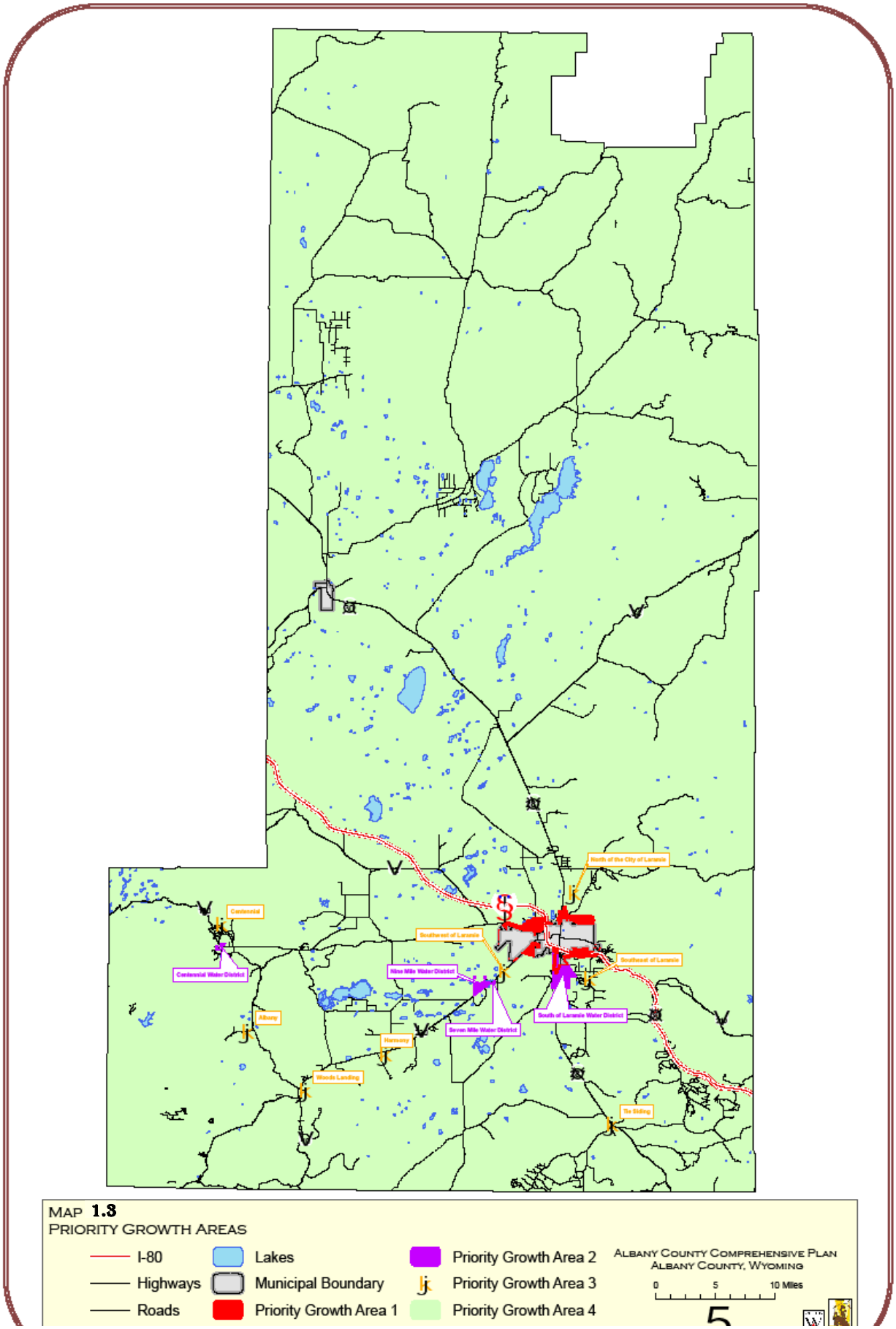
I-80
Highways
Other Roads

Municipal Boundary
Agricultural
Commercial

Exempt
Industrial
Residential

ALBANY COUNTY COMPREHENSIVE PLAN
ALBANY COUNTY, WYOMING

0 5 10 Miles

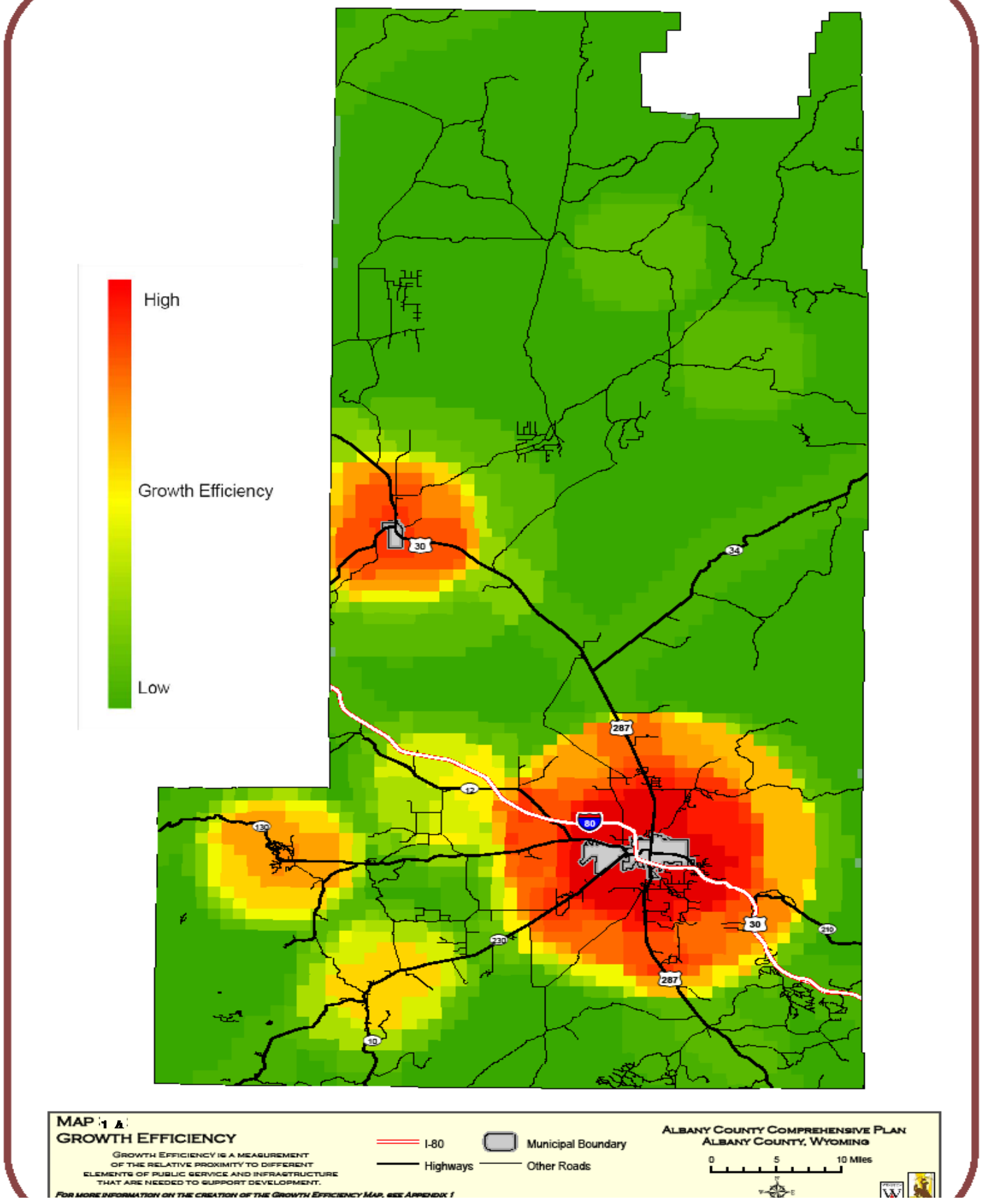

MAP 1.3
PRIORITY GROWTH AREAS
I-80
Highways
Roads
Lakes
Municipal Boundary
Priority Growth Area 1
Priority Growth Area 2
Priority Growth Area 3
Priority Growth Area 4
ALBANY COUNTY COMPREHENSIVE PLAN
ALBANY COUNTY, WYOMING
0
5
10 Miles
5

DEVELOPMENT TRENDS

Albany County is seeing a slowdown in permits and subdivisions, but there are still areas which are growing or are designated for growth. The area around the City of Laramie is designated for urban expansion. The area to the east of Laramie, which lies over the Casper Aquifer, is generally designated for only large lot rural residential, not urban development. Around the County growth is designated generally to what are called "community centers" and "nodes". The Jurisdictions of Laramie and Rock River are similar in development trends; future development will surround these current towns and settlement patterns.

Land usage and development trends in hazardous areas have undergone significant changes in the last 10-20 years as a result of awareness and action taken by Albany County. The Casper Aquifer is better protected than before, with limited building/construction allowed. There are no anticipated changes in land use that would increase vulnerability of homes and businesses in Albany County. The county planning department is in charge of ensuring that projects are safe for the owner and the environment prior to land development. As seen in Map 1.3, growth areas are centered on population nodes in Albany County and are projected to remain that way in the years to come. The population in Albany County is not expected to increase within the coming years and so the existing zoning maps accurately reflect what Albany County is dealing with in terms of growth and zoning.

The following map 1.4 depicts the growth areas in Albany County.


High
Growth Efficiency
Low
30
34
287
80
130
12
230
10
30
210
287
MAP 11
GROWTH EFFICIENCY
GROWTH EFFICIENCY IS A MEASUREMENT OF THE RELATIVE PROXIMITY TO DIFFERENT ELEMENTS OF PUBLIC SERVICE AND INFRASTRUCTURE THAT ARE NEEDED TO SUPPORT DEVELOPMENT.
FOR MORE INFORMATION ON THE CREATION OF THE GROWTH EFFICIENCY MAP, SEE APPENDIX 1
I-80
Municipal Boundary
Highways
Other Roads
ALBANY COUNTY COMPREHENSIVE PLAN
ALBANY COUNTY, WYOMING
0
5
10 Miles

CHAPTER II. PLAN MONITORING, MAINTANCE, REVISION, AND COORDINATION

PLAN ADOPTION

Many different agencies will be responsible for following the Albany County Hazard Mitigation Plan. The Albany County Commissioners, City of Laramie, and the City of Rock River will have the authority to promote policies regarding hazards. The Albany County EMA office will be the primary authority in maintaining and coordinating the plan adoption by the jurisdictions of Laramie and Rock River.

COORDINATING BODY

The Albany County Local Emergency Planning Committee (LEPC) will be responsible for coordinating implementation of plan action items and undertaking the formal review process, following the Leadership of EMA.

The Albany County Emergency Management Agency Coordinator will assist in monitoring and implementing the plan. The Coordinator will be the main contact for the plan.

FORMAL REVIEW PROCESS

The LEPC will evaluate the Albany County Hazards Mitigation Plan on an annual basis. The LEPC will determine the effectiveness of programs, and reflect changes in programs that may affect mitigation priorities. The evaluation process includes a firm schedule and timeline, and identifies the local agencies and organizations participating in plan evaluation. The EMA Coordinator will be responsible for monitoring and evaluating the progress of the mitigation strategies in the plan as well as coordinating with WOHS. Participating jurisdictions will assume the expiration date five years from the first approval date regardless of other participants subsequent adoption dates.

When the review takes place, this is what will be looked for:

- Have any potential hazards developed that were not addressed in the plan?
- Have any natural disaster occurred that were not addressed in the plan?
- Has any unanticipated development occurred that is vulnerable to hazards?
- Are there any additional mitigation ideas that need to be incorporated?
- Have projects been initiated and or completed?
- What are the barriers to completing projects identified in the plan?

Each January the LEPC will meet to review the questions listed above. The discussion will be documented so that when the plan is revised, the findings of the monitoring can be incorporated in the revision. The EMA Coordinator will convene the LEPC for this purpose. In the future the local LEPC and EMA hope to coordinate with the University in planning revisions and updates.

HOW WILL THE PLAN BE IMPLEMENTED, MONITORED, AND EVALUATED?

The plan maintenance section of this document details the formal process that will ensure that the Albany County Hazards Mitigation Plan remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the plan annually and producing a plan revision every five years. This plan section describes how the county will integrate public participation throughout the plan maintenance process. Participating agencies are asked to submit periodic reports that discuss implementing actions, progress and completion dates. The Emergency Management County Coordinator's office will be responsible for contacting the LEPC to organize an annual meeting to review these reports and changes. The jurisdictions of Laramie and Rock River are required to review the plan and provide any feedback and to attend all meetings held to review and update the plan.

The outcomes of the Mitigation Plan will be incorporated into other plans within the County. The LEPC will use and rely on the plan for guidance and past occurrences. Emergency Management will utilize the plan to seek out grants and projects that fulfill the mitigation requirements outlined in the plan. The Albany County EMA is currently working on revising the Emergency Operations Plan and will include and reference the mitigation plan.

The local government will incorporate the Hazard Mitigation Plan and other mitigation strategy information contained within this document into other plans and actions across the county. The Albany County Emergency Management Agency will be responsible for ensuring this occurs as well as scheduling a method of incorporation. Most plans originate or filter through the EMA office. EMA will include the necessary information in future plans and coordinate this operation through other agencies when needed. The LEPC will assist EMA in identifying portions of the plan to be incorporated into other planning efforts in Albany County.

The county has not really used the plan from 2003 due to it being outdated and not all inclusive of hazards in the county. There were brief overviews of hazards, but not with enough information or history to make it a reference plan or even a building plan. The revised plan has created a large awareness of possible hazards in our community and several mitigation actions came from this realization. It is the county's hope that this

updated plan will be far more effective and practical than the 2003 version. EMA has already begun using the plan in exercises and revisions and updates to the EOP in 2010.

Table 2.1 Plan Maintenance and inclusion

Plan/Mechanism Name	**Process related to Hazard Mitigation**	**Specific elements to incorporate**	**Responsible party**	**Timeline**
Albany County Comprehensive Plan	Future Land Use Plan and Current use	Show known hazard areas, critical infrastructure and where not to develop[	County Planning	During next update
Albany County Wildfire Mitigation Plan	Risk Assessment and or mitigation strategy	Wildfire risk assessment, mitigation strategies	Fire Chief and Fire Warden	During next update
Aquifer Protection Plan	Risk assessment	Public water and conservation acts, areas of concern	Public works, water and EMA	During next update process
Zoning code	Development, review process and hazard overlay district	Create a hazard overlay to restrict development	Administrator of zoning	Yearly updates
County EOP	Risk Assessment, mitigation and prevention	Update overall plan for outdated version	EMA	During next update
Snow Plan	Mitigation Strategy	Establish areas of snow removal and parking allocation	Streets, public works and EMA	During next update
Shelter and evacuation plan	Mitigation Strategy	Establish shelter areas with supplies and evacuation routes and plans	Red Cross, EMA	During next plan update

PLAN UPDATE REVIEW TRIGGERS

Any of the following three situations could trigger a review and update of the plan:
Occurrence of a major national disaster in or near Albany County
Passage of five years
Change in state or federal regulations which must meet compliance.

REVISION PROCEDURES

Should a major national disaster occur in Albany County, the LEPC shall meet following the disaster to determine whether a review of the MHMP is warranted? In the absence of a major natural disaster, the five year review will take place during the six month period preceding the FEMA approval anniversary date. At this time the plan will be analyzed to see if any application and awards for mitigation planning are available, contracting for technical or professional services, planning process to develop the update, state and FEMA reviews, revising the updated plan and finally the plan adoption procedures.

Following proper notice in the papers of record, the Albany County Emergency Management Coordinator will convene the LEPC and with their assistance and/or the assistance of the WOHS or a contractor as determined necessary, carry out the following tasks:

- Review the Hazard Mitigation Plan Review Crosswalk form completed by WOHS and FEMA during their most recent review of the plan.
- Examine and revise the risk assessment data as needed to ensure it is current.
- Update the mitigation strategies to incorporate completion of actions and add any needed strategies or projects.
- Identify problems that may be hindering or affecting implementation of the plan, and recommend actions for resolving those problems.
- Recommend any necessary revisions to the MHMP.
- Comply with all applicable regulations and statutes.

Forty-five days prior or earlier to the five year anniversary date, a final draft of the revised plan will be submitted to WOHS then passed on up to FEMA.

PUBLIC INVOLVEMENT

The public is encouraged to be involved in the continual updates of the mitigation plan. They will be notified of the annual meeting through Channel 11 news information, and through the local newspaper. The plan will be made available for them at the fire department, library and on the internet. The LEPC (Local Emergency Planning Committee) will participate in reviewing the plan. Notification of meetings will be made

in advance to allow ample opportunity for public comment. Public participation will be scheduled in advance to the plan coming up for review. EMA will be the lead agency to organize this effort. Public comments will be included in the plan where appropriate and listed in the appendix.

Albany County Multi-Hazard Mitigation Plan Vulnerability by population base

	Dam Failure	Drought	Earthquake	Flood	Hail	Hazmat	Landslide	Lightning	Mine Sub.	Avalanche	Tornado	Wildfires	Winds	Winter Storms
Bosler		X	X		X	X		X			X	X	X	X
Buford		X	X		X	X		X			X	X	X	X
Centennial	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Garrett	X	X	X	X	X	X		X			X	X	X	X
Laramie	X	X	X	X	X	X		X			X	X	X	X
Rock River	X	X	X	X	X	X		X			X	X	X	X
Tie Siding		X	X		X	X		X			X	X	X	X
oods Landing/Jelm	X	X	X	X	X	X	X	X		X	X	X	X	X

The above table was developed by Emergency Management based on the hazard risk assessment prepared by the Wyoming Office of Homeland Security.

Both the jurisdictions of Laramie and Rock River as well as Albany County as a whole have not changed in their vulnerability to disasters since the last plan was approved.

VULNERABILITY TO REPETITIVE LOSS

The hazard that is most associated with repetitive loss is flooding. The areas of Laramie, Centennial and Rock River are not likely to experience damages associated with repetitive loss of flooding due to their proximity to the rivers in the county. The Jurisdictions of Laramie and Rock River could be potentially affected by flooding and repetitive loss, but statistics show that this is not the case.

Other hazards such as hail, winds, wildfires and winter storms are broad ranging and are not possible to predict an exact location for repetitive loss.

EMERGENCY MANAGEMENT

PUBLIC NOTICE!

Albany County is working on revising its Mitigation Plan. A mitigation plan entails identifying hazards and assessing the damage hazards could potentially bring to the county.

As members of the community, you are Invited to attend a planning session with Albany County Emergency Management to discuss the plan, as it exists so far.

The reason for this plan is to keep our community safe, so please come and give your ideas.

For more details call Sandra Newland: 721-5314

Meeting to be held on:
Wednesday May 6, 2009
Laramie Fire Department Substation
1558 N. 23rd Street at 6:30pm

NAME	PHONE #	ADDRESS	REPRESENTING
Bob Fenton	307 232 4413	800 Cornwest Casper Wy	Kinder Morgan
Becky Bond	307-328-3553	PO Box 185 Sinclair WY 82334	Sinclair Pipeline
Eric Scott	307-214-5173	524 Cornell Ln Cheyenne	ONEOK - Overland Pass PL
Ralph Williams	307-742-5966	4223 Comanche Dr	Community
Mark Holder	307-742-2141 x2200	255 North 30th	Zurich Menard Hospitality
Valerie Pearce	307-761-1938	4746 E. Skyline #46	community
Tom Ubben	307-399-4228	1701 Shetland	Kinder Morgan.
Ryan Taylor	307-761-0028	1814 Bill Nye Ave.	Hilton Garden Inn
Rob Goodrich	307-760-6247	1518 Arnold	Source Gas

Wednesday
May 27, 2009

What should Laramie do in an emergency?

BY AARON LECLAIR
Boomerang Staff Writer

The Albany County Emergency Management office is asking for the public's help as it revises a countywide plan that identifies and assesses natural and material hazards.

The Emergency Management office is requesting local input for a revision of its mitigation plan during a public meeting at 7 p.m. Thursday in the Albany County Public Library.

Additional meetings will take place later this month in Centennial and Rock River when they are scheduled.

"I'm still working with a group in Centennial ... and then also with the Rock River City Council," Sandra Keller, grants coordinator for the Emergency Management office, said. "I'm at their mercy for whenever they can squeeze me in."

Keller said the meeting would be for people to both provide ideas for and receive information about the revision of the county's disaster mitigation plan.

The mitigation plan contains estimates of potential disaster losses and an assessment of each area's vulnerability to different types of natural disasters such as floods, earthquakes, tornadoes and blizzards.

The plan also identifies hazards most likely to hit each area of the county, as well as outlines several possible projects to protect communities that are vulnerable to disasters.

"I'm just going to bring the plan that I've been working on and have the public have the opportunity to look at it (and) voice their concerns with different hazards within Albany County," she said. "They can voice their concerns and look at what we have in the plan for emergencies."

Those who attend the meeting also will be asked to rank the hazards with which they are most concerned.

"Whether it's lightning, or hazardous spills on the highways, or tornados, or earthquakes or pandemic flu ... they can write them so I can get an idea of what citizens are with," Keller said.

In past meetings, Albany County residents have listed hazardous spills from wrecks on Interstate 80, natural gas pipelines and tornadoes as their top concerns.

"The most concern to people is hazardous spills on the interstate and on the railroads," Keller said. "There's also quite a concern with pipelines throughout the county."

In addition to accepting

See Emergencies, page 5

Emergencies:
Plan will be sent to FEMA for approval later this summer

Continued from page 1

public input on the mitigation plan, Keller said she would talk about emergency services for the special-needs population, which includes elderly, handicapped and ill residents.

"We're working with a lot of the home health care agencies and public health and just trying to get the word out," she said. "We're trying to do — with the CodeRed (EMS) inventory program — a database where we can keep track of people who might need assistance in an emergency. So, whether they need a handicapped-accessible van to evacuate, or whether they need electricity to run medical equipment, then we're aware of those people."

After its passage by the city council and county commissioners in late June, the disaster mitigation plan will be sent to the Federal Emergency Management Agency (FEMA) for its approval later this summer.

"If we don't have this plan completed ... if we ever were to have a disaster ... we would not be eligible for federal funding," Keller said. "So it's important to have."

For more information, to schedule an appointment or to obtain a copy of the disaster mitigation plan, contact Keller in the Albany County Emergency Management office at 721-5314.

"I'm always willing to take advice and ideas and see what people are concerned with," Keller said, "and what they would like to see in the plan."

Aaron LeClair's e-mail address is lbedit7@laramieboomerang.com

League of Women Voters
5-18-09

Sign in Sheet

NAME	PHONE #	ADDRESS	E-MAIL ADDRESS
MARIAN SHOWALTER	760-9657	1619 W Hill Rd Alpine 92001	mecs51@yahoo.com
FONCEY TAYLOR	949-6427	966 N. PINE 92072	Foncey@brepnet.net

MAYOR: Samuel Vieyra

Council: Sandra Broyles
Cathy Leslie
Shirley Smith
Betty Farris

Employees: Town Clerk: Andrea Lamb
Treasurer: Marla K. Conry
Maintenance: Jock Farris
Water/WW: Paul Lear
Landfill Caretaker: Jock Farris

TOWN OF ROCK RIVER
COUNCIL MEETING AGENDA

REGULAR MEETING OF JULY 7, 2009

1. CALL MEETING TO ORDER---ROLL CALL

2. MINUTES FROM JUNE 1, 2009 REGULAR MEETING
OPEN MEETING
JUNE 15, 2009 SPECIAL MEETINGS

3. MAINTENANCE REPORT: JOCK

4. WATER DEPT. REPORT: PAUL

5. TREASURER'S REPORT: MARLA

6. VOUCHERS: ANDREA

7. PUBLIC: Sandra Keller/Albany County Emergency/council to sign off on mitigation plan
Jim Cavelli/shop plans/sewer lagoon
Sheriff Pond

8. UNFINISHED BUSINESS:
1. Centennial Committee report – next meeting
2. Teal grant/welcome signs
3. Walk path around park
4. Check for preschool grant
5. Any other unfinished business?

9. NEW BUSINESS:
1. Building Permits: Gallegos-deck and shed/Thompson-driveway/Pam Pearson-sewer
2. Banking disclosures
3. New contract for propane
4. Using park for produce truck
5. Right-of-way easement from the Shaffers
6. Complaint on Eric Summer's dog
7. Mayor and clerk to go to Medicine Bow 07/09/09/impact assistance funds
8. Year end budget adjustments
9. Liquor license hearing scheduled for 08/27/09
10. Any other new business?

10. ADJOURN

Albany County Planning Office

1002 S. 3rd Street, Laramie, WY 82070

Phone: (307) 721-2568 Fax: (307) 721-2570

Email: planning@co.albany.wy.us

Albany County Planning and Zoning Commission

AGENDA

Regular Meeting

April 8, 2009 – 7:00 p.m.

Albany County Commissioners Chambers

CALL TO ORDER/ROLL CALL

APPROVAL OF AGENDA AND MINUTES (March 11, 2009)

DISCLOSURES

PUBLIC APPLICATION

A. Dale Creek – Conditional use

B. Bonham Land Use Change

CURRENT PLANNING PROJECTS

A. Priority Growth Area 3

B. Zoning Regulations

C. Nuisance Regulations

D. Hazard Mitigation Plan

E. Small Wind Energy Regulations

F. Priority Growth Area 4 – Discussion - interpretation

move to end

OTHER ITEMS/ANNOUNCEMENTS

CALENDAR

A. *April 21, - 9:30 a.m.* - Board of County Commissioners

B. *May 5, - 9:30 a.m.* - Board of County Commissioners

CITIZEN COMMENTS – Non-Agenda Related Topics

ADJOURNMENT

***NOTE – The Albany County Planning and Zoning Commission will table action on any application for which the Applicant or his/her representative is not present at the meeting for which the application is scheduled.**

MUNICIPAL AND COUNTY CRITICAL INFRASTRUCTURE

The following information is a listing of the critical infrastructure owned by the local governments listed individually with city/town. The source of the information is provided below each section.

Table 2.2 County Infrastructure

Laramie

Asset	**Replacement Cost (estimated)**
City Hall/Fire Hall	$7,098,442
City Shop and Garage	$1,060,376
Water/Sanitation	$1,098,438
Repair and Equipment	$173,029
Washington Park	$118,659
Turner Pump House	$117,464
Filter Plant	$404,189
Water Treatment	$2,587,703
Landfill/Storage	$112,819
Airport	$30,710
Animal Shelter	$1,215,000
Park Offices and Garage	$565,583
Fire Substation	$490,980
City Hall Annex	$1,938,007
Waste Water	$427,058
Lab Control Building	$459,806
Blower Building	$450,108
Fire Training Building	$176,656
Screw Pump Building	$354,129
Street Department	$25,227
Police Department	$1,681,037
Wastewater Treatment Plant	$26,784,514
Police Dept Garage	$105,805
Recreation Center	$14,020,606
Station 3 Fire Department	3.1 Million
Maintenance Building	$55,962
LARC	$40,310
Ice Arena	$118,919
Laramie City Landfill	$60,000
Cemetery	$125,000

Source: Wyoming Association of Risk Management

Rock River

Asset	**Replacement Cost (estimated)**
School	$13.5 billion
Town Hall	$500,000
Fire House	$500,000

The newest critical facility in the county is the fire station 3 which was completed in February of 2010 costing 3.1 million. All the buildings listed above are considered critical facilities and are of top priority to protect from flooding and other hazards within the county. More planning and consideration need to be placed on how to better protect these infrastructures. A goal has been created to get this need met within the county.

CHAPTER III. HAZARD IDENTIFICATION AND RISK ANALYSIS

The Albany County Emergency Management Agency along with the Wyoming State Geological Survey identified potential hazards that effect Albany County, fifteen were considered to be significant and potentially life threatening. Definitions and examples are listed below on twelve of the most prevalent hazards with further explanations and relations to Albany County located in individual chapters addressing each of the fifteen hazards that affect Albany County.

Hazardous Materials

A hazardous material is defined by the U.S. Department of Transportation, as a threat that poses an unreasonable risk to health and safety of operating or emergency personnel, the public and/or the environment if not properly controlled during handling, storage manufacturing, processing, packaging, use, disposal, or transportation.

The hazard risk in Albany County involves many of the features that comprise the county. Transportation accidents on Interstate 80 are a significant hazard. Many trucks transport hazardous materials so there is the potential for a hazardous materials component in any transportation accident. Additionally, Interstate 80 crosses the Casper Aquifer that is a major source of drinking water for residents of Laramie and Albany County. Transportation accidents in the vicinity of the Casper Aquifer have the potential to contaminate the drinking water supply. Other accidents involving the railroad, pipelines, and other vehicles also have the potential to contaminate the streams, underground water levels, the land, and the air.

The 2007 report of the State Emergency Response Committee (parent to our LEPC), identifies that there was an excess of 70,000 placarded hazardous materials shipments on Albany County roadways last year. The Union Pacific Railroad reports more than 70,000 placarded containers passed through Albany County and nearly 70,000 placarded railcars. There are hundreds of miles of gas and flammable liquid pipelines in the county and many fixed facilities meeting community right to know trigger requirements filing hazardous materials statements to the local LEPC. The presence of the potential for a hazardous materials disaster is well documented.

Controls in place include federal and state regulation of minimum safety handling and labeling, (tier two), City enforcement of Uniform Fire and Building Codes regulating hazardous material storage and use and Department of Transportation plack carding and transport requirements. The University of Wyoming has a regulated material handling division and the Environmental Health and Safety Office on campus who supervises the storage and use of hazardous materials. Responses to these emergencies are certified by a technician from the Laramie Fire Department. Problem areas include a lack of code enforcement outside municipal limits and a lack of jurisdictional authority in the Laramie

Fire Department to respond to the northern half of the county. Deficiencies in the warning systems of both city and county have been identified as a problem. The new CodeRED system installed in October of 2008 helps eradicate the delinquency of the old warning system within the county. As of January 2010 Albany County EMA has been actively seeking funding to upgrade or completely replace the outdated existing siren system.

Wildland Fire

Wildland fire is defined as an uncontrolled fire spreading through vegetation fuels, exposing and possibly consuming structures. The wildland fire problem is historically documented. There were two FEMA qualifying wildland fires in northern Albany County in the 2002 fire season (Hensal and Reese) the combined total cost of suppression for these two fires exceeded $3 million dollars. There are eight rural fire departments with a total of more than 90 volunteer fire fighters in Albany County. Laramie is served by a paid 43-member department. There are 19 forestry owned trucks in rural Albany County. The highest priority need identified is the wildland/urban interface, and in particular those residential enclaves located within the National Forest. Forest management policy has significantly reduced the number of logging roads, which provide both firebreak and emergency evacuation opportunities. The lack of logging and logging roads also contributes to; beetle kill and an excessive build-up of heavy fuels exposing the interface areas to overwhelming potential to be overrun. Fuels reduction and defensible space development are identified as action items of highest priority. The beetle kill problem has created a substantial threat to the County and the possibility for wildfires has increased. Chapter six describes wildland fires and addresses the U.S. National Fire Danger Rating System.

Severe Thunderstorms

Severe thunderstorms encompass hail, lightening and tornados in Albany County. The county has a strong history of all the above and thunderstorms are considered a high threat. Thunderstorms with lightning, winds, and damaging hail frequently occur in the summer months. Tornadoes also pose a threat in Albany County. Damages can impact electricity, water supply and transportation. Assets in the county can be tied up trying to repair damages sustained from severe thunderstorms. The TORRO Hailstorm Intensity Scale was referenced for data in Chapter seventeen, on tornadoes as was the Enhanced Fujita Tornado Damage Scale.

Land Subsidence

Land Subsidence is a gradual settling or sudden sinking of the Earth's surface owing to subsurface movement of Earth materials. This is often related to roof collapses in mined out areas. This is a minor threat in Albany County with little impact.

Flood

Flooding is a general and temporary condition of unusual and rapid accumulation or runoff of surface waters from any source. Flood areas along the Laramie River and tributaries are identified, particularly within the corporate limits. Additional work on drainage in south Laramie is identified as an action item need. Planning regulations to keep new construction out of identified flood zones is an action item. The following website provided a historical base for floods in Albany County. www.fema.gov/hazard/map/index.shtm

Flooding can be very damaging to private homes and businesses along the river line and in the down town district in Laramie. The jurisdiction of Rock River is also located along the Laramie River and flooding could damage local homes and businesses in the area.

Earthquake

Earthquakes are also a possibility in Albany County. Numerous quakes have been felt with over thirty magnitude 3.0 and greater earthquakes and hundreds of smaller earthquakes. In addition, problems, such as leaks can occur with buried pipelines. Wyoming Geological Survey provides historical information, which documents that Albany County is the most highly active seismic area in Wyoming outside of Yellowstone/Teton National Parks. Action items identified include a need for better warning system, (earthquake can't be predicted but the aftermath of large quakes includes a need to deal with ruptured gas and flammable liquid tanks and pipelines as well as a high potential for fire). Building codes as a means to mitigate through adaptive construction are also high priority issues to address. Earthquakes have the potential to affect critical infrastructure in the county and damage the assets and resources. The following website provided historical information for earthquakes in Albany County http://earthquake.usgs.gov/

Mined Out, Windblown and Landslide Areas

Unstable and unsuitable for building terrain areas are identified as landslide areas. An action item is to seek to create no build zones in these areas. Information was aided by the following website http://landslides.usgs.gov. Mined out, windblown and landslide areas are minimal in Albany County, but are still a threat. The Beaufort scale was used in chapter fourteen to measure wind speeds.

Dam Failure

Dam failure incidents involve unintended releases or surges of impounded water. Dam failure can be caused by earthquakes, blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, and terrorism. Dam failures have the potential to wipe out communities in Albany County. Dams will be discussed further in chapter thirteen.

Winter Storms/Blizzards

Winter storms and blizzards are the most common threat to Albany County. The National Weather Service has provided significant historical documentation on the threat and damages caused within Albany County by winter storms and blizzards. Severe winter weather is another hazard risk in Albany County. High winds, snowfall, fog, and icy roads often result in road closures, especially on Interstate 80. Travelers must be safely sheltered and cared for during episodes of emergency road closures. In addition, the essential services of the county must be maintained during episodes of severe weather. Caring for livestock is another area of concern during a winter storm. Winter storms and blizzards can have a tremendous impact on assets. The county has limited funding for providing sheltering, limited spaces and limited equipment to set these shelters up.

Droughts

Droughts are a potential problem when there is little rain or snowfall accumulation. With one of the primary businesses in the area being agriculture, droughts can pose a serious economical impact to the County. The following website provided detailed historical data for droughts in Albany County www.drought.unl.edu/dm/index.html. The Keetch-Byram Drought Index (KBDI) ranges from 0 to 800, where a drought index of 0 represents no moisture depletion, and an index of 800 represents absolutely dry conditions, this is referenced in chapter eight. The Palmer Drought Severity Index and the Standardized Precipitation Index was also consulted.

Avalanches

The Medicine Bow National Forest experiences avalanches almost every year. In the last twenty five year period, two deaths have been reported from avalanches within Albany County. Overall Wyoming ranks fifth among the eight states with the most avalanche fatalities. The following website provided an accident database for avalanches, http://avalanche.org. Avalanches risk people's lives and structures in Albany County.

Man/Made Terrorism

Albany County is considered to be a low risk for potential man-made and terrorism threats, but the possibility is always present. The overall impact could be detrimental for Albany County. The possibility exists due to Albany County's location on I-80 and the railroad as well as the University of Wyoming being located in the jurisdiction of Laramie.

DISASTER MANAGEMENT

There is no consideration of an interoperable mobile communications (radio) system or for a redundant emergency communication facility (fixed and mobile). Wyolink is in the works in Albany County, which should be fully functional in the community by summer 2010.

Also a fully functioning emergency operations center (EOC) is necessary for the county. Albany County does not have a functioning EOC or alternate communications system, which can be an issue especially when considering communications for wildland fires, or any critical incidents (natural or manmade) that call on outside resources (police, fire, EMS, etc.). These issues have been discussed at length over the years and would certainly be beneficial in the event of almost any of the described hazardous events. The Laramie Fire Department is building a new fire station that will house a permanent EOC for Albany County. The facility will need to be fully equipped for operation, grant money will be sought out to assist. The communications system is gradually improving with the implementation of CodeRED and WYOlink.

The Public Entity Risk Institute has not recorded any presidential declarations for Albany County.

HAZARD RISK ANALYSIS

Based on the history and potential future of hazards in Albany County, the LEPC and public have selected the following to be addressed in detail of this plan: winter storms and blizzards, hazardous materials, wildfires, lighting, hail, droughts, earthquakes, floods, dam failures, landslides, mine subsidence, wind, avalanches and tornadoes. Hazards that were not addressed further were those considered unlikely to occur in the next 100 years or those that have not been shown to have a historical impact on life safety and property.

The following hazards are ranked according to the risk to people and property for each hazard. At the end of each of the following hazard specific chapters there is a summary of the risk to people and property for each hazard.

- **High:** The ranking carries the highest threat. The potentials of these threats occurring in Albany County are a matter of "when" not "if". Hazards in this category have already occurred in the past or are likely to occur.
- **Medium:** This ranking carrier a moderate threat level to Albany County. The potential for damage is more isolated and less costly than those categorized as a high threat.

- **Low:** This is the lowest ranking for the hazards in this plan. The occurrence is considered minimal.

Estimates of potential losses were developed based primarily upon HAZUS info and flood plain maps, also considering historical occurrence info. Reference was also made to Keetch-Bryon Drought Index, Palmer Drought Severity Index, Standardized Precipitation Index, The U.S. drought monitor, Heat Index Charts, Torro Hailstorm Intensity Scale, Beaufort scale, Flash Density Maps, Enhanced Fujita Scale and the KBDI Fire Danger Rating system. The narratives in the hazard assessment chapters provide information on future impacts for each hazard including potential losses when possible.

CHAPTER IV. WINTER STORMS AND BLIZZARDS

Severe winter storms and blizzards are the most common hazards in Albany County and can occur in ten months of the year, while snow can occur in all of the months of the year. "Blizzard conditions" occur when strong winds (at least 35 mph) combine with either falling snow or snow on the ground to reduce visibilities to 1/4 mile or less for at least three hours. These severe winter storms impact work and travel while isolating communities and killing livestock.

HISTORY

The winter storm history in Albany County extends from 1886 to present. The data was derived from the Monthly Storm Data reports from National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (NCDC). Other sources were found in newspaper accounts and periodicals from Albany County Public Library.

TABLE 4.1 SEVERE WEATHER EVENTS 1949-PRESENT

Year	Month	Event	Location	Damage/Effects	$$$$$
1886		Blizzard	Statewide	The winter of 1886-1887 was the earliest severe economic disruption. The snow that winter came early and grew. A freak thaw turned much of this snow into water. As cold weather moved back in, this froe into a crust of ice, which prevented cattle from getting through to the forage underneath. These conditions, accompanied by blizzards of unusual severity, caused a loss of over 50 percent among the State's livestock operations. The snow was six feet deep on the level between Mountain Home and Woods Landing. Trains were stalled on their tracks.	Loss of 50% of livestock operations
1888	January	Blizzard	Statewide	This blizzard covered a number of states. The combination of strong winds, snow and rapid temperature drops made it very dangerous. Loss of life was great and thousands of cattle died.	
1931	March	Blizzard	Statewide	This blizzard covered several states. Temperatures dropped rapidly. Strong winds drifted snow badly, blocking highways for several days. Two people died in Wyoming.	2 deaths
1949	January	Blizzard	Eastern and Central Wyoming	This is the most significant blizzard in Wyoming's history. Snowfall measured up to 30 inches, with drifts 20 to 30 feet high. Within 24 hours all road, bus and railroad traffic was halted. Thirty-three hundred miles of state highway lay in the storm area; there was an estimated loss of 15% of the State's cattle. Seventeen people perished, along with 55,000 head of cattle and more than 105,000 sheep. "It is estimated from reports of field men that 4,194 people received aid through the Interior Department operations; that 104,839 cattle and 421,479 sheep were relieved. A total of 12,894 miles of roads and feed lanes were opened; 1,457 tons of food, fuel, and other supplies were hauled over opened roads." The total economic loss was estimated at over $9 million.	17 deaths

1950	March	Blizzard	Statewide	Heavy snow and strong winds covered much of several states; including Wyoming. Snowfall up to 60 inches fell in Wyoming. There was widespread damage to power lines and many cards and trains were stranded. Drifts were up to 16 feet deep.	1 death
1961	May	Blizzard	Albany County	Over one thousand people stranded on highways and in Laramie	
1955	February	Blizzard	Statewide	Up to 11 inches of snow fell with winds to 65mph and temperatures below zero.	4 deaths
1957	March	Snow Storm	Statewide	Heavy Snowfall, drifts were from 10 to 25 feet deep and many motorist were trapped in card or snow bound in towns.	
1961	October	Winter Storm	Statewide	Snow accompanied by high winds began early afternoon and continued throughout the evening. Three people were killed and four were injured in auto accidents caused by low visibility. Two hunters were lost and died in the storm. Over one thousand people stranded on highway and in Laramie.	5 deaths and $27,500 in damages
1962	January	Cold Snap	Albany County	Temperatures dropped from -36 to -44	
1963	January	Cold Snap	Laramie	Laramie reached its coldest temperature ever at 50 below	
1965	September	Winter Storm	Statewide	A cold wave moved over the state the evening of the 15th and caused considerable damage to crops, trees, and power and phone lines, stopped much of the transportation by closing roads, caused an estimated 5% shrinkage in marketable livestock and a few losses in livestock.	$21,739.13 in 1965 $ and $150,725.44 in 2008 $
1968	April	Blizzard	Southern half of Wyoming	Roads, UP and schools closed for three days in Albany County	3 deaths
1985		Avalanche	Med. Bow National Forest	Avalanche in Medicine Bow National Forest, a skier was killed	1 death
1973	March	Winter Storm	Statewide	The community was covered with 13.8 inches of snow. There were numerous power and communications outages as well as livestock losses. The National Guard opened roads for emergency vehicles.	$275,000
1973	December	Winter Storm	Albany County	11 consecutive days with temperatures below zero	
1975	March	Blizzard	Statewide	A severe blizzard with winds 40 to 50 mph and gusts to 75mph, snow and temperatures down to o degrees. Most damage was to livestock, especially new born.	$2,750,000
1976	January	Blizzard	Most of Wyoming	Heavy snow with strong winds. Livestock losses were minimal and most of the damage is attributed to loss of time, cars stuck, rescue missions and snow removal	$275,000
1977	November	Snow Storm	Wyoming	Snow with large accumulations entered the state followed by heavy winds. Lots of people were stranded due to the closed roads.	1 death
1978	December	Snow Storm	Statewide	A very heavy snowstorm dumped over a foot of snow followed by winds gusting to over 75mph caused extensive blowing and drifting of snow. Isolated livestock and caused losses.	$275,000

1979	January	Snow Storm	Statewide	Numerous heavy snow storms and extremely cold temperatures have caused widespread damage across the state. Estimated loss of 2700 sheep and 2000 cattle with projected losses of calves and lambs to 35,000 head are reported. Extensive damages to water systems due to frozen water mains. Winter Storm Relief Act of $2.5 million requested.	$21739.13 in 1979 $ and $64,595.98 in 2008 $
1980	January	Snow Storm	Statewide	Interstate 25 from Laramie to Utah was closed by winds approaching 80mph. An estimated 60 vehicles were in the ditch a long I-80 west of Rawlins. Reported 90 mph winds in Medicine Bow. Several schools closed	4 deaths
1980	October	Blizzard	Statewide	Heavy snow and blizzard like conditions. Several vehicle accidents, one plane crash and a freight train plowing into the back of a grain train killing two crew members. Schools were closed throughout most of the state.	4 deaths
1983	April	Winter Storm	Laramie	18.1 inches of snow fall	
1983	November	Winter Storm	Statewide	The greatest damage occurred to homes and businesses as hundreds of water pipes froze and burst. 16.4 inches of snow fall in Laramie Wyoming.	$2,750,000
1988	March	Winter Storm	Laramie	The community was covered with 10 inches of snow	
1990	March	Blizzard	Laramie	14” Shelter set up for 250 clients due to closed roads	
1992	December	Winter Storm	Laramie	Bitter cold temperatures -20 at Laramie	
1994	February	Winter Storm	Southern Wyoming	Seven inches of snow combined with 35mph gusts cased over 40 automobile crashes around Cheyenne and Laramie.	
1996	January	Blizzard	Albany, Carbon and Laramie Counties	Widespread blowing snow created near zero visibilities over the south central part of the state. Interstate I-80 was closed to and from Laramie	
1996	October	Blizzard	Albany, Carbon, Platte, Niobrara and Laramie Counties	The snow and winds closed many roads in the area. The heaviest snowfall way in the Laramie Mountains and Snowy Range, where 12 to 18 inches of snow were reported. The combination of snow and wind created many power outages across the South eastern part of Wyoming.	$20,000 in 1996 $ and $27,368.39 in $2008 $
1997	April	Winter Weather	Albany	Winter weather storm came through Albany County	$714,285.71 in 1997 $ $952,380.95 in 2008 $
1997	October	Blizzard/Ice	Albany and Carbon County	An accident near Laramie involving a bus injured at least 30 people. Icy conditions created a 20 mile long back up of traffic headed westbound on I-80 near the summit rest area between Laramie and Cheyenne. Postal delivery services were shut down in Cheyenne, the first time in fifteen years damages in crops as well.	1 death and 30 injuries, $100,000

1997	December	Winter Storm	Albany	Winter storms caused several accidents and 18 people were injured and one death.	$50,000 in 1997 $ 66,666.67 in 2008 $
1998	October	Blizzard	Albany, Carbon and Laramie Counties	I-80 closed with white out conditions, Buford also experiencing complete white out conditions.	$56,250.00 in 1998 $ and $74050.18 in 2008 $
1999	December	Blizzard	Albany	Four injuries and one fatality	$45,000 in 1999 $ and $58,500.06 in 2008 $
1999	March	Winter Storm	Albany	Winter storm came through the county creating accidents and utility shutdowns.	$25,000 in 1999 $ and $32,500.03 in 2008 $
2000	September	Blizzard	Laramie	Roads closed and shelters were opened. I-80 closed due to numerous wrecks.	$100,000
2001	April	Blizzard	Laramie	Roads, Businesses and Government offices closed	
2002	December	Avalanche	Snowy Range	Snowmobiler was killed	1 death
2003	March	Blizzard	Albany, Carbon, Converse, Goshen and Platte Counties	Laramie had two feet of snow, wind gusts to 50mph with drifts	$100,000
2005	June	Snow Storm	Laramie	Late snow storm caused broken branches and downed power lines	
2007	February	Snow Storm	Laramie	Albany County EMA opens shelter for 90 students stranded	

The snow, ice, and extended periods of cold associated with winter storms could potentially affect Albany County's infrastructure. For example, heavy snow and ice precipitation could shut down county transportation systems. Blocked roads and railroads could result in the county being shut off from supplies, of food, water, fuel, medical supplies and emergency services.

County power and communication systems could also be compromised due to winter storms. Power and phone lines could freeze or be knocked down. Lack of electricity and communication services could further hinder residents' ability to sustain them throughout a storm.

Stranded motorists and people unexpectedly caught outside in winter storms risk hypothermia, starvation, and even death without adequate shelter, food, and water supplies. Search and rescue teams and emergency medical services could be strained by attempts to rescue such people. Winter storms could also cause structural damage to county buildings and residences. Heavy snow loads can collapse roofs and extreme cold temperatures can freeze water pipes.

Albany County has large ranching communities and wildlife populations that may also be impacted by severe winter storms. Freezing streams can make water supplies scarce for both livestock and wildlife. Heavy snowfall could hinder both the animals' ability to find food and ranchers' attempts to bring food to their livestock. Finally, without adequate shelter, prolonged exposure to cold and wet conditions could ultimately result in loss of life.

Avalanches are also a possibility. The two main mountain ranges in Albany County are the Laramie Mountains in the eastern part, and the Snowy Range Mountains to the west. Each receives large amounts of snowfall, making the County susceptible to avalanches. According to the Colorado Geological Survey, avalanches in Albany County include one person's death in 1985, and one in 2002 with a snowmobiler buried and killed on the west side of the Snowy Range. Avalanches are discussed further in Chapter sixteen. The county can educate people about the risks of unstable snow and proper gear to have while in high country.

Finally, flood events may result from winter storms if warm temperatures cause large snow packs to melt quickly.

IMPACTS

Winter storms usually affect a significant part of the state of Wyoming and are thus difficult to describe regionally. In 2004 the statewide impact was $400,972,900. The actual statewide impacts are much greater because of the effects on transportation and because of loss of life and injuries. It is estimate the county impact is 18,000,000 yearly.

FUTURE IMPACTS

Based on the history of winter storms and blizzards in Albany County, we can guarantee that these storms will continue to affect the county on a regular basis. Life safety will continue to be a concern with the I-80 and US 287-US 30 corridors traveling through the county. Winter storms often strand motorists and contribute to multi-vehicle pileups. The isolation of towns across Albany County is also a concern when roads are closed.

SUMMARY

PROPERTY AFFECTED: Medium
POPULATION AFFECTED: High
PROBABILTIY: High
JURISDICTION AFFECTED: Both the Jurisdictions within the county are affected as well as other outlining communities.

CHAPTER V. HAZARDOUS MATERIALS AND WASTE

Hazardous wastes are discarded materials with properties that make them potentially harmful to human health or the environment. Hazardous wastes can include things such as chemicals, heavy metals, or substances generated as byproducts during commercial manufacturing processes, as well as discarded household products like paint thinners, cleaning fluids, and old batteries. Hazardous wastes can be in the form of liquids, solids, contained gases, or sludge's. Much of this hazardous material is stored in landfills or other containment areas. If these hazardous waste sites are not properly designed or managed, their contents can be released into the surrounding environment, posing a threat to public health. To address this issue, the NIEHS has created a Hazardous Waste Worker Training Program (HWWTP) to support the safety and health of workers engaged in activities related to hazardous waste and chemical emergency response.

The U.S. Department of Transportation, U.S. Environmental Protection Agency, and the Occupational Health and Safety Administration all have responsibilities in regards to hazardous materials and waste. The definitions and responsibilities of these two agencies are described below.

The U.S. Department of Transportation has control over hazardous materials that are transported. They define hazardous materials as "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 as hazardous under section 5103 of Federal hazardous materials transportation law (49 U.S.C. 5103)." The U.S. Department of Transportation has nine classes of hazardous materials:

1. Explosives
2. Gases
3. Flammable Liquids and Combustible Liquids
4. Flammable Solid, Spontaneously Combustible, and Dangerous when Wet
5. Oxidizer and Organic Peroxide
6. Poison (toxic) and Poison Inhalation Hazard
7. Radioactive
8. Corrosive
9. Miscellaneous

The U.S. Environmental Protection Agency also has responsibility for hazardous materials that have the potential to be released into the environment through facilities. The Environmental Protection Agency (EPA) addresses through the Resource Conservation and Recovery Act (RCRA), the need for facilities with hazardous waste substances to store the materials in approved containments. Hazardous waste regulations appear in Title 40 of the Code of Federal Regulations.

The EPA tracks chemical releases by state and county as well as waste transfer reports. Albany County has gone from releasing 115,301lbs in 2003 to 66,634lbs in 2007, the last available data. The releases in Albany County are all from the Mountain Cement Plant, located in Laramie, Wyoming. The epa.gov site tracks all onsite and offsite disposal and release of hazardous chemicals. **Table 5.1** below shows air emissions 2002-2007 in Albany County. These numbers represented pounds. No waste transfers were found to be conducted in Albany County.

Table 5.1 EPA Chemical Releases 2002-2007 Albany County

Year	Fugitive Air	Stack Air	Total Air Emissions
2002	0	65,869	65,869
2003	0	66,596	66,596
2004	0	67,105	67,105
2005	66	63,673	63,739
2006	58	64,607	64,665
2007	58	66,391	66,448

The Emergency Planning and Community Right to Know Act (EPCRA) require regulated entities to report information about hazardous chemicals and substances at their facilities to Federal, State, and Local authorities. The objective is to improve the safety of stored hazardous chemicals and to reduce the threat of chemical emergencies within the facility. This act also provides citizens with access to chemicals that are present within their communities. "Part of EPA's mission is to ensure that Federal facilities comply with these requirements. Sections 301 and 303 EPCRA mandate the creation of two organizations; the State Emergency Response Commission (SERC) and the Local Emergency Planning Committee (LEPC). Sections 311-312 of the EPCRA require facilities to submit material safety data sheets or Tier II forms (lists of hazardous chemicals on site above threshold quantities) to SERC's, LEPC's and local fire departments." These are submitted yearly and kept on file for first responders and the public to access.

HISTORY

Albany County has Interstate 80 as a major transportation route that crosses the southern part of the County. Transportation accidents on Interstate 80 are a significant hazard. Many trucks are now transporting hazardous materials across the county. Additionally, Interstate 80 crosses the Casper Aquifer, which is a major source of drinking water for residents of Laramie and Albany County. Transportation accidents in the vicinity of the Casper Aquifer have the potential to contaminate the drinking water supply. Accidents involving the railroad, pipelines, and other vehicles also have the potential to contaminate the streams, underground water levels, the land, and the air.

Several underground pipelines transport various products including natural gas, diesel fuel, fuel oil, gasoline, and crude oil across the county. Companies such as Conoco Pipeline, the Kaneb Pipeline, Kinder Morgan, Sinclair Pipeline, Williams Pipeline, and Colorado Interstate Gas, have pipelines throughout the county ***(FIGURE 5.1***). Potential leaks could cause problems. All pipelines have markers indicating where the pipelines are, and this is to ensure that pipelines are not damaged by digging or other accidents. Those that live near a pipeline should use sight, smell, and sound to make sure the pipelines are not leaking. A listing of pipelines in Albany County is included in Appendix E.

In recent years, there have been increases in number of hazardous materials spills in the county. Since 1992 Albany County has experienced numerous spills on highways and railroads. Histories of shipments for both Interstate 80 west and eastbound and Hwy 287 from the past three years can be received upon request. Other roads in Albany County did not have significant amounts of hazardous materials transported on them.

Union Pacific is the major railroad that travels through Albany County. Data records show that for year 2001, there were 36,789 plaque carded railroad cars that traveled through Laramie. There were also 42,779 plaque carded intermodal loads (truck trailers riding on a flatcar), for a total of 79,568 plaque carded loads of hazardous material through Laramie in 2001. For 2002, as of October 30, 2002, there have been 29,632 carloads, and 32,013 intermodal loads, for a total of 61,645 plaque carded loads through Laramie. In the years ranging from 1992 through 2000 there have been at least 7 derailments in the county. Derailments involved spills of cement, phosphorus, sulfuric acid, and 3000 gallons of corrosive herbicide. In 1995 there was one death due to a derailment.

The University of Wyoming has over 400 chemical laboratories that contain many types of chemicals, each in mostly small quantities. The approximately 30 laboratories using radioactive materials have placards on the doors and signs within the laboratory identifying the location where radioactive materials are used and stored. Radioactive materials are used in small quantities at UW and are considered low risk to emergency responders in the event of unintentional releases.

Of the laboratories, approximately 50 also conduct biological research. Few of the biological materials studied at UW are infectious. Biohazard signs mark infectious materials storage areas and waste containers. All wastes marked as bio-hazardous are decontaminated before disposal. One laboratory studies indigenous wildlife diseases and is designated for study of “select agents.” The federal government requires all such select agent laboratories to adopt high security procedures and provide secure facilities, and UW has done this.

The USDA Arthropod Borne Animal Disease Research Laboratory (ABADRL) biological containment building is used to study certain wildlife diseases that are spread by biting insects. Some disease organisms studied at this facility are considered to have serious consequences in the case of a laboratory infection or if released into the wildlife populations. Therefore the facility, and personnel and experimental procedures used at this facility are trained to minimize uncontrolled release of biological materials.

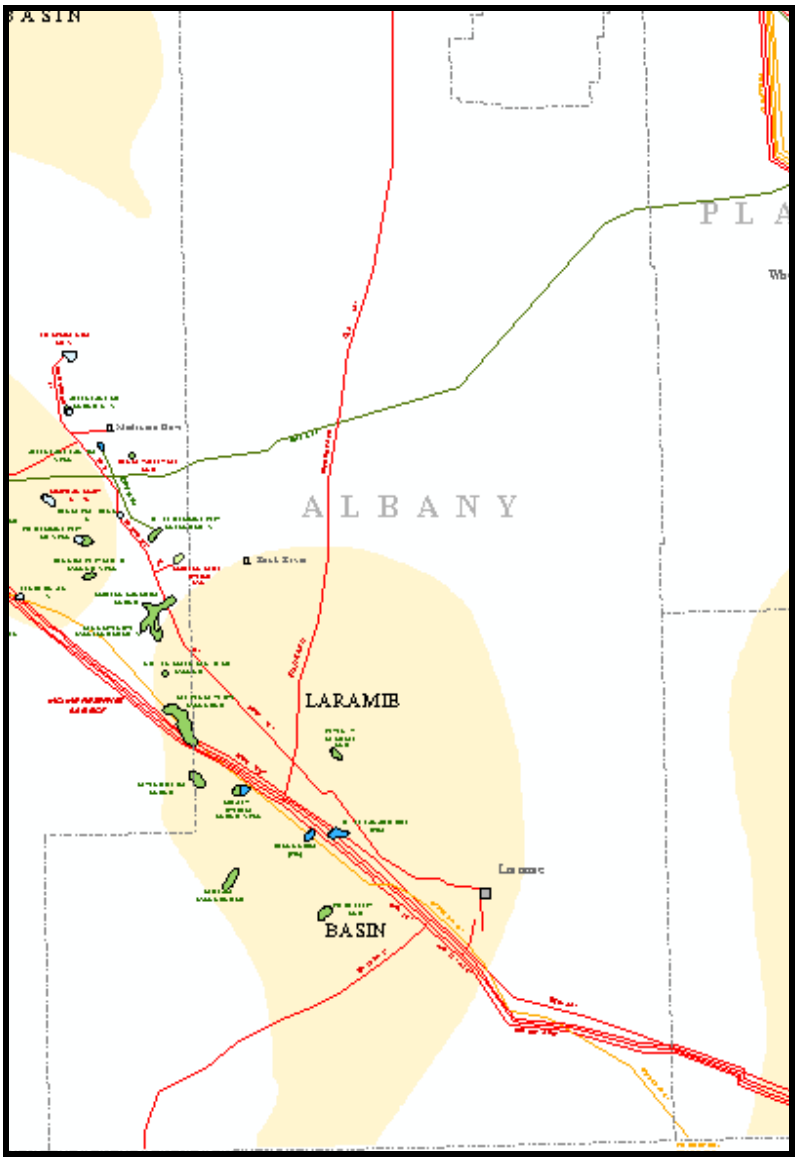
The University has prepared additional security plans and other procedures to meet the new requirements of the new Select Agent Regulation 42 CFR 73. The University's Emergency Response Plan was completed in 2004 which outlines three plans to deal with security, emergency incidents, and bio safety.

Another threat to Albany County is Coastal Chem. Inc. now renamed Dyno Nobel, located in Cheyenne, Wyoming. It manufactures industrial and agricultural nitrogen based products. These products include Anhydrous Ammonia, Ammonium Nitrate Prill (HiDAN and LoDAN), Ammonium Nitrate Liquid (83%), Urea Prill, Urea-Ammonium Nitrate Solution, and Carbon Dioxide. The facility also produces two petrochemical products, Methyl-Tertiary-Butyl-Ether (MTBE) and Methanol. All of these products are shipped from the facility by both truck and rail and have the potential to pass through Albany County.

Table 5.2 Hazardous Events from 1975-current

YEAR	MONTH	EVENT	LOCATION	DAMAGE/EFFECTS	COST
1975		Derailment/fire	Tie Siding	Phosphorus spill	
1979		Spill	Laramie	Insecticide	
1980		Spill	I-80 W. Laramie	Insecticide	
1992		Derailment	South of Laramie	Union Pacific	
1992	January	Derailment/Spill		3000 gallons of corrosive herbicide	Laramie River Banks Contaminated
1993		Spill	Fosters	200 gallons of diesel fuel	Contaminated river
1995	November	Derailment	5 Miles S. Laramie	Had to evacuate residents to shelters	1 death
1996		Derailment/ Spill	South of Bosler	Sulfuric Acid spill	
1998	July	Derailment	Bosler Area	22 cars off track	2 deaths
2000	June	Derailment	Mountain Cement	Cement Ruined	

2000	June 29th	Spill	High Country Sportsman	160-160 gallons of diesel fuel	
2001	July	Spill	S. of Laramie	Bridge Collapse	Spill in Laramie River
2001	August	Spill	5th and grand	Cleaning fluid from dry cleaners	
2001	January	Spill	I-80 mile 317	200 gallon diesel fuel	



FIELDS

New fields are spotted through September, 2001. Field boundaries are approximate; dashed boundaries through some fields in the Powder River Basin indicate projected extent of overlying coalbed methane development in Tertiary rocks.

FRENCHIE DRAW Tfu KI

Names in green denote fields that primarily produce oil. These fields may produce significant associated natural gas along with the oil in the primary reservoir or nonassociated natural gas from secondary reservoirs.

HARTZOG DRAW (W) Ksh

Names in red denote fields that primarily produce natural gas. These fields may produce significant condensate along with the natural gas in the primary reservoir or oil from secondary reservoirs.

HARTZOG DRAW (W) Ksh

Names in red denote fields that primarily produce natural gas. These fields may produce significant condensate along with the natural gas in the primary reservoir or oil from secondary reservoirs.

PIPELINES

Notation includes operator (see abbreviations below) and pipe diameter in inches; proposed pipelines are dashed. Pipeline routes are plotted as accurately as possible and are only accurate within the scale of this map or maps of smaller scale. Most infield gathering systems are not shown.

PLATTE 12" — Crude oil

MGTC 10" — Natural gas

CHEVRON 16" — Carbon dioxide

CONOCO 4" — Refinery or natural gas processing plant products

Figure 5.1 Field Boundaries for pipelines in Albany County

IMPACTS

From 2004 to May of 2009 the Region three RERT (Regional Emergency Response Team) has been activated eight times. Region three has already been called upon in 2010 and the K-9 unit out of Rawlins is used frequently. These activations were for biological cleanup, hazmat cleanup, fire, crashes, and once for a criminal situation. There is not readily available data on response and cleanup costs. It is estimated that the costs are thousands of dollars each year.

FUTURE IMPACTS

Hazardous materials and spills do and will affect Albany County. Presently I-80 is designated as a corridor for radioactive shipments. A map showing the distribution of Risk Management Plan facilities is below; Albany County does not have any facilities that pose a great risk to our communities.

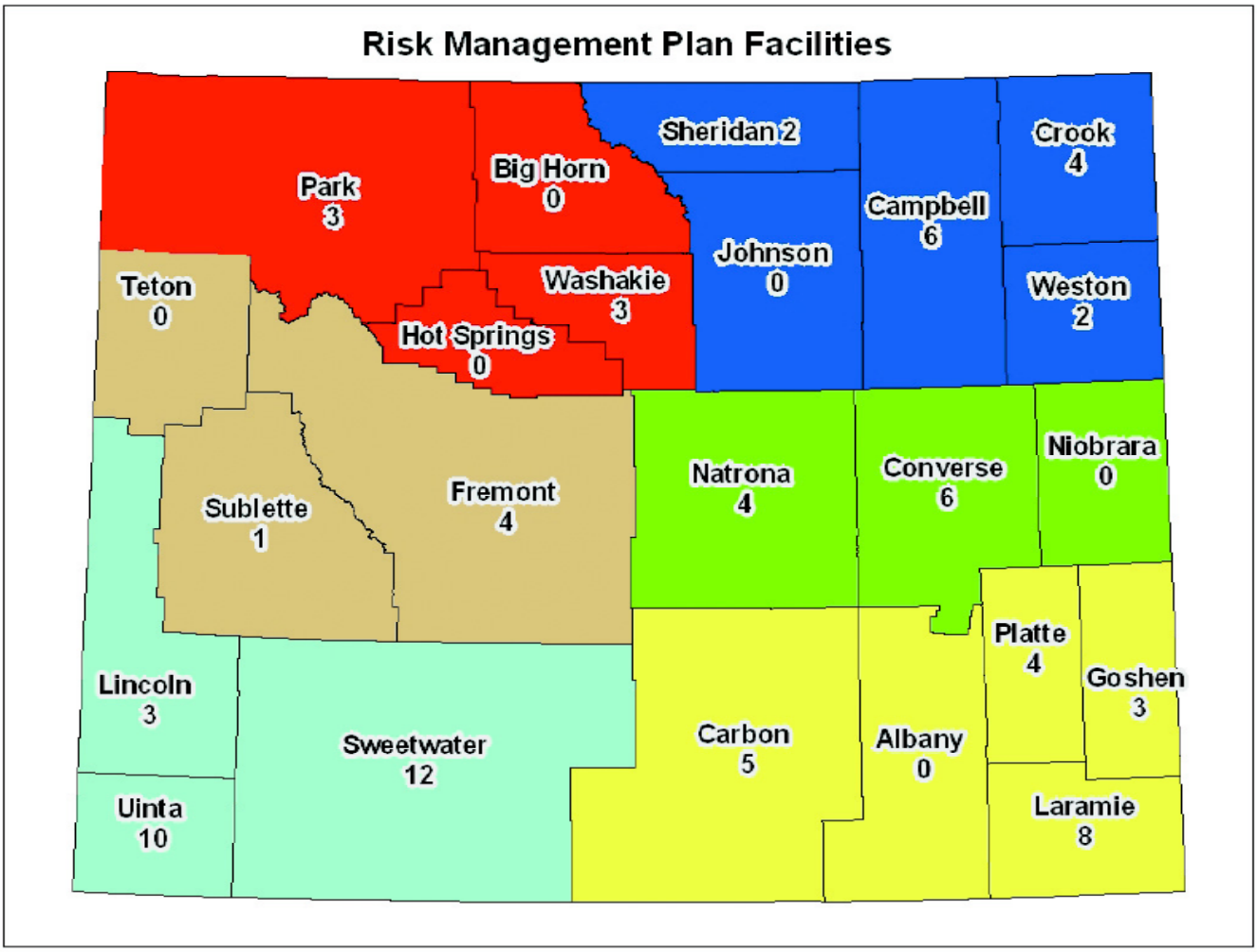


Figure 5.2 Risk Management Plan facilities in Wyoming

SUMMARY

PROPERTY AFFECTED: Low
POPULATION AFFECTED: Medium
PROBABILITY: High
JURISDICTION AFFECTED: Medium, mostly the jurisdiction of Laramie.

CHAPTER VI. WILDLAND FIRES AND FIRES

Albany County has a semi-arid climate and is very rural in character leading to a greater chance for wildland fires. The county has heavy fuel continuity across forested areas, coupled with a history of wind driven fires. The National Interagency Fire Center (NIFC) defines a wildland fire as a "non-structure fire, other than prescribed fire, that occurs in the wildland." Albany County has over forty-five forested wildland urban interface communities, with over 1,050 cabins and home sites comprised of mostly intermittent residents.

Both the Snowy Range and the Laramie Mountains are included in the Medicine Bow National Forest. Wildland fires often occur in the forest, especially in the summertime. The wildland fire potential increases during years when there are below average amounts of winter snowfall or spring and summer rainfall. Albany County forests are currently infested with the mountain pine beetle. Pine beetle causes timber mortality, providing more fuel for potential fires. The pine beetle infestation leads to a greater risk for fueling these wildland fires and threatening the growing home population in the Medicine Bow National Forest. As the population and the wildland urban interface increases, so does the risk of wildland fire as a hazard to these structures. Climate change has also increased the fire seasons with fires starting earlier and the season lasting longer. Wildfires are an ever present hazard in Albany County as well as across Wyoming.

Albany County has been working closely with the Fire Warden, Forest Service and volunteer fire departments to work on reducing vegetation that acts as fuel. Education efforts have been made to encourage private owners to clear their land of dead standing trees in an attempt to mitigation fuel sources if and when fires start in the Medicine Bow National Forest. Albany County EMA and the Fire Warden have been developing evacuation plans for those communities located in Medicine Bow National Forest. These plans should be completed by summer of 2010 with annual updates being made. The initial portions of these plans are included in appendix D.

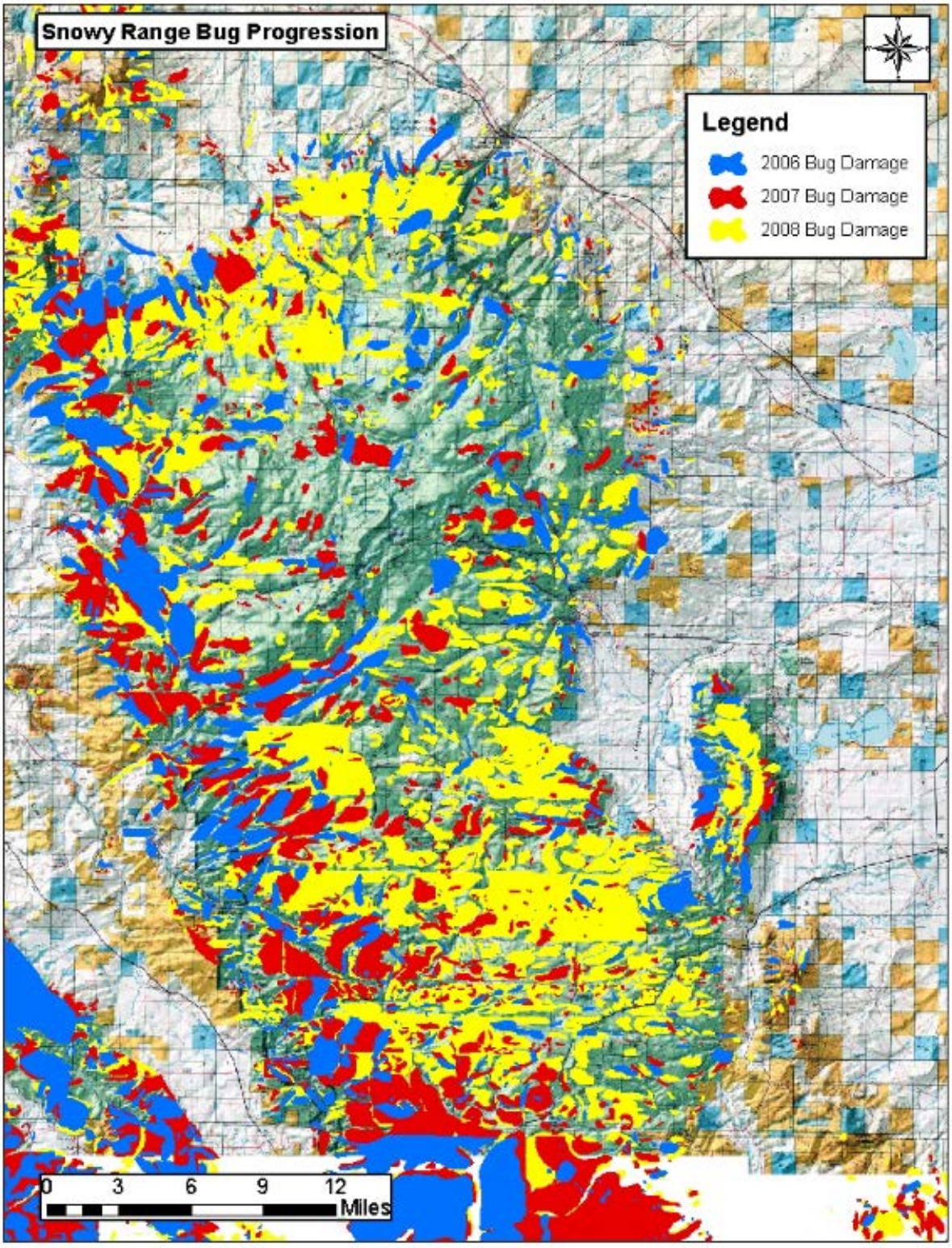


Figure 6.1 Map of Pine Beetle Infestation

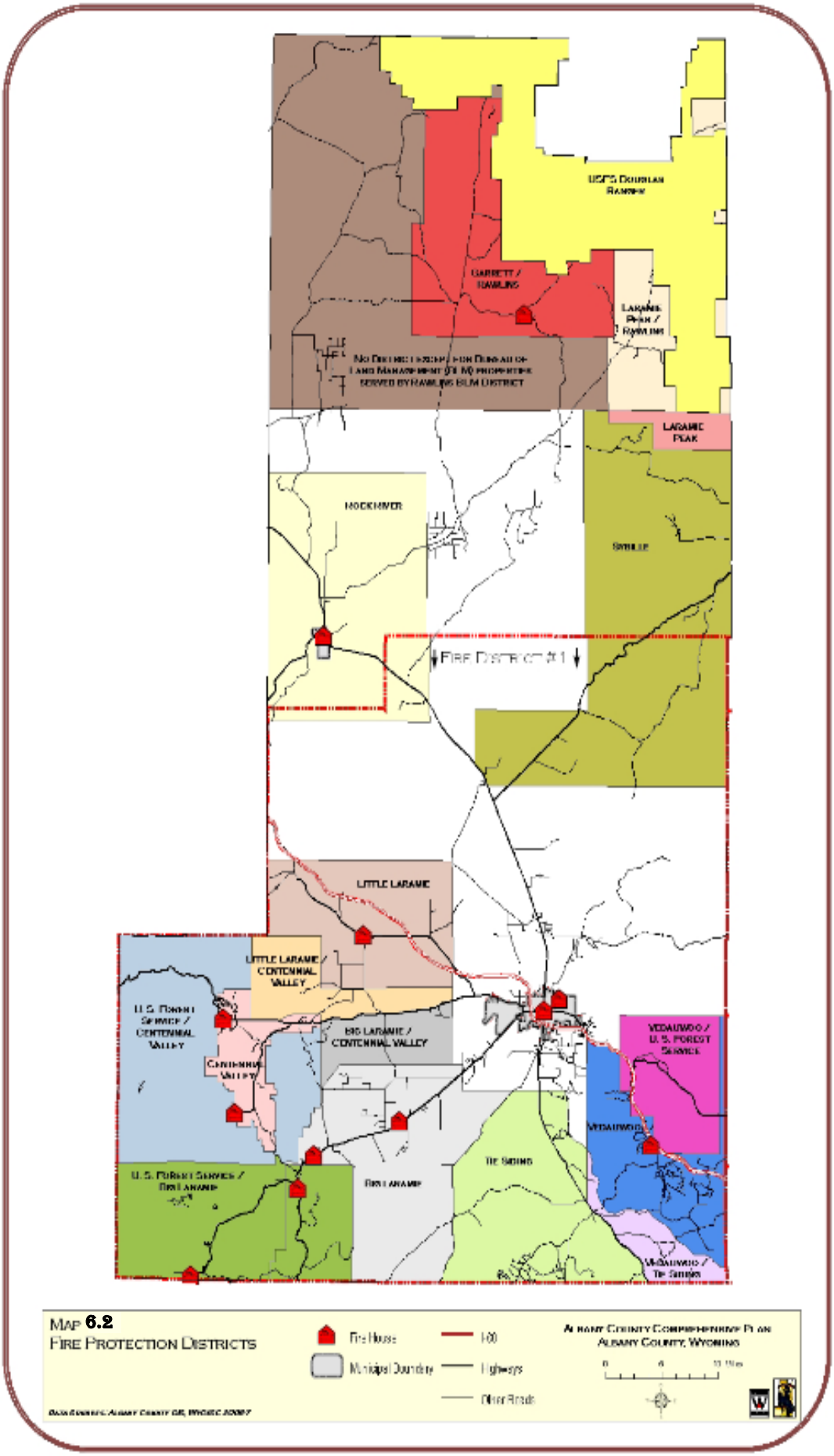
In the recent past Albany County has experienced severe drought conditions making wildland fires even more of a reality. See **Figures 6.3 & 6.4** for Albany County's wildland fire hazard levels. **Table 6.3** gives the exposure value for each census block in Albany County.

Wyoming wildland fires are managed and supported to varying extents through cooperative efforts by the:

- Albany County Fire District #1
- Albany County Fire Warden
- Bureau of Land Management
- Geospatial Multi-Agency Coordination
- Wyoming Fire Academy
- Wyoming Wildland Fire Plan Action Team
- National Park Service, Fire Management Program
- US Fish and Wildlife Service, Fire Management Branch
- National Interagency Fire Center
- Bureau of Indian Affairs, Fire and Aviation Management
- USDA Forest Service, Fire and Aviation Management
- Wyoming State Forestry Division
- Local City and Rural Fire Departments

Location	**Approx # of Volunteers/Paid**	**Capabilities**	**# of Apparatus**
Big Laramie	30 volunteer	Wildland, limited structure, and limited EMS	10 engines
Centennial	20 volunteer	Wildland, structure, and EMS	8 engines
Garrett	7 volunteer	Wildland	2 engines
Laramie	44 paid	Extrication, structure, wildland, hazmat, S&R, and medical response	8 engines+ hazmat trailer
Laramie Peak	16 volunteer	Wildland	13 engines
Little Laramie	20 volunteer	Wildland	3 engines
Rock River	14 volunteer	Wildland, Structure, EMS	5 engines
Sybille	15 volunteer	Wildland	10 engines
Tie Siding	9 volunteer	Wildland/Urban Interface	1 engine
Vedauwoo	16 volunteer	S&R, Structural, Wildland, Medical Response, Extrication	8 engines

Table 6.1 County Fire Divisions


USFS Douglas Ranger
Garrett / Rawlins
Laramie Peak / Rawlins
No District Assigned for Bureau of Land Management (BLM) properties served by Rawlins BLM District
Laramie Peak
Hockmeyer
Wheatley
Fire District #1
Little Laramie
Little Laramie / Centennial Valley
U.S. Forest Service / Centennial Valley
Big Laramie / Centennial Valley
Centennial Valley
Vedauwoo / U.S. Forest Service
Vedauwoo
Tie Siding
U.S. Forest Service / Big Laramie
Big Laramie
Vedauwoo / Tie Siding
Map 6.2
Fire Protection Districts
Fire House
Municipal Boundary
I-80
Highways
Other Roads
Albany County Comprehensive Plan
Albany County, Wyoming

The communities and the County work together on most of the wildland fires, sharing fire stations, apparatus, volunteers, and equipment. In addition to local resources, Wyoming Division of Forestry, the Bureau of Land Management (BLM), and the Forest Service (FS) fight fires in the County, either assisting local resources in the case of the state, or having primary responsibility on federal lands. The County has a Fire Warden, an Assistant Fire Warden, and Albany County Fire District #1. The County Fire Warden is in control of the northern portion of Albany County and monitors Garrett, Laramie Peak, and Sybille Volunteer Fire Departments. Fire District #1 monitors and assists the southern half of the county including, Big Laramie, Centennial, Laramie, Little Laramie, Rock River, Tie Siding, and Vedauwoo departments.

HISTORY

The Wildland fire history for the state of Wyoming has been compiled in the Wyoming Multi-hazard Mitigation Plan from various state and federal resources. Unfortunately the data does not provide detail to the county level; as a result there is not an accurate estimate on all wildland fires in the County. Table 5.2 lists wildland fires in Albany County starting in 1960. Due to inconsistent reporting/recording of types of fires some wildfires may be missing from the table. Albany County has a history of high fire occurrences with frequent large fires in the Laramie Peak area and fire occurrence in other geographical areas to be low to moderate.

Date	Location	Estimated Property Damage	Information
1-Sep-60	Near Keystone		350 acres burned
1980	Fireworks Stand on 287	4 deaths	explosion
12-Nov-91	Johnson Ranch	$100,000	Propane Explosion
1995	15th and Bill Nye		Brush Fire
1995	UBC		Brush Fire
7-Aug-96	Bear Creek, N. Albany County		5-7 thousand acres burned with 6 buildings
1996	Vee Bar Ranch		Wildland fire
1996	Roger's Canyon		Wildland fire
Jun-00	Medicine Bow NF		5 Acres Burned
2001 June	Bill Nye, Sherman Hills		Grass Fire
2001 July	Eagle Cliff on Pole Mountain		Forest Fire
2001 July	Leroy Forest Fire		5,600 acres burned
2001 Sept.	Lightning Fire Harmony		100 acres burned
1-Oct-01	Rock River Rancher's Supply	Total loss of business	Propane Leak–fire/explosion
Apr-02	Laramie		Grass Fire from Fireworks, several acres

			burned
Apr-02	Simon Ranch, Hwy 230		25 acres burned
Apr-02	Storage Unit, Laramie	$1,500	2 juveniles burned structure damage
10-Aug-03	US 287		Grass fire started by train
1-Jan-04	Osprey Road		Hay bales, started by wood stove sparks
4-Jun-04	Mason Lane		Small Hay Fire
4-Aug-04	US 287		Tree hit by lightening
17-Jul-05	Buford	2 Acres damaged	Lightening strike
22-Jul-05	Hwy 230	1 acre	One injury
31-Jul-05	US 287		Lightening strike
11-Aug-05	Sodergreen		Lightening struck tree
11-Sep-05	Somber Hill	1 acre	Fire started by lightening
7-Oct-05	Veadauwoo	3-5 acres	Fire started by lightening
2-Apr-06	Lewis Road	50-100 acres	One injury
19-Jun-06	Fox Creek	$1,700,000	Isabelle Fire
22-Jun-06	Hwy 230		Campfire started tree on fire
15-Jul-06	Happy Jack Road	50 acres	BLM assistance, fire started by fireworks
17-Jul-06	Sodergreen		Lightening struck tree
26-Jul-06	Fox Creek		Fire started by lightening
26-Jul-06	Track Road		Small Grass fire
27-Jul-06	US 287	1/2 acre	
28-Jul-06	Rogers Canyon	1 acre	Fire started by lightening
13-May-07	USFS Road 703C		Fire started by lightening
9-Jul-07	USFS Road 523B		Fire started by lightening
25-Jul-07	I-80		Small fire started by lightening
20-Aug-07	Hart Road		Small Hay Bale
21-Jun-08	Jelm		Small Grass fire
3-Jul-08	1 FS 701B		Single Tree Fire
19-Jul-08	Pelton Creek	1/2 acre	Fire started by lightening
23-Jul-08	Hwy 230		Small Hay Bale
27-Jul-08	Dallas Lane	$80.00	1250 lb Hay Bale
2-Aug-08	US 287	1/2 acre	Fire started by lightening
10-Aug-08	Centennial		Single Tree Fire

Table 6.2 Limited history of wildfires

The revision process in 2010 found 12 wildland fires that occurred in 2009 that caused no real significant damage. The majority of these were grass fires were started by lightning with the remainder being human error.

IMPACTS

GIS is a tool that is used to compare, capture, input, output, store, manipulate, analyze, model, and display spatial data. Wildfire hazard vulnerability is determined by comparing values such as slope, vegetation, housing density, and aspect.

There is currently an Albany County Wildfire Hazard and Risk Assessment and Mitigation Plan in place. This plan is designed to assist in prioritizing and planning mitigation projects as well as to create a communications tool amongst communities in the County. A complete copy of this plan is stored at Albany County EMA office and with the Fire Warden. Albany County also has complied pre-wildfire evacuation plans for our Urban/Interface communities that could be at risk, these are also included in Appendix D.

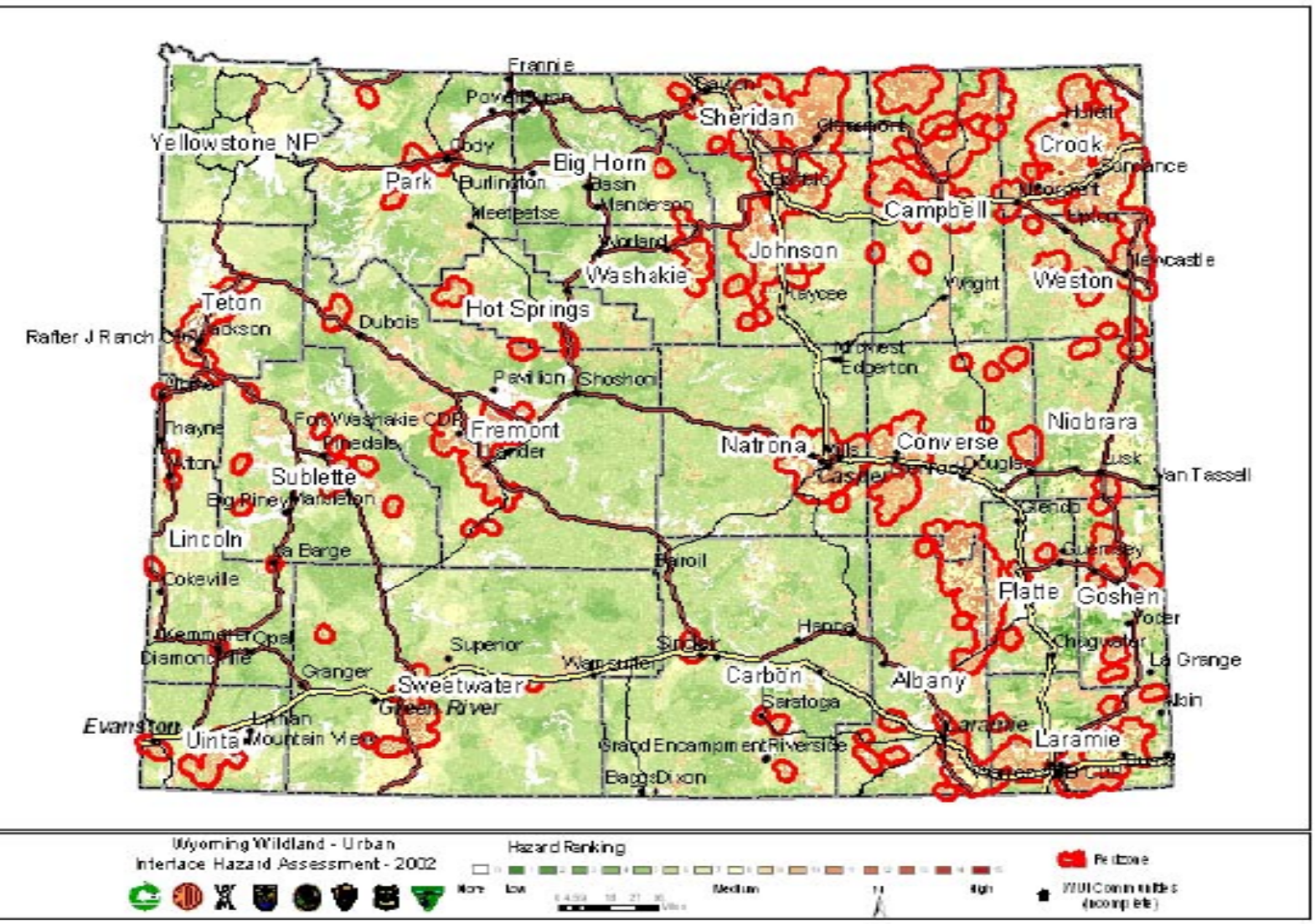


Figure 6.3 Wyoming Wildland Urban Interface Hazard Assessment Red Zone

WILDLAND FIRE ASSESSMENT INFORMATION FOR ESTIMATING POTENTIAL LOSSES

TABLE 6.3

Census Block	Exposure Value
560019627001005	$1,213,602.30
560019627001009	$99,209.90
560019627001011	$96,634.50
560019627001013	$145,494.80
560019627001020	$12,873.00
560019627001047	$530,154.30
560019627001048	$109,999.60
560019627001051	$109,999.90
560019627001052	$288,999.80
560019627001053	$551,000.00
560019627001054	$1,213,999.30
560019627001055	$1,103,999.20
560019627001056	$331,000.10
560019627001057	$110,000.00
560019627001058	$2,426,999.80
560019627001059	$109,999.90
560019627001062	$331,000.00
560019627001065	$441,999.60
560019627001066	$110,000.00
560019627001067	$221,000.00
560019627001069	$221,000.10
560019627001074	$4,735,999.70
560019627001079	$692,462.50
560019627001080	$331,000.00
560019627001081	$330,999.60
560019627001151	$269,909.80
560019627001156	$221,000.00
560019627001157	$4,698,997.50
560019627001158	$550,999.70
560019627001159	$4,194,000.30
560019627001160	$2,759,000.00
560019627001162	$43,560.00
560019627001164	$331,000.10
560019627001166	$442,000.00
560019627001172	$13,489,999.20
560019627001173	$331,000.00
560019627001174	$1,545,000.60
560019627001175	$330,999.90
560019627001176	$5,559,243.20
560019627001177	$60,765.50
560019627001180	$3,862,000.00
560019627001181	$3,752,976.10
560019627001182	$661,999.90
560019627001183	$330,999.90
560019627001184	$550,998.70
560019627001185	$551,000.00
560019627001186	$442,000.00
560019627001187	$661,996.40
560019627001188	$883,000.00
560019627001189	$661,994.10

560019627001191	$442,000.00
560019627001208	$109,999.60
560019627001209	$551,000.00
560019627001210	$551,000.00
560019627001211	$771,999.50
560019627001238	$221,000.00
560019627002004	$10,739.90
560019627002006	$118,582.80
560019627002018	$21,841.10
560019627002020	$5,318.20
560019627002028	$124,000.00
560019627002032	$121,709.30
560019627002033	$2,694,888.10
560019627002034	$1,039.70
560019627002035	$215,409.20
560019627002037	$7,691,497.90
560019627002038	$123,999.80
560019627002039	$136,000.00
560019627002047	$1,092,351.70
560019627002048	$2,337,089.20
560019627002049	$512,999.80
560019627002050	$4,587,000.00
560019627002051	$867,000.30
560019627002052	$867,000.00
560019627002053	$1,137,678.30
560019627002054	$2,849,338.00
560019627002055	$124,000.00
560019627002057	$866,999.00
560019628002035	$665,586.60
560019629001008	$72,047.70
560019629001016	$24,683.60
560019629001019	$225.40
560019629002039	$23,759.10
560019630001008	$7,420.50
560019630002000	$1,576,000.70
560019630002006	$101,999.80
560019630002011	$848,543.30
560019630002021	$957,476.70
560019630002026	$45.80
560019631004000	$291,000.10
560019631004002	$571,872.90
560019631004003	$319,874.00
560019631004004	$1,766,493.50
560019631004008	$1,559,399.20
560019631004010	$106,078.90
560019631004012	$757,072.90
560019631004013	$169,852.00
560019631004014	$101,452.50
560019631004015	$2,032,335.90
560019631004016	$290,997.80
560019631004017	$137,649.50
560019631004021	$260,407.90
560019631005006	$327,605.60
560019631005013	$839,022.60
560019637001000	$1,248,000.00
560019637001002	$210,088.10

560019637001022	$34,003.90
560019637001023	$275,646.60
560019637001025	$86,650.20
560019637001026	$226,863.10
560019637002007	$21,997.50
560019637002008	$81,671.20
560019637002009	$1,015,191.50
560019637003000	$39,533.90
560019637003002	$85,729.20
560019637003008	$18,154.60
560019637003009	$35,744.70
560019637003010	$2,299,369.90
560019637003011	$2,719,999.70
560019637003012	$746,154.30
560019637003013	$1,894,686.10
560019637003015	$1,298,635.20
560019637003016	$2,720,001.30
560019637003020	$101,061.20
560019637003021	$922.10
560019637003025	$34,476.90
560019637003026	$4,377,724.80
560019637004000	$5,046,999.90
560019637004002	$1,514,999.90
560019637004003	$1,008,000.40
560019637004004	$2,187,000.00
560019637004005	$1,514,996.30
560019637004006	$2,186,997.40
560019637004008	$636,161.20
560019637004028	$1,317,676.40
560019637004029	$143,861.30
560019637004032	$126,973.80
560019637004035	$190,354.50
560019637004037	$427,391.40
560019637004038	$434,490.30
560019637004039	$141,954.10
560019637004040	$2,020,000.00
560019637004041	$1,177,998.80
560019637004042	$1,008,000.00
560019637004043	$1,527,414.30
560019637004045	$2,020,000.00
560019637004048	$2,020,000.20
560019637004052	$2,020,000.00
560019637004053	$1,848,998.20
560019639001004	$402,065.40
560019639001005	$2,259,187.90
560019639001007	$100,000.00
560019639001009	$503,000.10
560019639001011	$604,000.00
560019639001012	$2,208,253.70
560019639001014	$100,000.00
560019639001015	$403,000.00
560019639001018	$100,000.00
560019639001019	$704,000.00
560019639001020	$100,000.00
560019639001022	$100,000.00
560019639001023	$301,000.00

560019639001024	$200,999.90
560019639001026	$503,000.00
560019639001027	$201,000.00
560019639001031	$301,000.00
560019639001032	$99,999.80
560019639001033	$100,000.00
560019639001037	$911,865.30
560019639001046	$100,000.00
560019639001049	$100,000.00
560019639001052	$804,034.90
560019639001056	$817,137.30
560019639001058	$201,000.00
560019639001063	$100,000.00
560019639001071	$262,863.10
560019639001078	$13,420.70
560019639001085	$444,154.90
560019639001326	$72,367.10
560019639001327	$99,999.80
560019639001331	$301,000.00
560019639001333	$100,000.00
560019639001335	$138,532.50
560019639001506	$203,056.80
560019639001509	$198,864.50
560019639001510	$99,999.10
560019639001511	$201,000.10
560019639001514	$199,591.00
560019639001516	$99,123.00
560019639001517	$313,702.90
560019639001518	$844,840.80
560019639001519	$201,000.00
560019639001536	$301,000.00
560019639001539	$201,000.00
560019639001553	$604,000.00
560019639001604	$45,393.00
560019639001605	$8,355.70
560019639001677	$167,737.80
560019639001692	$130,284.00
560019639001693	$2,036,390.80
560019639001694	$201,000.00
560019639001695	$44,992.10
560019639001700	$169,983.40
560019639001704	$100,000.00
560019639001706	$100,000.00
560019639001707	$201,000.00
560019639001708	$118,035.20
560019639001714	$53,424.30
560019639001715	$503,000.00
560019639001717	$100,000.00
560019639001718	$489,023.50
560019639001721	$13,604.80
560019639001726	$315,323.80
560019639001731	$3,139.30
560019639001743	$9,456,999.50
560019639001744	$99,999.50
560019639001746	$1,006,000.00
560019639001747	$503,000.00

560019639001748	$99,999.40
560019639001752	$99,999.60
560019639001753	$100,000.00
560019639001754	$200,997.60
560019639001755	$100,000.00
560019639001756	$301,000.00
560019639001757	$402,999.80
560019639001758	$503,000.00
560019639001759	$503,000.00
560019639001760	$402,992.30
560019639001761	$201,000.00
560019639001762	$1,107,000.00
560019639001763	$200,999.70
560019639001764	$402,998.50
560019639001765	$1,106,998.80
560019639001767	$300,995.10
560019639001768	$596,861.70
560019639001769	$200,999.70
560019639001770	$904,999.90
560019639001771	$9,456,999.80
560019639001783	$33,120.40
560019639001786	$3,301,861.10
560019639001809	$5,857.30
560019639001881	$100,000.00
560019639001887	$301,000.00
560019639001889	$298,910.00
560019639001896	$714,418.10
560019639001912	$196,364.90
560019639001914	$100,000.00
560019639001917	$381,854.90
560019639001919	$100,000.00
560019639001928	$62,916.80
560019639001939	$244,365.90
560019639001940	$100,000.00
560019639001943	$100,000.00
560019639001946	$69,205.20
560019639001947	$68,330.80
560019639001948	$3,999.60
560019639001960	$201,000.00
560019639002000	$484,656.20
560019639002003	$1,780,000.10
560019639002005	$324,000.00
560019639002011	$324,000.00
560019639002020	$648,000.00
560019639002036	$714,401.00
560019639002038	$564,689.70
560019639002041	$333,112.20
560019639002042	$74,589.60
560019639002043	$40,948.10
560019639002054	$162,000.00
560019639002060	$162,000.00
560019639002063	$193,000.00
560019639002070	$162,000.00
560019639002072	$323,999.90
560019639002073	$162,000.00
560019639002076	$162,000.00

560019639002078	$324,000.00
560019639002082	$323,999.60
560019639002083	$486,000.20
560019639002084	$161,999.90
560019639002086	$809,000.00
560019639002108	$162,000.00
560019639002111	$162,000.00
560019639002112	$162,000.00
560019639002113	$162,000.00
560019639002115	$162,000.00
560019639002123	$323,999.90
560019639002127	$324,000.00
560019639002128	$485,999.90
560019639002153	$208,806.60
560019639002180	$79,686.50
560019639002191	$213,473.00
560019639002192	$161,999.80
560019639002193	$162,000.00
560019639002194	$144,289.80
560019639002195	$25,154.60
560019639002291	$4,864,121.60
560019639002292	$486,000.00
560019639002294	$486,000.20
560019639002295	$466,286.30
560019639002297	$808,997.70
560019639002298	$1,264,072.20
560019639002299	$809,000.00
560019639002300	$2,751,000.00
560019639002302	$2,265,999.70
560019639002303	$464,489.70
560019639002306	$2,044,000.10
560019639002310	$161,999.90
560019639002313	$162,000.00
560019639002317	$76,281.30
560019639002324	$5,017,000.90
560019639002325	$808,990.70
560019639002326	$1,619,000.00
560019639002327	$161,999.40
560019639002331	$141,533.20
560019639002332	$332,364.30
560019639002339	$348,000.00
560019639002340	$1,230,132.30
560019639002344	$12,309.50
560019639002345	$10,041.00
560019639002346	$5,318.80
560019639002347	$453,406.60
560019639002466	$162,000.00
560019639002470	$323,999.20
560019639002471	$161,999.80
560019639002473	$90,458.80
560019639002503	$4,329.50
560019639002510	$107,736.40
560019639002557	$324,000.00
560019639002574	$485,997.40
560019639002591	$485,999.90
560019639002592	$162,000.00

560019639002617	$162,000.00
560019639002621	$648,000.10
560019639002624	$648,000.00
560019639002638	$162,000.00
560019639002647	$161,999.80
560019639002658	$161,749.90
560019639002661	$486,000.00
560019639002680	$162,000.00
560019639002682	$161,802.40
560019639002685	$162,000.00
560019639002686	$161,988.40
560019639002689	$158,827.70
560019639002692	$346,564.40
560019639002881	$2,423.00
560019639002886	$112,799.10
560019639002889	$46,585.60
560019639002903	$73,665.30
560019639002905	$78,763.70
SUM	$257,894,465.70

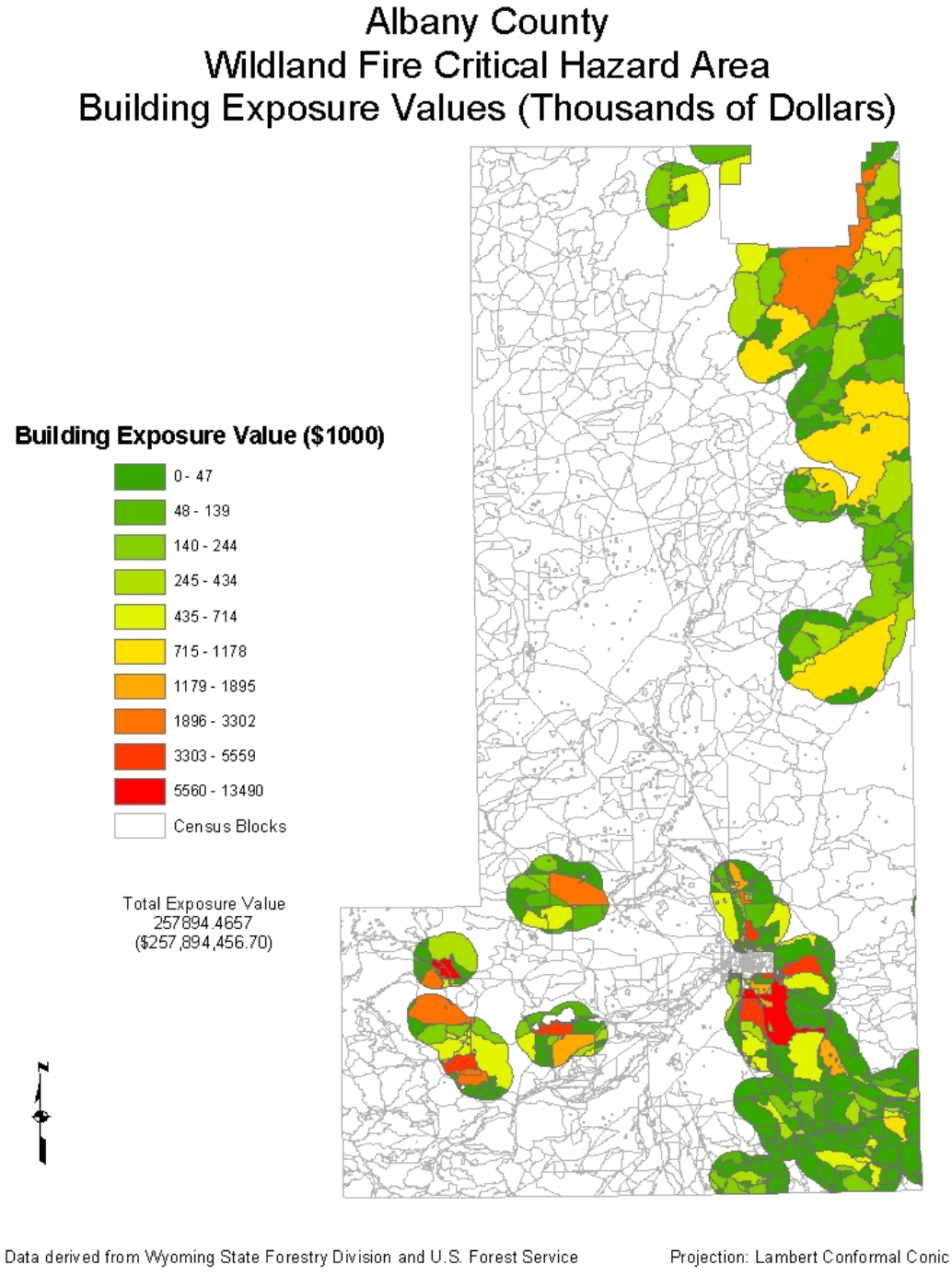
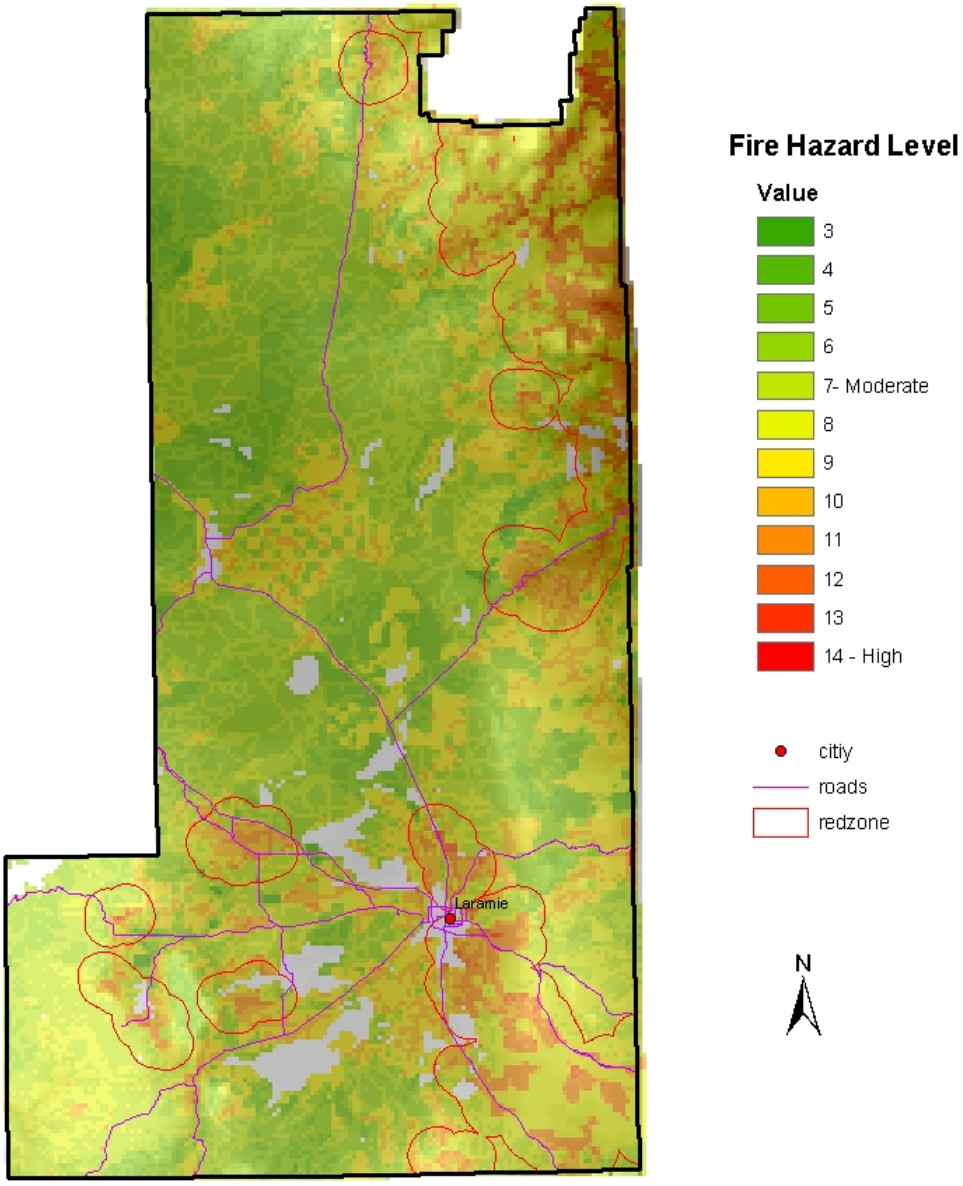


FIGURE 6.4 Building Exposure Values

Albany County Wildland Fire Hazard Map



Data derived from Wyoming State Forestry Division and the U.S. Forest Service

FIGURE 6.5

FUTURE IMPACTS

Wildfires occur within the County on an annual basis. Wildfire smoke is another concern to the public and citizens of Albany County. Emphasis has been placed on homeowner responsibility to create a fire resistant community. There is currently an inadequate and inconsistent system of addresses, streets, road names, and signs in Albany County that can make emergency response situations even more challenging. These are all concerns for if and when we have the next wildland fire.

SUMMARY

PROPERTY AFFECTED: High
POPULATION AFFECTED: Medium
PROBABILITY: High
JURISDICTION AFFECTED: Medium, both jurisdictions are affected as well as all outlying communities in the county.

Figure 6.6 Wildland Fire in Albany County

CHAPTER VII. LIGHTNING

Lightning is a sudden electrical discharge released from the atmosphere that follows a course from cloud to ground, cloud to cloud, or cloud to surrounding air, with light illuminating its path. Lightning's unpredictable nature causes it to be one of the most feared weather elements. Over a 36 year period (1959-1994), Wyoming recorded 21 deaths and 83 injuries resulting from lightning. "The Cowboy State ranks #2 behind only New Mexico in number of deaths per million people per year with an average of 1.47. The state of Wyoming has an average of 5.74 injuries per million people per year ranks #1 for the entire U.S in lightning related injuries. Since 1995, and additional six deaths and 31 injuries have occurred from lightning. All six of these deaths occurred in the mountains of Wyoming – namely the Teton, Wind River, Snowy, and Medicine Bow Ranges. Lightning is the cause of 42% of the wildfires in Wyoming and responsible for 50% of the burned acreage." Lightning kills the most people out of all the natural disasters that take place yearly.

Figure 7.1 this picture was taken in the Centennial Valley.

HISTORY

U.S. statistics show that one in 345,000 lightning flashes results in a death and one in 114,000 results in an injury. From 1937 to 2006 lightning has been responsible for 36

deaths, 104 injuries, over $4.4 million property damage, and $22,750 in crop damage in Wyoming. Lightning can reach a temperature of 50,000 degrees Fahrenheit and one stroke can carry between 100 million and 1 billion volts of electricity. **Table 7.1** lists lightning related incidents in Albany County since 1950. This table lacks a complete history of lightning occurrences in Wyoming. Several of the wildland fires that are started by lightning do not get recorded properly for tracking purposes. As a result the following table provides a general idea, not an exact determination. The chart below has been added since the 2003 version of the plan. Lighting happens every year in Albany County, but we have had no serious reports of deaths or injuries since 1999.

Table 7.1 History of Lightning in Albany County Wyoming 1950-2006

Date	Location	Deaths	Injuries	cost	Information
5/24/1950	Rock River	0	1		One Man was injured when struck by lightning near Rock River during a thunderstorm.
5/25/1956	Lookout 14 NE	0	0		A yearling heifer was killed by lightning
6/6/1961	Northwest of Laramie	1	0	$2,750	Lightning struck a herd of sheep, killing the herder and 89 sheep.
7/7/1971	Laramie 10 mile WSW	0	1		Lightning struck near two men injuring one of them.
6/20/1974	Hidden Valley	0	1	$275	In Hidden Valley, Pole Mountain Division, Medicine Bow National Forest, lighting struck a fiberglass sports car injuring the occupant, blowing out the tires and starting a fire.
8/30/1981	Albany County	1	1		Lightning struck and killed one person and injured another.
9/14/1981	Laramie	0	0		Repeated lightning strikes caused damage to Pacific Power equipment causing extensive power outages.
7/8/1982	Jelm Mountain	0	0	$9,000	Lighting destroyed a $7,000 surge arrestor at UW infrared observatory on 9656 foot summit of Jelm Mountain. A second strike on July 15 knocked out $2,000 worth of peripheral equipment.
8/12/1982	NW Wheatland	0	0	$275	Lightning caused a two acre grass fire 30 miles northwest of Wheatland on the Albany County border.
7/28/1987	Laramie	$0	0	$2,750	Heavy thunderstorms in the city of Laramie, several lighting strikes were reported in the city with a few trees

					damaged by lightning.
10/5/1988	25 W of Cheyenne	0	0	0	Lightning started an unknown number of trees on fire.
6/26/1996	Laramie	0	0	$4,000	Lighting struck several trees in Laramie. A forty foot cottonwood tree was uprooted and fell into a house. Another tree was struck and started a small fire.
7/7/1996	Laramie	0	0	$2,000	Lightning struck and splintered a large tree in Laramie. A TV and VCR in a nearby house were destroyed.
8/5/1996	25 W of Wheatland	0	0	$300,000	Lighting sparked a fire that consumed 5,000 acres by the time it was contained on August 12th. Several buildings were also destroyed.
7/24/1999	Centennial	2	0	0	Lighting killed two hikers on Medicine Bow Peak Northwest of Centennial about 150 to 200 ft below the summit at an altitude just over 12,000 feet.

IMPACTS

The eastern plains of Wyoming have more than three times the cloud to ground lightning as does the western half of the state. Lightning damage can depend on the climate for that year, which depends on the drought and wet cycles of Wyoming's climate. However, the locations of maximum and minimum strikes do not change much from year to year. Albany County has great potential for lighting strikes with both the mountains and the plains being represented. Lightning is responsible for the majority of wildland fires in the county each year. Residents of Albany County are urged to avoid open fields, water, and high ground during a thunderstorm.

FUTURE IMPACTS

Future impacts from lightning are difficult to determine because of the erratic nature of storms. Historical trends demonstrate that lightning will continue to be the leading cause of wildland fires in the county, and it will maintain dominance in the eastern plains of Wyoming. Lightning is a constant threat to the County. It is estimated that the upcoming years will be active for lightening caused wildland fires in the Snowy Mountain Range, due to the pine beetle kill.

SUMMARY

PROPERTY AFFECTED: Low

POPULATION AFFECTED: Low

PROBABILTY: High

JURISDICTION AFFECTED: Both the jurisdictions of Laramie and Rock River are affected as well as the other communities within the county.

CHAPTER VIII. HAIL

Hail causes more than $1 billion of property damage nationally each year, mostly to crops. The southeast corner of Wyoming lies within the nation's "Hail Alley." Together with adjacent portions of Colorado and Nebraska, this region of Wyoming is battered by more hailstorms than any other part of the United States. Climatologically data shows that this area of Wyoming averages five to nine days of hail annually.

Figure 8.1 this picture was taken in April 2007 in Laramie, Wyoming

HISTORY

Table 8.1 presents a history of damaging hail storms in Albany County. The data was derived from the monthly Storm Data reports generated and released by National Oceanic and Atmospheric Administration's National Climate Center. Other sources are unpublished reports from the Wyoming Office of Homeland Security, and newspaper records from public libraries. Record may not be complete due to reporting discrepancies throughout county. Hail has the potential to cause substantial damage to structures and vehicles in the county. **Table 8.1** shows the most damaging hail storms in the county. There have been hail occurrences since the last listing in 2003, but none that have caused significant damage.

Table 8.1 Hail storms recorded from 1944-2003

Date	County	Location	Estimated Damage	Information
7/3/1944	Albany	Laramie		A hailstorm on 3rd and 10th did damage to vegetation.
8/1/1953	Albany	Laramie	$20,000	A hailstorm in Northern Albany County caused $20,000 of damage to wheat crops.
6/15/1962	Albany	Laramie	$275	Two to three inches of .5 to 1 inch diameter hail did minor damage to range lands S. of Laramie
9/8/1973	Albany	Laramie		4.5 inches of hail
8/9/1978	Albany	Laramie	$27,500	A rapid developing thunderstorm did widespread damage to the University and personal property in Laramie. Approximately 1.10 inches
8/2/1986	Albany	15 ENE Laramie		Golf ball sized hail 15 miles East Northeast of Laramie, heavily damaged a sheriff deputy's vehicle. Approximately 1.75 inches
7/16/1994	Albany	10 miles SE Laramie	$275	1.75 Inches of hail
7/3/2001	Albany	Laramie	$50,000	
8/19/2001	Albany	10 miles E Laramie	$10,000	Hail cracked windshields East of Laramie.

IMPACTS

Figure 8.2 shows the distribution of the number of damaging hailstorms, the number of deaths and injuries, and the amount of damage in 2006 dollars. The total documented hail damage for 1926 to present is $304 million. In 2006 USD the damage would be $633.5 million. This is an estimation based off of what was reported in that time frame. Many incidents go without any reporting.

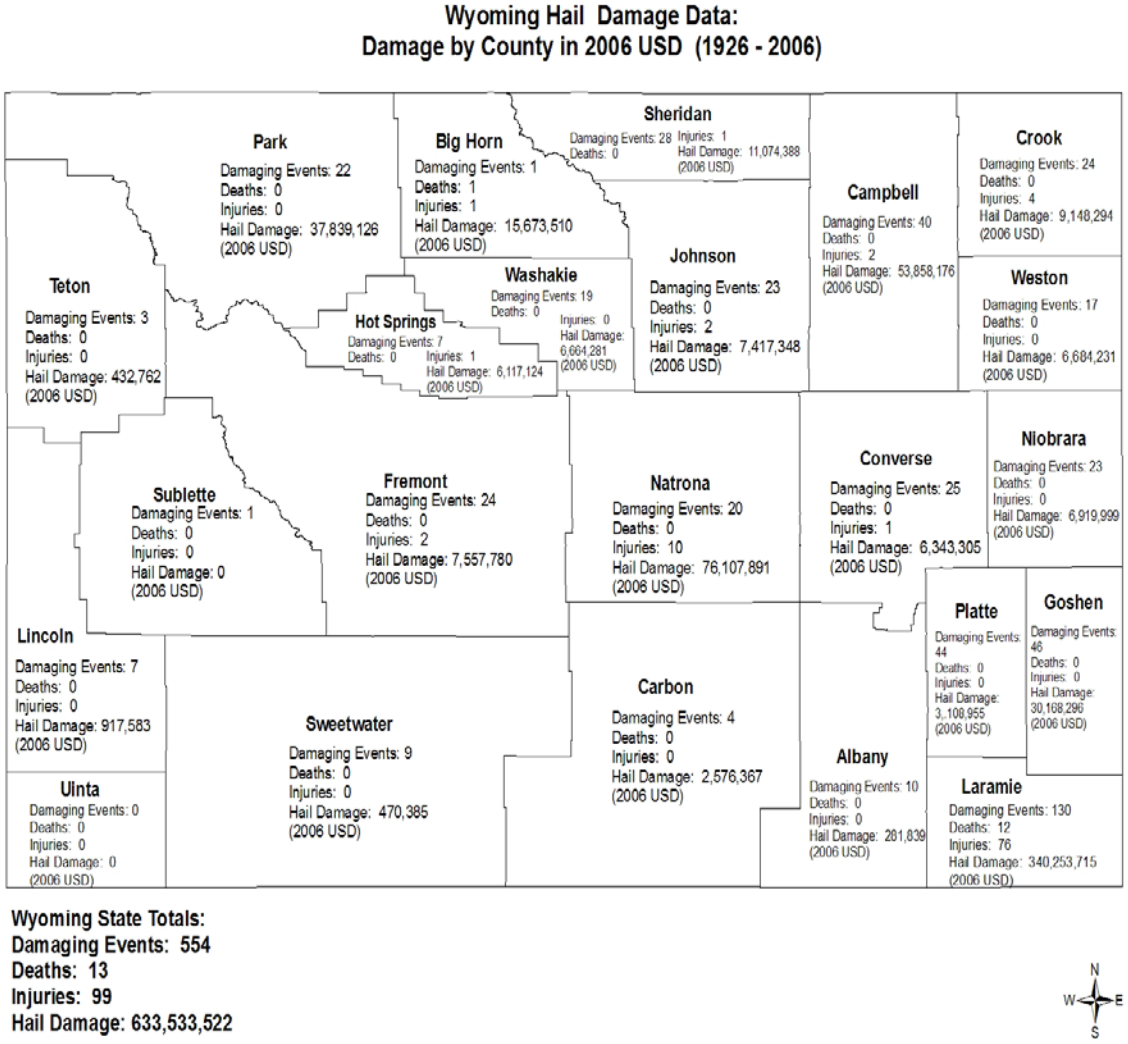


Figure 8.2 Wyoming Hail Damage Map

Table 8.2 represents actual dollar damages reported in the year of the hailstorms as well as dollar damages converted to 2006 USD. The table also shows the ranking of counties based upon dollar damages in 2006 USD. Laramie County has had the most significant hail impacts in Wyoming with $340.3 million (2006 USD) in damage. Southwestern, western, and south-central Wyoming has had the least hail impacts. Albany County had 10 hail storms that caused an estimate $135,825 in damages. Albany County did not have any associating deaths or injuries from the storms.

Table 8.2—County Rankings by Hail Damage.					
County	**Damaging Events**	**Deaths**	**Injuries**	**Hail damage (Year of Event USD)**	**Hail damage (2006 USD)**
Laramie	130	12	76	176,651,620	340,253,715
Natrona	20	0	10	32,799,925	76,107,891
Campbell	40	0	2	37,588,700	53,858,176
Park	22	0	0	10,810,000	37,836,126
Goshen	46	0	0	13,466,775	30,168,296
Big Horn	20	1	1	6,489,750	15,673,510
Sheridan	28	0	0	3,775,550	11,074,388
Crook	24	0	4	3,217,000	9,148,294
Johnson	23	0	2	3,532,775	7,417,348
Fremont	24	0	2	1,987,775	7,557,780
Niobrara	23	0	0	1,481,800	6,919,999
Washakie	19	0	0	2,100,000	6,664,281
Converse	25	0	1	1,194,125	6,343,305
Hot Springs	7	0	1	2,882,500	6,117,124
Weston	17	0	0	753,275	3,684,231
Platte	44	0	0	1,039,825	3,108,955
Carbon	4	0	0	550,000	2,576,367
Lincoln	7	0	0	275,000	917,583
Sweetwater	9	0	0	60,850	470,385
Teton	3	0	0	83,500	432,762
Albany	**10**	**0**	**0**	**135,825**	**281,839**
Sublette	1	0	0	0	0
Uinta	0	0	0	0	0
Regional	8	0	0	3,168,000	6,921,167
TOTAL	**554**	**13**	**99**	**304,044,570**	**633,533,522**

FUTURE IMPACTS

Hail is always a possibility in Albany County and will continue to pose a threat to private and public property in the upcoming years. It is predicted that hail occurs in Albany County on average of five to nine times a season.

SUMMARY

PROPERTY AFFECTED: Medium
POPULATION AFFECTED: Medium
PROBABILITY: Medium
JURISDICTIONS AFFECTED: The Jurisdictions of Laramie and Rock River are affected as well as the rest of the county.

CHAPTER IX. DROUGHTS

Drought characterizes our society's most costly natural weather-related disaster. It indirectly kills more people and animals than the combined effects of hurricanes, floods, tornadoes, blizzards, and wildfires. Unlike other disasters that quickly come and go, drought's long-term unrelenting destruction has been responsible for mass migrations and lost civilizations. The 1980 and 1988 droughts in the U.S. resulted in approximately 17,500 heat-related deaths and an economic cost of over $100 billion. Drought occurs in four stages and is defined as a function of its magnitude (dryness), duration, and regional extent. Severity, the most commonly used term for measuring drought, is a combination of magnitude and duration.

The first stage of drought is known as a meteorological drought. The conditions at this stage include any precipitation shortfall of 75% of normal for three months or longer. The second stage is known as agricultural drought. Soil moisture is deficient to the point where plants are stressed and biomass (yield) is reduced. The third stage is the hydrological drought. Reduced stream flow (inflow) to reservoirs and lakes is the most obvious sign that a serious drought is in progress. The fourth stage is the socioeconomic drought. This final stage refers to the situation that occurs when physical water shortage begins to affect people.

As these stages evolve over time, the impact to the economy, society, and environment converge into an emergency situation. Without reservoir water to irrigate farms, food supplies are in jeopardy. Without spring rains for the prairie grasslands, open range grazing is compromised. Without groundwater for municipalities, the hardships to communities result in increases in mental and physical stress as well as conflicts over the use of whatever limited water is available. Without water, wetlands disappear. The quality of any remaining water decreases due to its higher salinity concentration. There is also an increased risk of fires, and air quality degrades as a result of increased soil erosion in strong winds (blowing dust).

HISTORY

In September 2001 Albany County declared an Agri-Business Disaster Declaration. Another request for assistance was also made in 2002 and 2006 as the drought problems continued across Southeast Wyoming.

The most recent statewide drought started in 1999, but began in earnest in the spring of 2000. It is considered by many to be the most severe drought in collective memory. However, some longtime residents have indicated they remember streams drying up in the 1930s and 1950s. According to instrument records, there have been only seven multi-year (three years or longer) statewide droughts since 1895 (**Table 9.1**), although single wet years like 1957 (and probably 2005) have broken longer periods of drought (1952-1964 and 1999-present) into two separate events by this definition, making quantification

of impacts difficult. Based on statewide average annual precipitation each of the drought periods is ranked as follows:

Table 9.1 – Wyoming's Recent Worst Multi-year, Statewide Droughts.		
Drought Period	Average Annual Precipitation (Inches)	Percent of 1895-2006 Average Annual Precipitation (13.04")
1952-1956	10.65	81.69%
1900-1903	10.76	82.52%
1999-2004	11.07	84.89%
1987-1990	11.12	85.28%
1958-1964	11.67	89.49%
1974-1977	11.77	90.26%
1931-1936	11.79	90.41%

Widespread droughts in Wyoming, as determined from stream flow records, were most notable during three periods: 1929 to 1942, 1948 to 1962, and 1976 to 1982.

INSTRUMENTATION RECORD

As a whole, Wyoming's precipitation record from 1895 to 2006 reveals that, for the first half of the 20th Century (except for the Dust Bowl years of the 1930s), there was generally a surplus of moisture. During the second half of the century there was a trend of increased periods of drought (**Figure 9.1**) Wyoming Annual Precipitations

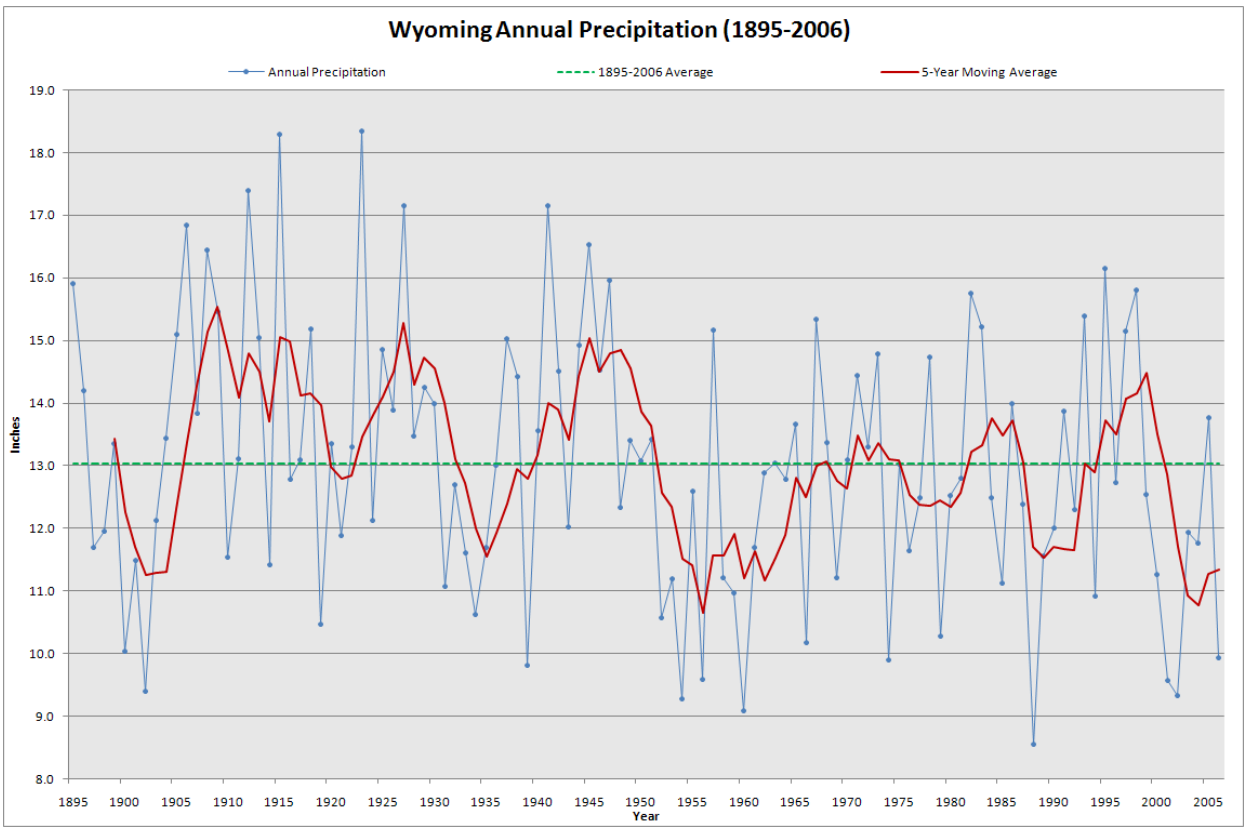


Figure 9.1 Wyoming Annual Precipitation

IMPACTS

Based on **Table 9.1** and **Figure 9.1**, the drought of 1999 to 2004 is as significant, if not more significant, than any other drought in the last 100 years. **Table 9.2**, from the *Wyoming State Climate Office*, indicates that the most significant droughts in the last century, in terms of annual statewide precipitation averages, were in 1952 to 1956, 1900 to 1903, and 1999 to 2004. In order to determine which drought period had the most significant impact on Wyoming, crop production and livestock inventory data for the 1952 to 1956 and 1999 to 2004 periods were compared. 1957 and 2005 were wetter years, with annual statewide precipitation totals above the 1895-2006 average. Those two years were used as endpoints for the droughts that started in 1952 and 1999 respectively. In both cases, the years following saw a return to drier conditions. Because of this the most recent drought impacts were also calculated for 2005 and 2006, and are included in summary tables. **Tables 9.2** and **9.3** show peak decline (%) in production during drought compared to the 5-year pre-drought production average for various commodities.

9.2—Peak Commodity Production Changes From Pre-drought (1947 to 1951) To Drought (1952 to 1956).					
Commodity	**5-year pre-drought production average (1947 to 1951)**	**Units**	**Lowest production during drought (1952 to 1956)**	**Year of lowest production (1952 to 1956)**	**Percent change**
Winter wheat	5,072	1,000 bu.	2,346	1954	-54%
Spring wheat	1,579	1,000 bu.	600	1954	-62%
Barley	4,414	1,000 bu.	2,700	1956	-39%
Oats	4,577	1,000 bu.	2,470	1954	-46%
Dry beans	1,009	1,000 cwt.	589	1955	-42%
Sugar beets	413	1,000 tons	421	1955	+2%
Corn	227	1,000 bu.	161	1953	-29%
Alfalfa hay	490	1,000 tons	675	1954	+38%
Other hay	674	1,000 tons	442	1954	-34%
Cattle/ calves inventory	1,050	1,000 head	1,096	1954	+4%

Table 9.3—Peak Commodity Production Changes From Pre-drought (1994 to 1998) To Drought (1999 to 2006).					
Commodity	**5-year pre-drought production average (1994-1998)**	**Units**	**Lowest production during drought (1999-2006)**	**Year of lowest production**	**Percent change**
Winter wheat	6029	1,000 bu.	2375	2002	-61%
Spring wheat	648	1,000 bu.	96	2002	-85%
Barley	8383	1,000 bu.	4680	2002	-44%
Oats	1648	1,000 bu.	600	2005	-54%
Dry beans	691	1,000 cwt.	514	2001	-26%
Sugar beets	1150	1,000 tons	659	2002	-43%
Corn	6328	1,000 bu.	4165	2002	-34%
Alfalfa hay	1581	1,000 tons	1150	2002	-27%
Other hay	817	1,000 tons	450	2002	-45%
Cattle/calves inventory	1536	1,000 head	1320	2002	-14%

A comparison of **Tables 9.2** and **9.3** indicate that drought impacts to the Wyoming agricultural community were greater in the 1999 – present drought than in the 1952 to 1956 drought. With the exception of dry beans, all commodities in the "worst" years of the most recent drought showed the most significant percentage decline in production than in the 1952 to 1956 drought. As a result, the 1999- present drought will be used as the drought of historic record to calculate dollar impacts.

DOLLAR IMPACTS

Dollar impacts of drought are derived from *Wyoming Agricultural Statistics 2007*, compiled by the Wyoming Agricultural Statistics Service of the U.S. Department of Agriculture. Supplemental data through 2006 were provided by the Cheyenne, Wyoming office of the agency.

The data below represent changes in production value for crops and changes in inventory value for cattle and calves (**Tables 9.4** through **9.11**). As such, the data should be

considered impact-value-versus-loss-value. For example, regarding cattle and calves inventory, the inventory has subsequently decreased during the drought. Therefore, the value of inventory on hand has decreased. The inventory decreased, because of the sale of the cattle and calves. The sales resulted in an increase in cash receipts to the farming and ranching community. The net result shows a decrease in inventory value, which is a negative drought impact. All dollar values shown (USD) are represented in 2006 dollars.

Table 9.4—Production And Inventory Value Impact for 1999.

Commodity	5-year pre-drought production average (1994 to 1998)	Units	1999 production	Value (USD)	Production and inventory value impact (USD)
Winter wheat	6029	1,000 bu.	6105	2.12/bu	+195,061
Spring wheat	648	1,000 bu.	264	2.54/bu	-1,180,823
Barley	8383	1,000 bu.	7310	3.03/bu	-3,936,065
Oats	1648	1,000 bu.	1539	1.45/bu	-191,344
Dry beans	691	1,000 cwt.	788	16.00/cwt	+1,878,935
Sugar beets	1150	1,000 tons	1205	39.00/ton	+2,596,852
Corn	6328	1,000 bu.	6136	1.94/bu	-450,944
Alfalfa hay	1581	1,000 tons	1782	67.00/ton	+16,303,874
Other hay	817	1,000 tons	1008	60.00/ton	+13,874,092
Cattle/calves inventory	1536	1,000 head	1580	770.00/head	+41,016,949
TOTAL					**+$70,106,586**

Table 9.5—Production and Inventory Value Impact for 2000.

Commodity	5-year pre-drought production average (1994 to 1998)	Units	2000 production	Value (USD)	Production and inventory value impact (USD)
Winter wheat	6029	1,000 bu.	4080	2.70/bu	-6,161,944
Spring wheat	648	1,000 bu.	232	2.70/bu	-1,315,222
Barley	8383	1,000 bu.	7885	3.08/bu	-1,796,066
Oats	1648	1,000 bu.	1156	1.55/bu	-892,974
Dry beans	691	1,000 cwt.	762	16.80/cwt	+1,396,721
Sugar beets	1150	1,000 tons	1556	32.50/ton	+15,450,820
Corn	6328	1,000 bu.	7656	2.02/bu	+3,141,171
Alfalfa hay	1581	1,000 tons	1449	85.00/ton	-13,138,173
Other hay	817	1,000 tons	650	80.00/ton	-15,644,028
Cattle/calves inventory	1536	1,000 head	1550	780.00/head	+12,786,885
TOTAL					**-$6,172,810**

Table 9.6—Production and Inventory Value Impact for 2001.					
Commodity	**5-year pre-drought production average (1994 to 1998)**	**Units**	**2001 production**	**Value (USD)**	**Production and inventory value impact (USD)**
Winter wheat	6029	1,000 bu.	2880	2.70/bu	-9,683,713
Spring wheat	648	1,000 bu.	168	2.90/bu	-1,585,421
Barley	8383	1,000 bu.	6970	3.32/bu	-5,343,007
Oats	1648	1,000 bu.	1344	1.65/bu	-571,298
Dry beans	691	1,000 cwt.	514	23.00/cwt	-4,636,674
Sugar beets	1150	1,000 tons	794	39.70/ton	-16,097,039
Corn	6328	1,000 bu.	6375	2.30/bu	+123,121
Alfalfa hay	1581	1,000 tons	1276	110.00/ton	-38,211,845
Other hay	817	1,000 tons	605	105.00/ton	-25,353,075
Cattle/calves inventory	1536	1,000 head	1470	780.00/head	-58,633,257
TOTAL					**-$159,992,210**

Table 9.7—Production and Inventory Value Impact for 2002.					
Commodity	**5-year pre-drought production average (1994 to 1998)**	**Units**	**2002 production**	**Value (USD)**	**Production and inventory value impact (USD)**
Winter wheat	6029	1,000 bu.	2375	3.70/bu	-15,156,726
Spring wheat	648	1,000 bu.	96	3.90/bu	-2,413,453
Barley	8383	1,000 bu.	4680	3.23/bu	-13,408,845
Oats	1648	1,000 bu.	750	2.20/bu	-2,214,798
Dry beans	691	1,000 cwt.	624	18.30/cwt	-1,374,552
Sugar beets	1150	1,000 tons	659	42.30/ton	-23,283,969
Corn	6328	1,000 bu.	4165	2.60/bu	-6,304,709
Alfalfa hay	1581	1,000 tons	1150	111.00/ton	-53,633,408
Other hay	817	1,000 tons	450	106.00/ton	-43,612,108
Cattle/calves inventory	1536	1,000 head	1320	760.00/head	-184,035,874
TOTAL					**-$345,438,442**

Table 9.8—Production and Inventory Value Impact for 2003.					
Commodity	**5-year pre-drought production average (1994 to 1998)**	**Units**	**2003 production**	**Value (USD)**	**Production and inventory value impact (USD)**
Winter wheat	6029	1,000 bu.	3915	3.40/bu	-7,872,508
Spring wheat	648	1,000 bu.	180	3.15/bu	-1,614,677
Barley	8383	1,000 bu.	6975	3.46/bu	-5,335,904
Oats	1648	1,000 bu.	1104	1.80/bu	-1,072,508
Dry beans	691	1,000 cwt.	645	17.40/cwt	-876,670
Sugar beets	1150	1,000 tons	752	41.20/ton	-17,960,131
Corn	6328	1,000 bu.	6450	2.50/bu	+334,064
Alfalfa hay	1581	1,000 tons	1625	80.00/ton	3,855,422
Other hay	817	1,000 tons	770	73.00/ton	-3,757,941
Cattle/calves inventory	1536	1,000 head	1400	890.00/head	-132,573,932
TOTAL					**-$166,874,786**

Table 9.9—Production and Inventory Value Impact for 2004.					
Commodity	**5-year pre-drought production average (1994 to 1998)**	**Units**	**2004 production**	**Value (USD)**	**Production and inventory value impact (USD)**
Winter wheat	6029	1,000 bu.	3510	3.20/bu	-8,602,775
Spring wheat	648	1,000 bu.	240	3.25/bu	-1,415,155
Barley	8383	1,000 bu.	7050	3.41/bu	-4,851,153
Oats	1648	1,000 bu.	795	1.55/bu	-1,411,046
Dry beans	691	1,000 cwt.	541	25.90/cwt	-4,146,211
Sugar beets	1150	1,000 tons	812	41.70/ton	-15,042,263
Corn	6328	1,000 bu.	6550	2.48/bu	+587,577
Alfalfa hay	1581	1,000 tons	1305	74.50/ton	-1,722,000
Other hay	817	1,000 tons	756	69.50/ton	-3,555,000
Cattle/calves inventory	1536	1,000 head	1350	1,020.00/head	-121,040,000
TOTAL					**-$161,198,025**

Table 9.10—Production and Inventory Value Impact for 2005.					
Commodity	**5-year pre-drought production average (1994 to 1998)**	**Units**	**2005 production**	**Value (USD)**	**Production and inventory value impact (USD)**
Winter wheat	6029	1,000 bu.	4350	3.50/bu	-6,064,499
Spring wheat	648	1,000 bu.	315	3.19/bu	-1,096,254
Barley	8383	1,000 bu.	5580	3.28/bu	-9,487,967
Oats	1648	1,000 bu.	600	1.60/bu	-1,730,444
Dry beans	691	1,000 cwt.	776	18.70/cwt	1,640,351
Sugar beets	1150	1,000 tons	801	42.80/ton	-15,415,067
Corn	6328	1,000 bu.	6860	2.45/bu	+1,345,098
Alfalfa hay	1581	1,000 tons	1560	75.00/ton	-1,625,387
Other hay	817	1,000 tons	756	71.50/ton	-4,501,032
Cattle/calves inventory	1536	1,000 head	1430	1,140.00/head	-124,705,882
TOTAL					**-$161,641,084**

Table 9.11—Production and Inventory Value Impact for 2006.					
Commodity	**5-year pre-drought production average (1994 to 1998)**	**Units**	**2006 production**	**Value (USD)**	**Production and inventory value impact (USD)**
Winter wheat	6029	1,000 bu.	3645	4.80/bu	-11,443,200
Spring wheat	648	1,000 bu.	234	3.80/bu	-1,573,200
Barley	8383	1,000 bu.	4731	3.35/bu	-12,234,200
Oats	1648	1,000 bu.	684	1.70/bu	-1,638,800
Dry beans	691	1,000 cwt.	590	21.10/cwt	-2,131,100
Sugar beets	1150	1,000 tons	798	X/ton	
Corn	6328	1,000 bu.	5805	3.00/bu	-1,569,000
Alfalfa hay	1581	1,000 tons	1400	91.00/ton	-16,471,000
Other hay	817	1,000 tons	715	88.00/ton	-8,976,000
Cattle/calves inventory	1536	1,000 head	1430	1,010.00/head	-107,060,000
TOTAL					**-$163,096,500**

Table 9.12—Production and Inventory Value Impact for Worst Year of Drought.						
Commodity	**5-year pre-drought production average (1994 to 1998)**	**Units**	**Worst yearly production of drought**	**Year**	**Value (USD)**	**Production and inventory value impact (USD)**
Winter Wheat	6029	1,000 bu.	2375	2002	3.70/bu	-15,156,726
Spring Wheat	648	1,000 bu.	96	2002	3.90/bu	-2,413,453
Barley	8383	1,000 bu.	4680	2002	3.23/bu	-13,408,845
Oats	1648	1,000 bu.	600	2005	1.60/bu	-1,730,444
Dry Bean	691	1,000 cwt.	514	2001	23.00/cwt	-4,636,674
Sugar Beet	1150	1,000 tons	659	2002	42.30/ton	-23,283,969
Corn	6328	1,000 bu.	4165	2002	2.60/bu	-6,304,709
Alfalfa Hay	1581	1,000 tons	1150	2002	111.00/ton	-53,633,408
Other Hay	817	1,000 tons	450	2002	106.00/ton	-43,612,108
Cattle/Calves Inventory	1536	1,000 head	1320	2002	760.00/head	-184,035,874
TOTAL						**-$348,216,210**

Table 9.12 shows the year of most significant impact for each of the commodities, and also the summation of production and inventory value impacts for the worst-case years.

FUTURE IMPACTS

The current drought, starting in 1999, can be shown to be the drought of historic record. There have been significant impacts on the agricultural industry from this drought. The worst-case year was 2002, with a negative dollar impact of $345.4 million. The total impact for the period 1999 to 2004 was -$769.6 million. While 2005 showed statewide average precipitation to be 0.73" above the long-term average, the following year, 2006 (9.94"), was the 10th driest in the period 1895-2006, indicating that, similar to the year 1957, 2005 is likely just a single, rare wet year among a longer term period of drought and thus statistically insignificant. **Tables 9.11 and 9.12** illustrate how production in 2005 and 2006 continued to be impacted. The total impact from 1999 to 2006, has been -$1,094.3 million. For the purpose of this report, the dollar impacts for the current drought are -$769.6 million. Future analysis most likely will include 2005-2007 in the drought beginning in 1999.

SUMMARY

PROPERTY AFFECTED: High
POPULATION AFFECTED: High
PROBABILTY: High
JURISDICTION AFFECTED: Both the jurisdictions of Laramie and Rock River are affected as well as the other communities in the county.

CHAPTER X. EARTHQUAKES

Seismological characterizations of an area can range from an analysis of historic seismicity to a long-term probabilistic seismic hazard assessment. A complete characterization usually includes a summary of historic seismicity, an analysis of the Seismic Zone Map of the Uniform Building Code, deterministic analyses on active faults, "floating earthquake" analyses, and short- or long-term probabilistic seismic hazard analyses. Historically, earthquakes have occurred in every county in Wyoming (**Figure 10.1**). The first earthquake was reported in Yellowstone National Park in 1871 and the most recent likely occurred in the park. Yellowstone National Park is one of the more seismically active areas in the U.S.

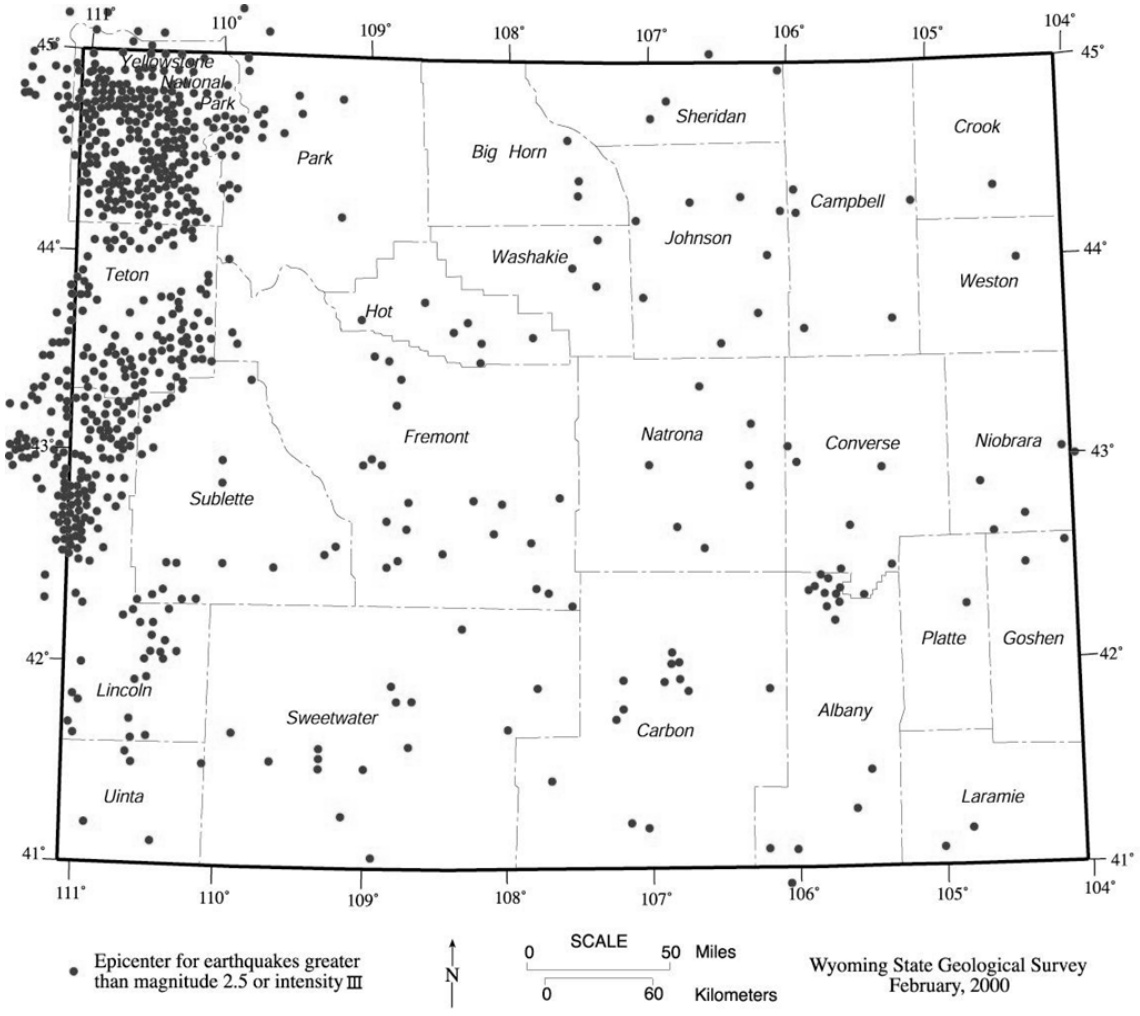


Figure 10.1 Earthquake areas in Wyoming

EARTHQUAKE SOURCES

Most Wyoming earthquakes, aside from Yellowstone National Park, occur as a result of movement on faults. If the fault has moved within the Quaternary, or last 1.6 million years, the fault is considered to be active. Active faults can be exposed at the surface (**Figure 10.2**) or deeply buried with no significant surface expression. Historically, earthquakes have not been associated with exposed active faults. The exposed active faults, however, have the potential to generate the largest earthquakes. As a result it is necessary to understand both exposed and buried active faults in order to generate a realistic seismological characterization of the state.

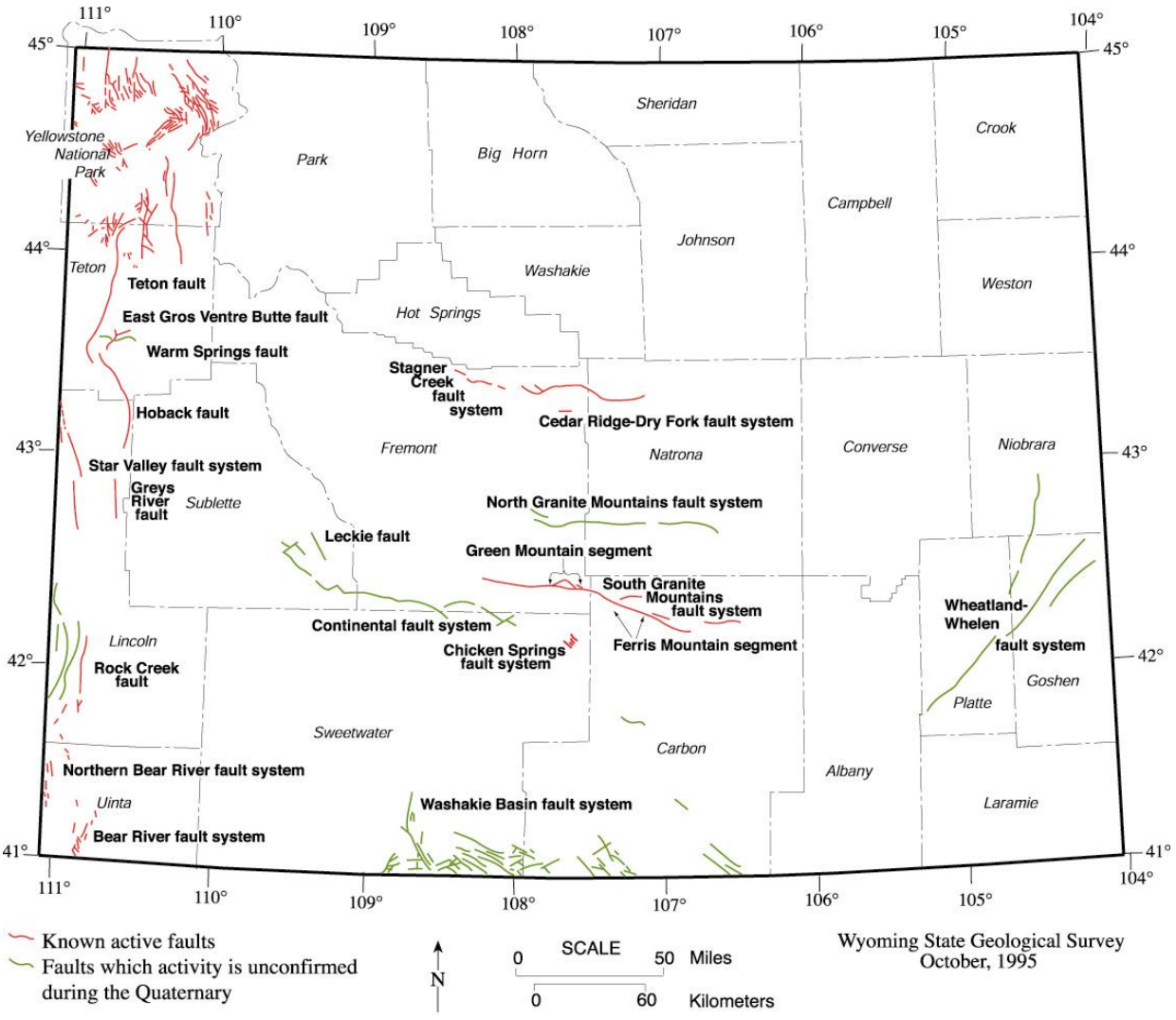


Figure 10.2 Earthquake sources in Wyoming

HISTORY

The enclosed map of "Earthquake Epicenters and Suspected Active Faults with Surficial Expression in Wyoming" (Case etl., 1997) shows the historic distribution of earthquakes in Wyoming. Over thirty magnitude 3.0 and greater earthquakes and hundreds of smaller earthquakes have been recorded in Albany County. Those earthquakes and one from Colorado are discussed below.

Two of the first earthquakes to be felt and recorded in southeast and south central Wyoming, occurred between Laramie, Wyoming and Estes Park, Colorado on November 7-8, 1882. The first and largest earthquake, which occurred on November 7, 1882, was estimated to have a magnitude of 6.2 and a maximum intensity of VII. It was felt over most of Colorado, the southern half of Wyoming, and northeastern Utah (Kirkham & Rogers, 1985). The second earthquake, which occurred on November 8, 1882, was felt from Denver to Laramie. In Laramie, the first event caused considerable concern, and some people ran into the streets. Clocks were stopped, plaster was cracked, and some glass in windows was broken (Case, 1993). Kirkham and Rogers (1985) documented that the earthquake was felt as an intensity VI event in Laramie.

The earliest recorded earthquake that actually originated in Albany County occurred in the Laramie area on January 13, 1898. The intensity IV event shook buildings and rattled dishes, windows, and loose objects in Laramie. Before the shock waves were felt, many Laramie residents reported that they "heard a noise similar to that which a heavy wagon would make moving at a good speed a block or two away" (The Daily Boomerang, January 14, 1898). As the earthquake occurred at 11:45 pm, a number of people were awakened by the shaking of their beds.

Three earthquakes occurred in Albany County in the 1930s. The first two occurred in the Laramie area, and the last occurred in northern Albany County. On September 20, 1931, an earthquake with a maximum intensity of IV was felt in Laramie and at the Summit Tavern, located east-southeast of Laramie in the Laramie Mountains. There were reports from Laramie that windows and dishes rattled, and some residents ran from their homes (The Laramie Republican-Boomerang, September 21, 1931). This event was followed by another intensity IV earthquake on November 10, 1935. This earthquake, thought to have an epicenter in Laramie, was felt in Laramie, Rawlins, and Rock River. In Laramie, buildings shuddered slightly, dishes rattled, and a low rumbling sound was heard. The earthquake lasted less than ten seconds (The Laramie Republican-Boomerang, November 11, 1935). On August 27, 1938, an intensity III earthquake was recorded in northern Albany County. No damage was associated with the event (Neumann, 1940).

No earthquakes were recorded in Albany County in the 1940's, although many occurred in the 1950's. On January 20, 1954, an intensity V earthquake occurred approximately 12 miles north-northeast of Laramie. In Wyoming, the earthquake was felt in Laramie, Fox Park, Albany, Centennial, Jelm, Tie Siding, and Ryan Park. In Colorado, it was felt

near Cowdrey. In fact, Murphy and Cloud (1956) estimated that the earthquake was felt over 2,000 square miles. In Laramie, a roaring noise was heard, buildings shook, and dishes fell from tables. One Laramie resident thought that the earthquake was an explosion, and alerted the local fire department. The local newspaper reported that stories "were getting more colorful by the hour" (The Laramie Republican and Boomerang, January 21, 1954). At Fox Park, a slow motion was observed by all residents. Doors and dishes were rattled, and a post supporting the roof of one house was shifted. In Albany, a rapid motion was felt, with furnishings shifting and windows rattling. The earthquake was reported to have been felt for two minutes in Albany. In Centennial, the earthquake was described as being similar to a heavy dynamite blast (Murphy and Cloud, 1956). In Jelm, a rapid motion that lasted for ten seconds was felt by all residents. An east-to-west motion was described in Jelm. In Tie Siding and Ryan Park, a slow motion was felt for a short period of time. In Cowdrey, Colorado, a rapid motion was felt for fifteen seconds, and hanging objects swung. A few aftershocks were reported in Fox Park and Jelm.

The rest of the 1950's-era earthquakes in Albany County occurred in the Fox Park, Jelm, and Woods Landing area. The first earthquake recorded in that area, an intensity IV event, occurred on January 22, 1954. The earthquake resulted in a very strong but brief shock felt in Jelm (Murphy & Cloud, 1956). On May 22, 1955, an intensity V earthquake near Jelm and Woods Landing caused considerable concern. Many area residents reported hearing a loud rumbling noise, which was then followed by shaking. Dishes, windows, and cupboards rattled in many cabins in the Woods Landing area. Reflecting the fears of the time, one Jelm resident thought that an atomic bomb had dropped on Denver. A group of fishermen camping near Woods Landing reported that they were rolled around in their tent. The earthquake was not felt in Laramie (The Laramie Republican and Boomerang, May 23, 1955; Murphy & Cloud, 1957). On August 6, 1958, an intensity IV earthquake near Fox Park was felt in Fox Park, Laramie, and Centennial. Windows rattled and dishes shook in Fox Park, and one Laramie resident thought there was an explosion in his basement (The Laramie Daily Boomerang, August 7, 1958). This earthquake was followed on August 15, 1958, by an intensity III event in the same general area. Residents in the Centennial area reported that buildings shook (The Laramie Daily Boomerang, August 15, 1958). In Fox Park, a light tremor was felt (Brazee and Cloud, 1960). The last earthquake recorded in the area occurred near Fox Park and Jelm on December 25, 1959. The magnitude 4.3, intensity V event was felt in Fox Park, Jelm, and Laramie. In Fox Park, slight cracks formed in a concrete block building under construction. Many residents of Fox Park felt the earthquake and described it as a pretty strong jolt. At Jelm, the earthquake was felt by all residents, with many reports of creaking walls (Eppley and Cloud, 1961).

Many of the earthquakes in the area have originated in the Laramie Range in northern Albany County and southern Converse County. The first earthquake recorded in the area occurred on August 27, 1938, as discussed previously. The intensity III earthquake, which was located near Marshall, did not cause any damage (Neumann, 1940). On

August 21, 1952, an intensity IV earthquake occurred approximately 7 miles north-northeast of Esterbrook, in Converse County. It was felt by several people in the area, and was reportedly felt 40 miles to the southwest of Esterbrook (Murphy & Cloud, 1954). Three additional earthquakes have occurred in the same location as the August 21, 1952 event. The first, a small magnitude event with no associated magnitude or intensity, occurred on September 2, 1952. The second, an intensity III event, occurred on January 5, 1957. The most recent, an intensity IV event occurred on March 31, 1964. No damage was reported for any of the events. On January 15, 1978, a magnitude 3.0, intensity III earthquake occurred approximately 3 miles northeast of Esterbrook, in Converse County. No damage was reported.

In the 1980's, there were a series of relatively significant earthquakes in northern Albany County that were felt over a wide area. On February 13, 1983, a magnitude 4.0, intensity IV event occurred approximately 6 miles southwest of Toltec. That non-damaging earthquake was felt in Laramie, Casper, Wheatland, and Medicine Bow (Laramie Daily Boomerang, February 15, 1983). The most significant earthquake to occur in the area, a magnitude 5.5, intensity VI event, occurred on October 18, 1984. That earthquake, with an epicenter located approximately 4 miles west-northwest of Toltec, was felt in Wyoming, South Dakota, Nebraska, Colorado, Utah, Montana, and Kansas. A 1985 report documents that cracks were found in the exterior brick walls of the Douglas City Hall and as well as a public school in Medicine Bow. Chimneys were cracked in Casper, Douglas, Guernsey, Lusk, and Rock River. A wall in a Laramie-area school was slightly cracked by the earthquake. The earthquake was one of the largest felt in eastern Wyoming. There were a number of aftershocks to the main event, with the most significant being a magnitude 4.5, intensity IV event, and a magnitude 3.8 event occurring on October 18, 1984; a magnitude 3.5 event on October 20, 1984; magnitude 3.3 events on October 19, November 6, and December 17, 1984; a magnitude 3.1 event on October 22, 1984; a magnitude 3.2 event on October 24, 1984; and a magnitude 2.9 event on December 5, 1984. On June 12, 1986, a magnitude 3.0 earthquake occurred in the same general area.

In 1993, there were a series of non-damaging earthquakes recorded in Northern Albany and southern Converse Counties. On July 23, 1993, a magnitude 3.7, intensity IV earthquake occurred in southern Converse County, approximately 13 miles north-northwest of Toltec in northern Albany County. This event was felt as far away as Laramie. On October 9, 1993, a magnitude 3.7, intensity IV earthquake occurred approximately 9 miles north of Marshall. The earthquake was felt in Garrett. On December 13, 1993, another earthquake occurred approximately 8 miles east of Toltec. This non-damaging event had a magnitude of 3.5.

Only one magnitude 3.0 and greater earthquake has occurred in Albany County in the 2000's. On April 13, 2000, a magnitude 3.3 earthquake occurred in northern Albany

County, approximately 2 miles southwest of Warbonnet Peak. No damage was reported. No earthquakes have been reported since the last time this plan was updated in 2003.

Table 10.1 History of Earthquakes in Albany County

DATE	EVENT	LOCATION	EFFECTS/DAMAGES
November 7, 1882	Earthquake	South WY and Northern Colorado	6.2 Broken Windows and furnishings/structures shifted
November 8, 1882	Earthquake	South WY and Northern Colorado	5.0 broken windows
January 13, 1898	Earthquake	Laramie	4.0 Minor Damage
September 20, 1931	Earthquake	Laramie	4.0 windows and dishes rattled
November 10, 1935	Earthquake	Northern Albany County	Minor rattling
August 27, 1938	Earthquake	Laramie, Rock River, and Rawlins	3.0 no damages
August 21, 1952	Earthquake	Northern Colorado, Southeast WY	4.0 minor damages
September 2, 1952	Earthquake	Northern Colorado and Southeast WY	3.0 no damages
January 20, 1954	Earthquake	Laramie, Fox Park, Jelm, Tie Siding, Ryan park and Colorado	5.0 furnishing shifted, broken dishes
January 22, 1954	Earthquake	Fox Park, Jelm, Woods Landing	4.0 minor damages
May 22, 1955	Earthquake	Jelm and Woods Landing	5.0 Shakings with minor damages
January 5, 1957	Earthquake	Northern Colorado and Southeast WY	3.0 with no damages
August 6, 1958	Earthquake	Fox Park, Centennial, and Laramie,	4.0 windows rattled and dishes shook
August 15, 1958	Earthquake	Centennial and Fox Park	3.0 Minor damages
December 25, 1959	Earthquake	Fox Park, Jelm, and Laramie	4.3 minor cracks
March 31, 1964	Earthquake	Laramie, Casper, Wheatland, and Medicine Bow	4.0 minor damages
January 15, 1978	Earthquake	Laramie, Casper, Wheatland, and Medicine Bow	3.0 no damages
February 13, 1983	Earthquake	Northern Albany County	4.0 no damages
October 18, 1984	Earthquake	WY, CO, NE, UT, MT, KS, and SD	5.5 cracks in foundations
June 12, 1986	Earthquake	Laramie Area	3.0 no damages
July 23, 1993	Earthquake	Northern Albany County	3.7 no damages
October 9, 1993	Earthquake	Garrett, WY	3.7 minor damages
December 13, 1993	Earthquake	Northern Albany County	3.5 no damages
April 13, 2000	Earthquake	Northern Albany	3.3 no damages

UNIFORM BUIDLING CODE (UBC)

The Uniform Building Code is a document prepared by the International Conference of Building Officials. Its stated intent is to "provide minimum standards to safeguard life or limb, health, property, and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location and maintenance of all buildings and structures within this jurisdiction and certain equipment specifically regulated herein."

The UBC contains information and guidance on designing buildings and structures to withstand seismic events. With safety in mind, the UBC provides Seismic Zone Maps to help identify which design factors are critical to specific areas of the country. In addition, depending upon the type of building, there is also an "importance factor". The "importance factor" can, in effect, raise the standards that are applied to a building.

The current UBC Seismic Zone Map (*Figure 10.3*) (1997) has five seismic zones, ranging from Zone 0 to Zone 4, as can be seen on *Figure 10.3*. The seismic zones are in part defined by the probability of having a certain level of ground shaking (horizontal acceleration) in 50 years. The criteria used for defining boundaries on the Seismic Zone Map were established by the Seismology Committee of the Structural Engineers Association of California (Building Standards, September-October, 1986). The criteria they developed are as follows:

The committee assumed that there was a 90% probability that the above values would not be exceeded in 50 years, or a 100% probability that the values would be exceeded in 475 to 500 years.

Albany County is in Seismic Zone 1 of the UBC. Since effective peak accelerations (90% chance of non-exceedance in 50 years) can range from 5%-10%g in Zone 1, and there have been significant historic seismicity in the county, it may be reasonable to assume that an average peak acceleration of 10.0%g could be applied to the design of a non-critical facility located in the County if only the UBC were used. Such acceleration, however, is significantly less than would be suggested through newer building codes.

Recently, the UBC has been replaced by the International Building Code (IBC). The IBC is based upon probabilistic analyses, which are described in a following section. Albany County still uses the UBC, as do most Wyoming Counties as of September 2008.

DETERMINISTIC ANALYSIS OF REGIONAL ACTIVE FAULTS WITH A SUPERFICIAL EXPRESSION

There are no known exposed active faults with a surficial expression in Albany County. As a result, no fault-specific analysis can be generated for Albany County.

FLOATING OR RANDOM EARTHQUAKE SOURCES

Many federal regulations require an analysis of the earthquake potential in areas where active faults are not exposed, and where earthquakes are tied to buried faults with no surface expression. Regions with a uniform potential for the occurrence of such earthquakes are called tectonic provinces. Within a tectonic province, earthquakes associated with buried faults are assumed to occur randomly, and as a result can theoretically occur anywhere within that area of uniform earthquake potential. In reality, that random distribution may not be the case, as all earthquakes are associated with specific faults. If all buried faults have not been identified, the distribution has to be considered random. "Floating earthquakes" are earthquakes that are considered to occur randomly in a tectonic province.

It is difficult to accurately define tectonic provinces when there is a limited historic earthquake record. When there are no nearby seismic stations that can detect small-magnitude earthquakes, which occur more frequently than larger events, the problem is compounded. Under these conditions, it is common to delineate larger, rather than smaller, tectonic provinces.

The USGS identified tectonic provinces in a report titled "Probabilistic Estimates of Maximum Acceleration and Velocity in Rock in the Contiguous United States" (Algermissen and others, 1982). In that report, Albany County was roughly classified as being in the "Faulted Laramie-Age Mountain Uplift" tectonic province. That province was assigned a "floating earthquake" with a maximum magnitude of 6.1. Geomatrix (1988b) suggested using a more extensive regional tectonic province, called the "Wyoming Foreland Structural Province", which is approximately defined by the Idaho-Wyoming Thrust Belt on the west, 104° West longitude on the east, 40° North latitude on the south, and 45° North latitude on the north. Geomatrix (1988b) estimated that the largest "floating" earthquake in the "Wyoming Foreland Structural Province" would have a magnitude in the 6.0 – 6.5 range, with an average value of magnitude 6.25.

Federal or state regulations usually specify if a "floating earthquake" or tectonic province analysis is required for a facility. Usually, those regulations also specify at what distance a floating earthquake is to be placed from a facility. For example, for uranium mill tailing sites, the Nuclear Regulatory Commission requires that a floating earthquake be placed 15 kilometers from the site. That earthquake is then used to determine what horizontal accelerations may occur at the site. A magnitude 6.25 "floating" earthquake, placed 15 kilometers from any structure in Albany County, would generate horizontal accelerations of approximately 15%g at the site. That acceleration would be adequate for designing a uranium mill tailings site, but may be too large for less critical sites, such as landfill areas. Critical facilities, such as dams, usually require a more detailed probabilistic analysis of random earthquakes. Based upon probabilistic analyses of random earthquakes in an area distant from exposed active faults (Geomatrix, 1988b), placing a

magnitude 6.25 earthquake at 15 kilometers from a site will provide a fairly conservative estimate of design ground accelerations.

PROBALISTIC SEISMIC HAZARD ANALYSIS

The U.S. Geological Survey (USGS) publishes probabilistic acceleration maps for 500-, 1000-, and 2,500-year time frames. The maps show what accelerations may be met or exceeded in those time frames by expressing the probability that the accelerations will be met or exceeded in a shorter time frame. For example, a 10% probability that acceleration may be met or exceeded in 50 years is roughly equivalent to a 100% probability of exceedance in 500 years.

The USGS has recently generated new probabilistic acceleration maps for Wyoming (Case, 2000). Copies of the 500-year (10% probability of exceedance in 50 years), 1000-year (5% probability of exceedance in 50 years), and 2,500-year (2% probability of exceedance in 50 years) maps are attached. Until recently, the 500-year map was often used for planning purposes for average structures, and was the basis of the most current UBC. The new IBC, however, uses a 2,500-year map as the basis for building design. The attached maps reflect current perceptions on seismicity in Wyoming. In many areas of Wyoming, ground accelerations shown on the USGS maps can be increased due to local soil conditions. For example, if fairly soft, saturated sediments are present at the surface, and seismic waves are passed through them, surface ground accelerations will usually be greater than would be experienced if only bedrock were present. In this case, the ground accelerations shown on the USGS maps would underestimate the local hazard, as they are based upon accelerations that would be expected if firm soil or rock were present at the surface.

Based upon the 500-year map (10% probability of exceedance in 50 years) (***Figure 10.3***), the estimated peak horizontal acceleration in Albany County ranges from 3%g in the southeastern corner of the County to approximately 7%g in the northwestern corner of the County. Those accelerations are roughly comparable to intensity IV earthquakes (1.4%g – 3.9%g) to intensity V earthquakes (3.9%g – 9.2%g). These accelerations are comparable to the low end of accelerations to be expected in Seismic Zone 1 of the UBC. Intensity IV earthquakes cause little damage. Intensity V earthquakes may result in cracked plaster and broken dishes. Laramie would be subject to an acceleration of approximately 5%g or intensity V.

Based upon the 1000-year map (5% probability of exceedance in 50 years) (***Figure 10.5***), the estimated peak horizontal acceleration in Albany County ranges from 6%g in the southeastern corner of the County to nearly 13%g in the northwestern corner of the County. Those accelerations are roughly comparable to intensity V earthquakes (3.9%g – 9.2%g) to intensity VI earthquakes (9.2%g -18.0%g). Intensity V earthquakes can result in cracked plaster and broken dishes. Intensity VI earthquakes can result in fallen plaster

and damaged chimneys. Laramie would be subjected to an acceleration of approximately 7%g or intensity V.

Based upon the 2500-year map (2% probability of exceedance in 50 years) (***Figure 10.6***), the estimated peak horizontal acceleration in Albany County ranges from 11%g in the southeastern corner of the County to over 21%g in the entire north central part of the County. Those accelerations are roughly comparable to intensity VI earthquakes (9.2%g – 18.0%g) to intensity VII earthquakes (18%g-34%g). Intensity VI earthquakes can result in fallen plaster and damaged chimneys. Intensity VII earthquakes can result in slight to moderate damage in well-built ordinary structures and considerable damage in poorly built or badly designed structures. Chimneys may be broken. Laramie would be subjected to an acceleration of approximately 12%g or intensity VI.

As the historic record is limited, it is nearly impossible to determine when a 2,500-year event last occurred in the County. Because of the uncertainty involved, and based upon the fact that the new IBC utilizes 2,500-year events for building design, it is suggested that the 2,500-year probabilistic maps be used for Albany County analyses. This conservative approach is in the interest of public safety.

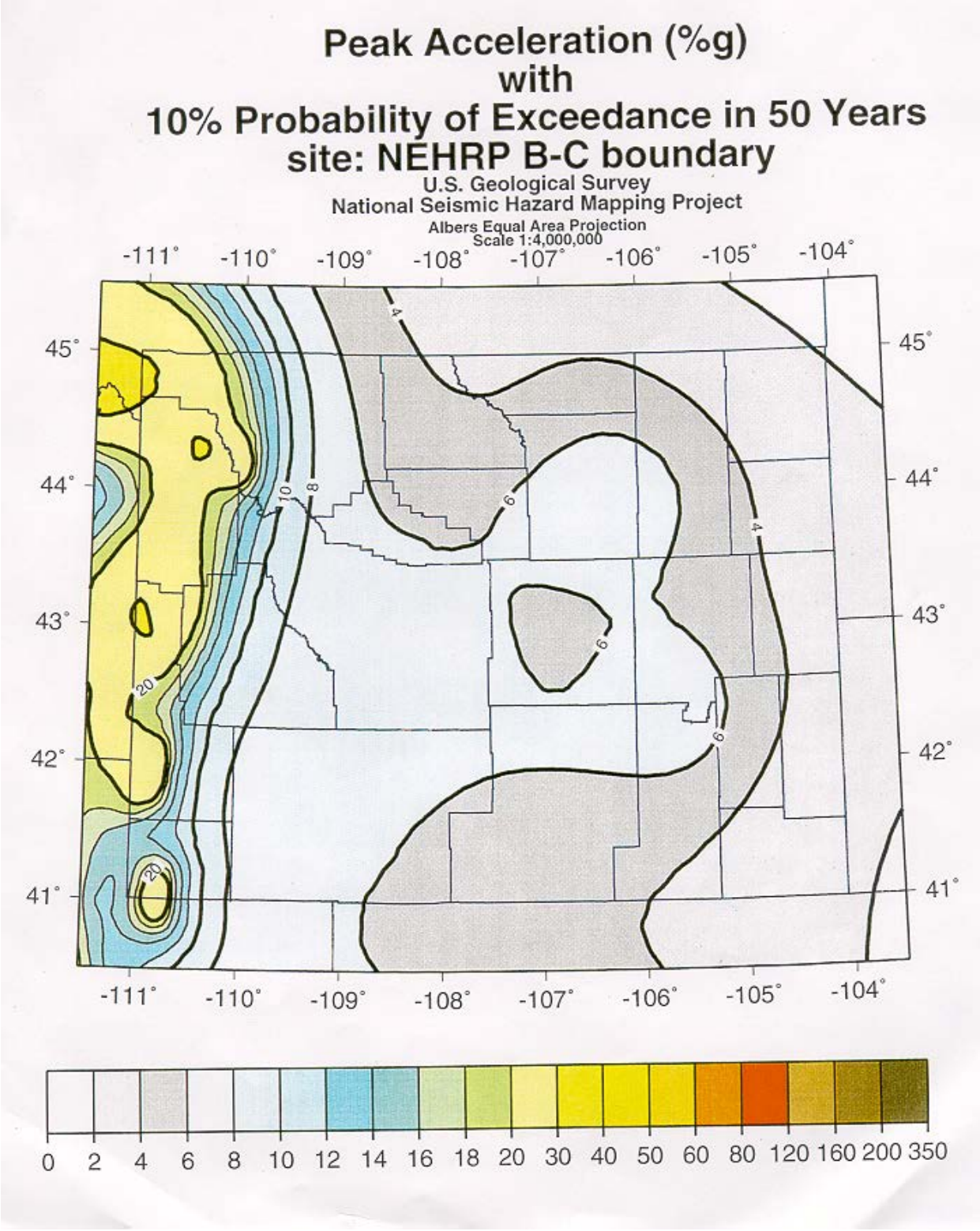


FIGURE 10.3 500-year probabilistic acceleration map (10% probability of exceedance in 50 years).

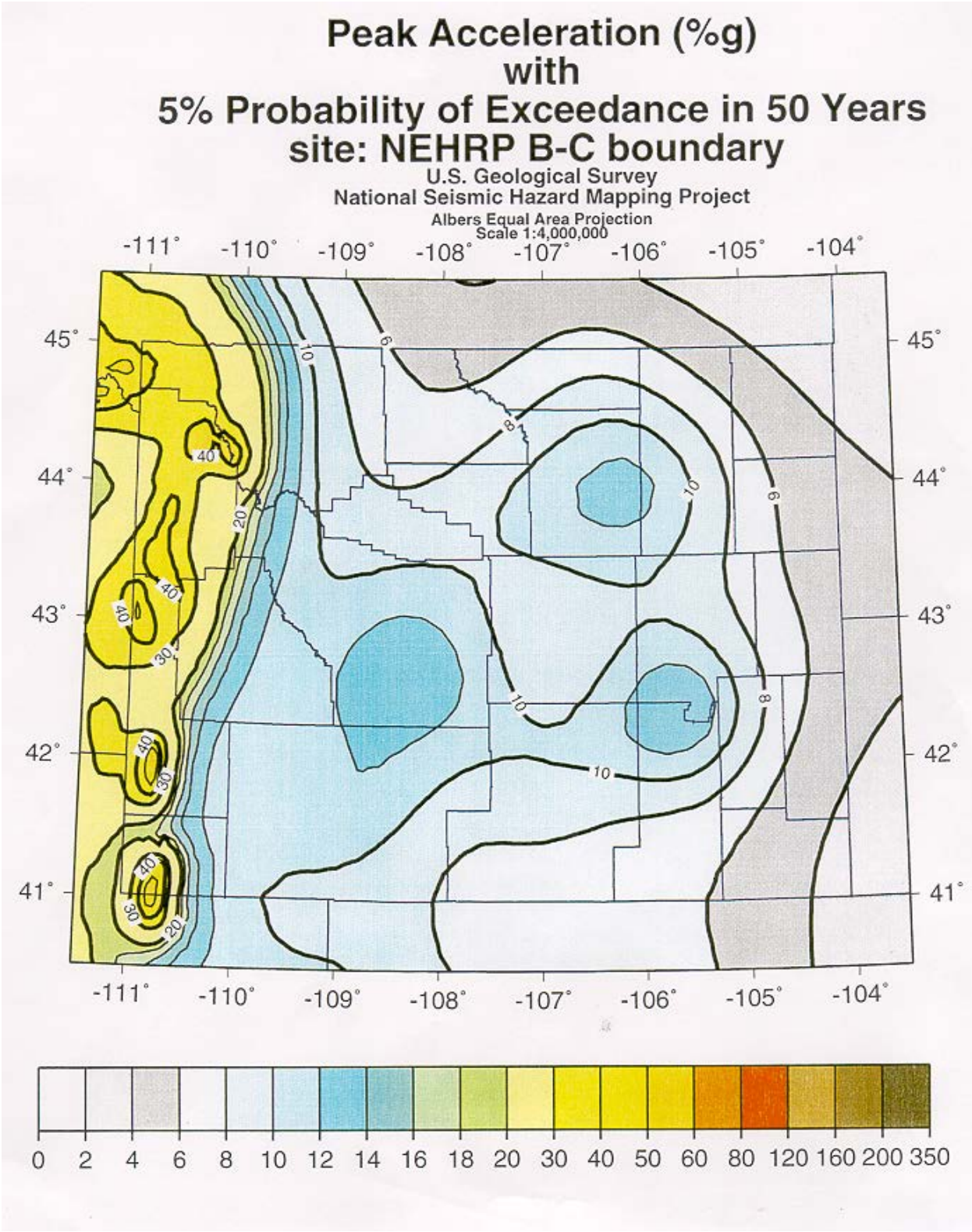


FIGURE 10.4. 1000-year probabilistic acceleration map (5% probability of exceedance in 50 years).

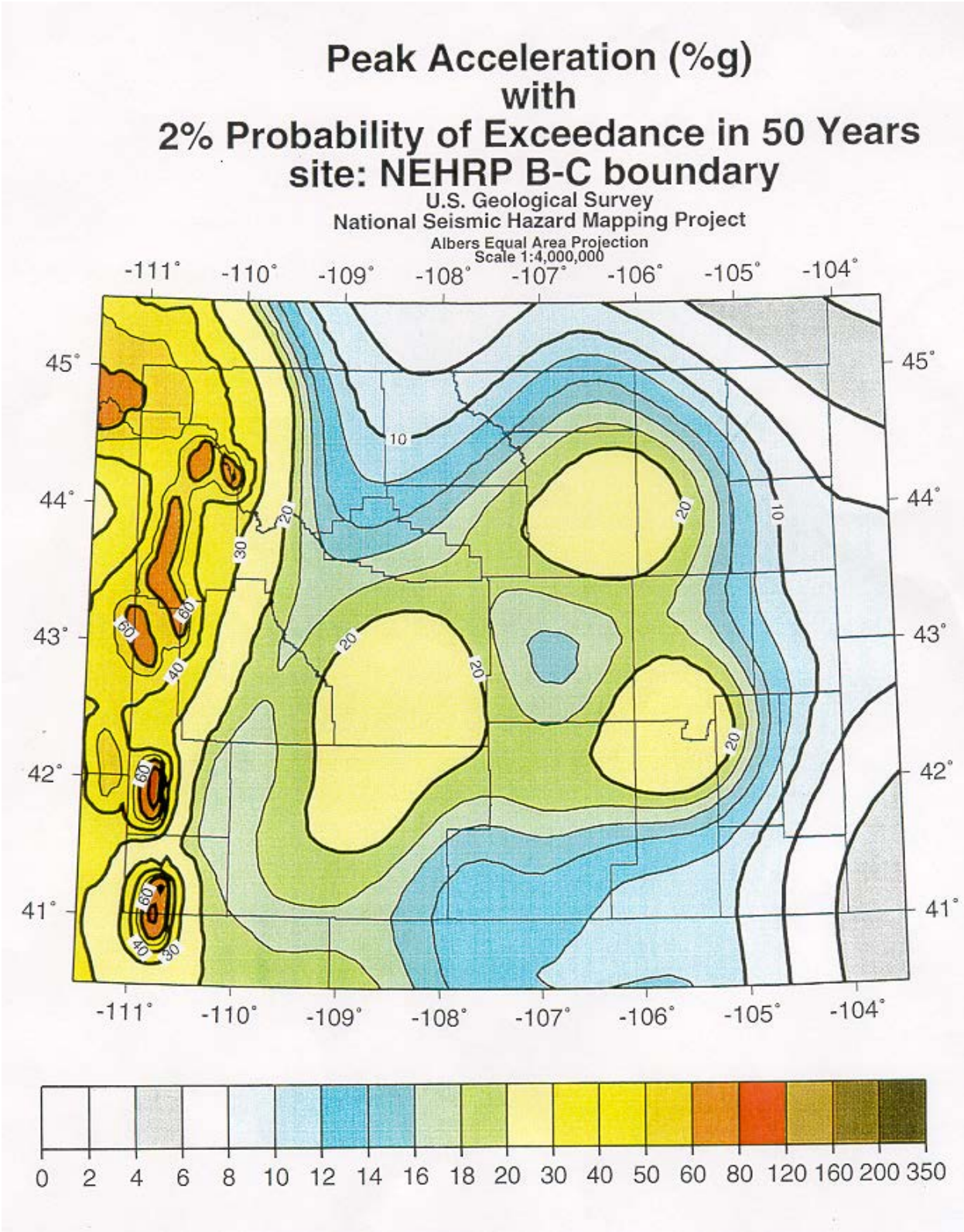


FIGURE 10.5 2500-year probabilistic acceleration map (2% probability of exceedance in 50 years).

IMPACTS

There have been over thirty historic earthquakes with magnitudes greater than magnitude 3.0 recorded in or near Albany County, with the largest being a magnitude 6.2-6.5 event in 1882 between Laramie and Estes Park, Colorado. Because of the limited historic record, it is possible to underestimate the seismic hazard in Albany County if historic earthquakes are used as the sole basis for analysis. Earthquake and ground motion probability maps give a more reasonable estimate of damage potential in areas without exposed active faults at the surface, such as Albany County.

Current earthquake probability maps that are used in the newest building codes suggest a scenario that would result in moderate damage to buildings and their contents, with damage increasing from the southeast to the north-northwest. More specifically, the probability-based worst-case scenario could result in the following damage at points throughout the County:

Intensity VII Earthquake Area

Toltec area
Esterbrook area
Marshall
Rock River

For intensity VII earthquakes, damage is "negligible" in buildings of good design and construction, "slight-to-moderate" in well-built ordinary structures, and "considerable" in poorly built or badly designed structures such as un-reinforced masonry buildings. Some chimneys will be broken.

Intensity VI Earthquake Areas

Laramie area
Jelm
Fox Park
Centennial
Albany
Woods Landing
Bosler
Buford
Tie Siding

In intensity VI earthquakes, some heavy furniture can be moved. There may be some instances of fallen plaster and damaged chimneys.

HAZUS 99-SR2: Earthquake Event Report

Region Name:	Albany County
Earthquake Scenario:	2500 Year Probabilistic Mag 6.5 Event
Print Date:	Tuesday, March 25, 2003

Disclaimer:

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

GENERAL DESCRIPTION the Region

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. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery. The earthquake loss estimates provided in this report were based on regions that include 1 county (ies) from the following state:

- Wyoming

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 4,308 square miles and contains 14 census tracts. There are over 12 thousand households in the region and has a total population of 30,800 people (1990 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 10 thousand buildings in the region with a total building replacement value (excluding contents) of 1,392 million dollars (1994 dollars). Approximately 97% of the buildings (and 81% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 6,309 and 3,936 million dollars (1994 dollars), respectively.

Building Inventory

HAZUS estimates that there are 10,000 buildings in the region which have an aggregate total replacement value of 1,392 million dollars (1994 dollars). **Figure 10.6** presents the relative distribution of the value with respect to the general occupancies.

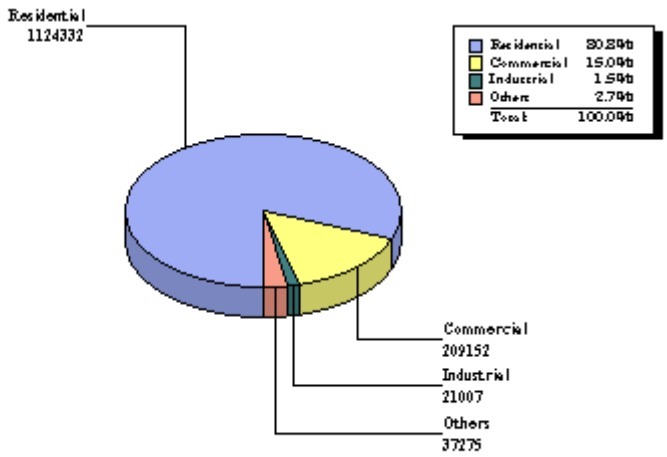


Figure 10.6 Building Exposures by Occupancy Type
(Thousands of dollars)

In terms of building construction types found in the region, wood frame construction makes up 73% of the building inventory.
The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police station and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants, and hazardous material sites.

For essential facilities, there are 7 hospitals and/or emergency care facilities in the region with a total bed capacity of 309 beds. There are 126 schools, 10 fire stations, 5 police stations and 1 emergency operation facility. With respect to HPL facilities, there are 84 dams identified within the region. Of these, 1 of the dams is classified as 'high hazard'. The inventory also includes 51 hazardous material sites, 0 military installations, and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry, and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power, and communications. The lifeline inventory data is provided in Tables 8 and 9.

The total value of the lifeline inventory is over 6,357 million dollars. This inventory includes over 507 kilometers of highways, 130 bridges, and 0 kilometers of pipes.

Table 10.2: Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (Millions of dollars)
Highway	Major Roads	30	5,070
	Bridges	129	429
	Tunnels	0	0
		Subtotal	5,499
Railways	Rail Tracks	183	518
	Bridges	1	5
	Tunnels	0	0
	Facilities	1	3
		Subtotal	526
Light Rail	Rail Tracks	0	0
	Bridges	0	0
	Tunnels	0	0
	Facilities	0	0
		Subtotal	0
Bus	Facilities	0	0
Ferry	Facilities	0	0
Port	Facilities	0	0
Airport	Facilities	4	32
	Runways	9	252
		Subtotal	284
		Total	**6,309**

Table 10.3: Utility System Lifeline inventory

System	Component	# Locations / Segments	Replacement value (Millions of dollars)
Potable Water	Pipelines	0	0.0
	Facilities	0	0.0
	Distribution Lines	*NA*	1,597.6
		Subtotal	1,597.6
Waste Water	Pipelines	0	0.0
	Facilities	0	0.0
	Distribution Lines	*NA*	958.5
		Subtotal	958.5
Natural Gas	Pipelines	3	0.0
	Facilities	0	0.0
	Distribution Lines	*NA*	639.0
		Subtotal	639.0
Oil Systems	Pipelines	2	12.1
	Facilities	0	0.0
		Subtotal	12.1
Electrical Power	Facilities	0	0.0
	Distribution Lines	*NA*	479.3
		Subtotal	479.3
Communication	Facilities	18	36.0
	Distribution Lines	*NA*	213.0
		Subtotal	249.0
		Total	3,935.5

Earthquake Scenario

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	2500 Year Probabilistic Mag 6.5 Event
Type of Earthquake	Probabilistic event
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	7
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	6.50
Depth (Km)	NA
Rupture Length (Km)	
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

HAZUS estimates that about 879 buildings will be moderately or extensively damaged. This is 8.79% of the total number of buildings in the region. There are an estimated 26 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 9.4 below summaries the expected damage by general occupancy for the buildings in the region. Table 9.5 summaries the expected damage by general building type.

Table 10.4: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Residential	6,957	97.67	1,757	98.16	730	96.05	116	97.48	26	
Commercial	125	1.75	28	1.56	25	3.29	3	2.52	0	0.00
Industrial	15	0.21	2	0.11	2	0.26	0	0.00	0	0.00
Agriculture	7	0.21	0	0.00	0	0.00	0	0.00	0	0.00
Religion	10	0.14	2	0.00	2	0.26	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	9	0.13	1	0.06	1	0.13	0	0.00	0	0.00
Total	**7,123**		**1,790**		**760**		**119**		**26**	

Table 10.5: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	53	0.7	13	0.7	10	1.3	1	0.8	0	0.0
Mobile Homes	714	10.0	436	24.4	411	54.1	97	82.2	19	76.0
Precast Concrete	32	0.4	7	0.4	7	0.9	1	0.8	0	0.0
RM*	416	5.8	79	4.4	84	11.1	17	14.4	6	24.0
Steel	54	0.8	4	0.2	8	1.1	0	0.0	0	0.0
URM*	58	0.8	30	1.7	17	2.2	2	1.7	0	0.0
Wood	5,796	81.4	1,221	68.2	223	29.3	0	0.0	0	0.0

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry

Essential Facility Damage

Before the earthquake, the region had 309 hospital beds available for use. On the day of the earthquake, the model estimates that only 201 hospital beds (65%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 77% of the beds will be back in service. By 30 days, 91% will be operational.

Table 10.6: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		Least Moderate Damage > 50%	Complete Damage > 50%	Functionality > 50% at day 1
Hospitals	7	0	0	7
Schools	126	0	0	121
EOCs	1	0	0	1
Police Stations	5	0	0	5
Fire Stations	10	0	0	7

Transportation and Utility Lifeline Damage

Table 10.7 provides damage estimates for the transportation system.

Table 10.7: Expected Damage to the Transportation Systems

System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 % After Day 1	With Functionality > 50 % After Day 7
Highway	Roads	30			30	30
	Bridges	129	0	0	129	129
	Tunnels	0	0	0	0	0
Railways	Tracks	0			183	183
	Bridges	1	0	0	1	1
	Tunnels	0	0	0	0	0
	Facilities	1	0	0	1	1
Light Rail	Tracks	0			0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	4	1	0	4	4
	Runways	9	0	0	9	9

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 10.8-10.10 provide information on the damage to the utility lifeline systems. **Table 10.10** provides damage to the utility system facilities. **Table 10.11** provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. **Table 10.12** provides a summary of the system performance information.

Table 10.8: Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	With Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	0	0	0	0	0
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	18	4	0	18	18
Total	**18**	**4**	**0**	**18**	**18**

Table 10.9: Expected Utility System Pipeline Damage

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	0	0	0
Waste Water	0	0	0
Natural Gas	0	0	0
Oil	73	3	1
Total	73	3	1

Table 10.10: Expected Portable Water and Electric Power System Performance (Level 1)

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	12,010	5,566	5,471	5,275	4,037	493
Electric Power	12,010	5,061	1,814	326	0	0

Induced Earthquake Damage

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 2 ignitions that will burn about 10 sq. mi (0.1% of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 million dollars of building value.

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) brick/wood and b) reinforced concrete/steel. 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 0.04 million tons of debris will be generated. Of the total amount, brick/wood comprises 29% of the total, with the remainder being reinforced concrete/steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 1,000 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

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 40 households to be displaced due to the earthquake. Of these, 32 people (out of a total population of 30,800) will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum;

Table 10.11: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
4. **A**	**Residential**	15	3	0	1
	Non-Residential	1	0	0	0
	Commute	0	0	0	0
	Total	16	3	0	1
5. **P**	**Residential**	3	0	0	
	Non-Residential				
	Commute				
	Total	46			
5 PM	**Residential**				
	Non-Residential				
	Commute				
	Total				

Economic Loss

The total economic loss estimated for the earthquake is 73 million dollars, which represents 1 % of the total replacement value of the region's buildings.

Building-Related 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 64 million dollars. 25% of the estimated losses were related to the business interruption of the region. The largest loss was sustained by the residential occupancies which made up over 62% of the total loss. **Table 10.12** below provides a summary of the losses associated with the building damage.

Table 10.12: Building-Related Economic Loss Estimates

(Millions of dollars)

	Area	Residential	Commercial	Industrial	Others	Total
Building Loss	Structural					
	Non-Structural					
	Content					
	Inventory					
	Subtotal		10.9	1.2	2.1	
Business Interruption Loss	Wage					
	Income					
	Rental					
	Relocation	2.9	2.1	0.1	0.0	5.8
	Subtotal	44	11	2	3	
	Total	39.4	20.2	1.4	3.0	63.9
			11	2	3	
		3	1	0	0	
		16	4	1	1	
				0		

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. **Tables 10.13 & 10.14** provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. **Table 10.13** presents the results of the region for the given earthquake.

Table 10.13: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Roads	5,070.4	0.0	0.0
	Bridges	429.0	0.0	0.0
	Tunnels	0.0	0.0	0.0
	Subtotal	5,499.4	0.0	0.0
Railways	Tracks	517.6	0.0	0.0
	Bridges	5.0	0.3	5.7
	Tunnels	0.0	0.0	0.0
	Facilities	3.0	0.2	7.3
	Subtotal	525.6	0.5	0.1
Light Rail	Tracks	0.0	0.0	0.0
	Bridges	0.0	0.0	0.0
	Tunnels	0.0	0.0	0.0
	Facilities	0.0	0.0	0.0
	Subtotal	0.0	0.0	0.0
Bus	Facilities	0.0	0.0	0.0
Ferry	Facilities	0.0	0.0	0.0
Port	Facilities	0.0	0.0	0.0
Airport	Facilities	32.0	3.5	10.9
	Runways	252.0	0.0	0.0
	Subtotal	284.0	3.5	1.2
		6,309.0	**4.0**	**0.1**

Table 10.14: Utility System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0	0.0	0.0
	Facilities	0.0	0.0	0.0
	Distribution Lines	1,597.6	*NA*	*NA*
	Subtotal	1,597.6	0.0	0.0
Waste Water	Pipelines	0.0	0.0	0.0
	Facilities	0.0	0.0	0.0
	Distribution Lines	958.5	*NA*	*NA*
	Subtotal	958.5	0.0	0.0
Natural Gas	Pipelines	0.0	0.0	0.0
	Facilities	0.0	0.0	0.0
	Distribution Lines	639.0	*NA*	*NA*
	Subtotal	639.0	0.0	0.0
Oil Systems	Pipelines	12.1	0.0	0.0
	Facilities	0.0	0.0	0.0
	Subtotal	12.1	0.0	0.01
Electrical Power	Facilities	0.0	0.0	0.0
	Distribution Lines	479.3	*NA*	*NA*
	Subtotal	479.3	0.0	0.0
Communication	Facilities	36.0	4.7	13.1
	Distribution Lines	213.0	*NA*	*NA*
	Subtotal	249.0	4.7	13.1
	Total	**3,935.5**	**4.7**	**0.7**

Table 10.15. Indirect Economic Impact
(With outside aid)

Year(s)	1	2	3	4	5	6-15
Income Impact (millions $)	0	-1	5	5	5	5
% Income Impact	-0.11	-0.33	1.33	1.33	1.33	1.33
Employment Impact (#)	0	0	303	303	303	303
% Employment Impact	0.00	0.00	1.98	1.98	1.98	1.98

Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Wyoming	Albany	30,800	1,120	270	1,390
State Total		*30,800*	*1,120*	*270*	*1,390*
Region Total		**30,800**	**1,120**	**270**	**1,390**

Direct Economic Losses for Buildings

March 25, 2003 *All values are in thousands of dollars*

	Capital Stock Losses					Income Losses				
	Cost Structural Damage	Cost Non-struct. Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	Total Loss
Wyoming										
Albany	6,626	27,576	13,307	182	2.46	5,762	3,024	3,718	3,751	63,946
Total State	**6,626**	**27,576**	**13,307**	**182**	**2.46**	**5,762**	**3,024**	**3,718**	**3,751**	**63,946**
Study Region Total	**6,626**	**27,576**	**13,307**	**182**	**2.46**	**5,762**	**3,024**	**3,718**	**3,751**	**63,946**

TABLE 10.16 Direct Economic Losses for buildings

SUMMARY

PROPERTY AFFECTED: Medium

POPULATION AFFECTED: Medium

PROBABILITY: Low-Medium

JURIDISDICTION AFFECTED: Both the jurisdictions of Laramie and Rock River are affected as well as the outlying communities of Albany County.

Figure 11.1 The Laramie River meanders across its floodplain in Albany County, Wyoming, 1949.

Floods can and have caused significant damage in Wyoming and are one of the more significant natural hazards in the state (**Figure 11.2**). They can cause millions of dollars in damage in just a few hours. Every county and many communities in the state have experienced some kind of flooding after spring rains, heavy thunderstorms, winter snow thaws, or ice jams. A flood, as defined by the National Flood Insurance Program (NFIP), is a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from overflow of waters, unusual and rapid accumulation or runoff of surface waters from any source, or a mudflow. Floods can be slow or fast rising, but generally develop over a period of many hours or days.

Floods can also occur with little or no warning and can reach full peak in only a few minutes. Such floods are called flash floods. A flash flood usually results from intense storms dropping large amounts of rain within a brief period. Floods can occur for reasons other than precipitation or rapidly melting snow. They can also occur because of ice jams or natural and man-made dam failures, both of which have occurred in Wyoming.

HISTORY

Flooding is an event that can happen anytime in Albany County. Dams break, snow melts, and ice jams and flashfloods occur, all creating a potential for flooding in the local jurisdictions and outlying communities. The abbreviated flood history below (**Table 11.1**) was in large part derived from the monthly storm data reports generated and

released by the National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC). Other sources are unpublished reports from the Wyoming Office of Homeland Security, newspaper accounts, and periodicals from public libraries. The table represents floods that have caused damage, injuries, or loss of life in Albany County. Not all flood activity is reported. As a result this chart may not represent an accurate flood history in Albany County. The last flooding to be documented was in 2006 when the Laramie River flooded, but did not cause damage to any infrastructures in the area and thus was not included in the chart below. The Laramie River typically reaches its banks in May and June and will have minor flooding along the floodplain areas.

Table 11.1 Albany County Flood History 1905-current

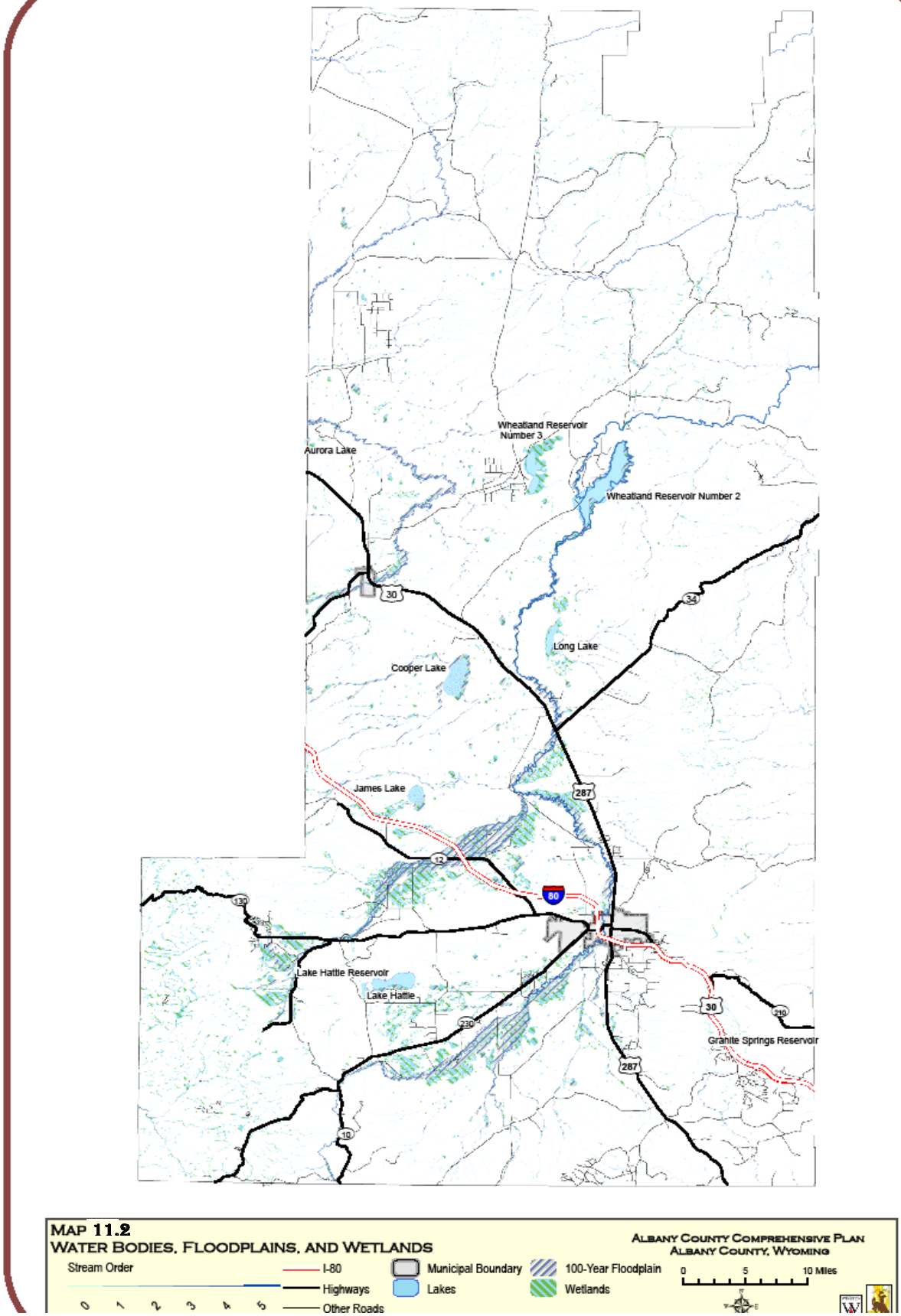
Date	County	Location	Deaths/Injuries	Information
5/8/1905	Albany	Spring Creek		Overflowing of the creek caused by thunderstorms occurring throughout the watershed during the spring and summer resulting in a flood damaging property and interrupting transportation due to roads being washed out.
6/12/1923	Albany	Laramie River		Snowmelt probably combined with rainfall runoff resulted in a flood 25- to a greater than 100 year flood.
9/1/1938	Albany	Southeast, Central WY		Some Damage was reported from the heavy rains to highways and bridges in the southeast and central portion of the state.
6/8/1945	Albany	Laramie		Moderate to heavy storms occurred in Laramie on the 8th and 22nd. These storms resulted in considerable damage to crops, gardens and vegetation.
6/22/1945	Albany	Laramie		Moderate to heavy storms occurred in Laramie on the 8th and 22nd. These storms resulted in considerable damage to crops, gardens and vegetation.
7/28/1953	Albany			A flash flood in Northern Albany County destroyed some buildings and machinery.

7/29/1953	Albany	Laramie	1 death	Cloudburst caused a flash flood down canyon where there was damage to roads, ranches, outbuildings, fences, haystacks, corrals, and machinery. There was $1800 total damage to national forest: roads $1000, meadows $500 and springs $300. Major through-fare over $30,000, loss of livestock: cows, calves, and horses. Pioneer residents remembered this as the heaviest rain.
7/30/1953	Albany	North Albany County	1 death	On the afternoon of the 30th, a cloudburst just east of Laramie, sent flood waters roaring down Telephone Canyon. A car was caught on Highway 30, in the canyon, and one of the passengers was killed. The car itself was tumbled about a half mile by raging waters. Damage to the highway was estimated at $25,000.
7/28/1955	Albany	East of Laramie		On the 28th, the observer at the Double Four Ranch noted that cloudburst west of Garrett on the headwaters of the North Laramie River the day before had caused damage, and threat the river rose 6-8 feet about midnight, washing out a dam and flooding ditches in his locality.
6/9/1957	Albany	Double Four Ranch		Flooding from late spring, slow melt then high temperatures with falling rain channel not kept clear because of drought years; silt deposited and debris collected. This caused quarries to be flooded; bridges, culverts washed out, flooding of homes (West Sheridan); ranch buildings damaged; families evacuated. This was a greater than 80 year flood that had a discharge of 3800 cubic feet per second at Pioneer Dam 25 miles southwest of Laramie according to WEMA, Laramie Boomerang, Flood Damage inventory. FEMA flood insurance study October 16, 1996 set the discharge amount to 3250 CFS.

6/10/1970	Albany		Flooding from the Laramie River caused $125,000 worth in damages
7/23/1984	Albany	Laramie River	Flash flooding from a late evening thunderstorm in East Laramie did thousands of dollars in damage to residences and businesses. The 100 year storm produced 1.04 inches of water in less than 24 hours. A wall of water breached dike, and storm sewers overloaded. Damage to residences and businesses estimated to be thousands of dollars. The University of Wyoming damage estimated to be $100,000. Wyoming school of Gymnastics estimated to be $12,000. Five percent of Laramie homes were damaged as well as flood channels damaged with erosion to bridges.
8/15/1984	Albany	Laramie	Thunderstorms dumped up to 1.67 inches of rain in an hour long deluge across Laramie. Damage to basements of houses, cars, and a just completed flood channel. Damages estimated at $22,500
7/19/1985	Albany		Storms dumped up to 1.26 inches of rain in Laramie, causing minor urban flooding. Two confirmed funnel clouds were also reported. One was west and the other was southwest, of Laramie at a distance of about 10 miles. Damages estimated at $22,500.

6/10/1986	Albany/Carbon County	35 NW Laramie	Pierce Dam failed at 1941 MST, spilling its contents into Rock Creek. This was about 35 miles northwest of Laramie along the Albany and Carbon County line. A bridge over Rock Creek along Wyoming Highway 13 was undercut. There was some flooding of buildings and ranch lands where Rock Creek runs into the Medicine Bow River. Damages estimated at $225,000.
8/20/1990	Albany/Platte County	25 miles SW Wheatland	A small but intense thunderstorm dumped up to 4 inches of rain and small hail just east of the Sybille Research Center. Water filled normally dry creeks, with Wyoming Highway 34 covered with up to 4-5 feet of water in some spots. Some bridges and corrals were washed out on ranches. Damages estimated to be $22,500.

Table 11.2 – County Rankings by Flood Damage						
County	**Total Dollar Damage Year of Event USD**	**Property Damage Year of Event USD**	**Crop Damage Year of Event USD**	**Injuries**	**Deaths**	**Total Dollar Damage 2006 USD**
Laramie	66,563,000	66,443,000	120,000	70	16	131,589,788
Platte	3,334,225	3,009,225	325,000	0	11	28,407,328
Big Horn	3,298,250	1,046,000	2,252,250	0	0	20,765,128
Fremont	1,936,725	1,914,225	22,500	0	3	15,167,689
Natrona	4,702,500	4,702,500	0	0	33	14,678,502
Carbon	5,002,250	5,002,250	0	0	0	9,382,564
Park	2,803,250	2,803,250	0	0	0	7,328,517
Goshen	3,420,000	3,060,000	360,000	0	0	7,188,033
Sheridan	867,000	866,000	1,000	0	1	7,152,228
Converse	1,181,500	1,181,500	0	0	1	6,257,044
Sweetwater	2,373,725	2,373,725	0	1	1	5,059,161
Campbell	1,923,748	1,922,725	1,023	0	1	4,501,091
Johnson	1,049,900	1,048,900	1,000	1	0	2,805,056
Teton	290,000	290,000		0	0	2,493,997
Hot Springs	394,750	349,750	45,000	0	0	1,902,375
Washakie	381,500	336,500	45,000	0	0	749,306
Albany	**215,600**	**215,600**	**0**	**0**	**2**	**740,008**
Crook	147,750	99,500	48,250	0	0	358,431
Sublette	20,000	20,000	0	0	0	150,376
Niobrara	44,500	42,250	2,250	0	0	70,396
Lincoln	32,500	22,500	10,000	0	0	47,759
Uinta	22,500	22,500	0	0	0	4,173
Weston	100,500	100,500	0	0	0	3,759
Regional	27,498,500	26,751,000	747,500	0		94,852,191
Total	**127,604,173**	**123,623,400**	**3,980,773**	**72**	**69**	**361,654,900**


Wheatland Reservoir Number 3
Aurora Lake
Wheatland Reservoir Number 2
Long Lake
Cooper Lake
James Lake
Lake Hattie Reservoir
Lake Hattie
Granite Springs Reservoir
30
34
287
80
130
210
12
10
MAP 11.2
WATER BODIES, FLOODPLAINS, AND WETLANDS
ALBANY COUNTY COMPREHENSIVE PLAN
ALBANY COUNTY, WYOMING
Stream Order
I-80
Highways
Other Roads
Municipal Boundary
Lakes
100-Year Floodplain
Wetlands
0 5 10 Miles

IMPACTS

Floods and flood damage have occurred in every county in Wyoming. **Table 11.2** shows the distribution of the amount of crop, property and total damage in reported dollars (year of event) and in 2006 dollars to adjust for inflation, as well as the number of injuries and deaths associated with floods. The total documented flood damage for 1905 to present is over $127.6 million. In 2006 dollars the damage would be over $361.6 million. **Table 11.2** also shows the ranking of counties based upon dollar damages in 2006 dollars. No obvious regional patterns for floods can be determined from **Table 11.2.**

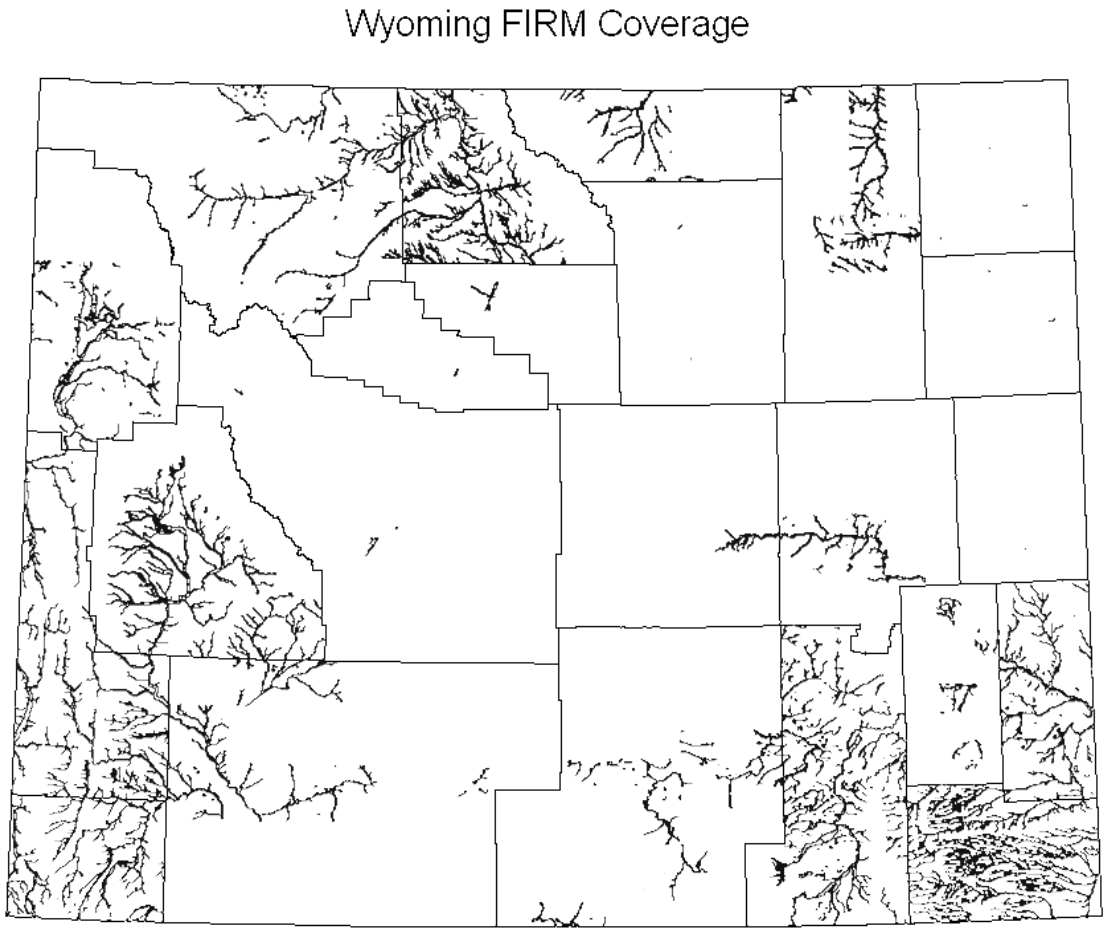


Figure 11.3—Wyoming Flood Insurance Rate Map (FIRM) Coverage.

Table 11.3 – Flood-Related Building Exposure Values Ranked by County	
County	**FIRM Building Exposure Value (USD)**
Teton	597,409,612
Natrona	587,434,021
Laramie	475,872,824
Sweetwater	311,450,629
Albany	**178,977,772**
Uinta	129,531,065
Sheridan	128,679,116
Converse	108,588,751
Campbell	93,879,876
Lincoln	76,773,848
Washakie	50,151,680
Park	45,051,824
Carbon	40,950,298
Fremont	38,890,385
Sublette	36,685,817
Big Horn	29,704,350
Hot Springs	26,577,959
Goshen	26,552,574
Platte	22,324,450
Johnson	17,477,646
Crook	11,243,224
Weston	10,981,061
Niobrara	1,866,236
Total	**3,047,055,018**

Table 11.4—Composite Ranking of Counties.					
County	**FIRM Building Exposure (FBE) (USD)**	**FBE Rank**	**Damage (2006 USD)**	**Damage Rank**	**Composite Rank**
Laramie	475,872,824	21	131,589,7884	23	44
Natrona	587,434,021	22	14,678,502	19	41
Sweetwater	311,450,629	20	5,059,161	13	33
Teton	597,409,612	23	2,493,997	10	33
Sheridan	128,679,116	17	7,152,228	15	32
Fremont	38,890,385	10	15,167,689	20	30
Converse	108,588,752	16	6,257,044	14	30
Big Horn	29,704,350	8	20,765,128	21	29
Carbon	40,950,298	11	9,382,564	18	29
Park	45,051,824	12	7,328,517	17	29
Platte	22,324,450	5	28,407,328	22	27
Campbell	93,879,876	15	4,501,091	12	27

Albany	**178,977,772**	**19**	**740,008**	**7**	**26**
Goshen	26,552,574	6	7,188,033	16	22
Washakie	50,151,680	13	749,306	8	21
Uinta	129,531,065	18	4,173	2	20
Lincoln	76,773,848	14	47,759	3	17
Hot Springs	26,577,959	7	1,902,375	9	16
Johnson	17,477,646	4	2,805,056	11	15
Sublette	36,685,817	9	150,376	5	14
Crook	11,243,224	3	358,431	6	9
Niobrara	1,866,236	1	70,396	4	5
Weston	10,981,061	2	3,759	1	3

NFIP for Albany County

The National Flood Insurance Program (NFIP) is a Federal program enabling property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

Participation in the NFIP is based on an agreement between local communities and the Federal Government that states if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas, the Federal Government will make flood insurance available within the community as a financial protection against flood losses.

The following is the NFIP for Albany County and the jurisdiction of Laramie, Rock River does not participate. There are no repetitive loss properties for either Albany County or the City of Laramie.

NFIP City of Laramie

Regular entry: 7/16/1979
Status effective: 7/16/1979
Policies in force: 71
Total premiums: $43,570
Insurance in force: $10,223,900.00
No. of paid losses: 0
Total losses paid: $0.00
Group flood policies: 0
Effective map date: 10/161986
Sub. Damage claims since 1978: 0

Single family

Policies in force: 66
Premium: $41,534
Insurance in force: $9,172,100

2-4 Family

Policies in force: 4
Premium: $1,452
Insurance in force: $551,800

Non- Residential

Policies in force: 1
Premium: $584
Insurance in force: $500,000

No Community Repetitive Loss for the City of Laramie

NFIP Albany County

Regular entry: 10/1/1986
Status entry: 10/1/1986
Emergency entry: 06/21/1984
Policies in force: 19
Total premiums: $16,993
Insurance in force: $4,078,600.00
No. of paid losses: 1
Total losses paid: $5,898.71
Effective Map Date: 10/1/1986
Group flood policies: 0
Sub. Damage claims since 1978: 0

Single Family:

Policies in Force: 18
Premium: $16,444
Insurance in Force: $3,895,600
Number of Closed Paid Losses: 1
$ of Closed Paid Losses: $5,898.71

2-4 family:

Policies in Force: 0

Premium: 0
Insurance in Force: 0
Number of Closed Paid Losses: 0
$ of Closed Paid Losses: 0

Non Residential:
Policies in Force: 1
Premium: $549
Insurance in Force: $183,000
Number of Closed Paid Losses: 0
$ of Closed Paid Losses: 0

No Community Repetitive Loss for Albany County

Albany County plans to continue to educate the public about NFIP and encourage the jurisdiction of Rock River to join in the plan. The jurisdiction of Rock River did not feel like it was necessary that their community participated. We hope to be able to add Rock River in the future. The County would benefit from updated maps that show the newly developed areas of west, south and east sides of Laramie.

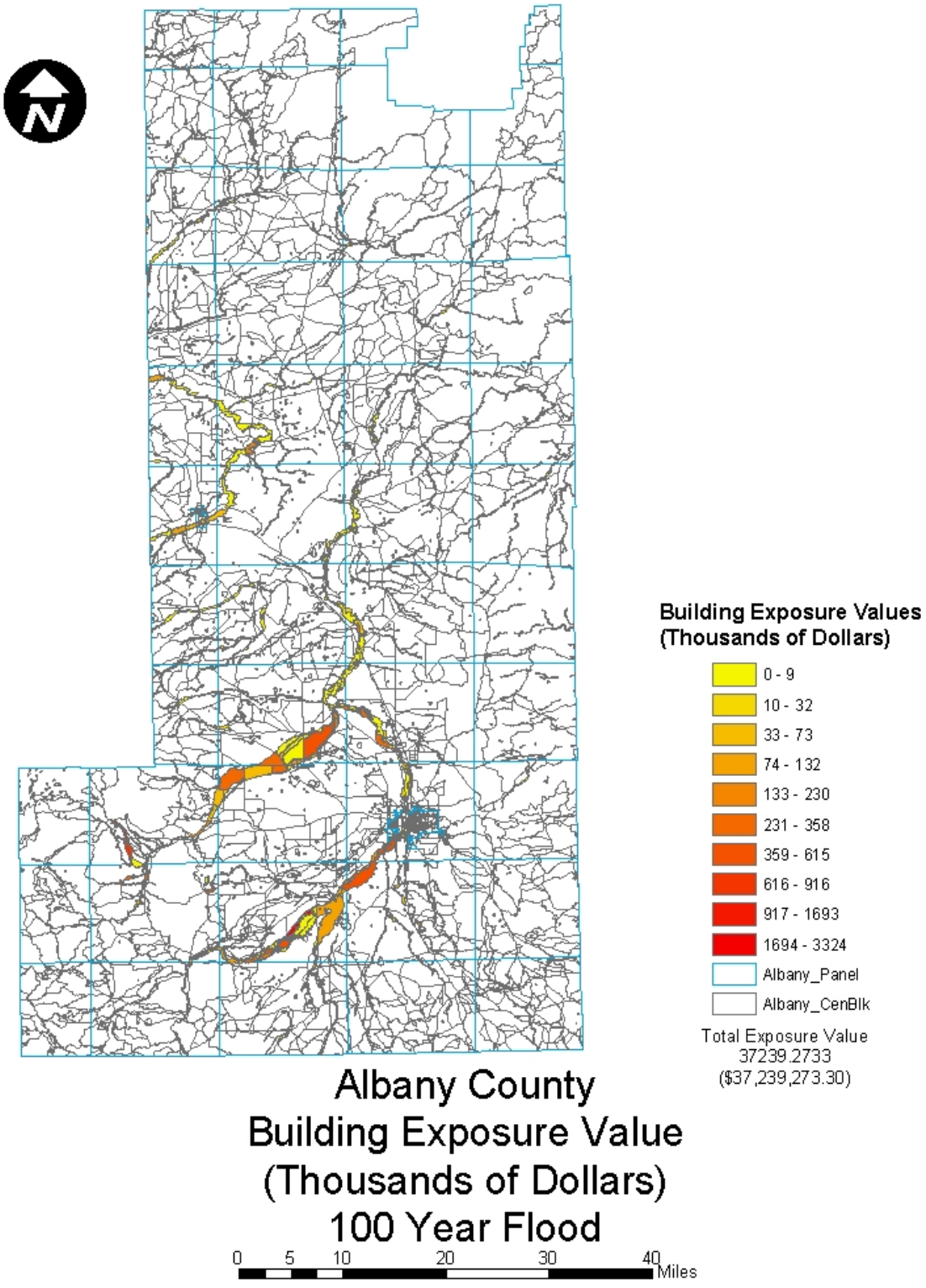


Figure 11.4 Building Exposure Value for 100 year flood

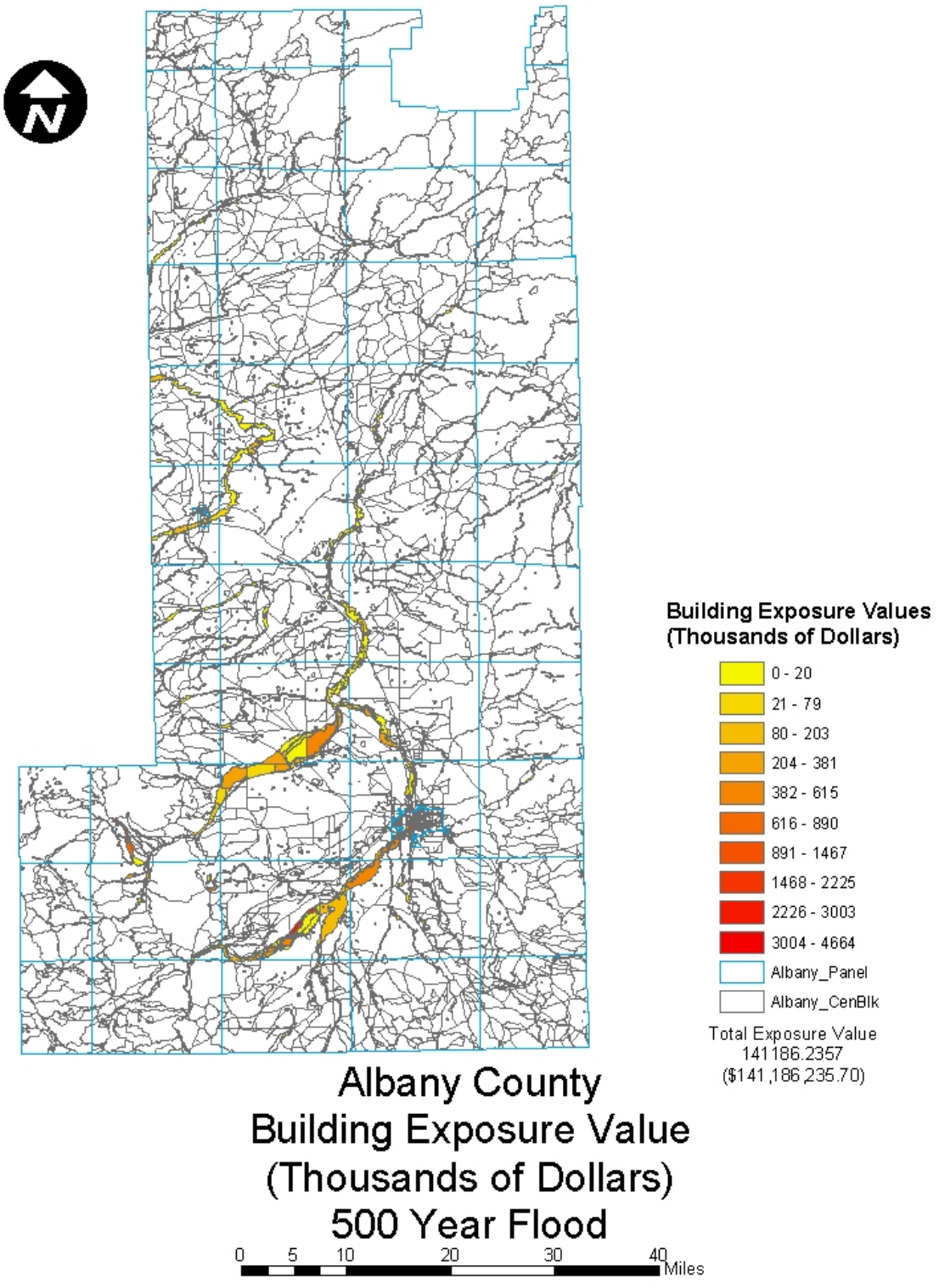


Figure 11.5 Building Exposure Value for 500 year flood

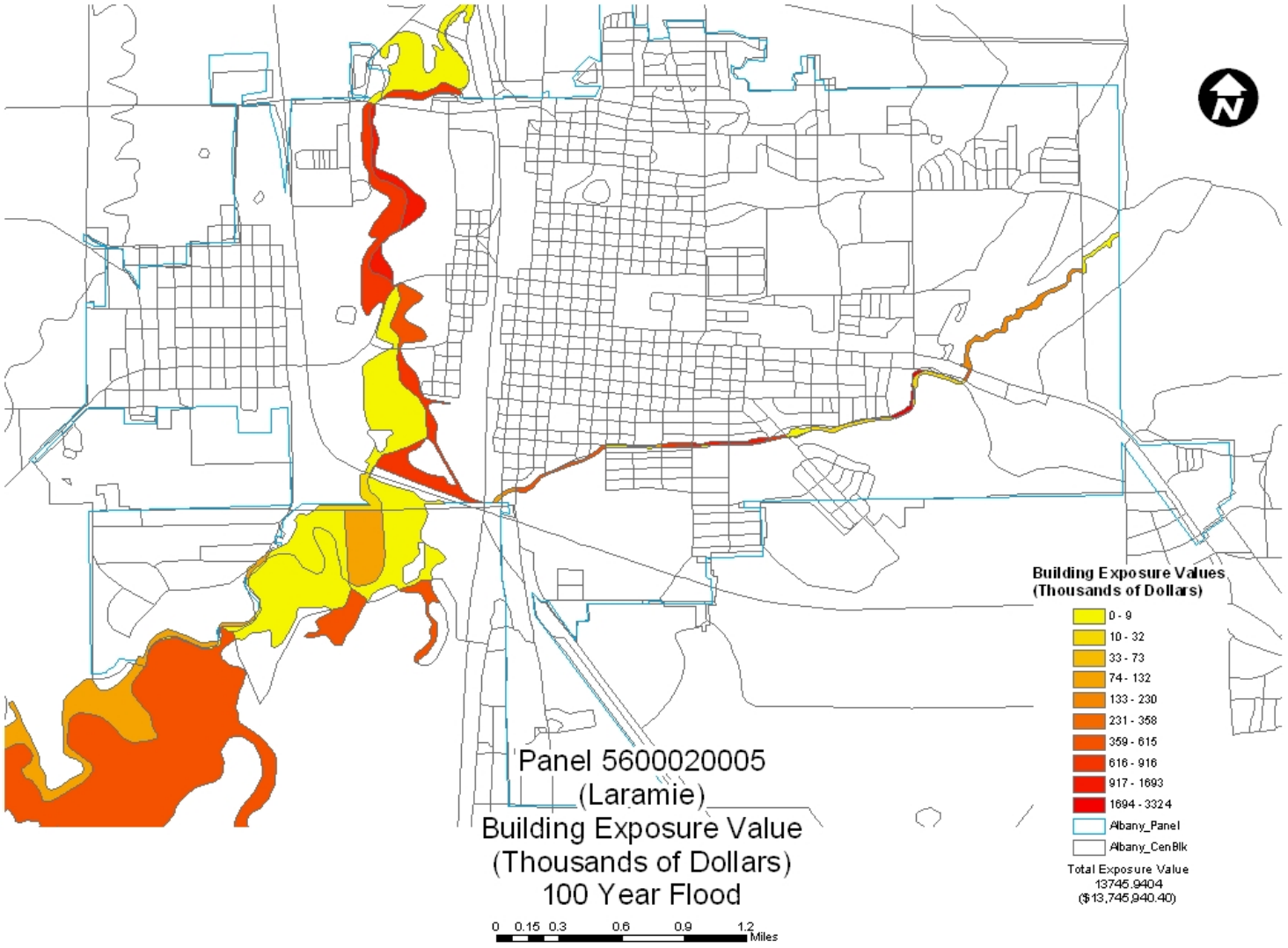


Figure 11.6 Building Exposure Values for the City of Laramie 100 year flood

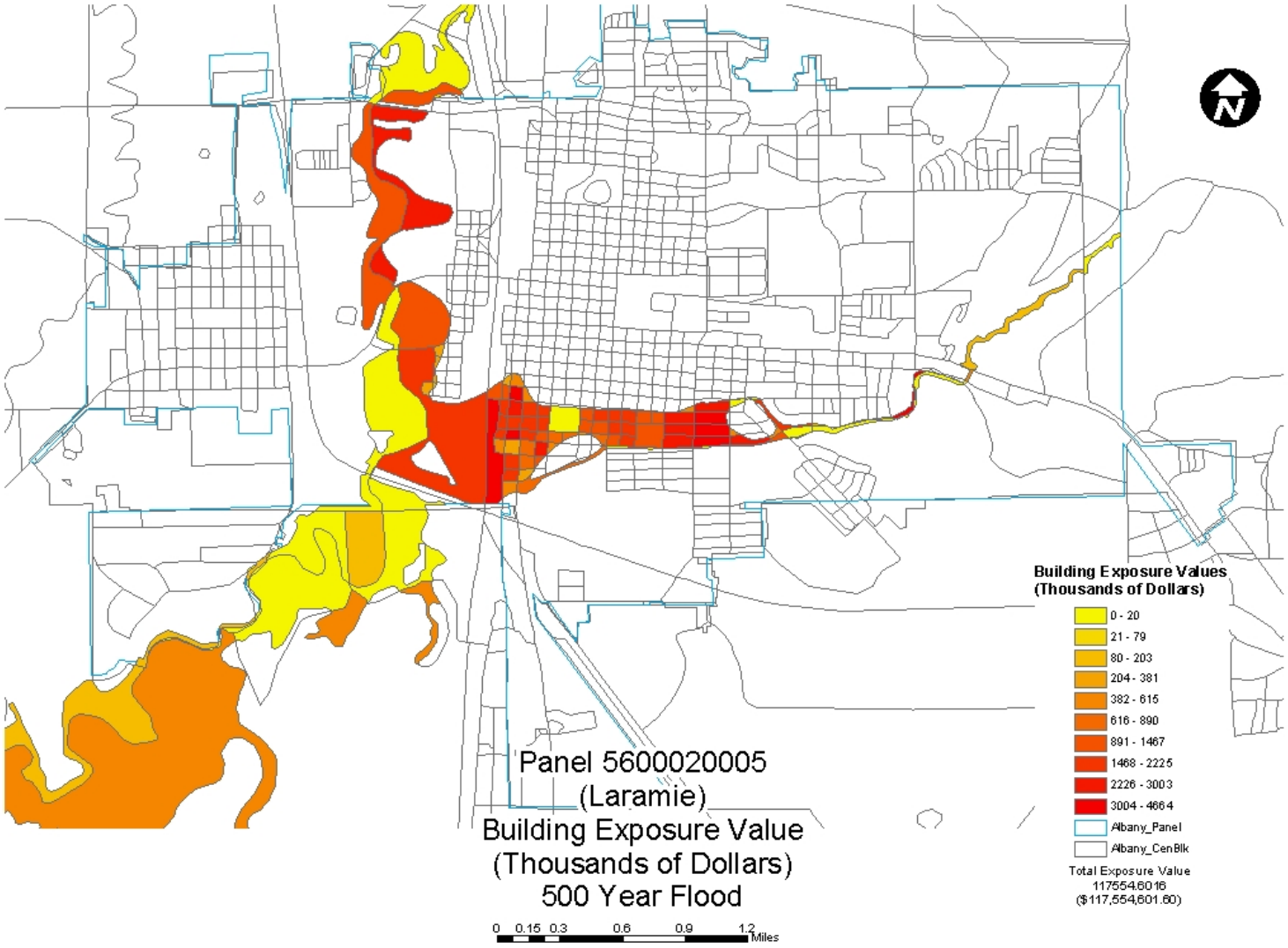


Figure 11.7 Building exposure values for the City of Laramie 500 year flood

FUTURE IMPACTS

When Albany County receives excess moisture, it is susceptible to flooding. According to historical events there have been floods both in the City of Laramie and Rock River as well as in the County. Actions have been taken to reduce the risk of floods in some parts of the City and County, but due to lack of funds, some repairs are still needed.

In the City of Laramie, flood mapping is based on FEMA's work along Spring Creek Channel and the Laramie River. The West Laramie Drainage Study and the North Laramie Drainage Study both reviewed existing scenarios of development and infrastructure and provided calculated rainfall impacts well beyond the FEMA work. Impact is limited, depending on future construction of infrastructure and very little has been done with construction of drainage infrastructure since both of those studies pointed out specific needs, lack of funding with other city priorities. The City of Laramie has never had the funds, and therefore never completed, the South Laramie Drainage Study, which means the City of Laramie may have potential flooding areas that it cannot yet address.

NO FLOOD ASSESSMENT INFORMATION FOR ESTIMATING POTENTIAL LOSSES AVAILABLE: NO NEW FLOOD INSURANCE STUDIES HAVE BEEN CONDUCTED SINCE THE LAST REVISION OF THE HAZARD MITIGATION PLAN.

SUMMARY

PROPERTY AFFECTED: High

POPULATION AFFECTED: Medium

PROBABILITY: Medium

JURISDICTION AFFECTED: Both the jurisdictions of Laramie and Rock River are affected as is the rest of the county.

CHAPTER XII. DAM FAILURES

The dams and reservoirs of Albany County serve a very important role for Wyoming residents and industry. Rarely, the dams fail, either completely or partially, but can become a significant hazard for those downstream.

Dam failures can be arranged into four classifications: overtopping, foundation failure, structural failure, and other unforeseen failures. Overtopping failures result from the uncontrolled flow of water over, around, and adjacent to the dam. Earthen dams are most susceptible to this type of failure. Hydraulic failures account for approximately 28% of all dam failures. Foundation and structural failures are usually tied to seepage through the foundation of the main structure of the dam. Deformation of the foundation or settling of the embankment can also result in dam failure. Structural failures account for approximately 28% of all dam failures, and foundation problems account for another 25%. Earthquakes or sabotage account for 12% of all dam failures, while inadequate design and construction account for the remaining 7% of failures.

In 1981, the U.S. Army Corps of Engineers completed an inspection program for nonfederal dams under the National Dam Inspection Act (P.L. 92-367). This was a four-year work effort and included compiling an inventory of about 50,000 dams and conducting a review of each state's capabilities, practices, and regulations regarding design, construction, operation, and maintenance of dams. Part of the inspection included evaluating the dams and assigning a hazard potential based on the downstream effects should a dam fail.

Dams are classified based upon hazard potential. This classification is based on the consequences if the dam were to fail, not the *potential* of failure, or the *existing* condition of the dam. The dams were rated (1) high, (2) significant, and (3) low hazard. The Corps of Engineers based the hazard potential designation on such items as acre-feet capacity of the dam, distance from nearest community downstream, population density of the community, and age of the dam. High hazard dams would, in case of failure of the dam, likely cause loss of life. Significant hazard dams would, in case of failure, likely cause significant property damage, but no loss of life. Failure of a low hazard dam would likely cause only minimal property damage. Hazard potential classification is no guarantee of safety.

The Wyoming State Engineer's Office (WSEO) regulates dams over 20 feet high or with a storage capacity of 50 acre-feet or more, although smaller dams are also regulated if the potential for failure indicates a need. The WSEO currently regulates 1,467 dams. As a part of the regulatory process the WSEO inspects these dams once every five years. Of these dams, 79 are rated high hazard, 116 are rated significant hazard, and 1,272 are rated low hazard. **Figure 12.1** shows the locations of dams that are inspected by the WSEO.

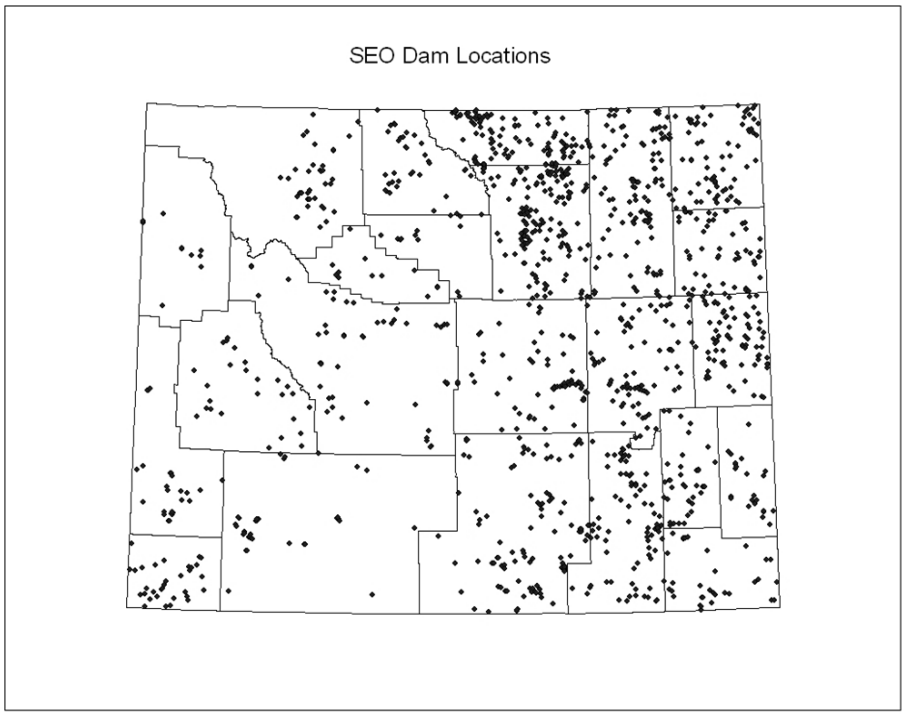


Figure 12.1—Dams inspected by the Wyoming State Engineer's Office and the U.S. Bureau of Reclamation

DAM FEATURES IN ALBANY COUNTY, WYOMING

Feature	Type	County	USGS Topo Map	Elevation	Lat	Long
Alvie Number One Dam	Dam	Albany	Ragged Top Mountain	7574 feet	41.485ºN	105.372ºW
Bar M Number 1 Dam	Dam	Albany	Cottonwood Creek	7938 feet	42.242ºN	105.692ºW
Bar M Number 2 Dam	Dam	Albany	Toltec	8200 feet	42.255ºN	105.626ºW
Bar M Number 3 Dam	Dam	Albany	Cottonwood Creek	8049 feet	42.245ºN	105.667ºW
Beery Number 2 Dam	Dam	Albany	Aurora Lake	6721 feet	41.898ºN	106.059ºW
Bell and Scranton Number 1 Dam	Dam	Albany	Toltec	7977 feet	42.333ºN	105.634ºW
Bell and Scranton Number 1 Dam	Dam	Albany	Toltec	7560 feet	42.295ºN	105.702ºW
Bell and Scranton Number 2 Dam	Dam	Albany	Windy Peak	7741 feet	42.315ºN	105.622ºW
Bell Dam	Dam	Albany	Goat Mountain	6514 feet	41.590ºN	105.292ºW
Berry Dam	Dam	Albany	Aurora Lake	6750 feet	41.907ºN	106.044ºW
Bliss Number 1 Dam	Dam	Albany	Baldy Mountain	7774 feet	41.558ºN	105.449ºW
Brown Number 1 Dam	Dam	Albany	Turpin Reservoir	9486 feet	41.420ºN	106.419ºW
Canon Number 1 Dam	Dam	Albany	Indian Guide	7000 feet	41.658ºN	105.344ºW
Canon Number 2 Dam	Dam	Albany	Indian Guide	7003 feet	41.657ºN	105.336ºW
Canon Number 3 Dam	Dam	Albany	Indian Guide	6931 feet	41.658ºN	105.341ºW
Canon Number 4 Dam	Dam	Albany	Indian Guide	7341 feet	41.658ºN	105.356ºW
Canon Number 5 Dam	Dam	Albany	Sheep Rock	7541 feet	41.635ºN	105.377ºW
Cashs Home Dam	Dam	Albany	King Mountain	8075 feet	41.450ºN	105.442ºW
Cavender Dam	Dam	Albany	Big Judson	7082 feet	41.578ºN	105.901ºW
Cavender Dam	Dam	Albany	Cooper Lake North	7019 feet	41.643ºN	105.869ºW
Chris Klein Dam	Dam	Albany	Laramie	7265 feet	41.255ºN	105.567ºW
Coal Bank Dam	Dam	Albany	Rock River	7065 feet	41.673ºN	105.972ºW
Columbus Dam	Dam	Albany	Hutton Lake	7226 feet	41.223ºN	105.626ºW
Cooper Dam	Dam	Albany	Big Judson	7180 feet	41.600ºN	105.931ºW
Duck Creek Number 1 Dam	Dam	Albany	Garrett	7318 feet	42.020ºN	105.604ºW
Dutton Dam	Dam	Albany	Big Judson	7141 feet	41.598ºN	105.919ºW
Ella Reservoir Dam	Dam	Albany	Sheep Rock	7774 feet	41.625ºN	105.451ºW
Gillespie Dam	Dam	Albany	Sevenmile Spring	6921 feet	41.930ºN	105.752ºW
Glade Dam	Dam	Albany	Dodge Ranch	6967 feet	41.918ºN	105.564ºW
Grant Creek Dam	Dam	Albany	Poe Mountain	6055 feet	41.753ºN	105.309ºW

Grazing Number 1 Stock Dam	Dam	Albany	Rogers Creek	7098 feet	42.155ºN 105.864ºW
Harman Dam	Dam	Albany	Caldwell Lake	7262 feet	41.208ºN 105.802ºW
Harney Creek Dam	Dam	Albany	Red Buttes	7416 feet	41.155ºN 105.564ºW
Home Dam	Dam	Albany	Sevenmile Spring	6921 feet	41.898ºN 105.781ºW
Hundred Springs Dam	Dam	Albany	Red Buttes	7321 feet	41.177ºN 105.586ºW
Hutton Lake Dam Number 3	Dam	Albany	Hutton Lake	7213 feet	41.187ºN 105.726ºW
Iron Mountain Dam	Dam	Albany	Indian Guide	7101 feet	41.630ºN 105.329ºW
Iron Mountain Number 1 Dam	Dam	Albany	Indian Guide	6632 feet	41.682ºN 105.297ºW
Joe D Dam	Dam	Albany	Rock River	7062 feet	41.638ºN 105.917ºW
Johnson Dam	Dam	Albany	Poe Mountain	6432 feet	41.782ºN 105.374ºW
Kafka Number 1 Dam	Dam	Albany	Toltec	7462 feet	42.272ºN 105.714ºW
Kennedy Number 1 Dam	Dam	Albany	Dodge Ranch	7183 feet	41.965ºN 105.517ºW
King Number 1 Dam	Dam	Albany	Bengough Hill	7364 feet	41.593ºN 106.064ºW
Lace Dam	Dam	Albany	Pierce Reservoir	7147 feet	41.653ºN 106.041ºW
Lake Hattie Dam	Dam	Albany	Sodergreen Lake	7282 feet	41.242ºN 105.899ºW
Lake Owen Dam	Dam	Albany	Lake Owen	8974 feet	41.145ºN 106.101ºW
Lime Creek Dam	Dam	Albany	Ayres Spring	7242 feet	41.957ºN 105.657ºW
Little Brooklyn Lake Dam	Dam	Albany	Medicine Bow Peak	10499 feet	41.367ºN 106.251ºW
Little Pierce Dam	Dam	Albany	Pierce Reservoir	7078 feet	41.692ºN 106.071ºW
Lone Tree Dam	Dam	Albany	Johnson Ranch	7478 feet	41.088ºN 105.681ºW
Lone Tree Number 1 Dam	Dam	Albany	Downey Lakes	7354 feet	41.097ºN 105.761ºW
Lost Creek Dam	Dam	Albany	Dodge Ranch	7137 feet	41.970ºN 105.544ºW
M G Dam	Dam	Albany	Garrett	7318 feet	42.020ºN 105.604ºW
Millbrook Number 2 Dam	Dam	Albany	Millbrook	7452 feet	41.322ºN 105.949ºW
Mule Creek Dam	Dam	Albany	Marshall	8167 feet	42.297ºN 105.779ºW
Newell Dam	Dam	Albany	Cottonwood Creek	7429 feet	42.195ºN 105.657ºW
Nickerson Dam	Dam	Albany	Pathfinder Reservoir SW	6068 feet	42.277ºN 106.996ºW
Old Smuggler Dam	Dam	Albany	Howell	7203 feet	41.388ºN 105.562ºW

Parker Number 1 Dam	Dam Albany South Mountain	6704 feet	42.198ºN 105.431ºW
Patrick Ryan Number 3 Dam	Dam Albany Sheep Rock	7475 feet	41.660ºN 105.434ºW
Phillips Number 1 Dam	Dam Albany Toltec	7741 feet	42.295ºN 105.669ºW
Pinto Dam	Dam Albany Pinto Creek	6983 feet	42.097ºN 105.662ºW
Rob Roy Dam	Dam Albany Keystone	9355 feet	41.197ºN 106.266ºW
Shellhart Fish and Stock Dam	Dam Albany Bull Camp Peak	7213 feet	41.997ºN 105.467ºW
Sid Number 1 Dam	Dam Albany Garrett	7134 feet	42.017ºN 105.566ºW
Soda Lake Draw Number 1 Dam	Dam Albany Caldwell Lake	7236 feet	41.215ºN 105.809ºW
Sportsman Dam	Dam Albany Hutton Lake	7360 feet	41.127ºN 105.656ºW
Strong Number 1 Dam	Dam Albany Baldy Mountain	7747 feet	41.590ºN 105.456ºW
Strong Number 4 Dam	Dam Albany Baldy Mountain	7462 feet	41.605ºN 105.399ºW
Sturgeon Number 1 Dam	Dam Albany Davidson Flats	7121 feet	42.088ºN 105.442ºW
Sturgeon Number 3 Dam	Dam Albany Garrett	6921 feet	42.103ºN 105.616ºW
Sundby Dam	Dam Albany Lake Owen	7924 feet	41.200ºN 106.089ºW
Sundby Reservoir Number 2 Dam	Dam Albany Lake Owen	7987 feet	41.217ºN 106.067ºW
Three Mile Dam	Dam Albany Chalk Hills	7190 feet	42.358ºN 106.019ºW
Twenty Mile Number 1 Dam	Dam Albany Pinto Creek	7016 feet	42.097ºN 105.721ºW
Two Bar Number 1 Dam	Dam Albany Indian Guide	6819 feet	41.690ºN 105.342ºW
Weaver Dam	Dam Albany Dale Creek	7790 feet	41.123ºN 105.497ºW
Wellbaum Dam	Dam Albany Rogers Creek	7101 feet	42.248ºN 105.874ºW
Wheatland Number 2 Dam	Dam Albany McGill Lakes	6960 feet	41.838ºN 105.639ºW

Wheatland Number 3 Dam	Dam	Albany	Ayres Spring	6944 feet	41.892ºN 105.727ºW
Whiskey Number 1 Dam	Dam	Albany	Pierce Reservoir	7045 feet	41.703ºN 106.034ºW
Whites Dam	Dam	Albany	Pierce Reservoir	7216 feet	41.743ºN 106.044ºW
Williams and Blunk Number 1 Dam	Dam	Albany	Dale Creek	7800 feet	41.082ºN 105.379ºW
Williams Number 1 Dam	Dam	Albany	Buford	7803 feet	41.083ºN 105.361ºW
Williams Number 2 Dam	Dam	Albany	Dale Creek	7934 feet	41.112ºN 105.459ºW
Williams Number 3 Dam	Dam	Albany	Sherman Mountains West	8351 feet	41.185ºN 105.436ºW
Willow Creek Dam	Dam	Albany	Best Ranch	7449 feet	41.118ºN 105.582ºW
Woodhouse Dam	Dam	Albany	Laramie	7278 feet	41.277ºN 105.559ºW

HISTORY

The above information was gathered from http://wyoming.hometownlocator.com. By accessing this site one can view Google maps of all the dams listed in Albany County and gather more information on the particular dam and its features. The maps were too comprehensive to include within the plan, but it is a great reference. Albany County has one high risk dam and that is the Rob Roy located in Albany Keystone. This dam is owned and controlled by the City of Cheyenne Board of Public Utilities. Albany County EMA has a copy of the emergency action plan for Rob Roy on hand in case of an emergency or dam failure. The majority of the dams in Albany County are owned privately. Albany County has had two dam failures in its history as outlined below in **Table 12.1.**

Table 12.1 History of Dam Failures in Albany County

Date	County	Location	Information
6/28/1955	Albany County	Double Four Ranch	On the 28th, the observer at the Double Four Ranch noted that cloudbursts west of Garrett on the headwaters of the North Laramie River the day before had caused damage, and that the river rose 6 – 8 feet about midnight, washing out a dam and flooding ditches in his locality
6/10/1986	Albany and Carbon	35 NW Laramie	Pierce Dam failed at 1941 MST, spilling its contents

	County		into Rock Creek. This was about 35 miles northwest of Laramie along the Albany and Carbon County line. A bridge over Rock Creek along Wyoming Highway 13 was undercut. There was some flooding of buildings and ranch lands where Rock Creek runs into the Medicine Bow River

IMPACTS

A dam failure in Albany County could affect the local jurisdictions of Laramie and Rock River creating issues with utilities such as sewer system infrastructure contamination into the water supply. The City of Laramie hopes to gain funding to support storm-water management to protect the sewer system and infrastructure. Albany County also needs to take greater responsibility in maintaining stream channels to prevent backup of debris and other hazards that could aid in flooding. Depending on the location and severity of the dam break, our local communities could be severely impacted with water. The City of Laramie has a plan in place to isolate areas of flooding that have caused pipe failures. This could be completed before depleting the supply which would maintain a positive pressure greatly reducing the probability of untreated water entering the system.

FUTURE IMPACTS

The U.S. Bureau of Reclamation controls most of the larger dams in the state. The dams and reservoirs all have inundation maps for a dam failure. Because of Homeland Security concerns, data on the areas inundated are not available for the study. The failure of many of the large dams may lead to hundreds of millions of dollars in damage.

Based upon historic dam failures, a failure with at least $9 million in damages and/or ten deaths could occur. There would be much higher damages and loss of life if one of the large dams failed. Albany County has the possibility for dam failures, but the probability is considered to be relatively low.

SUMMARY

PROPERTY AFFECTED: Medium
POPULATION AFFECTED: Medium
PROBABILTY: Low
JURISDICTION AFFECTED: The jurisdictions of Laramie and Rock River, as well as the entire county.

CHAPTER XIII. LANDSLIDES

Landslides are one of the most common geologic hazards in Wyoming, with some of the highest landslide densities in the country found within the state. One of the largest landslide complexes in the country is located southwest of Cody in northwestern Wyoming. The Carter Mountain landslide is more than 5 miles wide and 20 miles long. Landslides cause damage every year in Wyoming, but because many occur in remote areas, public awareness of danger is low. There are many types of landslides present in Wyoming. In order to properly describe landslide type, the Geologic Hazards Section of the Wyoming State Geological Survey (WSGS) developed a landslide classification modified from Varnes (1978) and Campbell (1985). As can be seen in ***Figure 13.1*** there are five basic types of landslides that occur in three types of material. Falls, topples, slides, lateral spreads, and flows can occur in bedrock, debris, or earth. While individual landslide types can occur in nature, most landslides are complex, or composed of combinations of basic types of landslides.

Falls and topples are easy to visualize. In a fall, material detached from a steep slope or cliff descends, and may bounce and roll. In a topple, a mass rotates forward on a pivot point. If a toppling mass pivots far enough, a fall may result.

Slides are characterized by shear displacement along one or several surfaces. Two general types of slides are rotational and translational. In a rotational slide, the surface of rupture is concave upward, and the mass rotates along the concave shear surface. Rotational slides are usually called slumps, and they can occur in bedrock, debris, or earth. In a translational slide, the surface of rupture is a planar or gently undulatory surface. In bedrock and earth, translational slides are usually called block slides if an intact mass slides down the slope. If rock fragments or debris slide down a slope on a distinct shear plane, the movements are called rock slides or debris slides. It is easy to see that confusion can result by applying the term “slide” to all types of landslides.

Lateral spreads are characterized by lateral extension movements in a fractured mass. Lateral spread movements may occur in bedrock and soil as a result of liquefaction or plastic flow of subjacent materials, or in bedrock without a well-defined basal shear surface or zone of plastic flow. Lateral spreads in bedrock without a well-defined zone of shearing or flow usually occur on ridge crests.

In general, a flow is a moving mass that has differential internal movements that are distributed throughout the mass. While most flows occur in debris and earth, one type of flow, gravitational sagging, does occur in bedrock. Flows in debris and earth can be cohesive or non-cohesive. Both cohesive and non-cohesive flows are further subdivided by water content and material properties.

Cohesive flows in debris include soil creep, solifluction, block streams, talus flows, and rock glaciers. Soil creep is an imperceptibly slow deformation that continues under constant stress. Solifluction is a slow flow in soil that is often observed in areas with perennially or permanently frozen ground. Block streams are slow moving tongues of rocky debris on steep slopes, and are often fed by talus cones. Talus flows are slow flows that occur in the basal portions of talus slopes. Rock glaciers are not true landslides, but have been included in the classification scheme because they are mass movements composed of coarse debris. Interstitial ice between debris fragments plays a role in the movement of rock glaciers, which are similar in form to a true glacier.

Cohesive flows in earth include soil creep, solifluction, earth flows, and debris laden earth flows. Soil creep and solifluction in earth are similar to those in debris. Earth flows are very slow- rapid flows that have a distinct source area, a main flow track, and a lobate depositional area. Debris-laden earth flows are flows that appear to be earth flows but are composed of debris. Standard classifications do not recognize debris laden earth flows, but many have been observed in Wyoming. Many of the landslides present in Wyoming have an earth flow component.

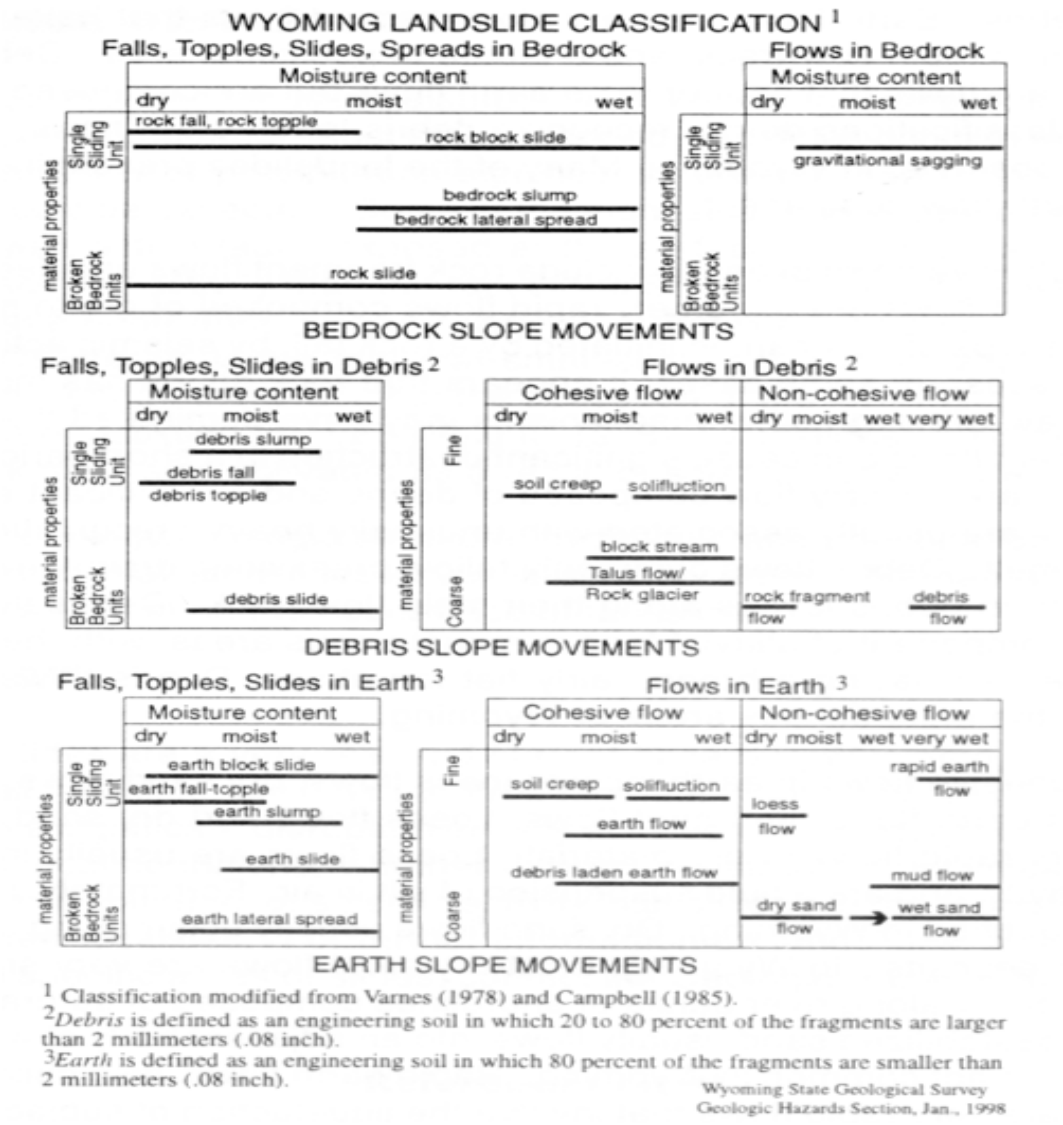


Figure 13.1—Wyoming Landslide Classification.

Non-cohesive flows in debris include rock fragment flows and debris flows. Rock fragment flows are extremely rapid flows composed of dry to moist rock debris. This type of flow can be initiated by a rock fall, by seismic activity, or by other processes. In some cases, it appears that rock debris has moved on a cushion of air, although other mechanisms may have dominated the process. Rock fragment flows can cause significant destruction in a short period of time. Debris flows are a slurry flow composed of debris and a significant amount of water. They are usually associated with unusually heavy precipitation or with rapid snowmelt. Debris flows commonly follow preexisting drainage ways, and commonly form debris levees along their main flow track. Debris flows are a significant component of alluvial fans in mountainous areas with the main debris flow deposit having a broad, fairly flat, fan shape. Debris flows are very common

in the mountainous areas of Wyoming. This is no exception of the Snowy Mountain Range in Albany County

Non-cohesive flows in earth include loess flows, dry sand flows, wet sand flows, rapid earth flows, and mud flows. Loess flows and dry sand flows are rapid to very rapid flows of dry material. Loess flows are usually initiated by seismic activity, and are a fluid suspension of silt in air. Fortunately, none have been identified in Wyoming. Dry sand flows usually occur along shorelines or in Aeolian deposits. In Wyoming, most dry sand flows are very small. Wet sand flows occur along river banks or shorelines composed of saturated clean sand. The destabilized sand usually flows into an adjacent body of water. Wet sand flows are not common in Wyoming. Rapid earth flows, also called quick clay flows, are very rapid flows that involve the liquefaction of subjacent material and the entire slide mass. They usually initiate in sensitive materials, such as quick clay, and are not common in Wyoming. Mud flows are slurry flows composed of earth and a significant amount of water. They differ from debris flows only in the size of their component materials.

Most landslides mapped in Wyoming are classified as being complex. For example, many landslides in the state are slump/earth flow complexes. That type of landslide is composed of a slump at its head, with the main body and deposit being an earth flow. Block slides often grade into rock slides, which can further grade into earth flows or debris laden earth flows. Such a movement would be classified as a block slide/rock slide/flow complex.

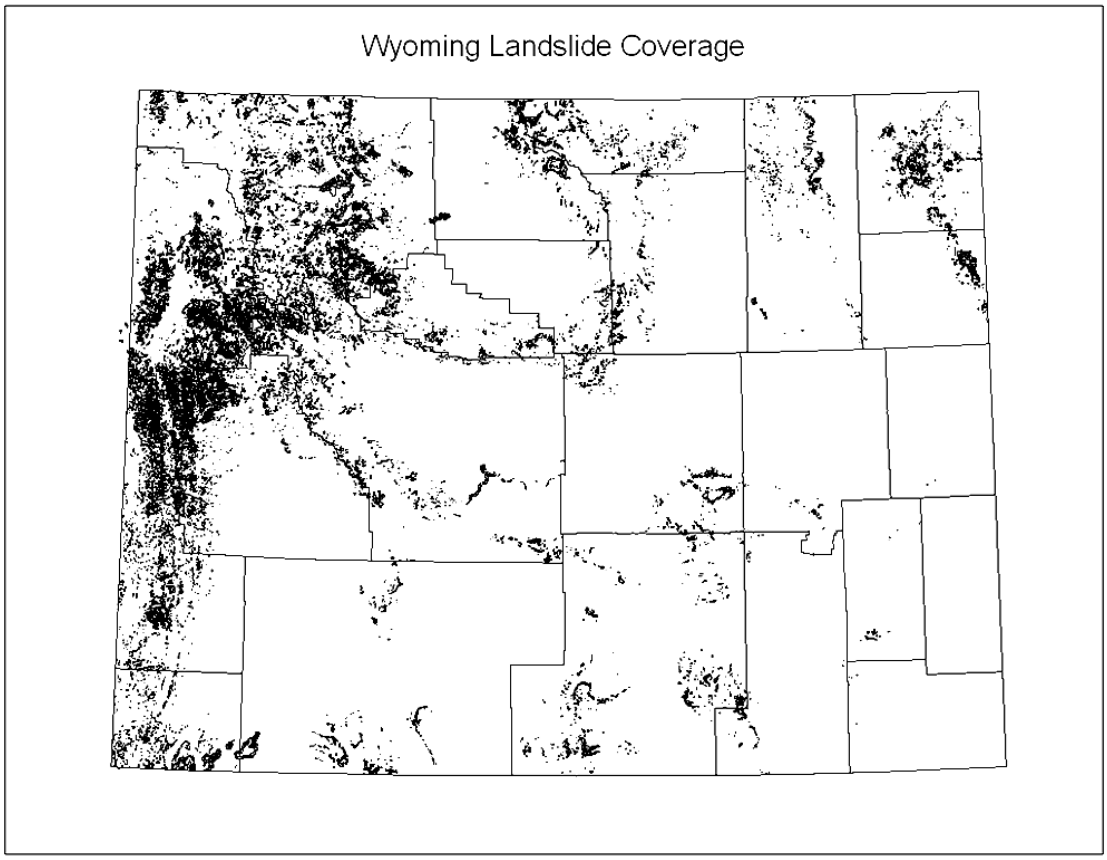


Figure 13.2—Wyoming Landslide Coverage.

IMPACTS

WYDOT estimates that the approximate yearly cost to remove landslides from roads, maintain landslide-damaged roads, and to study or stabilize landslides is one million dollars per year. Some years have required a larger expenditure of funds. **Table 13.1** shows a nine-year total of landslide related expenditures by WYDOT.
The total expenditure is $9,830,000.

Table 13.1—Yearly Costs of Landslide-Related Activities.

Fiscal year	Cost (USD)
1998	8,000,000
1999	396,500
2000	288,900
2001	194,300
2002	157,200
2003	184,300
2004	154,700
2005	237,700
2006	Not available
2007	216,400

Reference: Wyoming Department of Transportation.

Landslides are present in the southwestern, northwestern, and east-central parts of Albany County. Specifically landslides are present on the following Quadrangles:

Albany	Bengough Hill
Centennial	Chalk Hills
Indian Guide	James Lake
Jelm Mountain	Keystone
Lake Owen	Medicine Bow Peak
Morgan	Millbrook
Rex Lake	Rock Creek
Sand Lake	Sherman Mountains East
Sodergreen Lake	Squaw Spring
Strouss Hill	

All Quadrangles were examined by the Wyoming State Geological Survey and Albany County Emergency Management, and the following areas were determined to pose a potential hazard to homes, roads, or other facilities.

Albany and Lake Owen Quadrangles: three blockslide and flow complexes are located immediately south, southwest, and east of Albany (Sections 14, 15, 22, and 23, T14N, and R78W). If the complexes destabilize, damage could occur in or near Albany. The complexes are currently vegetated with trees, and do not appear to pose an immediate threat to the area. Heavy periods of precipitation or significant development could have an effect on slope stability.

Centennial Quadrangle: A rockslide/flow/debris flow complex is present immediately north of the North Fork Subdivision (Section 27, T16N, R78W), with a debris flow complex and a rock slide/flow complex present to the northeast (Sections 26 and 27, T16N, R78W). If the complexes destabilize, damage could occur to nearby homes and roads. The complexes are currently vegetated with grasses, and do not appear to pose an immediate threat to the area. Heavy periods of precipitation or significant development could have an effect on slope stability.

Rex Lake Quadrangle: A rockslide/flow complex is present on the north flank of Sheep Mountain (Sections 8, 9, 10, and 15, T15N, and R77W). County Highway 11 crosses through the complex in Sections 8 and 9. If the complex destabilizes, the highway would be blocked, although access to the south would still be possible from the west. The complex is currently vegetated with grasses, and does not appear to pose an immediate threat to the area. Heavy periods of precipitation or significant development could have an effect on slope stability.

LANDSLIDE ASSESSMENT INFORMATION FOR ESTIMATING POTENTIAL LOSSES

The attached **Table 13.2** contains exposure values for those blocks that intersect landslides within Albany County. In a case where a block does not intersect a landslide, that block will not be shown in the table. $0.00 exposure values indicate that no buildings are present in the respective census block (according to the FEMA census block data). The exposure values are calculated by multiplying the percentage of the census block that intersects the landslide by the total building census block value. Therefore, these exposure values may underestimate or overestimate the real value. These will be updated and revised as more specific data is made available.

TABLE 13.2. Exposure values for those blocks that intersect landslides within Albany County

Census Block	Exposure Value
560019639001127	$0.00
560019639001135	$0.00
560019639001137	$0.00
560019639001703	$0.00
560019639001725	$0.00
560019639001726	$6,624.70
560019639001727	$0.00
560019639001728	$0.00
560019639001741	$0.00
560019639001771	$223,914.10
560019639001782	$64,336.70
560019639002191	$54,345.70
560019639002290	$0.00
560019639002291	$971,645.00
560019639002296	$0.00
560019639002747	$0.00
SUM	$1,320,866.20

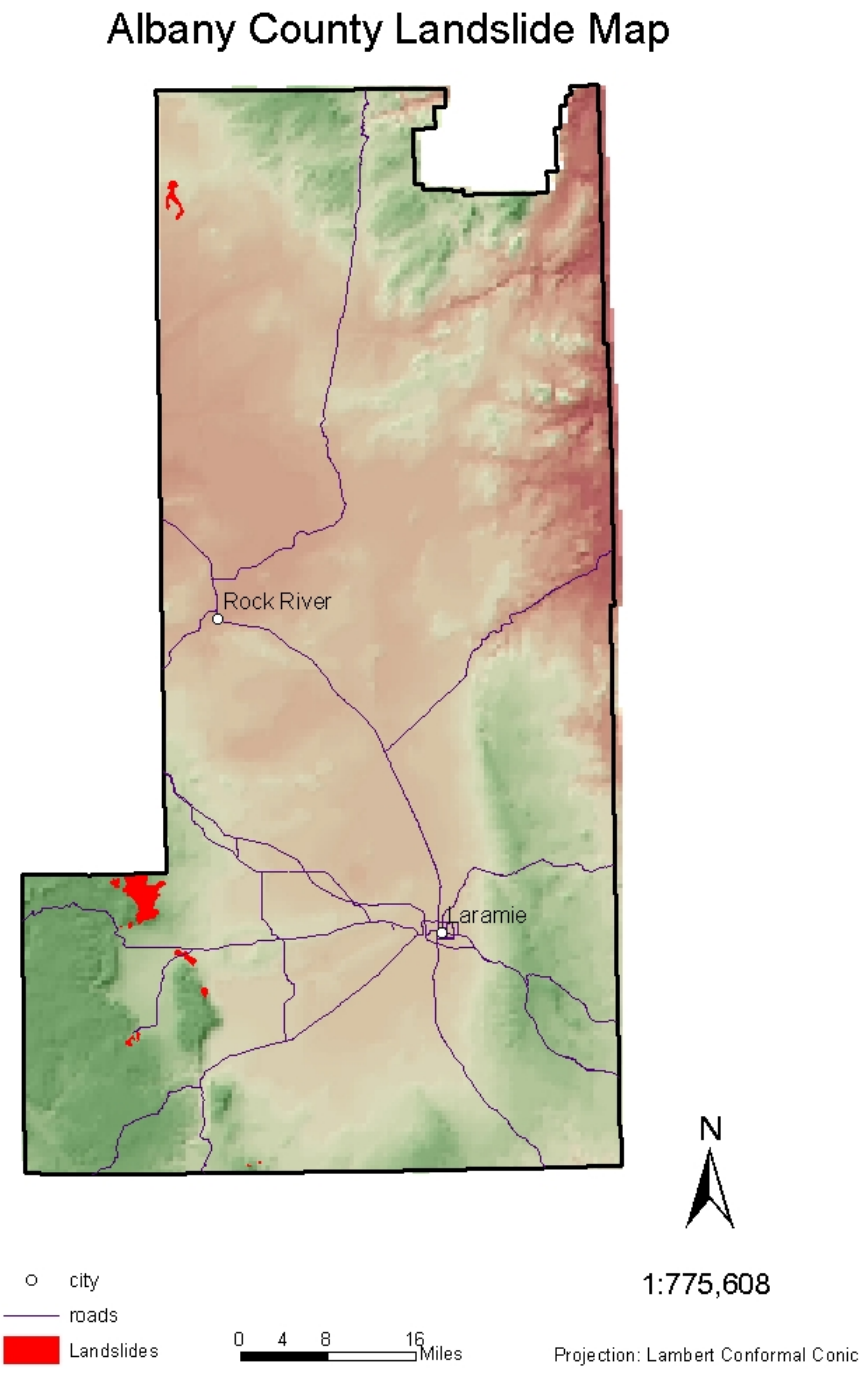


FIGURE 13.3 Albany County landslide map

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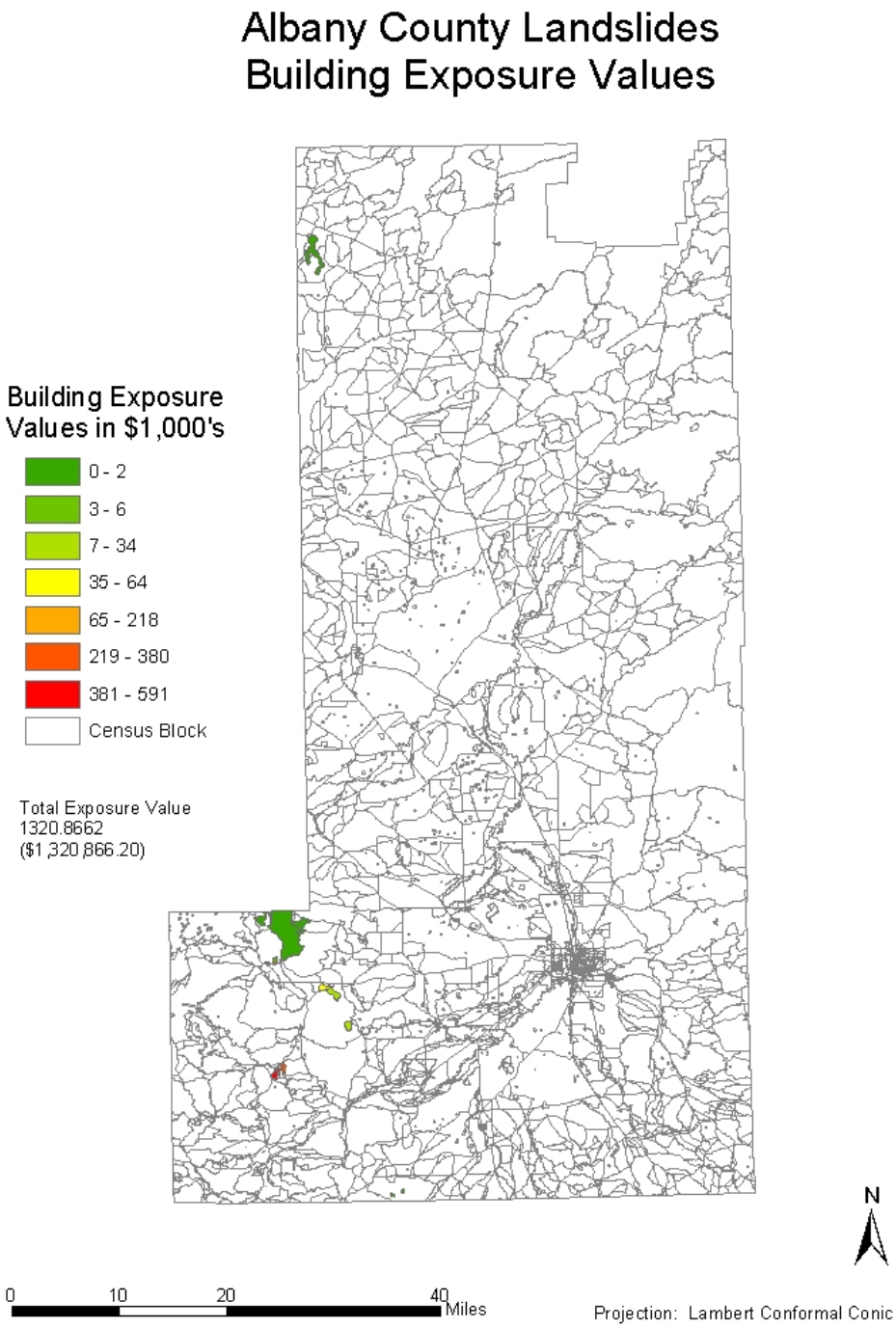


FIGURE 13.4. Albany County Building Exposure to Landslides

FUTURE IMPACTS

There are three measures of future landslide impacts—historic dollar damages, estimated yearly damages, and building exposure values. There are not enough current data to estimate historic dollar damages. Estimated yearly damages, as mentioned above, are one million dollars for roads alone. That would equate to $50 million in a 50-year period and $100 million in a 100-year period.

The WSGS calculated the building exposure value for buildings that may occur in or within 100 feet of mapped landslides. All landslides mapped in Wyoming have been digitized (**Figure 13.2**). The landslides then had a 100-foot buffer digitally added to the outside of their boundary. The modified landslides were then digitally crossed with census block building values. In some cases, a landslide boundary will dissect a census block. In that case the proportional value of buildings in the census block will be assigned to the landslide. If a census block is within a landslide, then the values of all the buildings in the census block is assigned. The values derived by county are shown in **Figure 13.5**. **Table 13.3** shows the ranking of counties based upon landslide building exposure values. Albany County has limited worry for landslides.

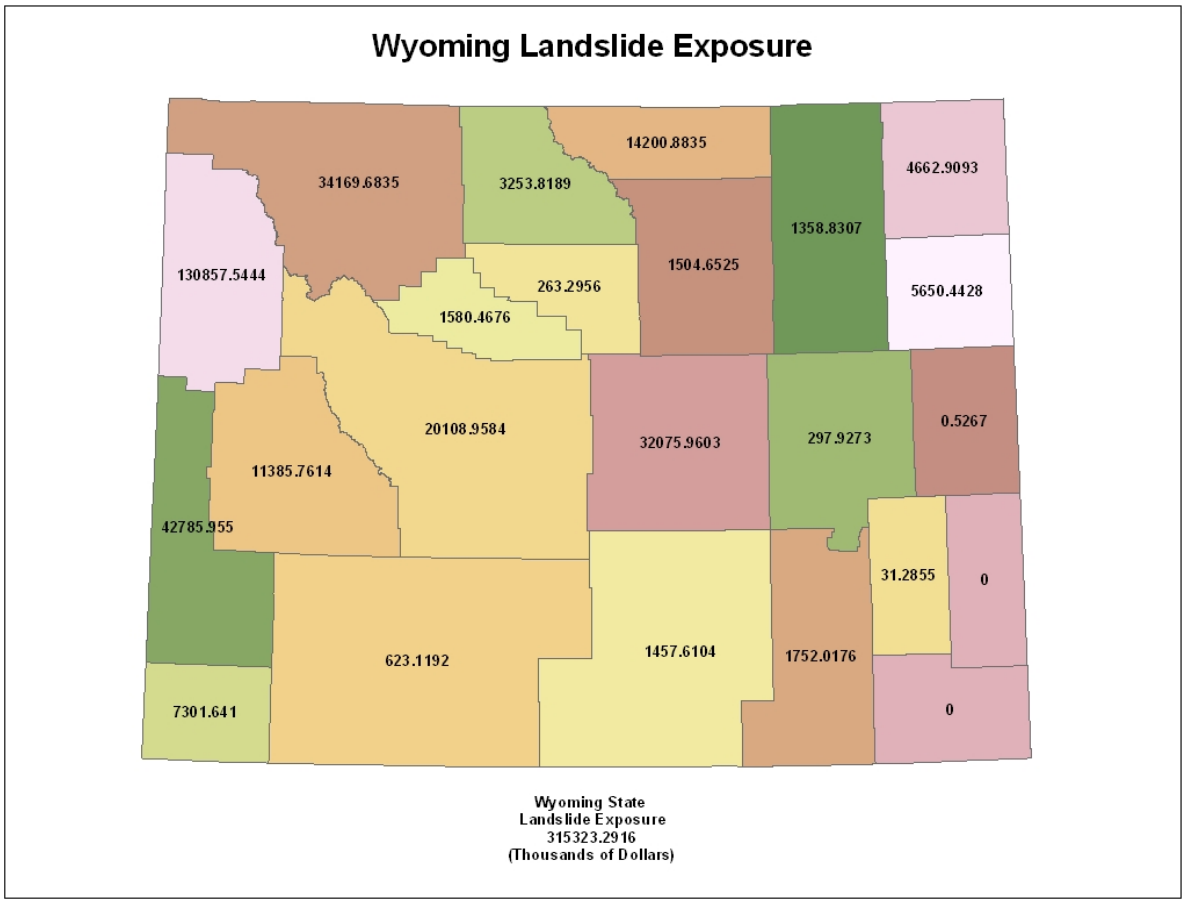


Figure 13.5—Wyoming Landslide Exposure by County.

Table 13.3—Building Exposure Values for Landslides	
County	**Landslide Building Exposure Value (USD)**
Teton	130,857,545
Lincoln	42,785,955
Park	34,169,685
Natrona	32,075,960
Fremont	20,108,960
Sheridan	14,200,885
Sublette	11,385,760
Uinta	7,301,640
Weston	5,650,450
Crook	4,662,910
Big Horn	3,253,820
Albany	**1,752,020**
Hot Springs	1,580,470
Johnson	1,504,650
Carbon	1,457,610
Campbell	1,358,830
Sweetwater	623,120
Converse	297,930
Washakie	263,295
Platte	31,285
Niobrara	525
Goshen	0
Laramie	0
Total	315,323,305

Although landslides shown in **Figure 13.5** have a distinct distribution, the counties do not separate into distinct regions for building exposure values. **Table 13.3** does indicate that there are buildings in the state that may be significantly affected by landslides. The total statewide building exposure value for landslides is over $315.3 million.

The probability of a landslide causing damage in Albany County is difficult to determine because of the poor historic data. Heavy periods of precipitation or significant development could have an effect on slope stability in the mapped hazard areas. Based on the geological studies county roads are likely to experience direct landslide impacts. Secondary impacts could include flooding from landslide dams and power outages where transmission line may be affected.

SUMMARY

PROPERTY AFFECTED: low
POPULATION AFFECTED: low
PROBABILTY: Medium
JURISDICTION AFFECTED: Outlying county communities such as Centennial

CHAPTER XIV. MINE SUBSTINENCE

Underground coal mining began in Wyoming during the 1860s. Many of the early coal mines were not designed and constructed well; as a result the underground pillars failed. If enough pillars failed, the cap rock in the mine would collapse, and the effects of the collapse would reach the surface in some cases. If the effects of the collapse reached the surface, a subsidence pit would form. Not all subsidence was due to poor design, however. In some cases, the pillars were pulled as mining retreated from an area. In other cases, fires would occur in mines, resulting in a loss of strength in the pillars and cap rock.

HISTORY

Significant areas have abandoned underground coal mines present (***Figure 14.1***). Coal mine subsidence has been threatening select areas of Wyoming since the onset of mining in the 1860s. Due to the long history of underground coal mining in the state, many more undermined areas have subsided than most people imagine. A written history of mine subsidence in or near urban areas was published in the *Governor's Workshop on Mine Subsidence* proceedings held on October 31, 1986 at the University of Wyoming. A report titled *Overview of Coal Mine Subsidence in Wyoming* by James C. Case of the WSGS is an excellent reference point for more information. There have been no reported historical implications of problems created by Albany County Mine Subsidence.
The WSGS has also generated a report for each county in Wyoming on abandoned underground coal mines and hard rock mines that have been identified in the county. Since the original plan in 2003 no areas have been labeled as mine subsidence and no incidents have occurred.

Significant subsidence problems have occurred in Rock Springs, Hanna, Glenrock, Superior, Reliance, Evanston, Kemmerer, Sheridan, and Gillette. A map showing documented subsidence is shown in ***Figure 14.1.***

IMPACTS

There have been property and infrastructure damage associated with coal-mine subsidence in Wyoming communities. The dollar amounts of the damage are not readily available. An indirect measure of the impacts is the existing cost of mitigating the hazards. The Wyoming Abandoned Mine Lands (AML) Program at Wyoming Department of Environmental Quality (DEQ) has spent $85 million mitigating the effects of mine subsidence and on mine reclamation.

There are a few abandoned and un-reclaimed coal mines in Albany County. The Rock Creek Mine is located approximately 2 miles south of Rock River in Section 18, T20N, and R76W. Two unnamed mines are located approximately 2.5 miles southeast of Rock River in Section 16, T20N, and R76W. In addition, The Sunshine Mine is located approximately 1.75 miles northwest of Rex Lake in NW Section 22, T16N, and R77W.

The mines only pose a site-specific hazard, and no facilities, roads, or homes are at risk. No development should be allowed at the mine sites until it can be shown that reclamation has occurred and that the reclamation was successful and that the area is safe.

There are also a number of hard-rock mines in Medicine Bow National Forest near the Centennial ridge area located west and southwest of Centennial in Sections 4, 5, 7, 8, 9, 16, and 17, T15N, R78W and in Section 1, T15N, R79W. All the mines have been reclaimed or sealed except for the Independence Mine in Section 8, T15N, and R78W. As such, no significant hazard exists.

FUTURE IMPACTS

Although many areas of the state have already had mitigation projects designed to reduce or remove the impacts from underground mining and subsidence, subsidence may still occur in some areas. The dollar impact is impossible to predict, due to inaccurate knowledge and ability to predict damage.

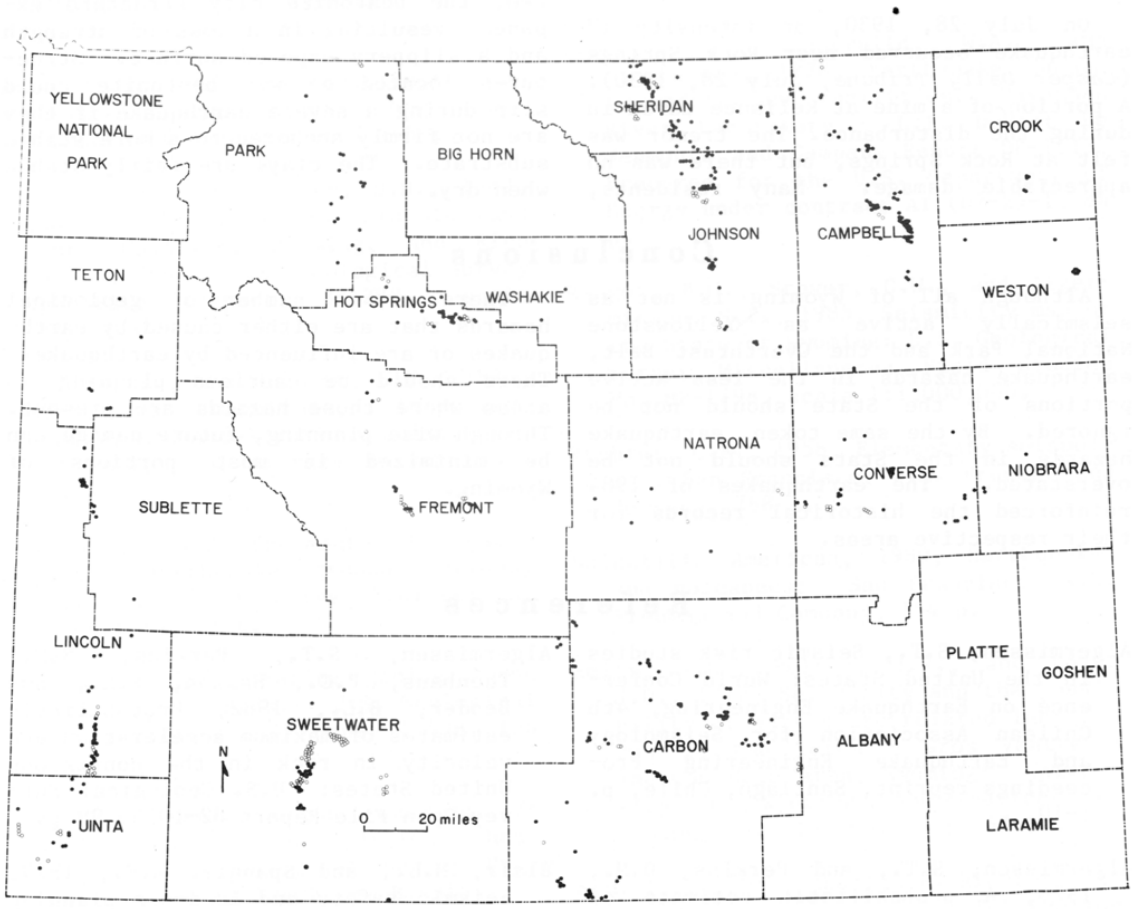
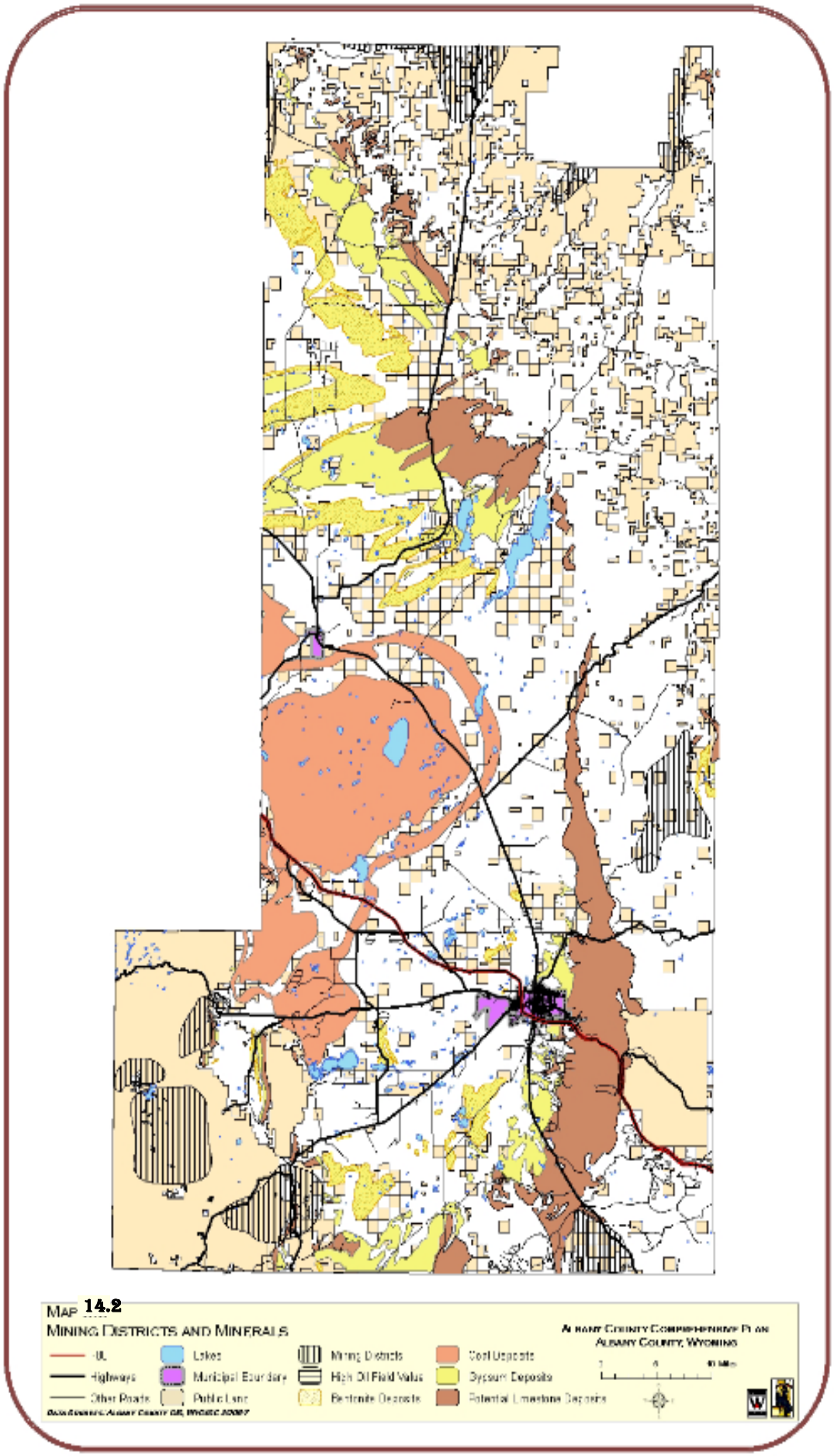


Figure 14.1—Mined-out areas and mine subsidence in Wyoming. Gray areas represent mined-out areas with subsidence. Solid areas represent mined-out areas with no known subsidence.


MAP 14.2
MINING DISTRICTS AND MINERALS
ALBANY COUNTY COMPREHENSIVE PLAN
ALBANY COUNTY, WYOMING
UL
Highways
Other Roads
Lakes
Municipal Boundary
Public Land
Mining Districts
High Oil Field Value
Bentonite Deposits
Coal Deposits
Gypsum Deposits
Potential Limestone Deposits

SUMMARY

PROPERTY AFFECTED: low
POPULATION AFFECTED: low
PROBABILITY: low
JURISDICTION AFFECTED: The jurisdiction of Rock River and the outlying communities and areas of Medicine Bow and Centennial.

CHAPTER XV. WIND AND WINDBLOWN DEPOSITS

Wyoming has some of the most significant windblown deposits in the U.S. Strong winds can mobilize and significantly move sand or silt grains in much of Wyoming. Many of the mapped deposits in Wyoming are somewhat stabilized, but a significant number are still active.

The Killpecker Dune Field, in northern Sweetwater County, is more than 50 miles long and 10 miles wide at its widest point. The Seminoe Dune Field, extends from the Seminoe Reservoir to the west for approximately 30 miles, and is approximately 15 miles wide at its widest point. The Casper Dune Field is a part of a much larger series of dune fields that extend from eastern Fremont County to the Casper area (**Figure 15.1**).

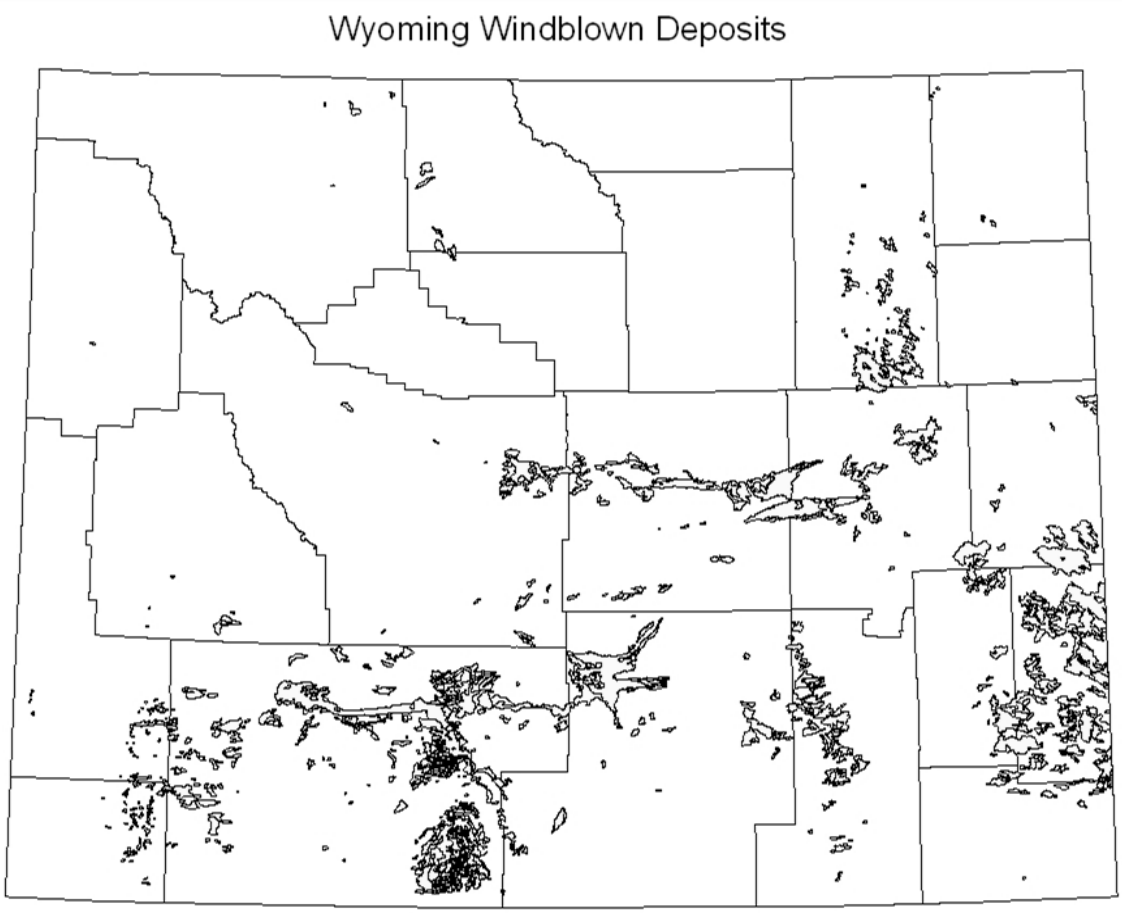


Figure 15.1—Wyoming Windblown Deposits.

HISTORY

There are numerous quadrangles in Albany County with mapped windblown deposits. A detailed summary of the windblown deposit locations is presented in Table 15.1.

The names and numbers shown below represent dunes from deposits present on the 1:24,000 paper maps. Other eolian deposits are designated in black and are also available in digital format.

TABLE 15.1. Windblown deposit locations in Albany County

Quadrangle Name:	Township (N):	Range (W):	Sections:
Aurora Lake	22	77	1-4,9-12
	23	77	1,2,9-16,21-25,28
Alsop Lake	17	75	6
	17	76	1,12
	18	75	28-33
Ayres Spring	22	74	4-8,17,18
	23	74	17,18,28-33
Bamforth Lake	17	73	31
	17	74	36
Big Charlie Lakes	25	76	6,7,18,19
	25	77	1,2,11-14
	26	76	6,18,19,30,31
	26	77	1-4,9-14,22-27,35,36
Big Judson	19	76	24-26
Boot Heel	25	76	4-8,17-20
	26	76	18,19,30-32
Boot Heel SE	24	75	6-8,18-20,28-31
	25	75	31
Bosler	19	74	16,18-20,29,30
Cannonball Cut	21	74	30,31
	21	75	1-11,14-16,18-26,28-36
	22	74	18,19,30,31
	22	75	13-28,30-36
Chalk Hills	26	76	6
	26	77	1-4
	27	76	6
	27	77	1-4,9-12,16,21,22,27,28,33-36
	28	77	25-27,34-36
	28	76	31
Cooper Lake North	19	74	6,7,18

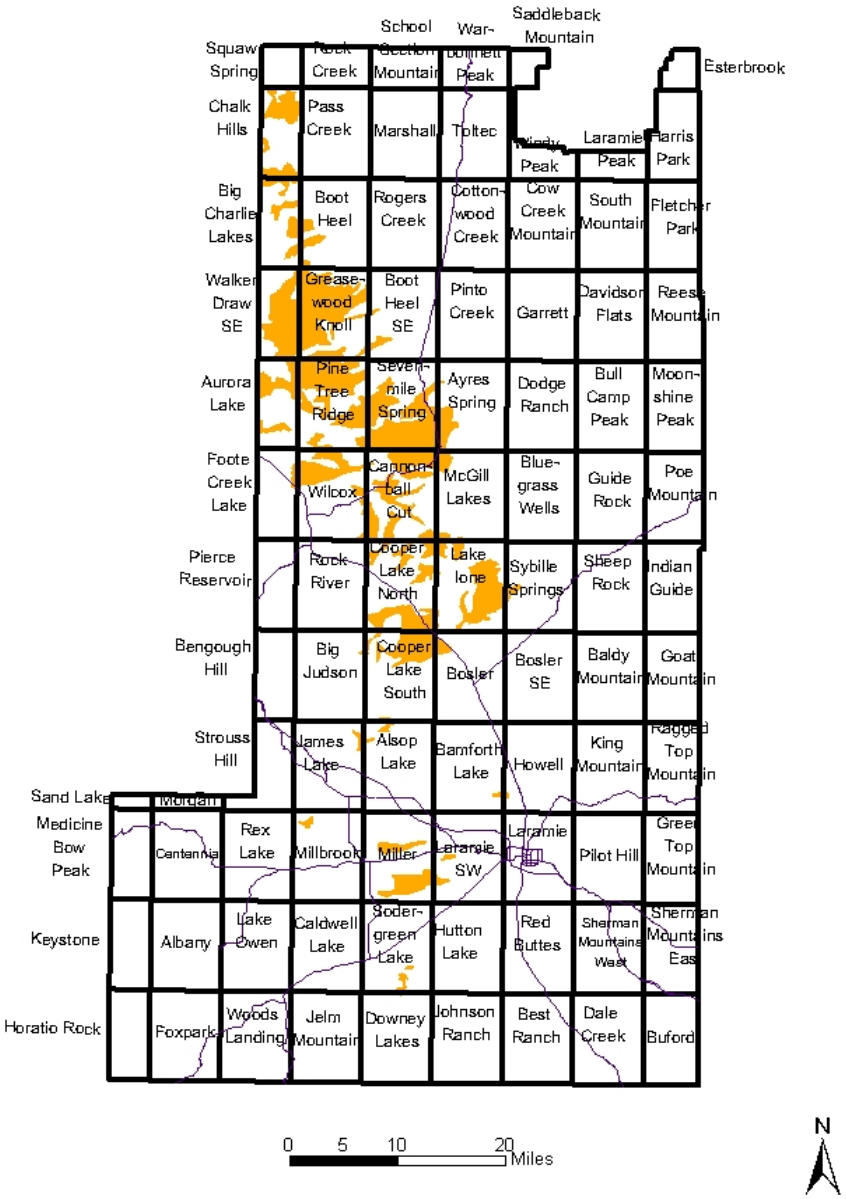
	19	75	1-18
	19	76	1,12
	20	74	6,7,18
	20	75	1-7,8-16,22-24,32-34
Quadrangle Name:	**Township (N):**	**Range (W):**	**Sections:**
Cooper Lake North	20	76	1,12
	21	74	31
	21	75	31-36
Cooper Lake South	18	75	28-30
	19	74	18,19,30
	19	75	13-31,33-36
	19	76	24,25
Downey Lakes	13	75	3,4
Foote Creek Lake	21	77	1
	22	77	24,25,36
Greasewood Knoll	23	76	1-6
	23	77	1
	24	75	6,7,30,31
	24	76	1-22,25-36
	24	77	1,12,13,24,25,36
	25	76	19-22,25-36
	25	75	30,31
Howell	16	73	6
	17	73	31,32
James Lake	18	76	35,36
	17	76	1,2,11,12,19,30
Lake Ione	19	73	6
	19	74	1-4,6,7,9-12,16,18
	20	73	18,19,30,31
	20	74	4-15,18,22-28,33-36
	21	74	31-34
Laramie SW	15	74	6-8,17,18
	16	74	31-33
McGill Lakes	21	74	29-34
	22	74	17-20,29-31
Millbrook	16	76	7,18
	16	77	13
Miller	15	75	1,2,9-23
	16	75	24-34
Pass Creek	28	76	31

	27	76	6
Pine Tree Ridge	22	75	6,7,18
	22	76	1-4,7-9,12,13,15-18
	23	75	6,7,19,30,31
	23	76	1-26,28-36
	23	77	1,12,13,24,25
Rock River	20	76	12
Quadrangle Name:	**Township (N):**	**Range (W):**	**Sections:**
Seven-mile Spring	22	74	6,7,18
	22	75	1-18
	23	74	18,19,30,31
	23	75	6-9,13,16-21,23-36
Sodergreen Lake	13	75	3,4
	14	75	22,23,26-28,33,34
Sybille Springs	20	73	19-21,28-32
Walker Draw SE	23	77	1-3
	24	77	1-3,9-16,21-28,34-36
	25	76	19,30,31
	25	77	24-26,34-36
Wilcox	21	75	7,18,19,30,31
	21	76	1,2,5,6,11-13,24,25,36
	21	77	1
	22	75	30
	22	76	15-17,19-23,25-35
	22	77	24,25,36

.

If these deposits are disturbed, they could potentially destabilize. It is recommended that if the areas are disturbed that they be re-vegetated.

Albany County Wind Blown Deposits Map



Map of 7.5 minute quadrangle names and eolian wind blown depoits

Figure 15.2

WINDBLOWN ASSESSMENT INFORMATION FOR ESTIMATING POTENTIAL LOSSES

There is not a well-documented history of problems associated with windblown deposits in Wyoming. If stabilizing vegetation has been stripped from the surface because of some form of development, previously stable dunes may mobilize and encroach on human development. There are accounts of such problems in the Casper area. Dunes have moved onto subdivision properties, temporarily closed roads, and impinged on homes. The problems were easily fixed, and no significant dollar losses have been associated with windblown deposits.

FUTURE IMPACTS

As development continues in Wyoming, more land is disturbed. Eventually, stabilized dunes will be disrupted, leading to nuisance problems with the windblown deposits.

SUMMARY

PROPERTY AFFECTED: low
POPULATION AFFECTED: low
PROBABILITY: medium
JURISDICTION AFFECTED: The jurisdictions of Laramie and Rock River as well as the communities of Bosler and Tie Siding.

CHAPTER XVI. SNOW AVALANCHES

Wyoming is one of the top-ranking states for avalanche hazard because of its weather and mountainous terrain coupled with outdoor recreation. Skiers, snowboarders, and snowmobile operators are most commonly victims of avalanche hazards. However, motorists and others not engaging in recreation are also at risk of being caught in an avalanche. An avalanche is defined as a large mass of snow, ice, earth, rock, or other material in swift motion down a mountainside or over a precipice (Merriam-Webster). In the case of this evaluation, avalanche medium refers to snow.

Avalanche fatalities provide the best indicator for locations of where events occur and what populations are most threatened. According to the U.S. Forest Service, Utah Avalanche Center, Wyoming ranks fifth among the eight states with the most avalanche fatalities. Wyoming comprised 8% of avalanche deaths in the U.S. from 1992 through 2007 ***(Figure 16.1)***.

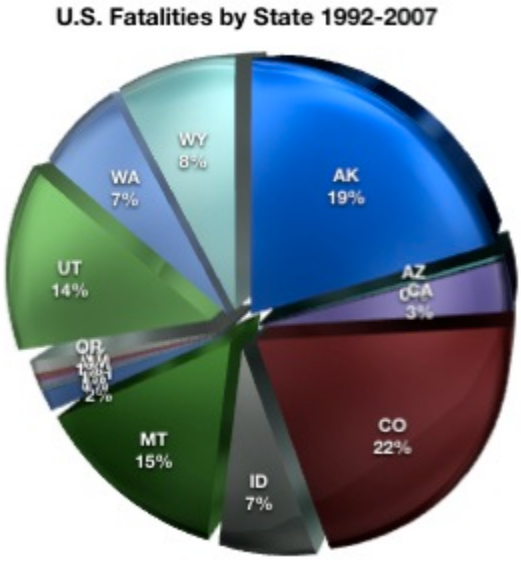


Figure 16.1 – Chart highlighting Wyoming as the fifth most at-risk U.S. state for fatalities from avalanches. Figure adapted from the USDA Forest Service, Utah Avalanche Center.

Since 1913, there have been 61 fatalities from avalanches with the majority resulting from individuals partaking in mountain recreation, most predominantly backcountry skiers (***Figure 16.2***). Although deaths occur primarily in the backcountry, motorists, residents, and workers in high angle, avalanche-prone terrain must be aware of the danger; at least five individuals have perished this way. In ***Figure 16.3*** it is apparent that the majority of fatalities occurred in western Wyoming, in particular the Teton area. This area presents an increased population of outdoor enthusiasts; an increased population engaging in extreme winter sports; and a more significant high angle, avalanche-prone character of terrain.

Wyoming Avalanche Fatalities by Activity (1913– 2007)

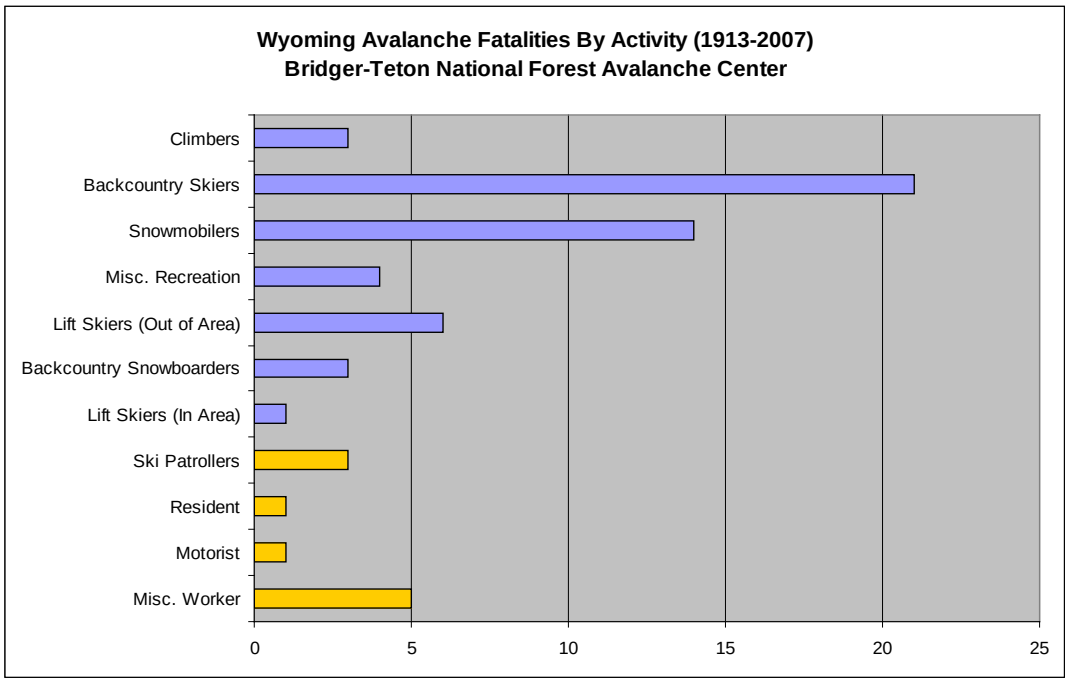


Figure 16.2 – Wyoming Avalanche Fatalities by Activity. Graph from the Bridger-Teton National Forest Avalanche Center.

Wyoming Avalanche Fatalities by Area (1913-2007)

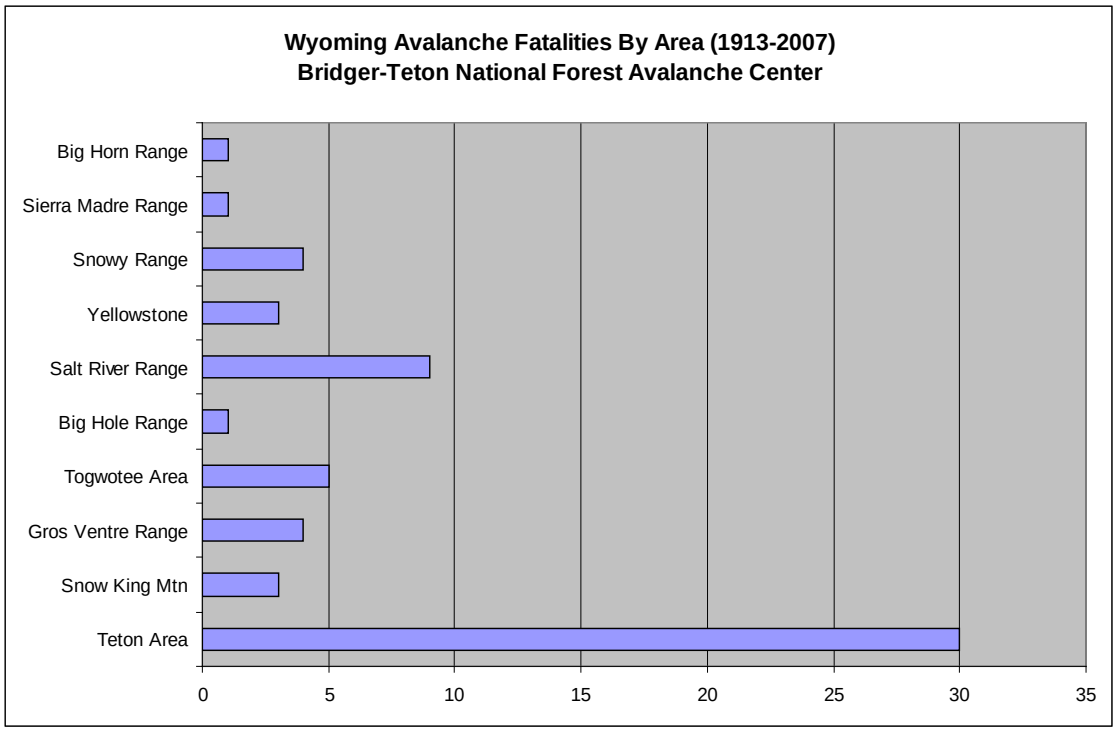


Figure 16.3 – Wyoming Avalanche Fatalities by Location. Graph from the Bridger-Teton National Forest Avalanche Center.

HISTORY

Table 16.1 lists all fatal avalanche events from 1913 to 2008. Of the seven counties that have had avalanches resulting in death, Teton County has the most events in Wyoming. Albany County has had three avalanches with human fatalities. Avalanches occur in Albany County all the time in the Snowy Mountain range, but most are not reported because they do not impact people or property. There have been no avalanches in Albany County that have caused harm or damage to infrastructure since the 2003 update of the plan.

Table 16.1–Wyoming Fatal Snow Avalanche Events (1913-2007)				
Date	Name	Age	Location	Activity/Travel
1913	Clarence Curtis		Mail Trail, Teton Pass	Mail Carrier
1914	Frankie Parsons		Mail Trail, Teton Pass	Mail Carrier
1914	Freighter		Freight Trail, Teton Pass	Freighter Horse Team
1/9/1916	Soldier	25	NW of Cleopatra Terrace, Yellowstone YNP	Soldier
2/11/1932	Harry Swanson	17	Crater Lake, Teton Pass	Woodcutter Foot
12/15/1945	Bob MacLeod	15	Crater Lake, Teton Pass	In-Vehicle Skier
2/13/1949	Harold Ross	32	Horse Creek Ranch	Rancher Horse Team
3/5/1956	John Stanley	57	Leeks Canyon, Snow King Mt	Alpine Skier Out of Area
2/10/1962	Dr. Max Stock	34	Swift Creek, Salt River Range	Snowshoer

Table 16.1–Wyoming Fatal Snow Avalanche Events (1913-2007)				
Date	Name	Age	Location	Activity/Travel
3/12/1964	Dick Pittman	30	Patroller, Snow King Mt	Alpine Patroller
1/16/1974	Wes Krause	20	Glacier Gulch, Teton Range	Backcountry Skier
1/16/1974	Bart Brodsky	18	Glacier Gulch, Teton Range	Backcountry Skier
1/16/1974	David Silha	20	Glacier Gulch, Teton Range	Backcountry Skier
1/19/1975	Rick Caller	24	Near Owen Creek, Big Horn Range	Backcountry Skier
2/8/1975	**Perry Despain**	**14**	**Near Centennial, WY**	**Snow Player**
1/12/1976	Phillip Gartland	26	Jackson Peak, Gros Ventre Range	Backcountry Skier
1/12/1976	Jim Rierson	19	Jackson Peak, Gros Ventre Range	Backcountry Skier
3/20/1976	Wayne Farrell	20	South Leigh Canyon, Teton Range	Backcountry Skier
3/26/1977	Steve Karl	23	Near Ski Cabin, Gros Ventre Range	Backcountry Skier
4/26/1979	Tim Drew	24	Grand Teton, Teton Range	Climber
4/26/1979	Jerry Lucas	22	Grand Teton, Teton Range	Climber
2/16/1984	Pierre Muheim	27	Ferrin's Slide, Snow King Mt	Alpine Skier Out of Area
2/3/1985	Bruce Melliger	29	Mt Wister, Teton Range	Climber
2/9/1985	Dennis Jeperson		Rock Creek Knoll, Snowy Range	Snowmobiler
12/2/1985	Paul Driscoll	48	Rendezvous Mountain, Teton Range	Alpine Patroller
2/17/1986	Tom Raymer	37	Rendezvous Mountain, Teton Range	Alpine Patroller
2/22/1992	Gregory Felzien	26	Mount Norris, Yellowstone NP	Snowshoer
2/28/1992	Dan Schwendiman	21	Dry Ridge, Teton Range	Snowmobiler
12/28/1992	Richard Saenoff	41	Simpson Peak, Togwotee Pass	Backcountry Skier
2/25/1994	Rick Clayton	37	Poison Creek, Salt River Range	Snowmobiler
4/19/1995	Kevin Marriot	22	Taylor Mountain, Teton Range	Backcountry Skier
1/15/1996	Ginger Shaw	38	Bradley Mountain, Near Alpine	Helicopter Skier
1/21/1996	**Christopher Garber**		**Centennial Ridge, Snowy Range**	**Backcountry Skier**
2/10/1996	Chris McGee	29	Strawberry Creek, Salt River Range	Snowmobiler
3/3/1997	Rick Hutchinson	49	Factory Hill, Yellowstone	Backcountry Skier
3/3/1997	Diane Dustman	37	Factory Hill, Yellowstone	Backcountry Skier
1/11/1998	Benjamin Romios	21	Battle Lake, Sierra Madre Range	Snowmobiler
1/4/1999	Dave Reyberg	35	Dry Lake Creek, Togwotee Pass	Snowmobiler
1/19/1999	Michael Langer	17	Rendezvous Mountain, Teton Range	Alpine Skier
11/27/2000	Marl Nielson	41	Hoodoo Creek, Absaroka Range	Hunter
12/1/2000	Joel Roof	28	Glory Bowl, Teton Range	Snowboarder
12/9/2000	Jonathan Beall	29	Titmouse Ridge, Teton Pass	Backcountry Skier
12/25/2000	Sara Campbell	26	South Badger Creek, Teton Range	Backcountry Skier
2/6/2001	Ralph Toscano Jr.	43	Rock Springs, Teton Range	Alpine Skier Out of Area
2/23/2001	Allen Wagner	24	Granite Canyon, Teton Range	Alpine Skier Out of Area
3/3/2001	Jay Almos		Leigh Bowl, Salt River Range	Snowmobiler
3/12/2002	Chance Schiess	16	Grove Creek, Big Hole Range, ID	Snowmobiler
3/21/2002	Mike Dollarhide	32	Jackson Peak, Gros Ventre Range	Backcountry Skier
12/26/2002	**Snowmobiler**		**West Side of the Snowy Range**	**Snowmobiler**
1/4/2003	Tristan Picot	19	Near Ski Lake, Teton Range	Snowboarder
1/5/2003	Joshua Roy Richins	16	Balls Mountain, Salt River Range	Snowmobiler
1/25/2003	Marshall Heverly	44	Kettle Creek, Togwotee Pass	Snowmobiler
1/27/2003	Pavel Wolf	27	Avalanche Bowl, Teton Pass	Snowboarder
2/10/2003	Steve Haas	41	Hourglass Couloir, Teton Range	Skier Permanently

Table 16.1–Wyoming Fatal Snow Avalanche Events (1913-2007)				
Date	Name	Age	Location	Activity/Travel
				Area
2/24/2003	Mark Loveland	41	Smiths Fork, Salt River Range	Snowmobiler
1/31/2004	Ray Azar	48	Peak 9670, Teton Range	Backcountry Skier
12/27/2005	Jesse Humphries	21	Split Rock, Togwotee Pass	Snowmobiler
1/5/2006	Laurel Dana	43	Mt. Taylor, Teton Range	Backcountry Skier
12/16/2006	Daniel Boschae	30	Stewart Peak	Snowmobiler
1/5/2007	Justin Kautz	25	Rock Springs, Teton Range	Alpine Skier Out of Area
2/17/2007	Nicolas Steinman	26	Palisades Peak, Snake River Range	Snowmobiler
3/10/2007	Paul Maniuci	24	Darby Canyon, Teton Range	Backcountry Skier

Reference: Bridger Teton National Forest Avalanche Center

IMPACTS

Avalanches cause two primary hazards—road blocks and death. Since 1994 there has been a trend of at least one fatality per year in Wyoming. Fatalities are the best-documented impact related to avalanches and are significant simply because of the nature of the hazard. Furthermore, there are costs associated with search and rescue and removal of the deceased.

Road blocks are another major concern when roads intersect an avalanche path. The major costs associated with road blocks are snow removal and traffic diversion, which both necessitate personnel and equipment. Another less frequent issue is the costs associated with rescuing motorists if they were involved in the avalanche.

FUTURE IMPACTS

Given the popularity of winter recreational activities in Albany County it is likely that avalanches will continue to pose a threat for backcountry travelers. Albany County encourages its citizens to be prepared when going out in the backcountry and to have an avalanche beaker and knowledge of avalanche safety.

SUMMARY

PROPERTY AFFECTED: Low
POPULATION AFFECTED: Low
PROBABILTIY: High
JURISDICTION AFFECTED: Unincorporated areas of Albany County such as the Snowy Mountain Range.

CHAPTER XVII. TORNADOES

Wyoming, lying just west of "tornado alley," is fortunate to experience fewer intense tornadoes than its neighboring states to the east. However, tornadoes remain a significant hazard in the state. Tornadoes are the most intense storm on earth, having been recorded at velocities exceeding 315 miles per hour (mph). The phenomena results in a destructive rotating column of air ranging in diameter from a few yards to greater than a mile, usually associated with a downward extension of cumulonimbus cloud. Tornadoes are classified by their intensity using the Fujita (F) Scale, with F0 being the least intense and F6 being the most intense. **(Table 17.1)**

Table 17.1 – Fujita Scale of Tornado Intensity

Fujita Scale	Wind Speed	Damage
F0	40-72	Light
F1	73-112	Moderate
F2	113-157	Considerable
F3	158-206	Severe
F4	207-260	Devastating
F5	261-318	Incredible
F6	319-379	Inconceivable

According to the Wyoming Climate Atlas, Wyoming ranks 25th in the number of annual tornadoes (10), 33rd in fatalities (six deaths per one million people), 36th in property damage ($49,339,505) (figure from WSGS), and 37th in injuries, in the U.S. from 1950 to 1994 (excerpted from the Wyoming Climate Atlas).

Tornado statistics, especially prior to the 1970s, must be viewed as incomplete since many twisters must have occurred without being witnessed. Wyoming's open rangelands experience little, if any, damage from these storms so many go unreported. In the 1990s, the Internet and Doppler radar increased the public's awareness of tornadoes with the potential of more being observed and reported. However, the trend in annual tornadoes has decreased by one-third since 1976 and appears to have coincided with a major hemispheric weather pattern shift, despite the increased reporting based on Doppler radar vortex (circulation) signatures (excerpted from the Wyoming Climate Atlas).

HISTORY

Table 17.2 presents damages from tornadoes rated by county from 1907 through 2006. **Table 17.3** shows estimated dollar damage by year for the same time period in both dollar amounts for the year of event and for the equivalent in 2006. By a large margin, 1979 was the worst year with a total damage estimate of $42.8 million ($118.9 million in 2006 USD), with the influential factor being the Cheyenne-area tornado on July 16. The second worst year was 2005 with a total estimated damage of $5.0 million ($5.1 million

in 2006 USD). This is a significant difference of $37.8 million ($113.8 million in 2006 USD). The amount of damage in 1979 is unlikely, but nevertheless is possible and should be considered in a mitigation plan. Moreover, the 1979 tornado damage was all concentrated on property, rather than crops.

Property versus crop damage should be considered because, in most instances, property is more critical to restore and time sensitive than crops due to the public service and protective nature of property. Furthermore, public disturbance is affected with property damage, while public disturbance with crop damage is marginal and confined usually to the private owner of the crops. However, long-term effects of crop damage have potential to affect the public, but is not as time sensitive as property damage.

In a database composed of information derived from the National Oceanic and Atmospheric Administration's (NOAA) National Climactic Data Center (NCDC), the Wyoming Climate Atlas, and the WOHS, there are 523 recorded tornado events from 1907 to 2006 (**Table 17.2**). The number does not include events classified only as funnels. Of the 523 events, 186 tornadoes have been identified as damaging **(Table 17.4).** Damage is defined as those events that resulted in loss of property or life, and any events of F2 or greater.

Annual tornado statistics show a wide degree of variation across the state. For example, 42 tornadoes were counted in 1979 while no tornadoes were reported in 1951 and 1970 ***(Figure 17.1***). With respect to counties, of the 523 recorded tornadoes (1907-2006), Laramie County had the most with eighty-two. Southeast Wyoming is closest to "tornado alley" and explains these high numbers ***(Figure 17.2***). The average length of a tornado in Wyoming is 3.05 miles with an average width of 79 yards. On average there are six tornado days per year. (Excerpted from the Wyoming Climate Atlas).

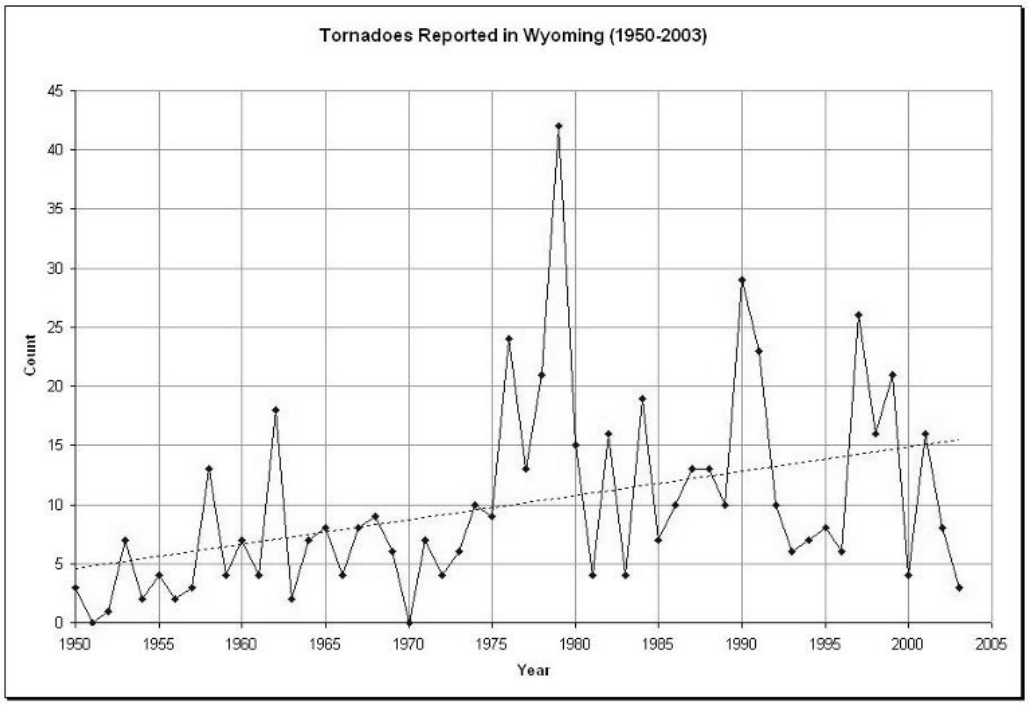


Figure 17.1 *– Annual Wyoming Tornado Count with Long-term Trend Line (dashed). Graph from Wyoming Climate Atlas*

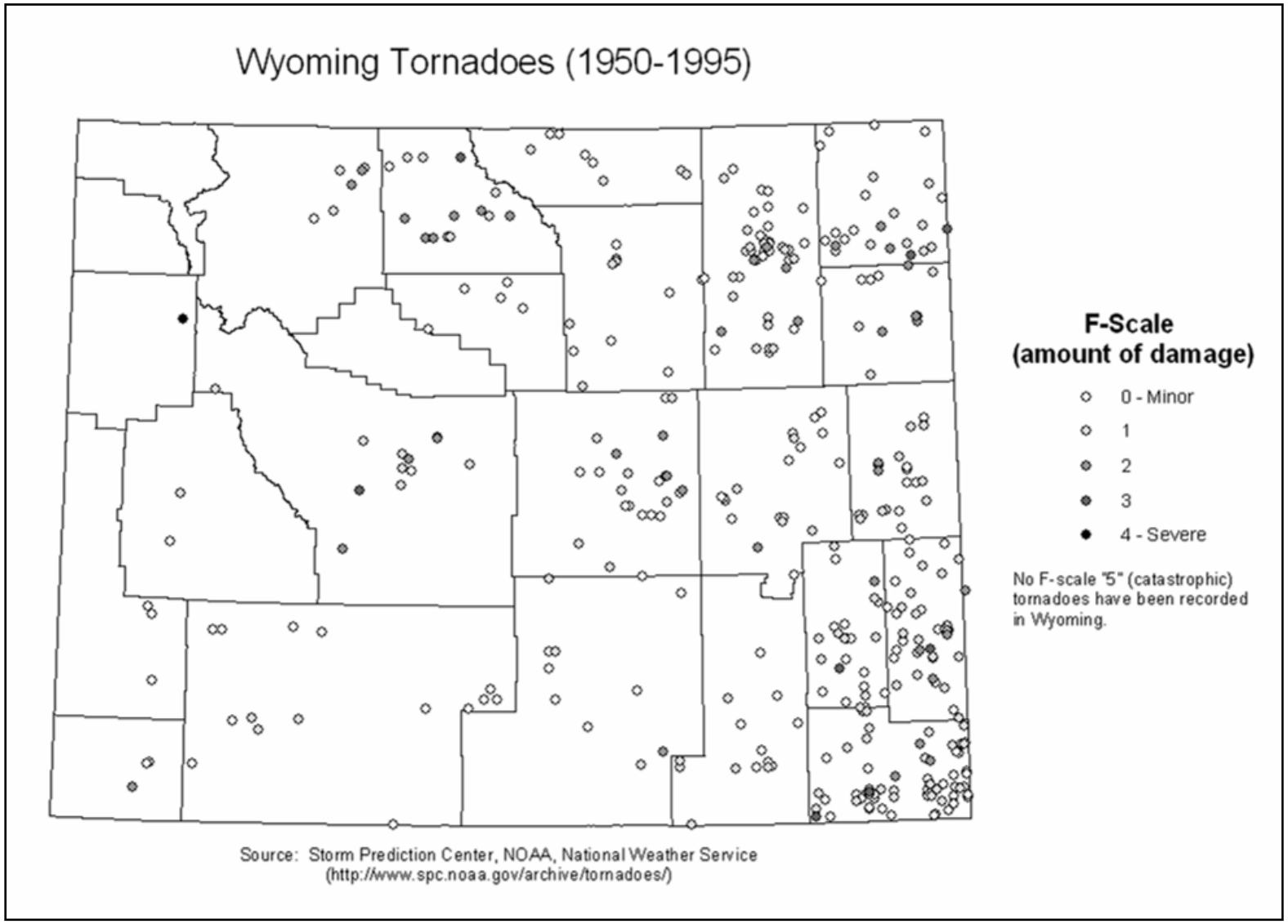
Table 17.2 – Wyoming Damaging Tornado Data Totals By County For 1907 Through 2006.							
County	**Events**	**Deaths**	**Injuries**	**Property Damage (Year of Event USD)**	**Crop Damage (Year of Event USD)**	**Total Damage (Year of Event USD)**	**Total Damage (2006 USD)**
Albany	**21**	**0**	**2**	**77,500**	**-**	**77,500**	**142,607**
Big Horn	23	2	2	329,500	2,750	332,250	1,098,856
Campbell	71	2	23	8,732,500	5,275	8,737,775	14,004,531
Carbon	16	0	0	27,500	277,750	305,250	1,172,445
Converse	37	0	12	185,800	2,750	188,550	1,152,910
Crook	30	0	0	648,525	308,000	956,525	4,263,503
Fremont	15	0	3	490,500	275	490,775	1,536,354
Goshen	51.3	0	26	3,023,775	27,500	3,051,275	8,876,753
Hot Springs	2	0	0	27,500	-	27,500	52,286
Johnson	13.5	0	0	11,050	-	11,050	27,191
Laramie	82.3	1	41	40,177,775	52,750	40,230,525	112,803,334
Lincoln	6	0	4	27,500	-	27,500	68,291
Natrona	31	0	9	390,500	-	390,500	1,016,471
Niobrara	31	0	6	854,750	100,275	955,025	2,162,451
Park	7	0	3	85,250	275,275	360,525	739,167
Platte	32.3	2	4	641,500	32,500	674,000	2,680,231
Sheridan	11.5	1	0	41,250	2,750	44,000	301,001
Sublette	2	0	0	-	-	-	-
Sweetwater	16	0	0	55,000	-	55,000	303,164
Teton	1	0	0	500,000	-	500,000	888,100
Uinta	2	0	0	5,500	-	5,500	23,125
Washakie	6	0	0	30,250	-	30,250	191,298
Weston	15	0	2	130,250	-	130,250	409,153
Total	**523**	**6**	**123**	**56,493,675**	**1,087,850**	**57,581,525**	**153,913,222**

PRESIDENTIAL DECLARATION

There has been one Presidential Disaster Declaration related to tornadoes in Wyoming. FEMA DR-WY-1599 was associated with the August 12, 2005, tornado in Wright, Wyoming located in Campbell County.

Table 17.3 – Wyoming Damaging Tornado Estimated Damage (USD) by Year (1907 – 2006)				
Year	Property Damage	Crop Damage	Total Damage (year or event USD)	Total Damage (2006 USD)
1907	-	-	-	-
1920	-	-	-	-
1923	4,000	-	4,000	47,058
1938	5,000		5,000	71,429
1942	1,500	5,000	6,500	76,659
1944	2,600		2,600	29,884
1948	110,000	100,000	210,000	1,750,002
1950	-	-	-	-
1953	56,500	5,000	61,500	465,909
1955	210,000		210,000	1,578,947
1959	38,000	27,500	65,500	454,861
1960	50,250	-	50,250	341,837
1961	55,275	-	55,275	373,479
1962	96,250	33,275	129,525	863,500
1963	30,250	-	30,250	199,013
1964	137,500	-	137,500	892,857
1965	55,275	275,000	330,275	2,117,147
1966	302,500	-	302,500	1,878 ,881
1967	57,750	3,025	60,775	366,114
1968	63,525	-	63,525	367,196
1969	-	27,500	27,500	151,099
1971	11,000	-	11,000	54,726
1973	27,500	-	27,500	125,000
1974	90,750	-	90,750	370,408
1975	527,500	-	527,500	1,975 ,655
1976	338,250	275,000	613,250	2,174 ,645
1977	-	2,750	2,750	8,136
1978	957,500	3,300	960,800	2,974,613
1979	42,835,250	-	42,835,250	118,986,805
1980	302,500	-	302,500	739,609
1982	335,250	2,750	338,000	705,637
1984	240,250	2,750	243,000	471,845
1985	35,750	-	35,750	66,948
1986	257,750	-	257,750	473,805
1987	802,500	-	802,500	1,425,400
1988	2,752,750	-	2,752,750	4,689 ,523
1989	30,250	-	30,250	49,817
1990	8,250	-	8,250	12,731
1991	402,500	325,000	727,500	1,076,183
1993	100,000	-	100,000	139,470
1994	-	-	-	-
1996	130,000	-	130,000	167,095
1997	2,000	-	2,000	2,512
1998	20,000	-	20,000	24,722
1999	10,000	-	10,000	12,106
2001	-	-	-	-
2003	-	-	-	-
2005	5,000,000	-	5,000,000	5,159,959
Total	**56,493,675**	**1,087,850**	**57,581,525**	**153,913,222**

***Figure 17.2**—Tornadoes documented in Wyoming from 1950 through 1995, according to damage on the F-Scale.*



June has nearly twice the number of tornadoes compared to May and July. The period of November through March has no reported tornadoes (**Figure 17.3**). With the heating of the day, tornadoes peak in occurrence between 3:00 p.m. and 4:00 p.m. MST. Tornadoes occurring at night are rare, although more probably occur but go unseen (**Figure 17.4**).

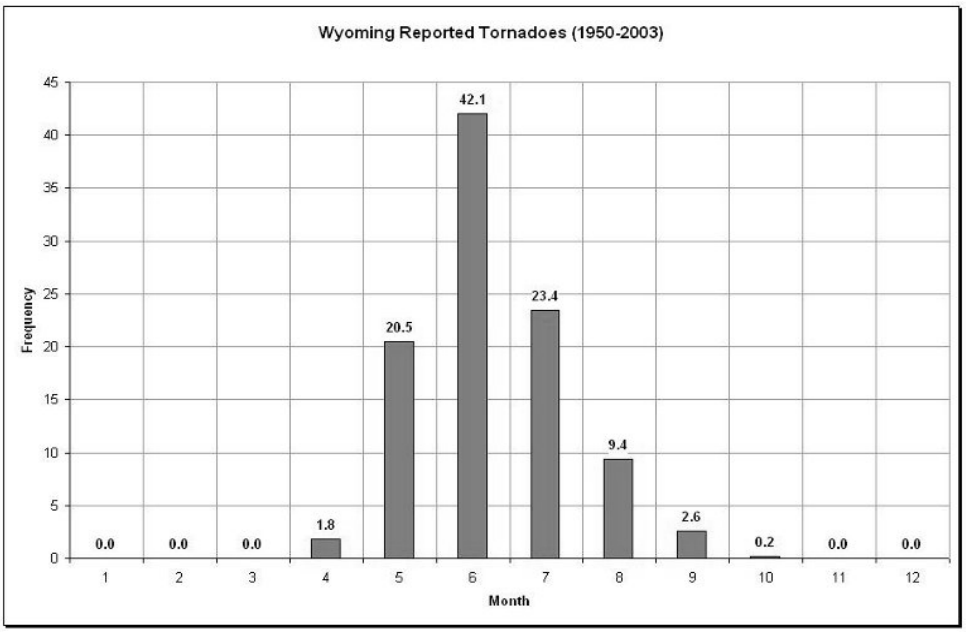


Figure 17.3 *– Wyoming Monthly Tornado Statistics (1950-2003). Graph from Wyoming Climate Atlas*

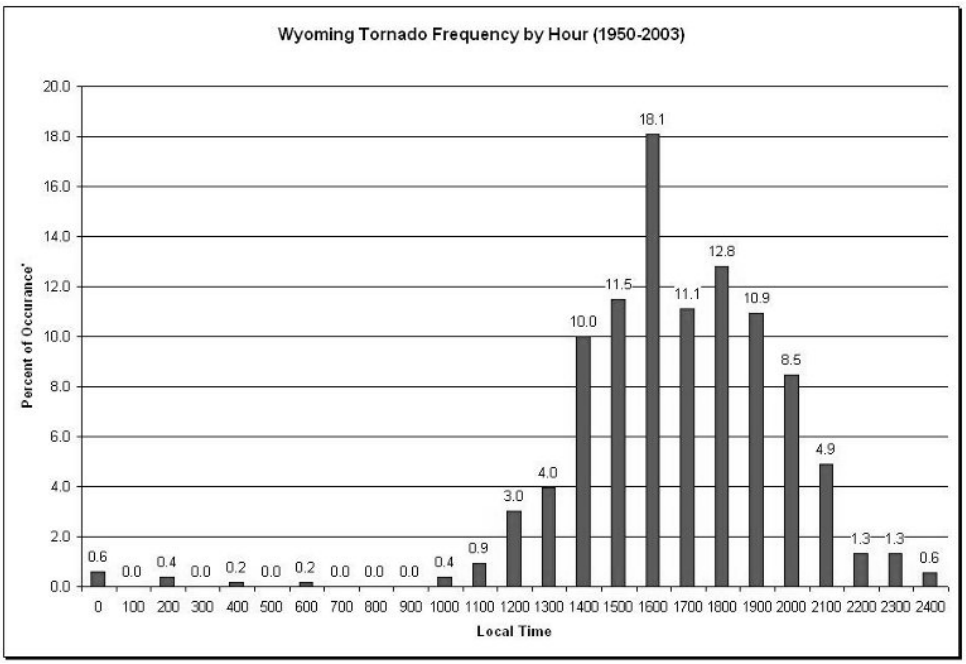


Figure 17.4 *– Wyoming Tornado Frequency by Hour (1950-2003).*

Graph from Wyoming Climate Atlas

The weakest intensity (F0) winds (40 to 72 mph) occurs more than half the time producing minimal damage (**Figure 17.5**). Significant tornadoes are considered to be F2 intensity winds, between 113 and 157 mph or stronger, or if a weaker tornado kills a person. Significant tornadoes occur in about four out of 100 tornadoes in Wyoming (excerpted from the Wyoming Climate Atlas).

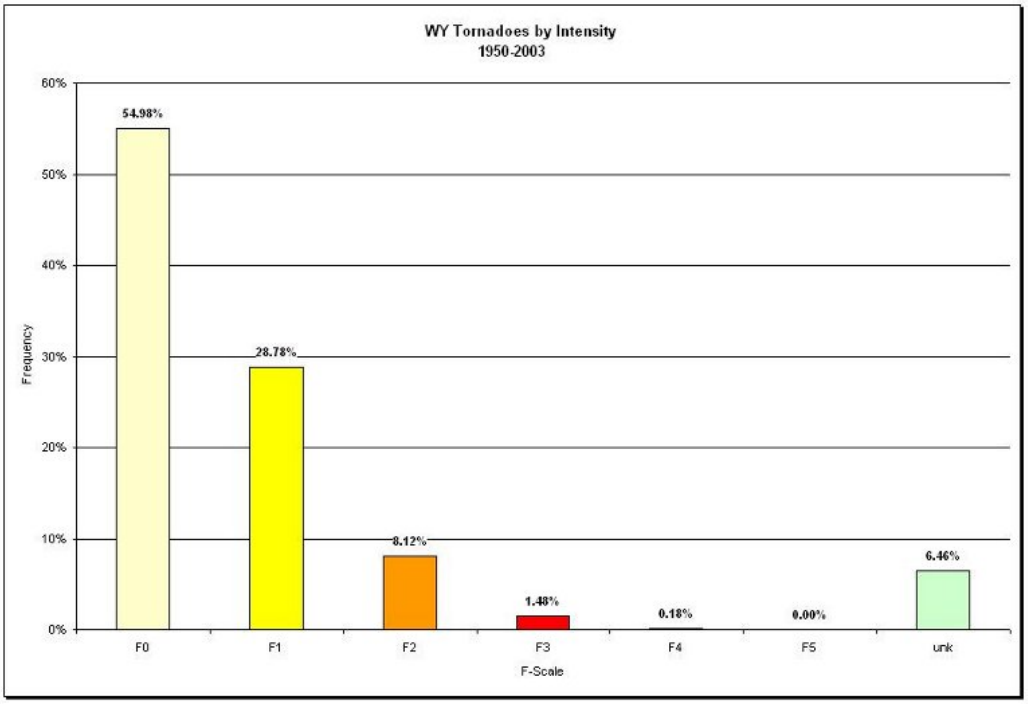


Figure 17.5 *– Frequency of Tornadoes by Intensity (1950-2003). Graph from Wyoming Climate Atlas*

The strongest tornado in Wyoming was an F4 with winds between 207 and 260 mph, which occurred on July 21, 1987, in Teton County and resulted in $500,000 ($888,100 2006 USD) in damages:

Date	County	Location	Damage	Information
7/31/1960	Albany	38 Miles W of Laramie		Small tornado
5/5/1979	Albany	Laramie	27,500	A small tornado touched down in Laramie destroying a roof on the Regency Apartments. 14 vehicles damaged as pieces of roof hit parking lot area.
5/23/1996	Albany	3N to 3.2 N. of Laramie	50,000	A tornado briefly touched down just north of Laramie. The tornado downed a large spruce tree and a metal shed was blown up into a tree.
5/22/2008	Albany	Vedauwoo and Laramie		A tornado came up from Colorado and hit up at Vedauwoo and came down the hill and went across the east and north ends of Laramie causing substantial damage to residential neighborhoods and the local golf course. The tornado caused one injury.

Table 17.4 History of Tornadoes in Albany County

IMPACTS

Although counties have been affected by varying of tornado intensity, frequency, and damage, they nevertheless have struck every county in Wyoming, thus proving to be a considerable danger.

Historically, the most devastating tornado event in Wyoming was July 16, 1979 when the Cheyenne area received an estimated $111,100,000 worth of damage (2006 dollars). This is significant because Laramie County, the location of the state's capitol city, has Wyoming's greatest population and is also the most likely to have the highest frequency and intensity of tornadoes. However, tornado frequency and dollar damage are not necessarily directly related as they are with some counties, including Laramie and Campbell Counties (compare **Tables 17.5**, **Tables 17.6 and 17.7**).

Table 17.5- Tornado Events By County (1907 through 2006).

County	Number of Events
Laramie	82.3 (crossed 3 counties)
Campbell	71
Goshen	51.3 (crossed 3 counties)
Converse	37
Platte	32.3 (crossed 3 counties)
Natrona	31
Niobrara	31
Crook	30
Big Horn	23
Albany	**21**
Carbon	16
Sweetwater	16
Fremont	15
Weston	15
Johnson	13.5 (crossed 2 counties)
Sheridan	11.5 (crossed 2 counties)
Park	7
Lincoln	6
Washakie	6
Hot Springs	2
Sublette	2
Uinta	2
Teton	1
TOTAL	**523**

Teton County, for example, only had one tornado event, but suffered approximately $888,100 in total damage (2006 dollars). In contrast, Sheridan and Johnson counties each experienced more than 10 tornadoes, yet only suffered an estimated $301,001 and $27,191 in total damage, respectively (2006 dollars).). ***Figure 17.6*** is a graphical representation of the number of damaging tornadoes, the number of deaths and injuries, and the amount of damage in 2006 dollars by county.

FUTURE IMPACTS

Historical data demonstrates the most critical area of the state for tornado hazard is the eastern one third, with the five most threatened areas being Laramie, Campbell, Goshen, Converse, and Platte Counties. The five least threatened areas include Teton, Uinta, Sublette, Hot Springs, and Washakie Counties (**Table 17.5**). Laramie, Campbell, Goshen, Crook, and Platte Counties are the five counties having received the most damage, while Sublette, Uinta, Johnson, Hot Springs, and Lincoln Counties have sustained the least damage. Interestingly, when the damage values from the year of the event are converted to 2006 values, Carbon County (which originally seemed to have less damage than Big Horn, Park and Natrona Counties) actually had more damage in current dollars. There are also other noticeable changes in the order of counties when the damages are converted to 2006 dollars (compare **Tables 17.6** and **17.7).**

Using the figures from **Tables 17.6 and 17.7** as a predictor of the future, Laramie, Goshen, and Campbell Counties should be viewed as most critical, and Johnson, Uinta, and Sublette Counties are the least threatened. The July 1979 tornado in the Cheyenne area, resulting in over $111 million worth of damage in 2006 dollars, should be considered a worst-case scenario. The data suggest that Cheyenne's size and location places it at the highest risk for economic damage from tornado hazards.

Table 17.6—Tornado Damage by County in 2006 USD (1907 through 2006).

County	Damage
Laramie	112,803,334
Campbell	14,004,531
Goshen	8,876,753
Crook	4,263,503
Platte	2,680,231
Niobrara	2,162,451
Fremont	1,536,354
Carbon	1,172,445
Converse	1,152,910
Big Horn	1,098,856
Natrona	1,016,471
Teton	888,100
Park	739,167
Weston	409,153
Sweetwater	303,164
Sheridan	301,001
Washakie	191,298
Albany	**142,607**
Lincoln	68,291
Hot Springs	52,286
Johnson	27,191
Uinta	23,125
Sublette	0
TOTAL	**$153,913,222**

Table 17.7—Tornado Damage by County In Year-of-Event USD (1907 through

County	Damage
Laramie	40,230,525
Campbell	8,737,775
Goshen	3,051,275
Crook	956,525
Niobrara	955,025
Platte	674,000
Teton	500,000
Fremont	490,775
Natrona	390,500
Park	360,525
Big Horn	332,250
Carbon	305,250
Converse	188,550
Weston	130,250
Albany	**77,500**
Sweetwater	55,000
Sheridan	44,000
Washakie	30,250
Lincoln	27,500
Hot Springs	27,500
Johnson	11,050
Uinta	5,500
Sublette	0
TOTAL	**$57,581,525**

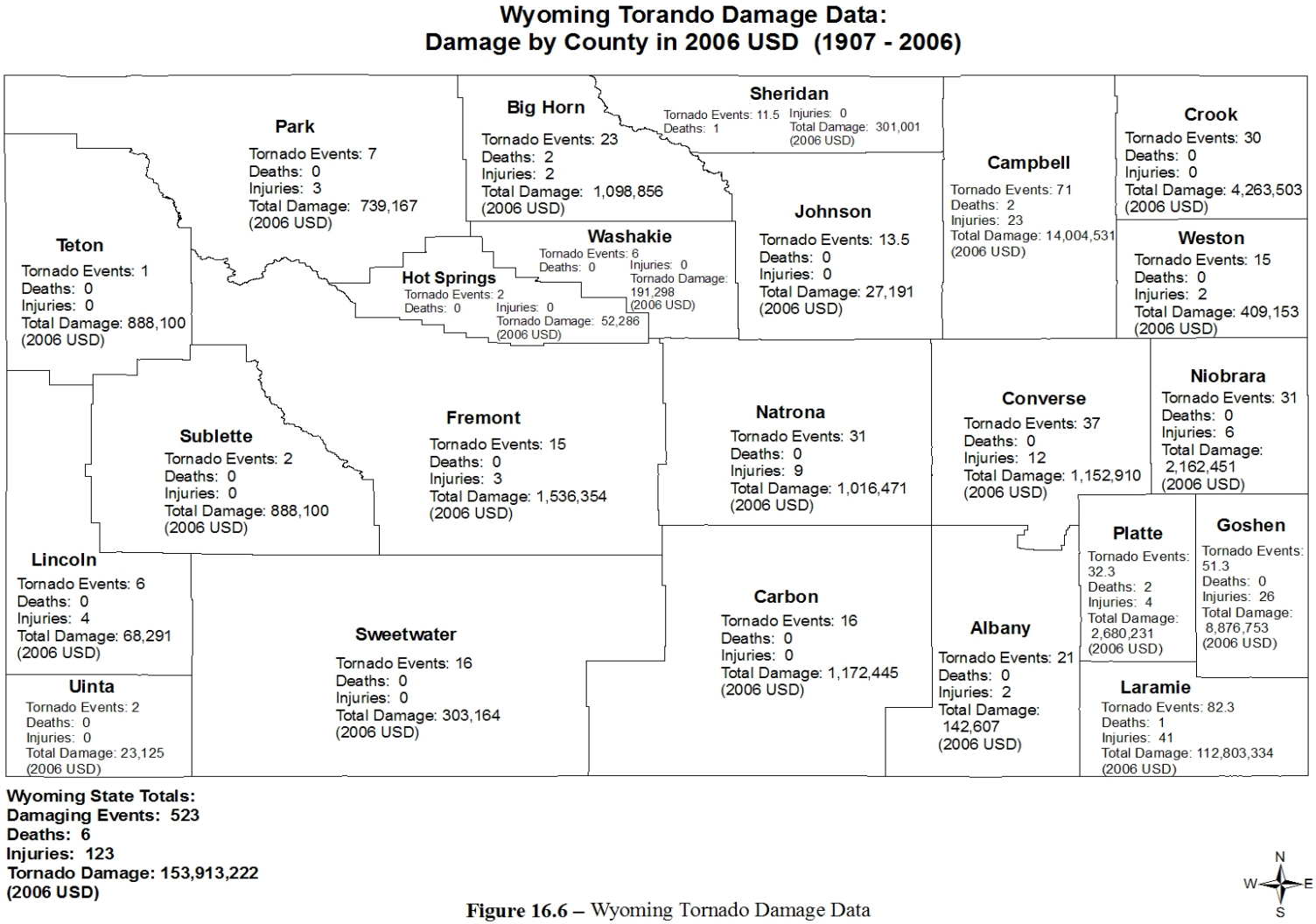


Figure 16.6 – Wyoming Tornado Damage Data

The only recent tornadoes causing loss of life occurred in Big Horn County on June 26, 1959, in Cheyenne on July 16, 1979, and in Wright on August 12, 2005. One life was lost in the Big Horn County Cheyenne events, and two lives were lost in the Wright event. The Cheyenne event also resulted in 40 injuries, caused an estimated $111 million in damage in 2006 dollars, and is considered the state's worst tornado.

In **Figure 17.7**, tornado occurrence by county is shown from 1950 to 2003. The three highest counts occurred in Laramie, Campbell, and Goshen Counties. For average annual damage costs based on 1999 dollars from 1950 to 1999 see **Figure 17.8**.

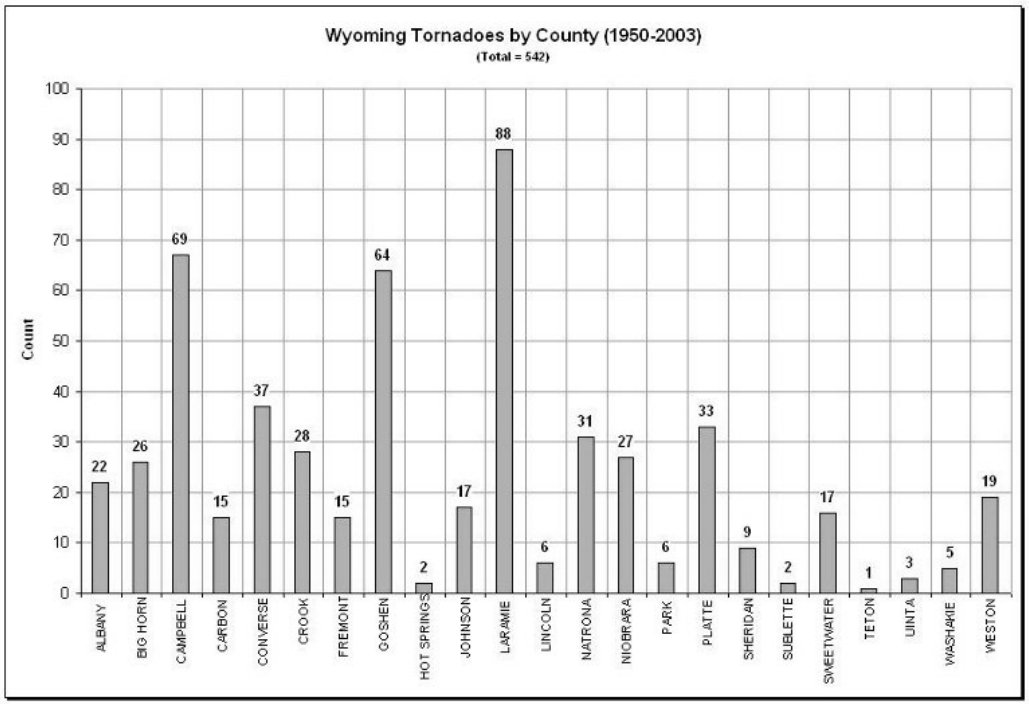


Figure 17.7—*Wyoming Tornadoes by County (1950-2003). Graph from Wyoming Climate Atlas.*

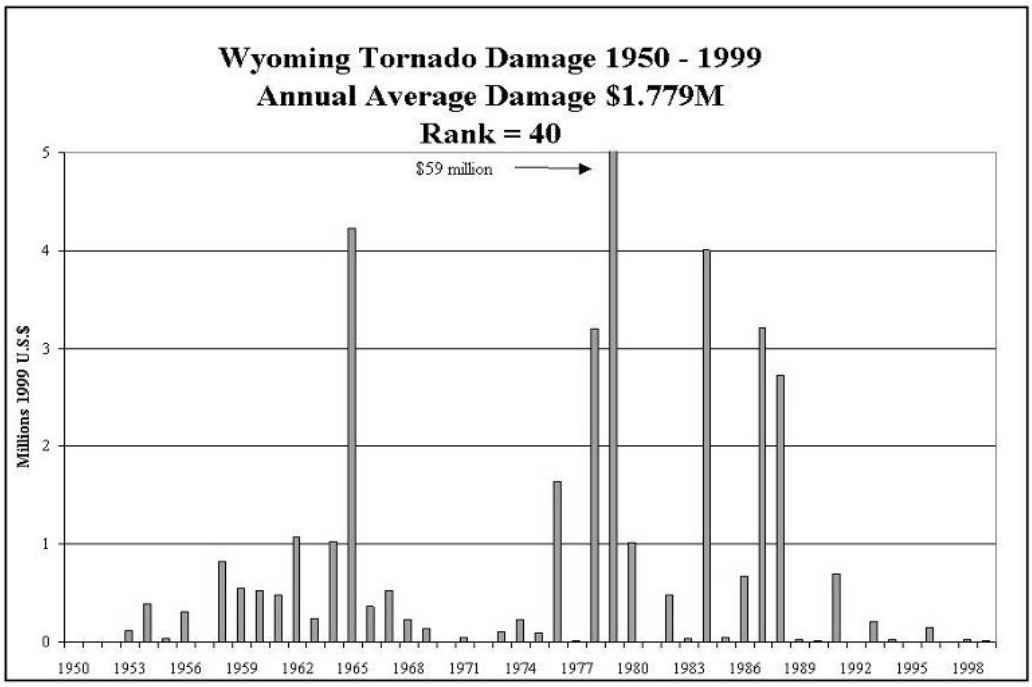


***Figure 17.8**– Wyoming Tornado Damage (1955 – 1999). Graph from Wyoming Climate Atlas.*

Figure 17.9 Tornado that touched down in Laramie, Wyoming on May 22, 2008

SUMMARY

PROPERTY AFFECTED: Medium
POPULATION AFFECTED: Medium
PROBABILTIY: Medium
JURISDICTIONS AFFECTED: Both Laramie and Rock River as well as outlying communities in the county.

CHAPTER XVIII. GOALS AND MITIGATION ACTIONS

The plan goals were developed following the completion of the hazard analysis and the public meetings that were held across the county from the beginning stages in 2001 up until 2009. There is at least one goal for each of the identified hazards, all of the hazards that ranked higher priorities by the participants of the process have at least one or more mitigation actions and many of the mitigation actions will prove beneficial across the county.

The mitigation actions or projects were determined during the public meetings, LEPC meetings, and various presentations of the material to public officials, city, and county Staff. The suggestions, actions and plans were compiled and used to create the list of goals and mitigation actions. Participants ranged from formalized LEPC members to citizens that attended the public meetings to review the plan.

Each goal statement below is followed by a table giving information about the specific mitigation actions or projects. The actions vary in cost and in priority and were assigned within three ranges.

Low Cost Projects: from $0 to $5,000
Medium Cost Projects: from $5,001 to $25,000
High Cost Projects: $25,001 and over

Low Priority Projects: Projects that is associated with low or infrequent hazard probability and least likely to prevent loss of life.
Medium Priority Projects: Projects associated with a less probable hazard with potential to save lives or damage to property.
High Priority Projects: Projects identified in response to one or more of the highest probability hazards combined with the ability to save lives.

The older goals from the 2003 plan were either completed and listed as such or put into the new goal matrix to be included in prioritizing actions.

Albany County looked at all forms of mitigation actions such as prevention, preparation, property protection, education and awareness, natural resource protection, structural, and coordination. The following projects were selected by the LEPC, private citizens who attended the planning meetings and city and county departments.

PROJECT SELECTION AND IMPLEMENTATION

Some of the projects identified in the following section have already been planned for and implemented into current planning and procedures. A cost benefit analysis was conducted for each project under consideration, regardless of whether federal funding is requested. At the completion of the plan each goal was ranked depending on the cost

benefit analysis for each hazard section. The analysis can reaffirm that funds and resources spent on any particular project will be effective in reducing potential for loss of life, injury, or property loss, or damage. Rankings based off of this cost/ benefit analysis is included in the tables for each hazard.

The implementation schedule will depend on availability of resources. The general time frame for project initiation are 1-3 years for the high priority projects, 3-5 years for medium priority projects and 5 years or longer for the projects that are considered low priority.

The LEPC viewed all potential projects and categorized them based on the criteria listed above. These projects are listed below in relation to which disaster they hope to mitigate.

REVISION PROCEDURES

The current revision of the Hazard Mitigation Plan was a new experience for the County. Procedures were created as the process was carried out. It will be the job of the Emergency Management office to take on revisions in the future. Albany County tried to model the work of other counties in including more information than was found in the original plan. Albany County will try to include all organizations and members of the community in participating in future updates and revisions. With the guidelines provided by the state, the county will comply with all required revisions and updates.

1. Improve Notification of individuals prior to threats of all types

(The projects under this goal are most likely to prevent injury or loss of life rather than reduce vulnerability of existing or future structures and infrastructure.)

Project	**Type**	**Ranking**	**Cost**	**Responsible Parties**	**Funding Source**	**Cost and Benefit**
Identify a point of contact for information dissemination during a disaster	Preparation, Education and Awareness	High	Low	County Emergency Management, City of Laramie and City of Rock River	EMA Budget	#3
Replace existing siren system with a more functional system with better coverage.	Preparation, Education and Awareness	High	High	County Emergency Management, City of Laramie and City of Rock River	Grant avenues, such as HSGP	#1
Install a siren system for Garrett Wyoming	Preparation, Education and Awareness	Medium	High	Albany County EMA	Grant avenues, such as HSGP	#2
Continue to implement CodeRED into Community	Preparation, Education and Awareness	High	Low	Albany County EMA, Fire and Police throughout County	EMA and City Budget	#4

2. **Be prepared to respond effectively to severe winter storms and blizzards**. (The projects under this goal are most likely to prevent injury or loss of life rather than reduce vulnerability to existing or future structure and infrastructure.) The winter storms mitigation action items provide direction on specific activities that organizations and residents in Albany County can undertake to reduce risk and prevent loss in severe winter storm events.

Project	**Type**	**Ranking**	**Cost**	**Responsible Parties**	**Funding Sources**	**Cost and Benefit**
Clearly identify parking areas for trucks during times of I-80 closure also for hazmat trucks	Preparation	High	Medium	Streets Dept, Police, EMA and WYDOT	City and County budgets	#3
Obtain supplies for sheltering	Preparation	Medium	Low	EMA	EMA budget and CERT grant	#4
Identify shelter locations for all types of disasters, educate citizens	Preparation and Public Education and Awareness	High	Low	EMA	EMA and Red Cross	#1
Prepare backup power for communication systems.	Preparation and prevention	Medium	Medium	EMA, City and County officials	HSGP grant	#2
Building codes for snow loads	Preparation and prevention	Low	Low	County Planning and Zoning	County and City Planning	#5

2003 WINTER STORMS AND BLIZZARDS GOALS THAT HAVE BEEN MET

The goal of using warning systems to announce on public communication system in the event of an impending winter storm has been met by the new CodeRED system.

CodeRED allows the county to send out information to the public about events such as winter storms and blizzards.

The goal of creating a care plans for special needs population in case of severe storm was begun with the UTSE program (Unable to Self Evacuate). CERT partnered up with the local Boy Scouts to create kits for those unable to evacuate. These kits included food, water, blankets, flashlight etc… The county has also worked towards creating a special needs database for CodeRED.

The goal of creating public service announcements to promote winter preparedness has been used since 2004. EMA places notifications and educational material on channel 11 and also works with the local radio stations to broadcast information to the public.

3. **Reduce the vulnerability for injury and loss of life from a Hazardous Material Incident**. (The projects under this goal will protect life, existing buildings, and future buildings.) The Hazardous materials mitigation action items provide direction on specific activities that organizations and residents in Albany County can undertake to reduce risk and prevent loss from hazardous materials events.

Project	**Type**	**Ranking**	**Cost**	**Responsible Parties**	**Funding Sources**	**Cost and Benefit**
Develop a Hazmat Response and evacuation plan	Preparation and Public Awareness and Education	High	Medium	Laramie Fire Department, EMA, County Fire Warden	EMA and EMPG grant	#1
Better education to the public on hazardous materials in County.	Public Awareness and Education	Low	Low	EMA, Police and Fire	EMA	#4
City, County involvement with UW labs and other private businesses	Preparation Prevention and Coordination	High	Low	EMA, Fire, Police, UW	EMA, Fire, Police and UW	#3
Warning System	Prevention and Coordination as well as public education	High	High	Albany County EMA	Grant avenues such as HSGP	#2

2003 HAZMAT GOALS THAT HAVE BEEN MET

The 2003 goal of developing and implanting a more accurate addressing system for residents outside the municipalities, to provide for efficient emergency response has been completed thanks to the County GIS and Planning team. They were able to address the road naming system and fix areas of concern within the county.

Continued training for responders to hazmat calls. The Laramie Fire Department and other volunteer organizations and the RRT have increased their abilities to respond to hazmat incidents through extensive training and drills. Although this goal has been met, efforts for continued training will be an ongoing event in the county.

4. **Minimize the potential for loss or damage from catastrophic wildland fire and other types of fires.** (The projects under this goal will primarily protect existing buildings and infrastructure; they will also protect future buildings and lessen the chance of loss of life.) The wildland fire mitigation action items provide direction on specific activities that organizations and residents in Albany County can undertake to reduce risk and prevent loss from wildland fire events.

Project	**Type**	**Ranking**	**Cost**	**Responsible Partners**	**Funding Sources**	**Cost and Benefit**
Type 3 wildland engine with firefighting gel pump and 50 5 gallon buckets of gel	Natural Resource Protection and property protection	Medium	High	County Fire Warden, Fire Departments	SLIB grant	#5
Fire wise programs with public and enforce these restrictions.	Prevention, and education & Awareness	High	Low	County Fire Warden, Fire Departments, EMA	Fire wise education programs.	#1
Cache of sprinklers for protecting buildings	Natural Resource Protection and Property Protection	Medium	High	County Fire Warden, Fire Departments	AFG grant	#4
Continue to work on and update the evacuation plans	Natural Resource protection and property and life protection	High	Low	Fire Warden and EMA	EMA and HSGP grant	#2
Conduct a pine beetle exercise that includes	Natural Resource protection and	Medium	Medium	Fire Warden, County Fire Departments, Sheriff	Training and exercise funds	#3

evacuation measures	property and life protection			Department and EMA		

2003 WILDLAND FIRE GOALS THAT HAVE BEEN MET

The goal of developing and implanting a more accurate addressing system for residents, outside the municipalities has been completed thanks to the Albany County GIS and Planning team.

The goal of developing effective suppression deployment resources has been completed by the creation of evacuation plans for the County. These evacuation plans are continually being updated and planning continues throughout the county.

5. **Reduce vulnerability to river flooding.** (The projects under this goal will primarily protect existing and future buildings and infrastructure.) The flood mitigation action items provide direction on specific activities that organizations and residents in Albany County can undertake to reduce risk and prevent loss from flood events.

Projects	**Type**	**Ranking**	**Cost**	**Responsible Parties**	**Funding Sources**	**Cost and Benefit**
Complete Floodplain study for South Laramie and establish base flood elevations	Prevention, Property Protection and Natural Resource Protection	Medium	High	FEMA, Emergency Management	Grant avenues	#1
Implement West and North Laramie Drainage studies into plans of action	Structural project, Property and Protection	Medium	High	EMA, City and County	Grant avenues	#2
Create a critical facilities matrix/plan for county	Prevention, property and Natural Resource Protection	Medium	Medium	EMA, City and County	Grant Avenues	#3

2003 FLOODING GOALS THAT HAVE BEEN MET

The goal of better emergency warning systems is underway with attempting to get a grant to fund the replacement of out of date sirens in the County. The CodeRED program also allows us use to send out warnings and information to the public.

6. Develop back-up systems for loss of power and/or communications during a disaster. (The projects under this goal will primarily protect human life.)

Project	**Type**	**Ranking**	**Cost**	**Responsible parties**	**Funding Sources**	**Cost and Benefit**
Work with local phone service providers as appropriate to address communication gaps	Prevention, Structural Projects and Coordination	High	Low	Emergency Management and Phone Companies	EMA	#2
Develop back-up communications system for Laramie and Rock River during power outages	Prevention and Structural Project	High	Medium	Mayor, Local Utility, LARC and Emergency Management	HSGP grant and other grant avenues	#1

7. Minimize potential for injury and loss of life from lightning and wind events. (The projects under this goal will help prevent injury and loss of life.)

Project	**Type**	**Ranking**	**Cost**	**Responsible parties**	**Funding Sources**	**Cost and Benefit**
Identify and designate shelter sites throughout county	Education and Awareness	High	Low	Emergency Management	EMA and Red Cross budgets	#1
Work with Local utilities on lightning education for kids	Education and Awareness	Medium	Low	Emergency Management	EMA	#3
Work with local paper and radio stations to add info on lightning	Educational Awareness	Medium	Low	Emergency Management	EMA	#2

8. Establish a highly functioning and effective Emergency Management Program in Albany County. (The projects under this goal will primarily protect human life, but may also reduce the risk of property loss and damage to both existing and future buildings and infrastructure.)

Project	**Type**	**Ranking**	**Cost**	**Responsible Party**	**Funding Sources**	**Cost and Benefit**
Revise/develop the County/town EOP	Prevention and Coordination	High	Medium	Emergency Management	EMA and EMPG grant	#1
Continue to work with NWS to offer weather spotter training sessions	Education and awareness	Medium	Low	Emergency Management	EMA	#3
Educate citizens on being prepared for disasters of all types	Education and Awareness	High	Low	Emergency Management	EMA	#4
Inventory and map siren locations and condition across county.	Coordination	Low	Low	Emergency Management	EMA	#2
Studies on current infrastructures in County	Prevention and Coordination of infrastructures	Low	Low	City and County Planning as well as Engineers	Grant Revenues	#5

9. Minimize potential property damage caused by hail. (The projects under this goal will reduce the risk of property loss and damage to both existing and future buildings and infrastructure.)

PROJECT	**TYPE**	**RANKING**	**COST**	**RESPONSIBLE PARTY**	**Funding Sources**	**Cost and Benefit**
Start educating the public about reporting hail and how to keep safe.	Education and Awareness	Low	Low	EMA	EMA	#1

10. Minimize potential property damage caused by droughts. (The projects under this goal will reduce the risk of property loss and damage to crops in the event of a drought.)

PROJECT	**TYPE**	**RANKING**	**COST**	**RESPONSIBLE PARTY**	**Funding Sources**	**Cost and Benefit**
Create water conservation plans for County	Prevention and coordination	Medium	Low	County and City Public Works and Utilities	County Planning	#1
Create an agricultural business plan for protecting lands and crops	Prevention and coordination	Low	Low	EMA, livestock board and local agricultural businesses.	County and EMA	#2

11. Minimize potential property damage caused by earthquakes. (The projects under this goal will reduce the risk of property loss and damage to both existing and future buildings and infrastructure.) The earthquake mitigation action items provide direction on specific activities that organizations and residents in Albany County can undertake to reduce risk and prevent loss from earthquake events.

PROJECT	TYPE	RANKING	COST	RESPONSIBLE PARTY	Funding Resources	Cost and Benefit
Update HAZUS research for County	Prevention and public awareness	Medium	Low	EMA	EMA/State	#1
Building inspections to check for possible weaknesses and enforce building codes	Prevention and Public Awareness	Low	Medium	Code enforcement and Fire Prevention	Albany County Planning and Zoning through grants	#3
Public awareness of Earthquakes	Prevention and Public Awareness	Low	Low	EMA	EMA	#2

2003 EARTHQUAKE GOALS THAT HAVE BEEN MET

The goal of alerting the community in case of an earthquake has been met through the usage of CodeRED. The county is now able to send out a reverse 911 message to alert the community in case of a disaster or threat.

12. Minimize potential property damage caused by dam failures. (The projects under this goal will primarily protect human life, but may also reduce the risk of property loss and damage to both existing and future buildings and infrastructure.)

PROJECT	**TYPE**	**RANKING**	**COST**	**RESPONSIBLE PARTY**	**Funding Resources**	**Cost and Benefit**
Update the plan for Rob Roy Dam	Prevention and coordination	Medium	Low	EMA, Cheyenne Board of Utilities, Forest Service	EMA	#1
Inspections for private dams	Prevention and coordination	Low	Medium	Undetermined	Grants	#2

13. Minimize potential property damage caused by landslides. (The projects under this goal will primarily protect human life, but may also reduce the risk of property loss and damage to both existing and future buildings and infrastructure.) The landslide mitigation action items provide direction on specific activities that organizations and residents in Albany County can undertake to reduce risk and prevent loss from landslide events.

PROJECT	**TYPE**	**RANKING**	**COST**	**RESPONSIBLE PARTY**	**Funding Resources**	**Cost and Benefit**
Further analysis of landslide boundaries	Prevention and structural project	Low	Low	Geological survey team and EMA	Grants	#3
Install County Road protection measures and signage along with public awareness	Prevention and public awareness	Low	Low	County Planning and EMA	County Planning and Zoning	#1
Enact regulations on where homes can be built due to landslide prone areas	Prevention and Coordination	Low	Low	County Planning and Zoning	County Planning and Zoning	#2

14. Minimize potential property damage caused by mine substinence. (The projects under this goal will primarily protect human life, but may also reduce the risk of property loss and damage to both existing and future buildings and infrastructure.) The mined out areas mitigation action items provide direction on specific activities that organizations an residents in Albany County can undertake to reduce risk and pre vent loss from mined out area events.

PROJECT	**TYPE**	**RANKING**	**COST**	**RESPONSIBLE PARTY**	**Funding Resources**	**Cost and Benefit**
Create sight specific plans for mines of concern in the jurisdiction of Rock River	Prevention and coordination	Low	Low	City of Rock River, EMA	Grants and city of Rock River	#1

15. Minimize potential property damage caused by windblown deposits. (The projects under this goal will reduce the risk of property loss and damage to both existing and future buildings and infrastructure.) The windblown mitigation actions items provide direction on specific activities that organizations and residents in Albany County can undertake to reduce risk and prevent loss from windblown events.

PROJECT	**TYPE**	**RANKING**	**COST**	**RESPONSIBLE PARTY**	**Funding Resources**	**Cost and Benefit**
Stabilize vegetation on identified areas	Prevention	Low	Medium	Landowner	Grants	#3
Public awareness of windblown mitigation activities	Prevention and public awareness	Low	Low	EMA	EMA	#1
Restrict building in mined out areas	Prevention and structural	Low	Low	Albany County Planning and Zoning	County Planning and Zoning	#2

16. Minimize potential life and property damage caused by snow avalanches.
(The projects under this goal will primarily reduce the loss of human life but will also address the risk of property loss and damage to both existing and future buildings and infrastructure.)

PROJECT	**TYPE**	**RANKING**	**COST**	**RESPONSIBLE PARTY**	**Funding Resources**	**Cost and Benefit**
Public Awareness and education	Public Awareness	Low	Low	EMA, Forest Service and Search and Rescue	EMA	#1

17. Minimize potential life and property damage caused by tornadoes. (The projects under this goal will primarily reduce the loss of human life but will also address the risk of property loss and damage to both existing and future buildings and infrastructure.) The tornado mitigation action items provide direction on specific activities that organizations and residents in Albany County can undertake to reduce risk and prevent loss from tornadoes.

PROJECT	TYPE	RANKING	COST	RESPONSIBLE PARTY	Funding Resources	Cost and Benefit
Ensure evacuation shelters are equipped and safe for tornadoes	Prevention, Public Safety	Medium	Low	EMA, Red Cross	EMA and Red Cross budgets as well as CERT grant	#2
Work on replacing siren system in county.	Prevention, Coordination and public awareness	High	High	EMA, LARC	Grant Avenues	#1

2003 TORNADO GOALS THAT HAVE BEEN MET

The goal of better emergency warnings has partially been met thanks to the Reverse 911 system called CodeRED.

The goal of increasing public awareness has been in the process since 2004 when Albany County launched an educational program. The county also holds a Weather Spotter class every spring in partnership with the National Weather Service.

WORK DONE IN ALBANY COUNTY

Albany County Road Closure Plan- Finalized by November 2001.

Indian Hills Dike- Prevention of flooding in Indian Hills area/ Alta Vista.

Spring Creek Channel – Attempt to lower flooding in tree area.

Monthly Siren checks/ CodeRED warning system installed in 2008

Exercise Design Team and Exercise Drills.

Aquifer Protection- Plan and implementing regulations adopted by city and county 2002-2003.

Red Cross- Shelter planning, agreements, assessment.

Volunteer- Training's Mobilization- Equipment training.

ARES- Establish and continue training of active chapter.

Create more county volunteer fire departments.

Special Populations – Y2K, exercises, raise public awareness.
Unable to self evacuate database in progress for CodeRED

Bioterrorism Drill- Small Pox drills in Albany County.

SNS distribution of antiviral exercise

Union Pacific Evacuation Drill.

Evacuation Preplan

for

Bear Creek

Bee Hive

June 2008

Bear Creek, Bee Hive Evacuation Plan

If a fire is near these developments use the following table to help decide appropriate action.
Under reciprocal agreement other agencies can be call on to help monitor and decide on a course of action.

Location	Trigger Points	Action
OUTSIDE 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER ERC 90% OR ABOVE	Merits close attention, but will not require an evacuation unless the fire moves closer and / or conditions change Consider evacuation alert.
2 - 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	May soon require an evacuation. A change in wind speed, rate of spread or increased fire behavior could trigger an evacuation. Preparations for evacuation should be made. Start an evacuation alert.
2 MILES	HIGH FIRE DANGER, WIND BLOWING TOWARDS WUI	Evacuation is likely. The wind is or is expected to be moving the fire towards the community. An increase in wind speed or increase in fire behavior could require immediate evacuation. Start evacuation alert or an evacuation.
INSIDE 2 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	Immediate action should be taken. An evacuation should be ordered if time permits and evacuation route safety can be assured.

Critical contacts when considering an evacuation:

Albany County Fire Warden
Albany County Sheriff
Highway Patrol
Laramie Area Records and Communication
Casper Interagency Dispatch
EMA (Laramie Fire Department)
Rawlins Interagency Dispatch

Guidelines:

1) Incident Command will make the decision to start notification or to start an evacuation.
2) Suggested Evacuation Command Area - Gravel pit at Highway 230 and FS road 512
3) ACSO will be primary agency to contact homeowners in coordination with the fire service.
4) Fire units may be used to facilitate evacuation.
5) FS Road 520 will be primary evacuation route to Highway 230.
6) Road Closures in the area should be done as soon as practical to facilitate movement of the public and fire equipment.
7) Incident Command channel should be USFS - Spruce Mountain
8) Evacuation Coordination Channel should be AC - Jelm
9) Other common non repeated work channels, FERN, Fire 2, USFS work

Evacuation Command Area:

Gravel pit at Highway 230 and FS road 512

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Evacuation Center:

Primary: Harmony School Secondary:

Special Considerations:

Gravel pit will work as Safety Zone

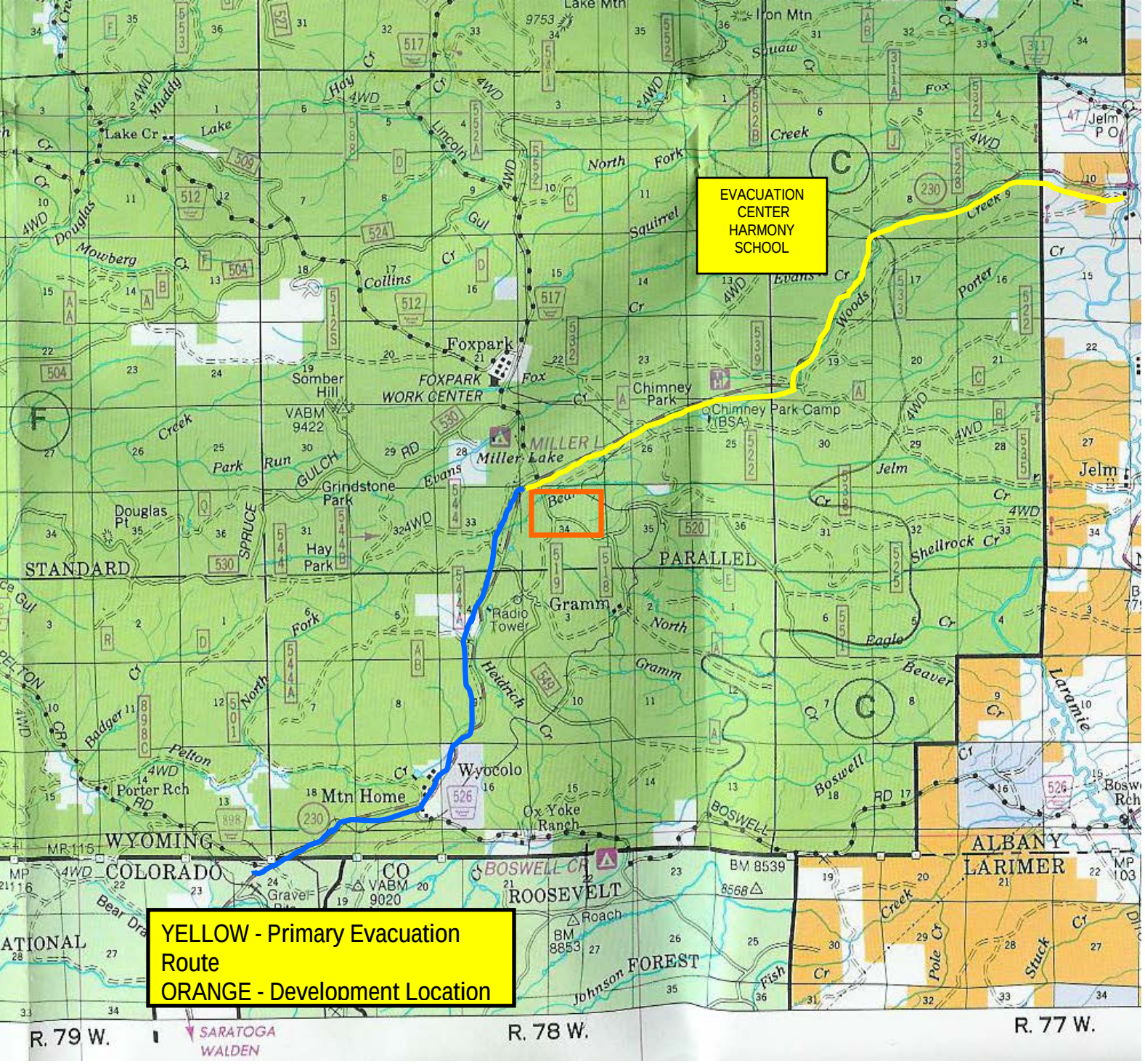
Somber Hill might be used for a lookout point.

Gramm and Chimney Park may need consideration also.

USFS Campgrounds and dispersed Recreation Sites:

Dispersed camping in area.

Miller Lake camp ground


EVACUATION CENTER HARMONY SCHOOL
YELLOW - Primary Evacuation Route
ORANGE - Development Location
Lake Mtn
Iron Mtn
Squaw Cr
Lake Cr
Muddy
Hay Cr
Lincoln
Fox Creek
Jelm P O
Douglas
Mowberg Cr
Collins
North Fork
Squirrel Creek
Foxpark
FOXPARK WORK CENTER
Somber Hill
VABM 9422
Chimney Park
Chimney Park Camp (BSA)
Evans Cr
Woods
Porter
Miller Lake
Park Run GULCH
Grindstone Park
Hay Park
Douglas Pt
SPRUCE
STANDARD
PARALLEL
Shellrock Cr
Jelm
Gramm
Radio Tower
North Gramm
Eagle Cr
Beaver Cr
Laramie
Heidrich Cr
Badger
Pelton
Porter Rch RD
Wyocolo
Mtn Home
Ox Yoke Ranch
Boswell RD
BOSWELL
WYOMING
COLORADO
MR 115
MP 116
CO VABM 9020
BOSWELL CR
ROOSEVELT
Roach
BM 8853
BM 8539
8568
ALBANY
LARIMER
Johnson FOREST
Pole Cr
Stuck Cr
Fish Cr
Bear Dra
ATIONAL
SARATOGA
WALDEN
R. 79 W.
R. 78 W.
R. 77 W.


Z-PRIM 2-TRACK
Z-OBLIT RD
Z-OBLIT RD
PLATTE RIVER ACCESS
Z-OBLIT CAND
27
HWY 230
STATE HWY 230
BEEHIVE SUMMER HOME SPUR
13W 78W
BEE HIVE SUBDIVISION
EAGLE SPUR
TELEPHONE LINE WEST
BEAR CREEK SUBDIVISION
Z-OBLIT RD
Z-OBLIT RD
34
Z-PRIM 2-TRACK

Evacuation Preplan

for

Foxborough

Valhalla

Pronghorn

June 2008

Foxborough, Valhalla and Pronghorn Evacuation Plan

If a fire is near this development use the following table to help decide appropriate action. Under reciprocal agreement other agencies can be call on to help monitor and decide on a course of action.

Location	Trigger Points	Action
OUTSIDE 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER ERC 90% OR ABOVE	Merits close attention, but will not require an evacuation unless the fire moves closer and / or conditions change Consider evacuation alert.
2 - 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	May soon require an evacuation. A change in wind speed, rate of spread or increased fire behavior could trigger an evacuation. Preparations for evacuation should be made. Start an evacuation alert.
2 MILES	HIGH FIRE DANGER, WIND BLOWING TOWARDS WUI	Evacuation is likely. The wind is or is expected to be moving the fire towards the community. An increase in wind speed or increase in fire behavior could require immediate evacuation. Start evacuation alert or an evacuation.
INSIDE 2 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	Immediate action should be taken. An evacuation should be ordered if time permits and evacuation route safety can be assured.

Critical contacts when considering an evacuation:

Albany County Fire Warden

Albany County Sheriff

Highway Patrol

Laramie Area Records and Communication

Casper Interagency Dispatch

EMA (Laramie Fire Department)

Rawlins Interagency Dispatch

Guidelines:

1) Incident Command will make the decision to start notification or to start an evacuation.
2) Suggested Evacuation Command Area - FOXPARK WORK CENTER
3) ACSO will be primary agency to contact homeowners in coordination with the fire service.
4) All fire units may be used to facilitate evacuation.
5) FS Road 512 will be primary evacuation route to Highway 230.
6) Alternate routes will be FS Road 512s to FSR 512 or FS Road 512 to the west then to Albany.
7) Road Closures in the area should be done as soon as practical to facilitate movement of the public and fire equipment.
8) Incident Command channel should be USFS - Spruce Mountain
9) Evacuation Coordination Channel should be AC - Jelm
10) Other common non repeated work channels, FERN, Fire 2, USFS work

Evacuation Command Area:

Fox Park Work Center USFS

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Evacuation Center:

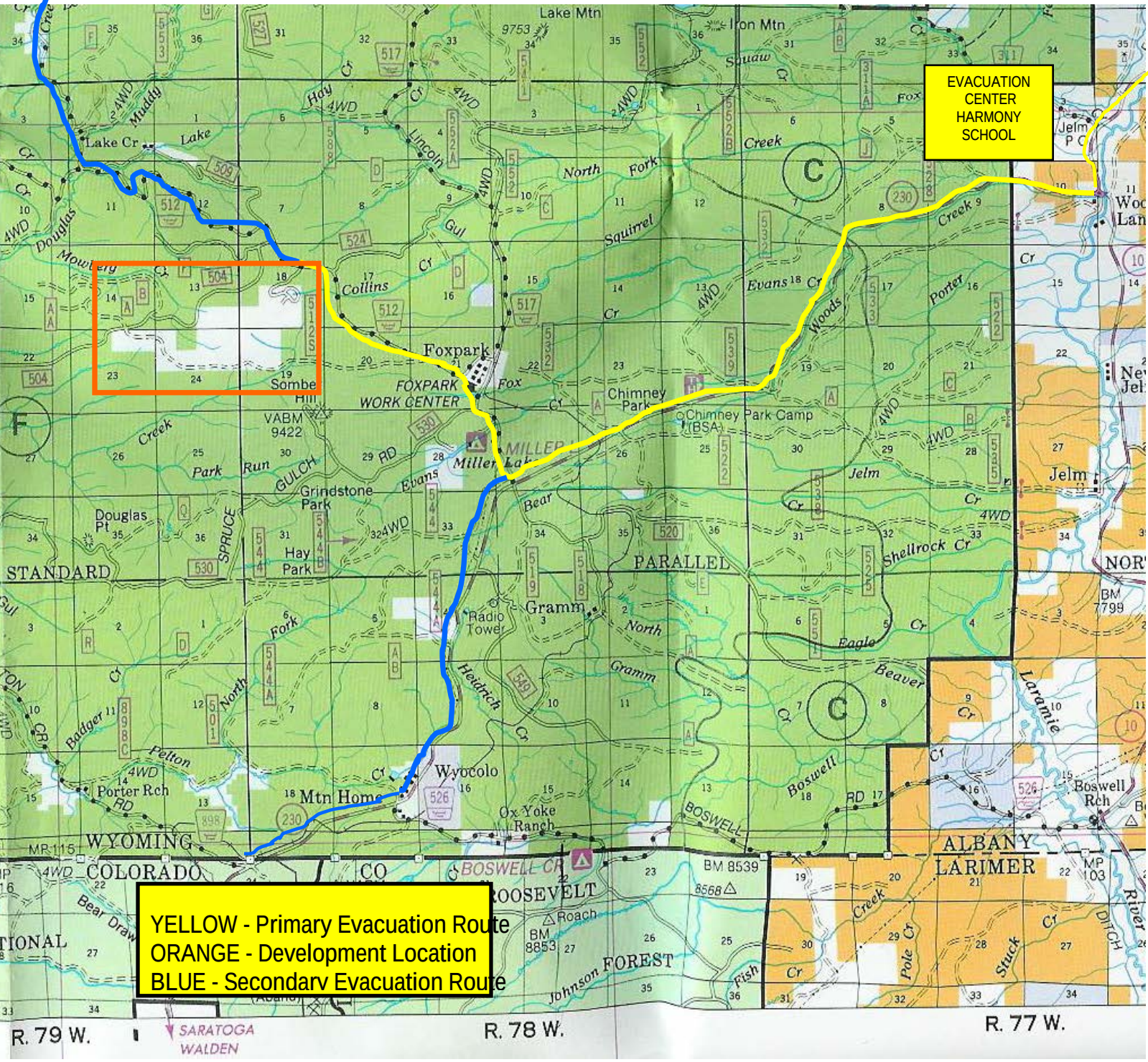
Primary: Harmony School Secondary: Centennial School

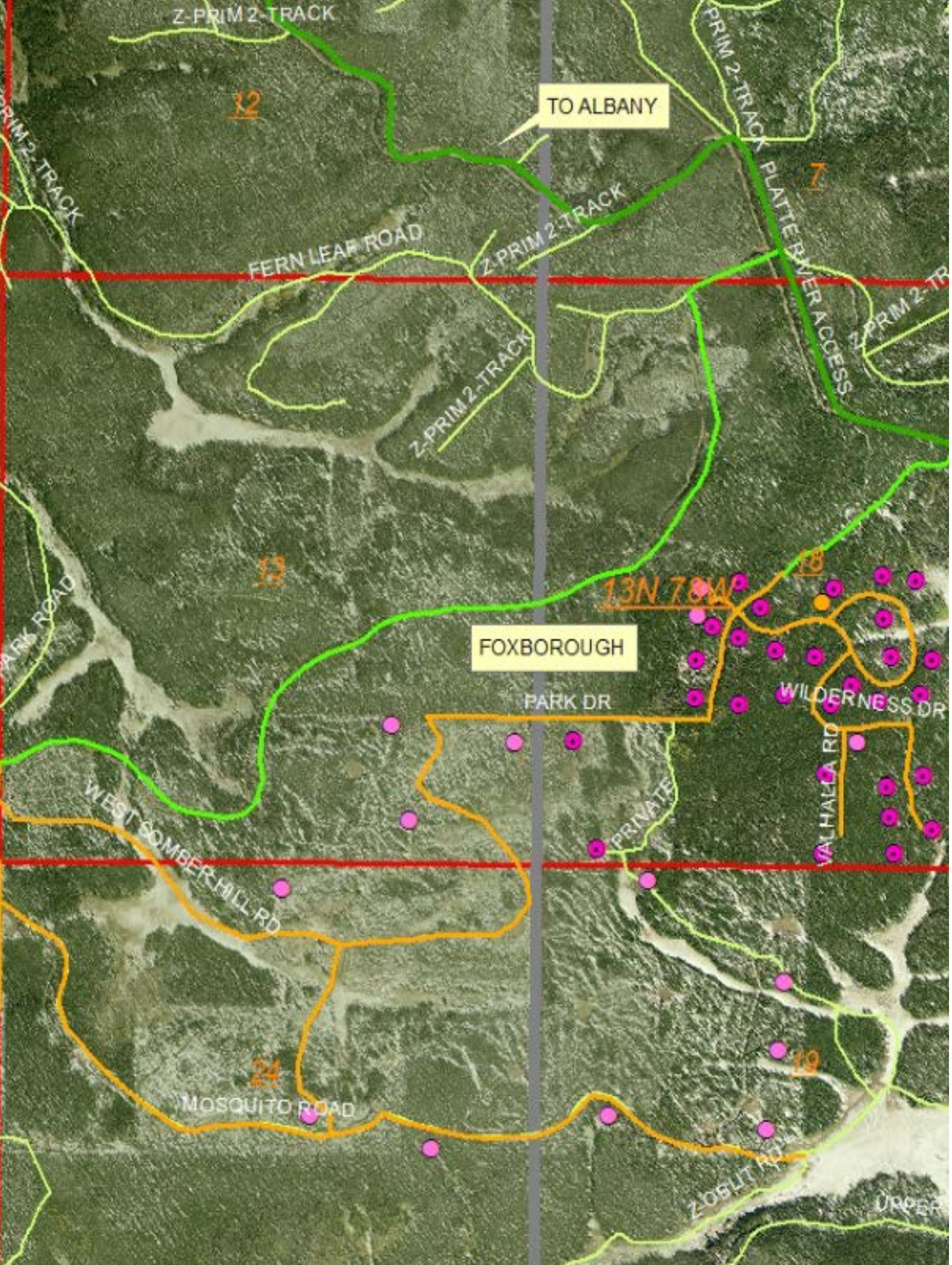
Special Considerations:

Meadow to South East may work as Safety Zone

USFS Campgrounds and dispersed Recreation Sites:

Dispersed camping in area.


EVACUATION CENTER HARMONY SCHOOL
YELLOW - Primary Evacuation Route
ORANGE - Development Location
BLUE - Secondary Evacuation Route
Foxpark
FOXPARK WORK CENTER
Chimney Park
Chimney Park Camp (BSA)
Sombe Hill
VABM 9422
Miller Lake
Grindstone Park
Hay Park
Douglas Pt
Radio Tower
Gramm
Wyocolo
Mtn Home
Ox Yoke Ranch
Porter Rch
Boswell Rch
Roach
BM 8539
BM 8853
BM 7799
Lake Mtn
Iron Mtn
Johnson FOREST
STANDARD
PARALLEL
WYOMING
COLORADO
CO
ALBANY
LARIMER
SARATOGA
WALDEN
R. 79 W.
R. 78 W.
R. 77 W.


Z-PRIM 2-TRACK
12
TO ALBANY
PRIM 2-TRACK
PLATTE RIVER ACCESS
7
FERN LEAF ROAD
Z-PRIM 2-TRACK
Z-PRIM 2-TRACK
Z-PRIM 2-TRACK
13
18
13N 70W
FOXBOROUGH
PARK DR
WILDERNESS DR
VALHALLA RD
PRIVATE
WEST SOMBER HILL RD
24
MOSQUITO ROAD
19
Z-OSLUT RD

Evacuation Preplan

for

Foxpark

Miller Lake

June 2008

Foxpark, Miller Lake Evacuation Plan

If a fire is near this development use the following table to help decide appropriate action. Under reciprocal agreement other agencies can be call on to help monitor and decide on a course of action.

Location	Trigger Points	Action
OUTSIDE 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER ERC 90% OR ABOVE	Merits close attention, but will not require an evacuation unless the fire moves closer and / or conditions change Consider evacuation alert.
2 - 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	May soon require an evacuation. A change in wind speed, rate of spread or increased fire behavior could trigger an evacuation. Preparations for evacuation should be made. Start an evacuation alert.
2 MILES	HIGH FIRE DANGER, WIND BLOWING TOWARDS WUI	Evacuation is likely. The wind is or is expected to be moving the fire towards the community. An increase in wind speed or increase in fire behavior could require immediate evacuation. Start evacuation alert or an evacuation.
INSIDE 2 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	Immediate action should be taken. An evacuation should be ordered if time permits and evacuation route safety can be assured.

Critical contacts when considering an evacuation:

Albany County Fire Warden

Albany County Sheriff

Highway Patrol

Laramie Area Records and Communication

Casper Interagency Dispatch

EMA (Laramie Fire Department)

Rawlins Interagency Dispatch

Guidelines:

1) Incident Command will make the decision to start notification or to start an evacuation.
2) Suggested Evacuation Command Area - Gravel pit at Highway 230 and FS road 512
3) ACSO will be primary agency to contact homeowners in coordination with the fire service.
4) All fire units may be used to facilitate evacuation.
5) FS Road 512 will be primary evacuation route to Highway 230.
6) For Miller Lake FS Road 530D to FS 530 to FS 512
7) Alternate routes will be FS Road 512 to FSR 517 and to Centennial.
8) Road Closures in the area should be done as soon as practical to facilitate movement of the public and fire equipment.
9) Incident Command channel should be USFS - Spruce Mountain
10) Evacuation Coordination Channel should be AC - Jelm
11) Other common non repeated work channels, FERN, Fire 2, USFS work

Evacuation Command Area:

Gravel pit at Highway 230 and FS road 512

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Evacuation Center:

Primary: Harmony School Secondary: Centennial School

Special Considerations:

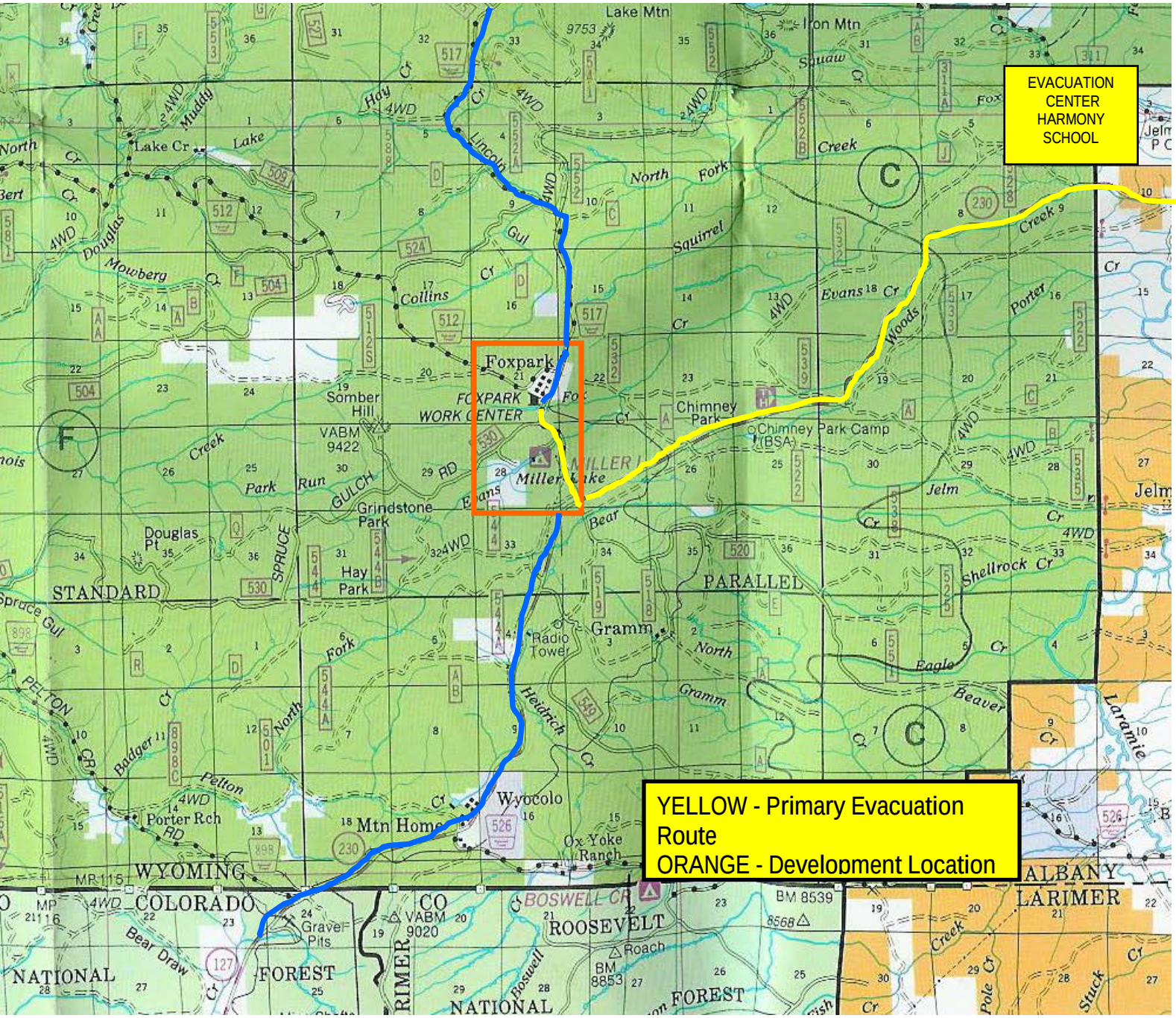
Old saw mill yard east of Foxpark will work as Safety Zone

Somber Hill might be used for a lookout point.

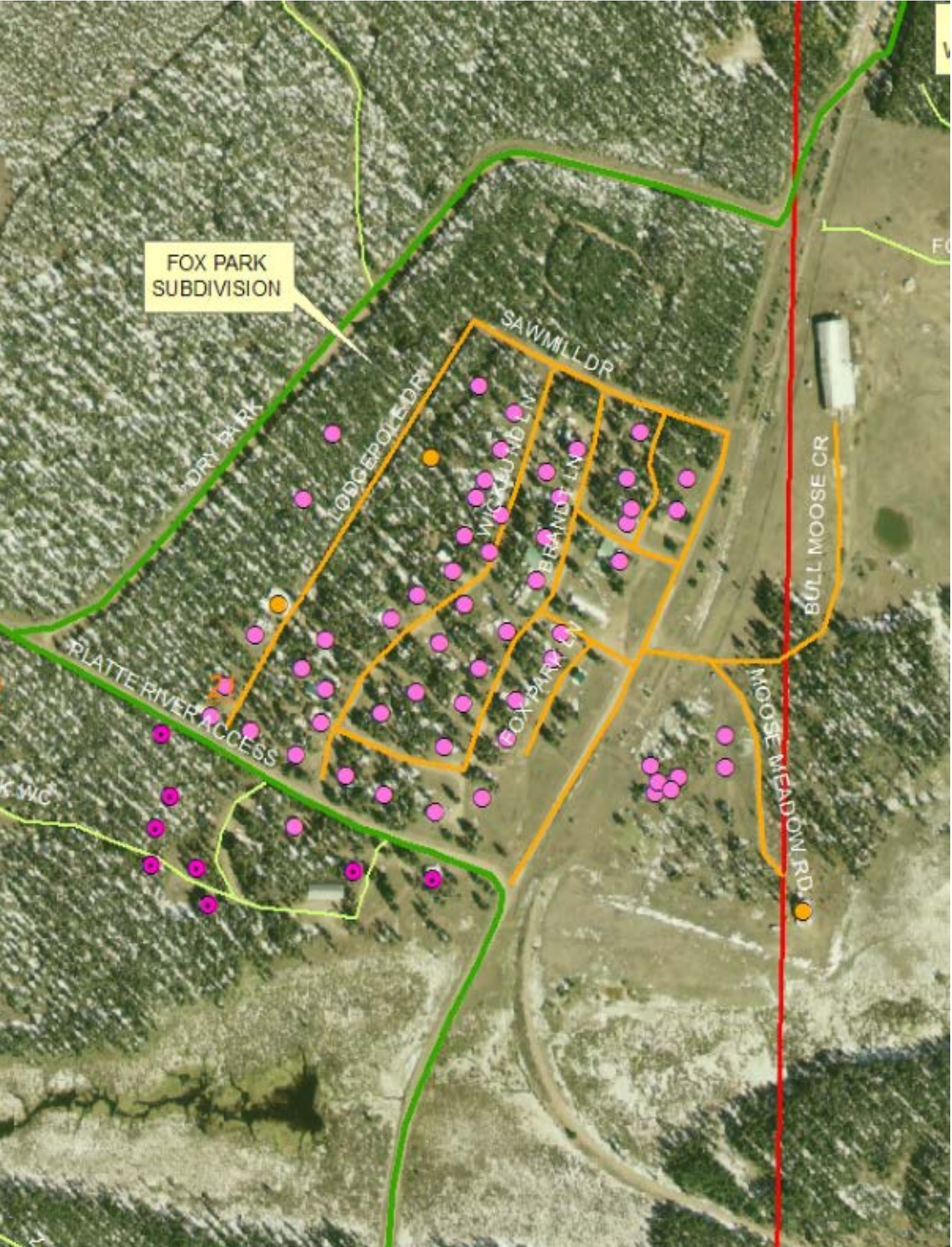
USFS Campgrounds and dispersed Recreation Sites:

Dispersed camping in area.

Miller Lake camp ground


EVACUATION CENTER HARMONY SCHOOL
YELLOW - Primary Evacuation Route
ORANGE - Development Location
Foxpark
Miller Lake
Chimney Park Camp (BSA)
Wyocolo
Mtn Home
Ox Yoke Ranch
Gramm
Radio Tower
Grindstone Park
Hay Park
Douglas Pt
Somber Hill
VABM 9422
Porter Rch
Gravel Pits
VABM 9020
Roach
BM 8539
BM 8853
STANDARD
PARALLEL
ROOSEVELT
WYOMING
COLORADO
ALBANY
LARIMER
NATIONAL FOREST


TO FOX PARK
SEEN BETTER DAYS R
MILLER LAKE
CAMP GROUND
MILLER LAKE
HOME GROUP


FOX PARK
SUBDIVISION
SAWMILL DR
LODGEPOLE DR
DRY PARK
WOODLAND LN
BRAND LN
FOX PARK LN
BULL MOOSE CR
MOOSE MEADOW RD
PLATTE RIVER ACCESS

Evacuation Preplan

for

Gramm

June 2008

Gramm Evacuation Plan

If a fire is near this development use the following table to help decide appropriate action. Under reciprocal agreement other agencies can be call on to help monitor and decide on a course of action.

Location	Trigger Points	Action
OUTSIDE 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER ERC 90% OR ABOVE	Merits close attention, but will not require an evacuation unless the fire moves closer and / or conditions change Consider evacuation alert.
2 - 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	May soon require an evacuation. A change in wind speed, rate of spread or increased fire behavior could trigger an evacuation. Preparations for evacuation should be made. Start an evacuation alert.
2 MILES	HIGH FIRE DANGER, WIND BLOWING TOWARDS WUI	Evacuation is likely. The wind is or is expected to be moving the fire towards the community. An increase in wind speed or increase in fire behavior could require immediate evacuation. Start evacuation alert or an evacuation.
INSIDE 2 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	Immediate action should be taken. An evacuation should be ordered if time permits and evacuation route safety can be assured.

Critical contacts when considering an evacuation:

Albany County Fire Warden

Albany County Sheriff

Highway Patrol

Laramie Area Records and Communication

Casper Interagency Dispatch

EMA (Laramie Fire Department)

Rawlins Interagency Dispatch

Guidelines:

1) Incident Command will make the decision to start notification or to start an evacuation.
2) Suggested Evacuation Command Area - Gravel pit at Highway 230 and FS road 512
3) ACSO will be primary agency to contact homeowners in coordination with the fire service.
4) Fire units may be used to facilitate evacuation.
5) FS Road 518 to FS Road 520 will be primary evacuation route to Highway 230.
6) Road Closures in the area should be done as soon as practical to facilitate movement of the public and fire equipment.
7) Incident Command channel should be USFS - Spruce Mountain or Pole Mountain
8) Evacuation Coordination Channel should be AC - Jelm
9) Other common non repeated work channels, FERN, Fire 2, USFS work

Evacuation Command Area:

Gravel pit at Highway 230 and FS road 512

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Evacuation Center:

Primary: Harmony School Secondary:

Special Considerations:

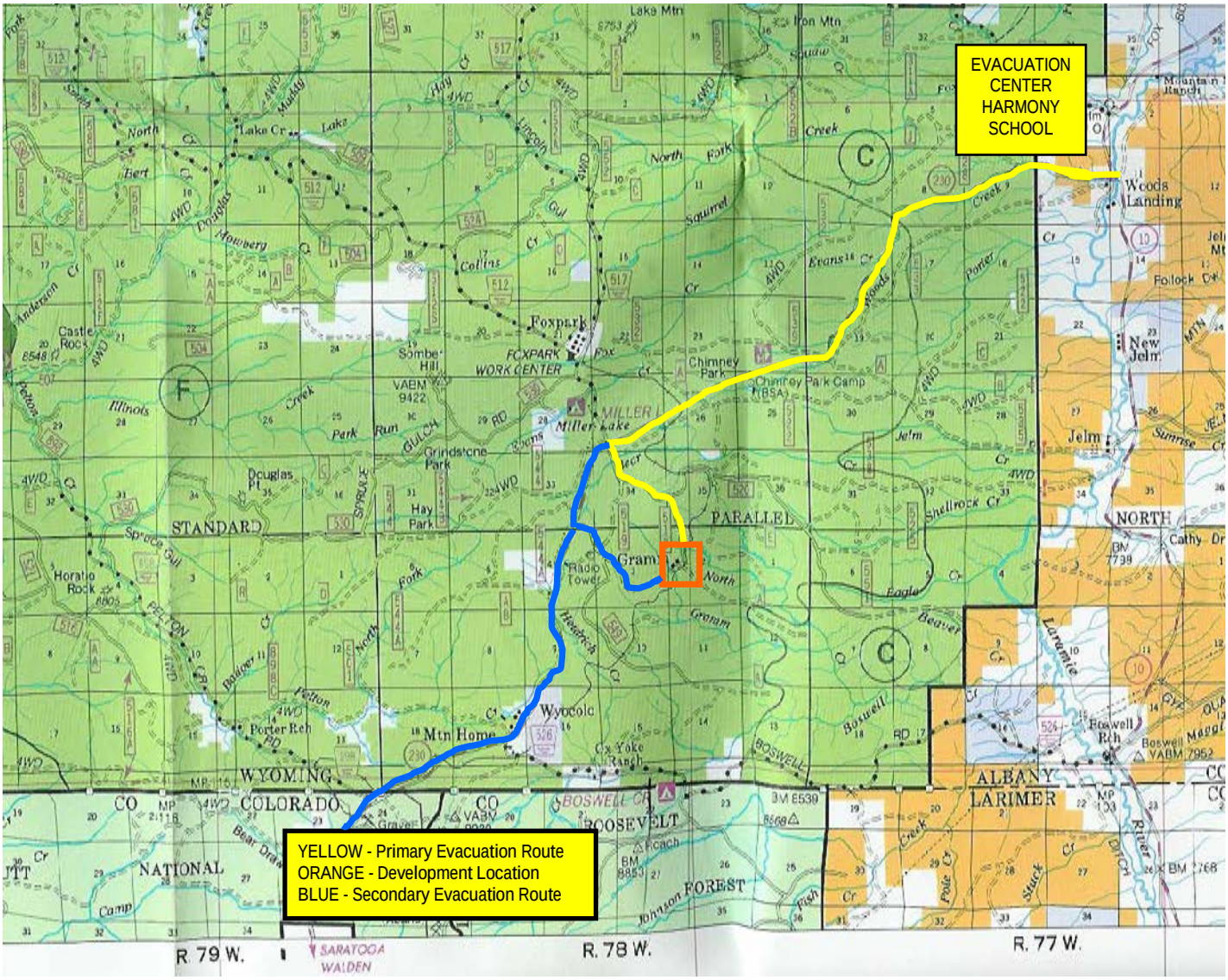
Clear Cut just north of Gramm will work as Safety Zone with some work.

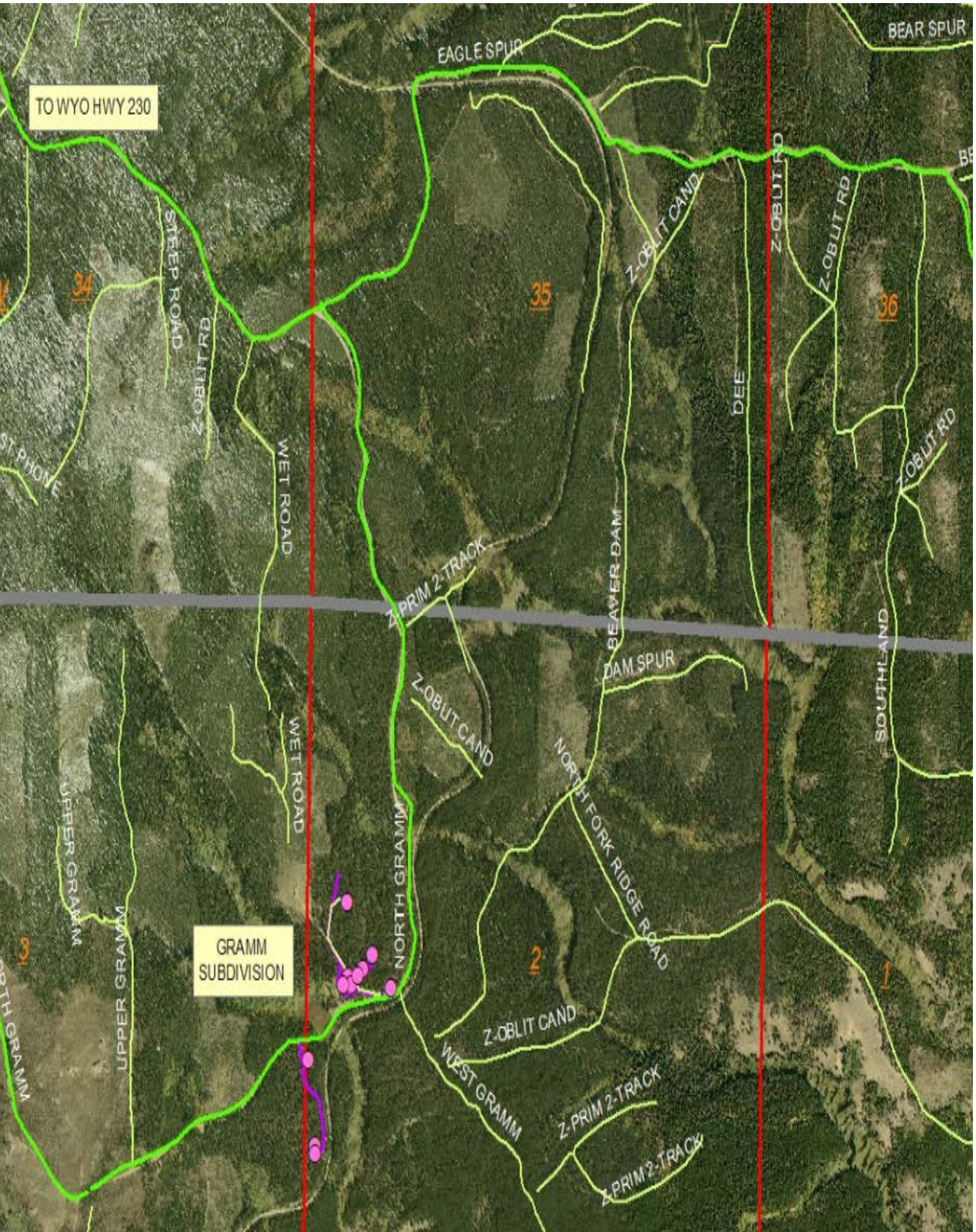
Gramm fire area may be a safe area also.

Chimney Park may need consideration.

USFS Campgrounds and dispersed Recreation Sites:

Dispersed camping in area.


EVACUATION CENTER HARMONY SCHOOL
YELLOW - Primary Evacuation Route
ORANGE - Development Location
BLUE - Secondary Evacuation Route
R. 79 W.
R. 78 W.
R. 77 W.
WYOMING
COLORADO
NATIONAL
ROOSEVELT
FOREST
ALBANY
LARIMER
STANDARD
PARALLEL
NORTH
Foxpark
Miller Lake
Chimney Park
Jelm
Woods Landing
New Jelm
Wyocolo
Mtn Home
Porter Rch
Boswell Rch
Cx Yoke Ranch
Radio Tower
Grindstone Park
Hay Park
Douglas Pt
Horatio Rock
Castle Rock
Lake Mtn
Iron Mtn
Lake Cr
Sombe Hill
FOXPARK WORK CENTER
Chimney Park Camp (BSA)
Cathy
Pollock
Shellrock Cr
Eagle
Beaver
Laramie
Boswell
Johnson
SARATOGA
WALDEN


TO WYO HWY 230
EAGLE SPUR
BEAR SPUR
STEEP ROAD
Z-OBLIT RD
WET ROAD
Z-OBLIT CAND
DEE
Z-OBLIT RD
Z-OBLIT RD
Z-OBLIT RD
34
35
36
Z-PRIM 2-TRACK
BEAVER DAM
DAM SPUR
SOUTHLAND
Z-OBLIT CAND
WET ROAD
NORTH FORK RIDGE ROAD
UPPER GRAMM
NORTH GRAMM
GRAMM SUBDIVISION
2
1
Z-OBLIT CAND
WEST GRAMM
Z-PRIM 2-TRACK
Z-PRIM 2-TRACK

Keystone, Douglas Creek Evacuation Plan

If a fire is near this development use the following table to help decide appropriate action. Under reciprocal agreement other agencies can be called on to help monitor and decide on a course of action.

Location	Trigger Points	Action
OUTSIDE 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER ERC 90% OR ABOVE	Merits close attention, but will not require an evacuation unless the fire moves closer and / or conditions change Consider evacuation alert.
2 - 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	May soon require an evacuation. A change in wind speed, rate of spread or increased fire behavior could trigger an evacuation. Preparations for evacuation should be made. Start an evacuation alert.
2 MILES	HIGH FIRE DANGER, WIND BLOWING TOWARDS WUI	Evacuation is likely. The wind is or is expected to be moving the fire towards the community. An increase in wind speed or increase in fire behavior could require immediate evacuation. Start evacuation alert or an evacuation.
INSIDE 2 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	Immediate action should be taken. An evacuation should be ordered if time permits and evacuation route safety can be assured.

Critical contacts when considering an evacuation:

Albany County Fire Warden

Albany County Sheriff

Highway Patrol

Laramie Area Records and Communication

Casper Interagency Dispatch

EMA (Laramie Fire Department)

Rawlins Interagency Dispatch

Guidelines:

1) Incident Command will make the decision to start notification or to start an evacuation.
2) Suggested Evacuation Command Area - Confluence of Lake Creek and Douglas Creek. Assessment of where fire is and is going needs to be done.
3) ACSO will be primary agency to contact homeowners in coordination with the fire service.
4) Fire units may be used to facilitate evacuation.
5) Depending on fire location, evacuation route will be FS Road 543 south towards Fox Park or FSR 543 and 542 towards Albany or FSR 543 North towards Rob Roy and Albany.
6) Road Closures in the area should be done as soon as practical to facilitate movement of the public and fire equipment.
7) Incident Command channel should be USFS - Spruce Mountain
8) Evacuation Coordination Channel should be AC - Jelm (May not work in some areas)
9) Other common non repeated work channels, FERN, Fire 2, USFS work

Evacuation Command Area:

Confluence of Lake Creek and Douglas Creek

`

Evacuation Center:

Primary: Centennial School Secondary: Harmony School

Special Considerations:

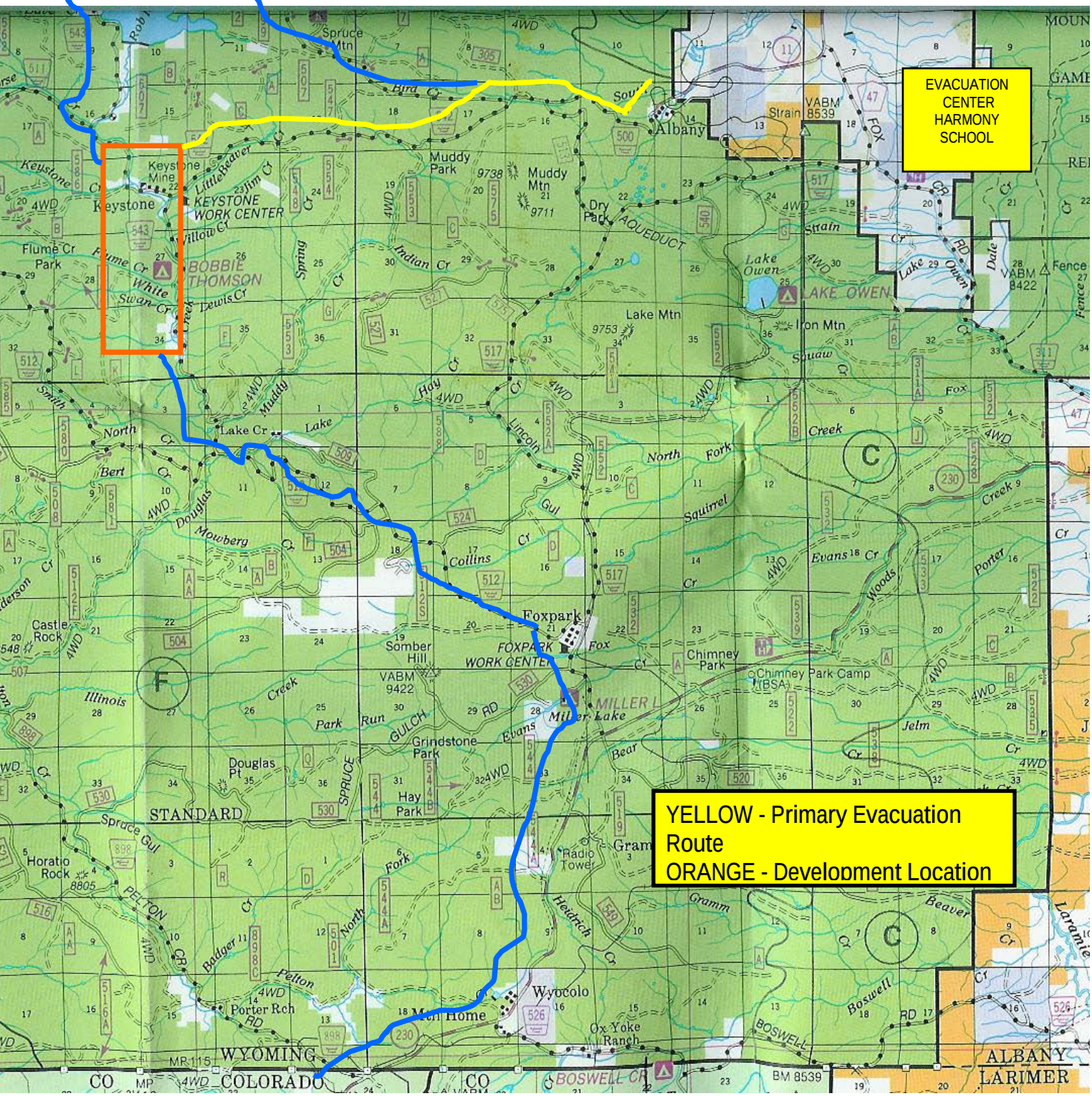
These developments are in river drainages / canyons, use special care on route selection and knowing what the fire is doing.

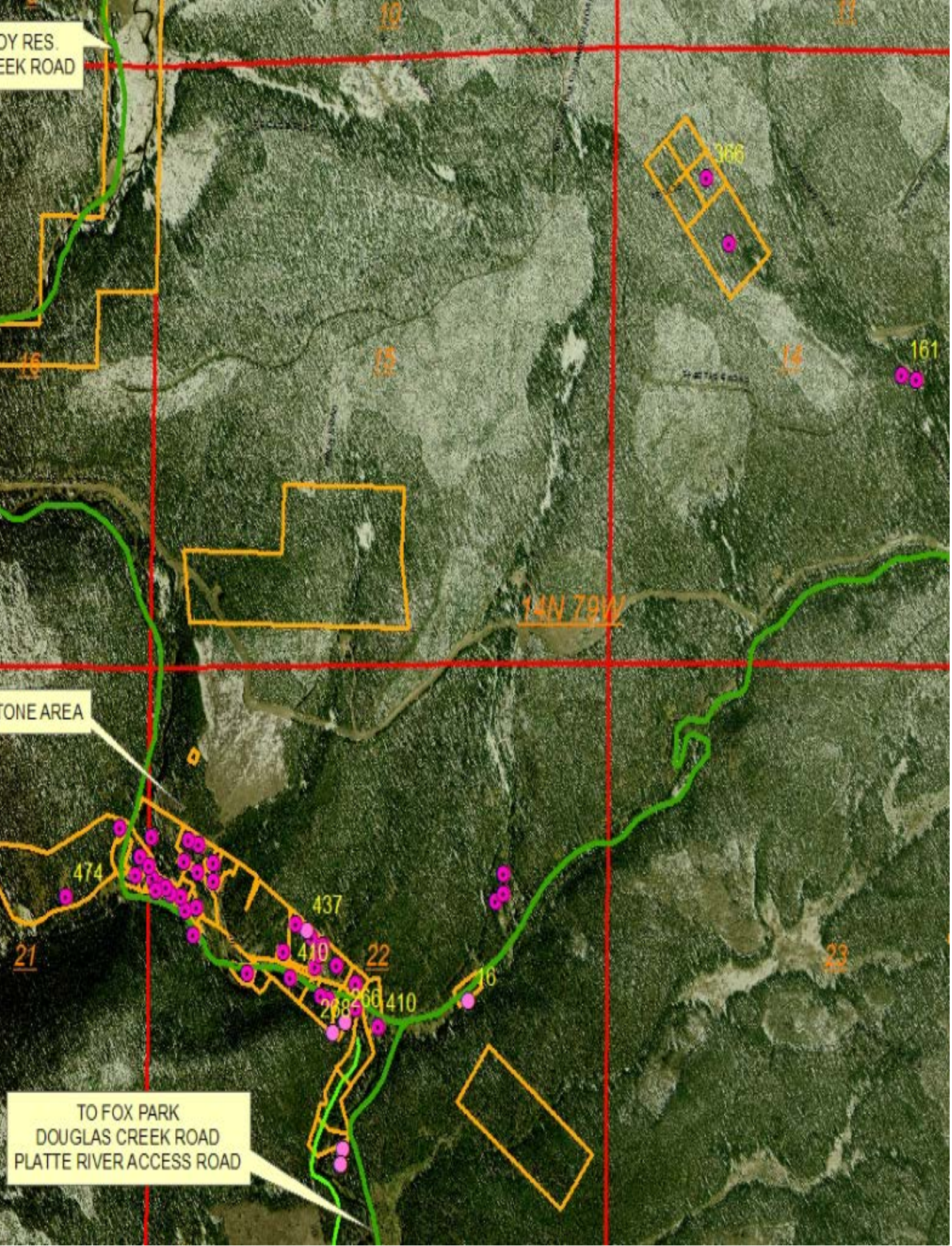
Open area at confluence of Douglas and Lake Creek may work as Safety Zone.

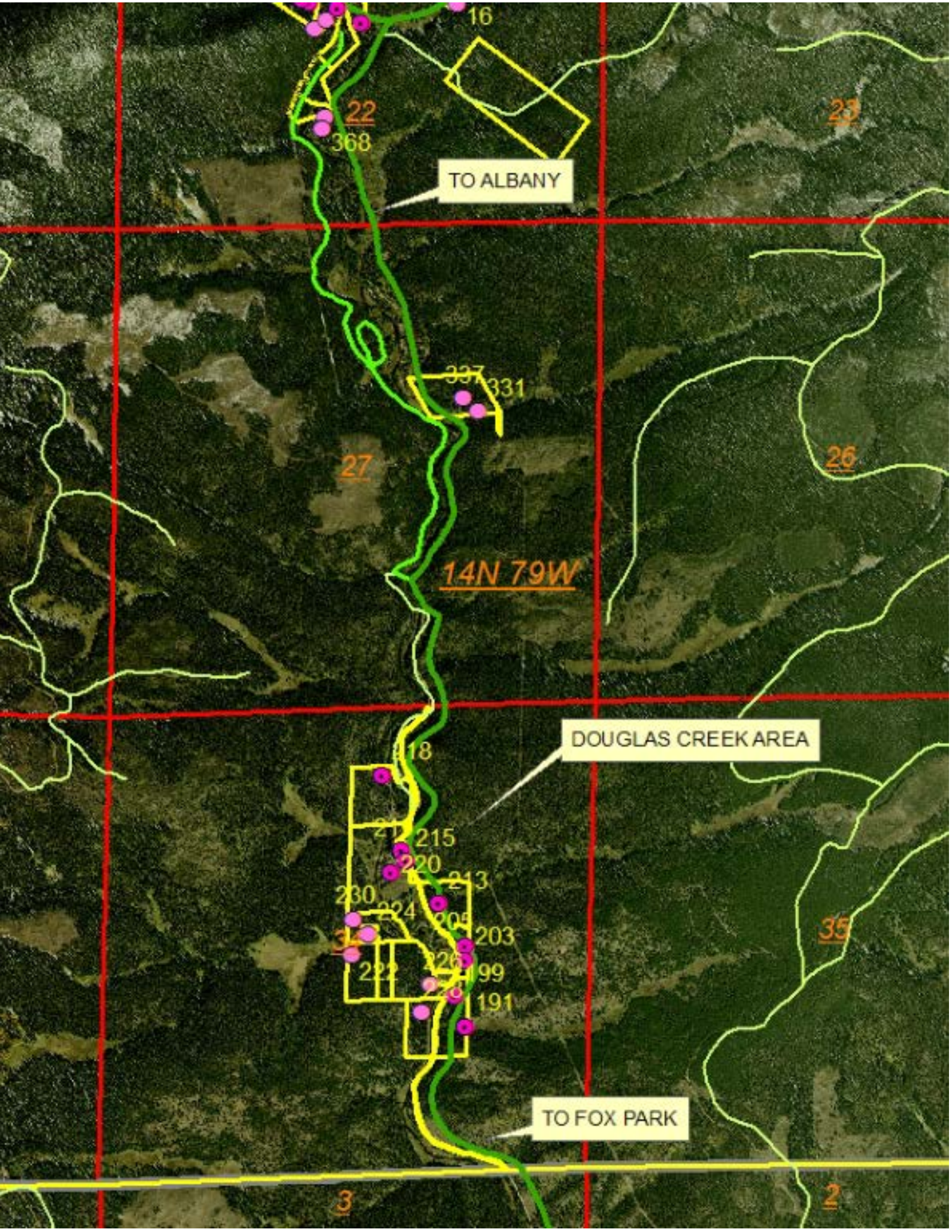
USFS Campgrounds and dispersed Recreation Sites:

Dispersed camping in area.

Bobbie Thompson Camp Ground


EVACUATION CENTER HARMONY SCHOOL
YELLOW - Primary Evacuation Route
ORANGE - Development Location
Keystone
KEYSTONE WORK CENTER
BOBBIE THOMSON
LAKE OWEN
FOXPARK WORK CENTER
MILLER LAKE
Chimney Park Camp (BSA)
Ox Yoke Ranch
WYOMING
COLORADO
ALBANY
LARIMER


OY RES.
EEK ROAD
10
11
366
15
14
161
16
14N 79W
TONE AREA
474
437
21
410
22
23
16
410
TO FOX PARK
DOUGLAS CREEK ROAD
PLATTE RIVER ACCESS ROAD


16
22
368
23
TO ALBANY
331
27
26
14N 79W
DOUGLAS CREEK AREA
215
220
230
203
99
191
35
TO FOX PARK
3
2

Evacuation Preplan

for

Lake Creek Resort

June 2008

Lake Creek Resort Evacuation Plan

If a fire is near this development use the following table to help decide appropriate action. Under reciprocal agreement other agencies can be called on to help monitor and decide on a course of action.

Location	Trigger Points	Action
OUTSIDE 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER ERC 90% OR ABOVE	Merits close attention, but will not require an evacuation unless the fire moves closer and / or conditions change Consider evacuation alert.
2 - 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	May soon require an evacuation. A change in wind speed, rate of spread or increased fire behavior could trigger an evacuation. Preparations for evacuation should be made. Start an evacuation alert.
2 MILES	HIGH FIRE DANGER, WIND BLOWING TOWARDS WUI	Evacuation is likely. The wind is or is expected to be moving the fire towards the community. An increase in wind speed or increase in fire behavior could require immediate evacuation. Start evacuation alert or an evacuation.
INSIDE 2 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	Immediate action should be taken. An evacuation should be ordered if time permits and evacuation route safety can be assured.

Critical contacts when considering an evacuation:

Albany County Fire Warden

Albany County Sheriff

Highway Patrol

Laramie Area Records and Communication

Casper Interagency Dispatch

EMA (Laramie Fire Department)

Rawlins Interagency Dispatch

Guidelines:

1) Incident Command will make the decision to start notification or to start an evacuation.
2) Suggested Evacuation Command Area - Confluence of Lake Creek and Douglas Creek. Assessment of where fire is and is going needs to be done.
3) ACSO will be primary agency to contact homeowners in coordination with the fire service.
4) Fire units may be used to facilitate evacuation.
5) Evacuation route will be FS Road 509 to FSR 512 to Highway 230.
6) Alternate route will be FS road 509 to FSR 512 to FSR 543 to Keystone then to Albany.
7) Road Closures in the area should be done as soon as practical to facilitate movement of the public and fire equipment.
8) Incident Command channel should be USFS - Spruce Mountain
9) Evacuation Coordination Channel should be AC - Jelm (May not work in some areas)
10) Other common non repeated work channels, FERN, Fire 2, USFS work

Evacuation Command Area:

Confluence of Lake Creek and Douglas Creek.

Fox Park Work Center USFS.

`

Evacuation Center:

Primary: Harmony School Secondary: Centennial School

Special Considerations:

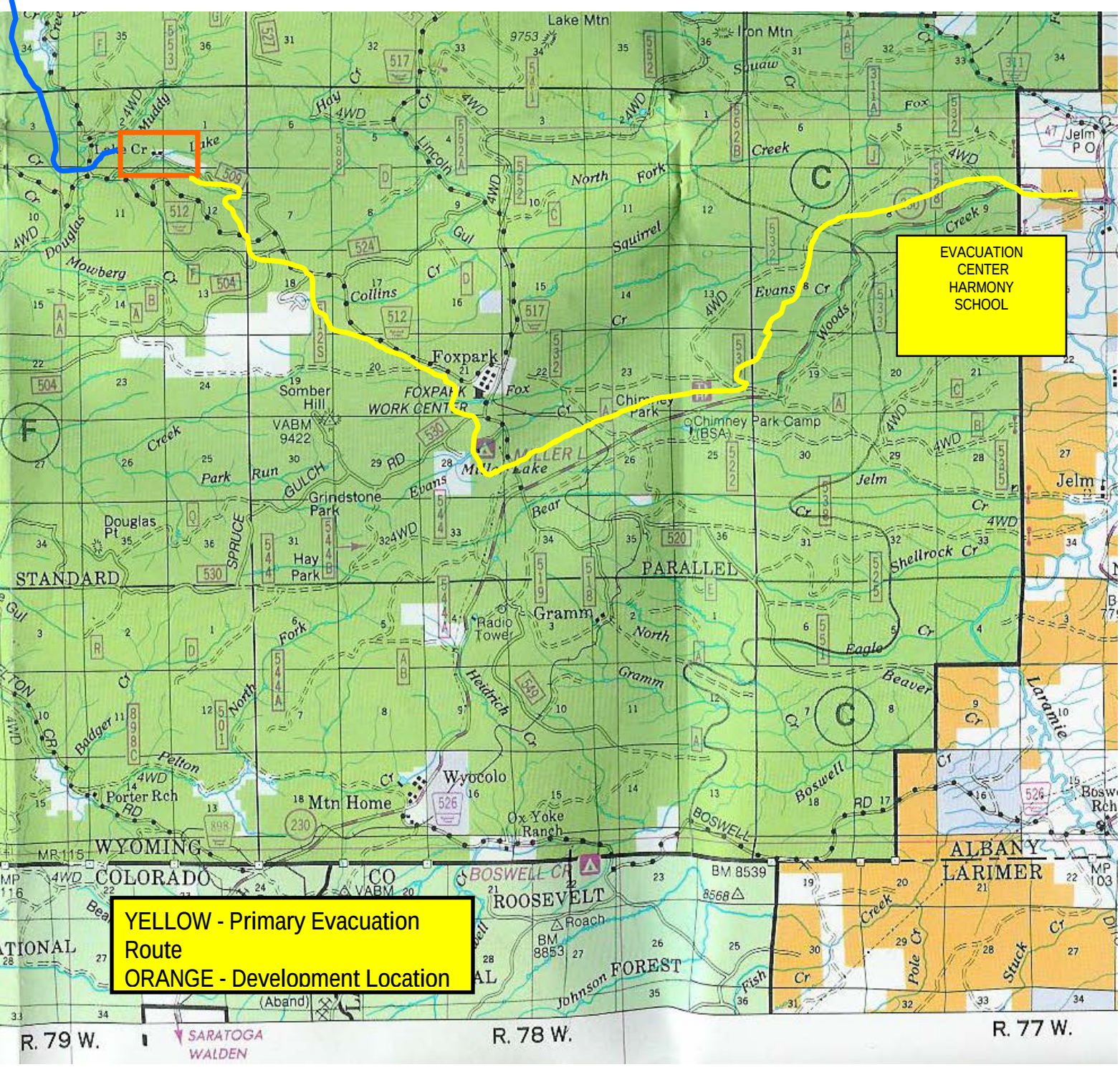
Meadow to East may work as Safety Zone

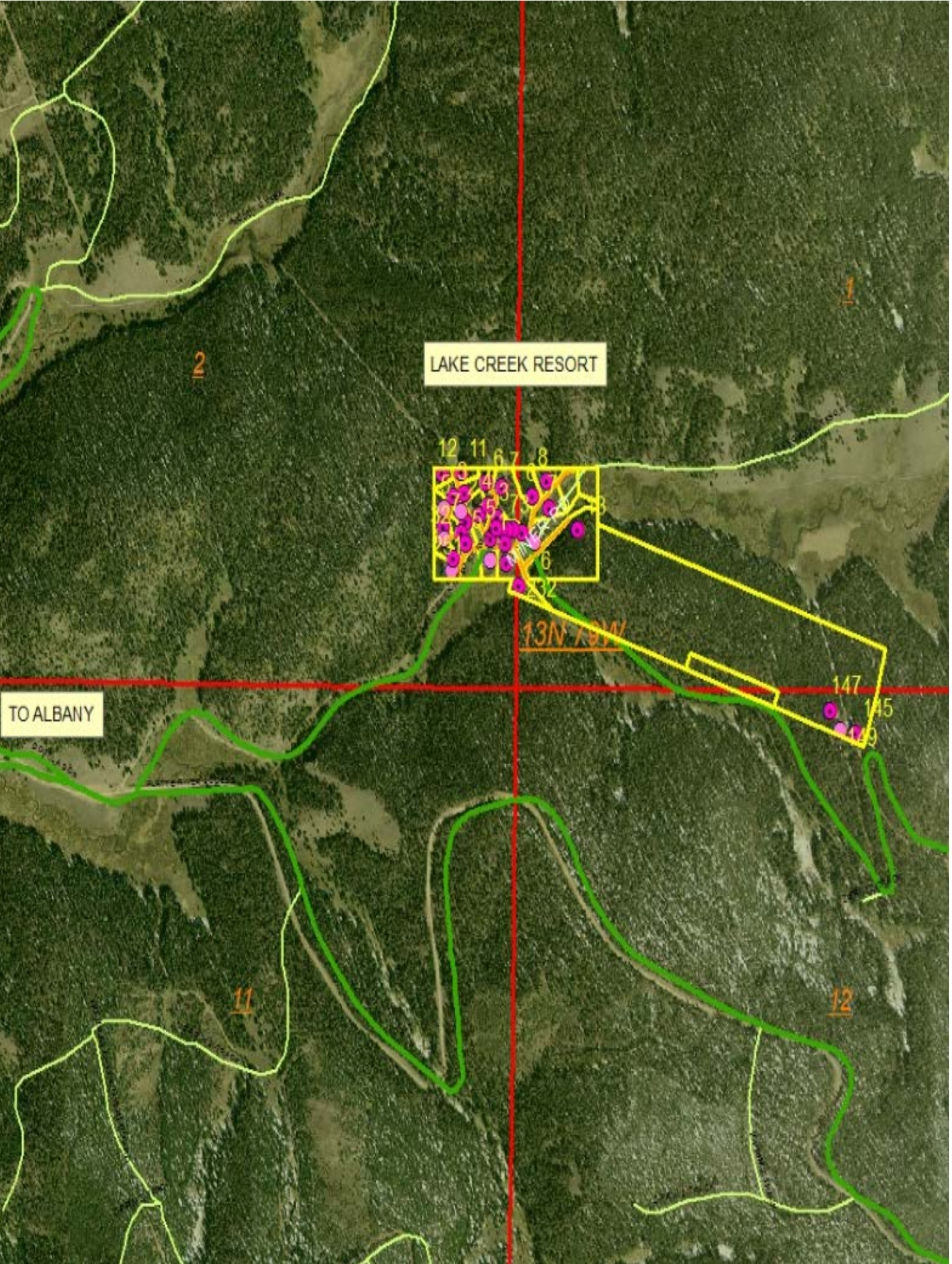
Open area at confluence of Douglas and Lake Creek may work as Safety Zone.

Remember 3 cabins at the top of ridge to the South East

USFS Campgrounds and dispersed Recreation Sites:

Dispersed camping in area.


EVACUATION CENTER HARMONY SCHOOL
YELLOW - Primary Evacuation Route
ORANGE - Development Location
Lake Mtn
Iron Mtn
Foxpark
Chimney Park Camp (BSA)
Gramm
Wyocolo
Mtn Home
Ox Yoke Ranch
Roach
Jelm
PARALLEL
STANDARD
WYOMING
COLORADO
ALBANY
LARIMER
ROOSEVELT
Johnson FOREST
R. 79 W.
R. 78 W.
R. 77 W.


LAKE CREEK RESORT
TO ALBANY
1
2
11
12
13N 7W

Evacuation Preplan

for

Mountain Home

Wycolo

June 2008

Mountain Home, Wycolo Evacuation Plan

If a fire is near these developments use the following table to help decide appropriate action.
Under reciprocal agreement other agencies can be call on to help monitor and decide on a course of action.

Location	Trigger Points	Action
OUTSIDE 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER ERC 90% OR ABOVE	Merits close attention, but will not require an evacuation unless the fire moves closer and / or conditions change Consider evacuation alert.
2 - 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	May soon require an evacuation. A change in wind speed, rate of spread or increased fire behavior could trigger an evacuation. Preparations for evacuation should be made. Start an evacuation alert.
2 MILES	HIGH FIRE DANGER, WIND BLOWING TOWARDS WUI	Evacuation is likely. The wind is or is expected to be moving the fire towards the community. An increase in wind speed or increase in fire behavior could require immediate evacuation. Start evacuation alert or an evacuation.
INSIDE 2 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	Immediate action should be taken. An evacuation should be ordered if time permits and evacuation route safety can be assured.

Critical contacts when considering an evacuation:

Albany County Fire Warden
Albany County Sheriff
Highway Patrol
Laramie Area Records and Communication
Casper Interagency Dispatch
EMA (Laramie Fire Department)
Rawlins Interagency Dispatch

Guidelines:

1) Incident Command will make the decision to start notification or to start an evacuation.
2) Suggested Evacuation Command Area - BLVVFD Fire Station or Parking lot
3) ACSO will be primary agency to contact homeowners in coordination with the fire service.
4) All fire units may be used to facilitate evacuation.
5) Primary evacuation route Highway 230.
6) Multiple structures with some limited access roads
7) Road Closures in the area should be done as soon as practical to facilitate movement of the public and fire equipment. Closure of Highway 230.
8) Incident Command channel should be USFS Spruce Mountain.
9) Evacuation Coordination Channel should be AC - Jelm
10) Other common non repeated work channels, FERN, Fire 2, USFS work

Evacuation Command Area:

BLVVFD Fire Station or West parking lot.

`

Evacuation Center:

Primary: Harmony School Secondary:

Special Considerations:

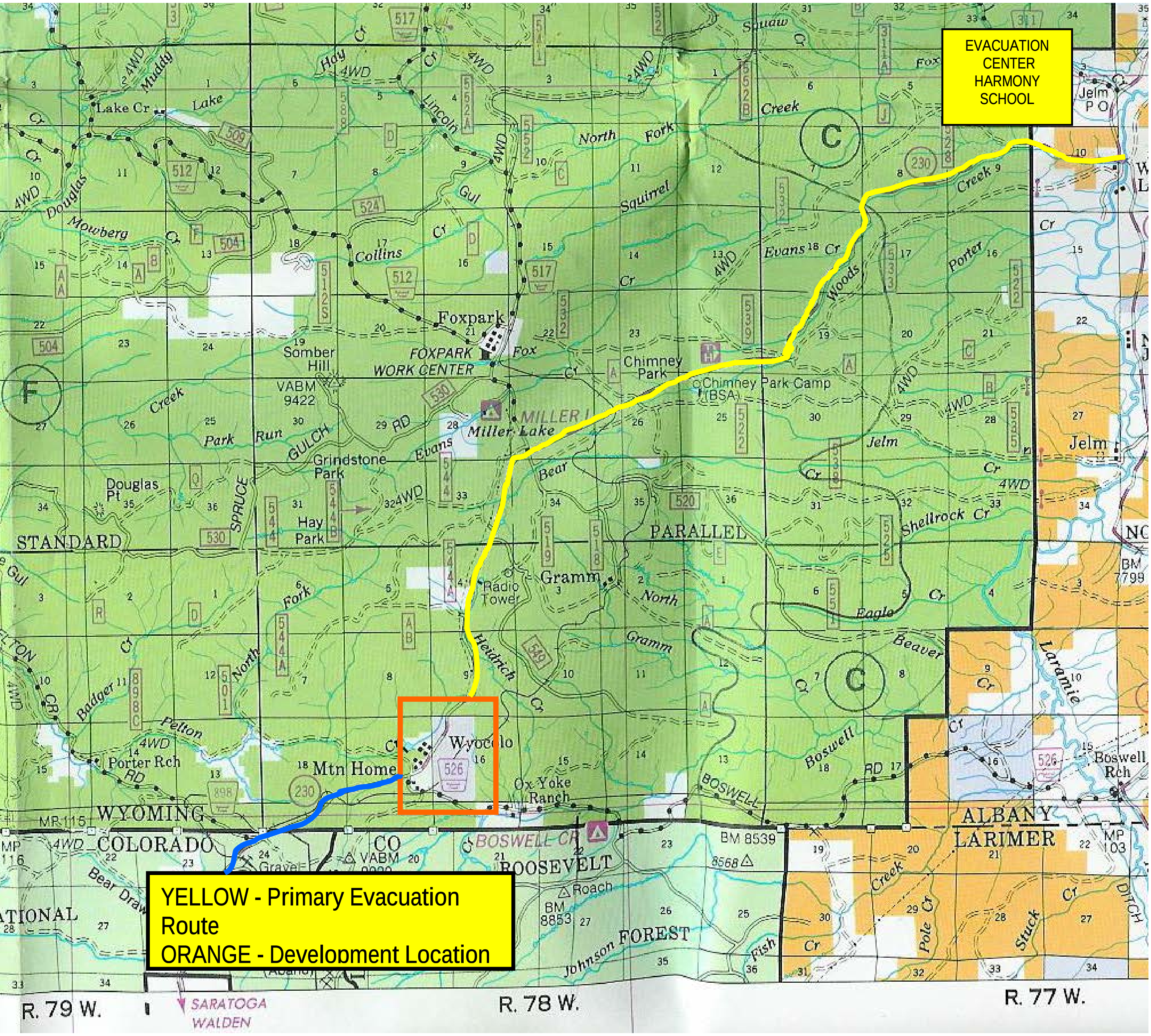
Some open areas may work as Safety Zones with preparation.

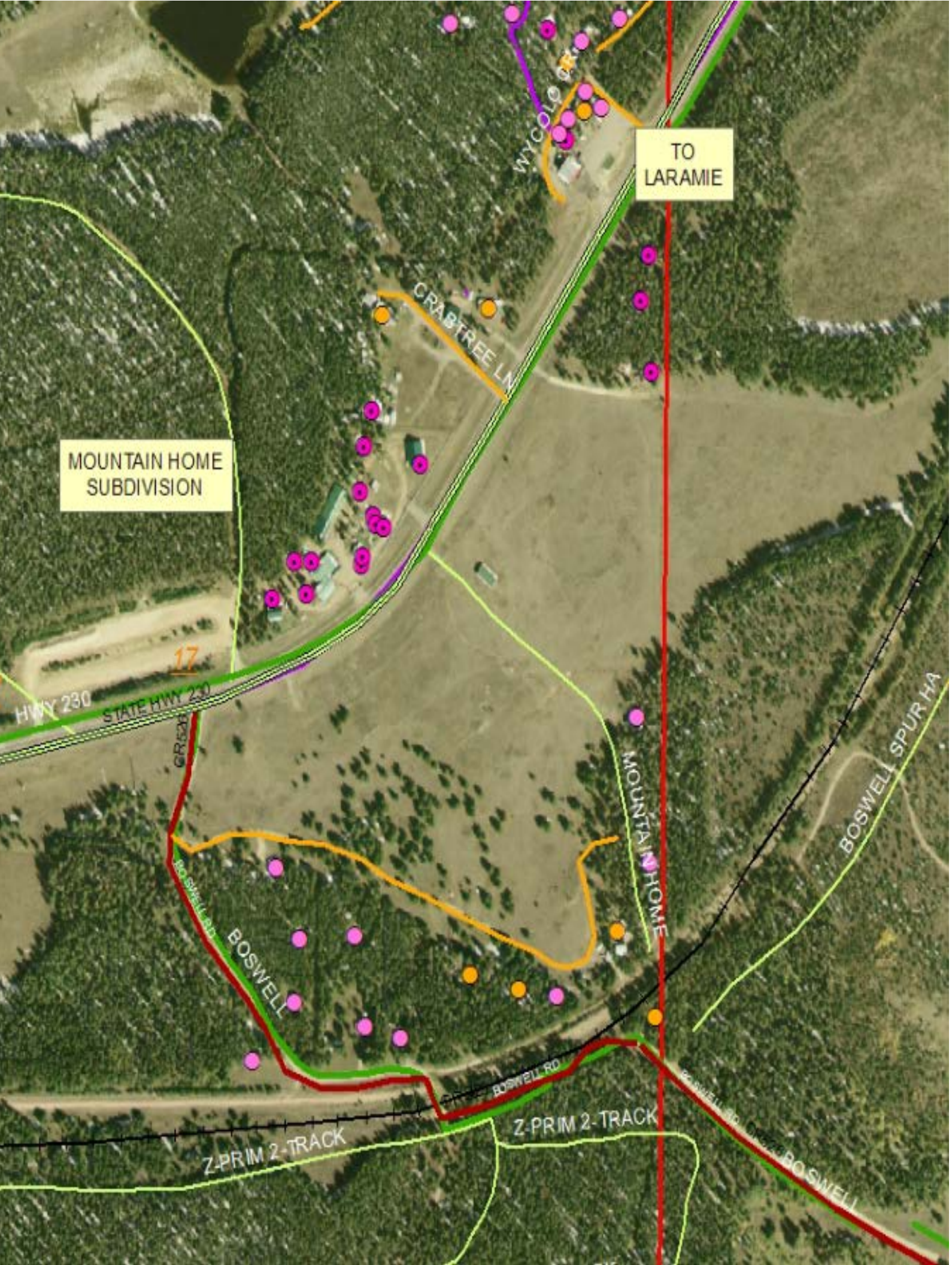
Boswell Road FS road 526 may be used as an alternate route.

USFS Campgrounds and dispersed Recreation Sites:

Dispersed camping spots in the area.

Boswell Creek camp ground (see OxYoke Ranch)


EVACUATION CENTER HARMONY SCHOOL
YELLOW - Primary Evacuation Route
ORANGE - Development Location
Foxpark
FOXPARK WORK CENTER
Miller Lake
Chimney Park
Wyocolo
Mtn Home
WYOMING
COLORADO
ALBANY
LARIMER
Jelm
R. 79 W.
R. 78 W.
R. 77 W.


TO
LARAMIE
WYCOLO
CRABTREE LN
MOUNTAIN HOME
SUBDIVISION
17
HWY 230
STATE HWY 230
CR52
BOSWELL
MOUNTAIN HOME
BOSWELL SPUR HA
BOSWELL RD
Z-PRIM 2-TRACK
Z-PRIM 2-TRACK


Z-PRIM 2-TRACK
WYOCOLO SUBDIVISION
MOOSE PL
WYOCOLO RD
WYOCOLO RD
PROPOSED ROADWAY
WYOCOLO RD
ROAD TO BE NAMED
WYOCOLO LN
STATE HWY 2
WYCOLD CR
TO WALDEN

Evacuation Preplan

for

Ox Yoke Ranch

June 2008

Ox Yoke Ranch Evacuation Plan

If a fire is near these developments use the following table to help decide appropriate action.
Under reciprocal agreement other agencies can be call on to help monitor and decide on a course of action.

Location	Trigger Points	Action
OUTSIDE 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER ERC 90% OR ABOVE	Merits close attention, but will not require an evacuation unless the fire moves closer and / or conditions change Consider evacuation alert.
2 - 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	May soon require an evacuation. A change in wind speed, rate of spread or increased fire behavior could trigger an evacuation. Preparations for evacuation should be made. Start an evacuation alert.
2 MILES	HIGH FIRE DANGER, WIND BLOWING TOWARDS WUI	Evacuation is likely. The wind is or is expected to be moving the fire towards the community. An increase in wind speed or increase in fire behavior could require immediate evacuation. Start evacuation alert or an evacuation.
INSIDE 2 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	Immediate action should be taken. An evacuation should be ordered if time permits and evacuation route safety can be assured.

Critical contacts when considering an evacuation:

Albany County Fire Warden
Albany County Sheriff
Highway Patrol
Laramie Area Records and Communication
Casper Interagency Dispatch
EMA (Laramie Fire Department)
Rawlins Interagency Dispatch

Guidelines:

1) Incident Command will make the decision to start notification or to start an evacuation.
2) Suggested Evacuation Command Area - BLVVFD fire station?
3) ACSO will be primary agency to contact homeowners in coordination with the fire service.
4) Fire units may be used to facilitate evacuation.
5) Primary evacuation route: Forest Road 526 to Highway 230 or Highway 10
6) Road Closures in the area should be done as soon as practical to facilitate movement of the public and fire equipment.
7) Incident Command channel should be USFS Spruce Mountain. (Jelm if Spruce cannot be hit)
8) Evacuation Coordination Channel should be AC - Jelm
9) Other common non repeated work channels, FERN, Fire 2, USFS work

Evacuation Command Area:

BLVVFD Fire Station or West parking lot.

`

Evacuation Center:

Primary: Harmony School Secondary:

Special Considerations:

Some open areas may work as Safety Zones with preparation.

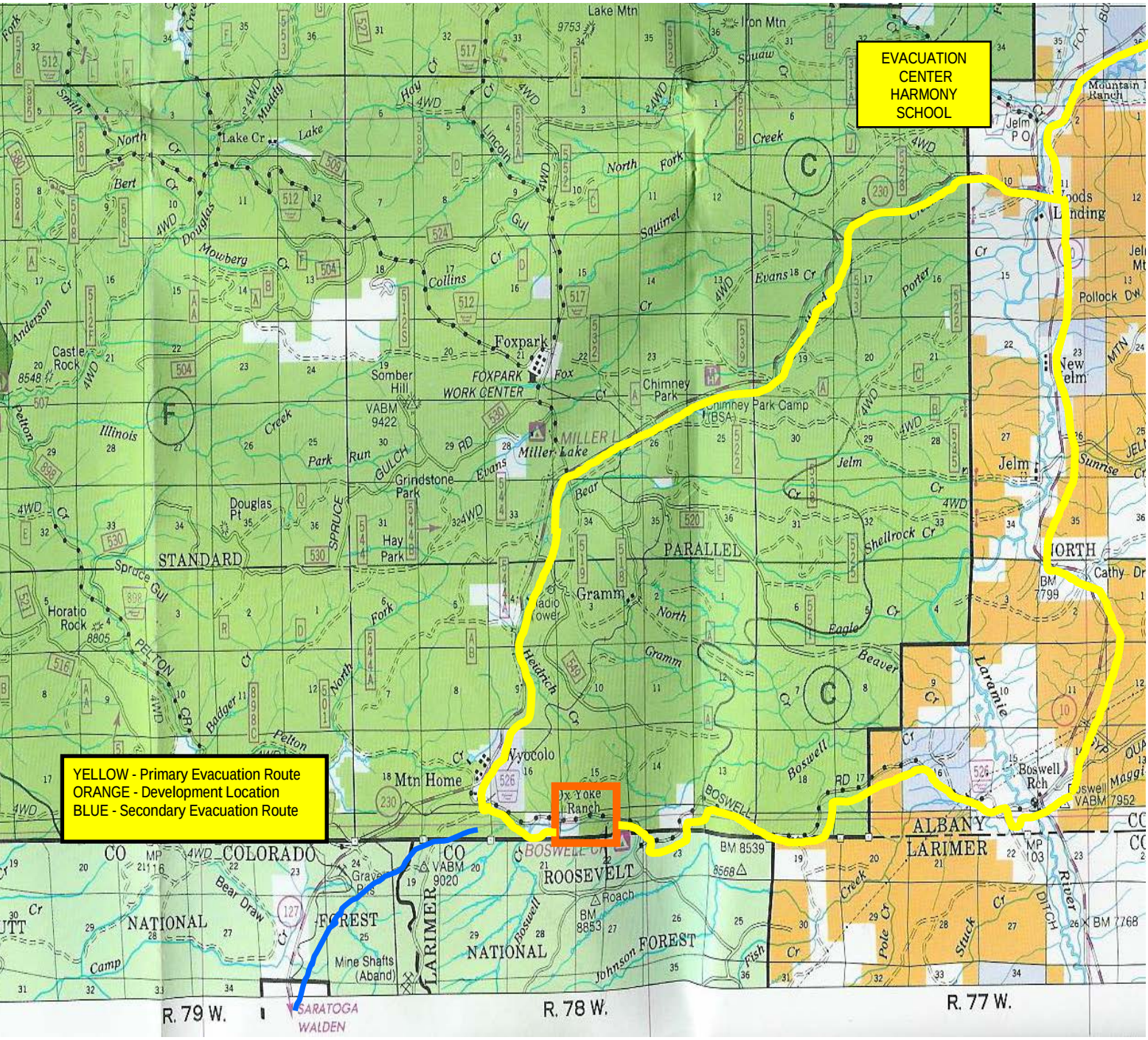
Fairly long travel distance to paved roads.

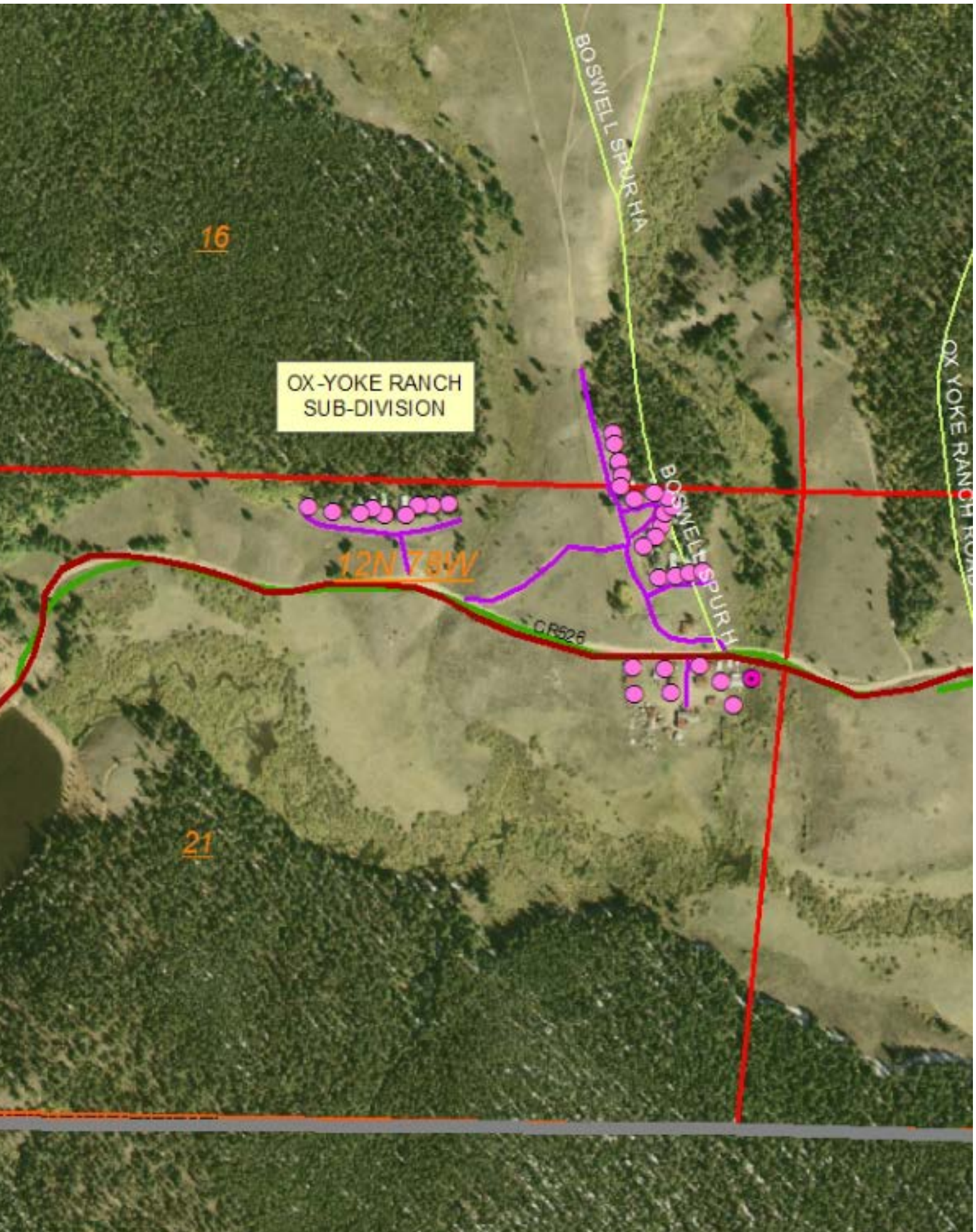
May need Evacuation Command area in another location.

USFS Campgrounds and dispersed Recreation Sites:

Dispersed camping spots in the area.

Boswell Creek camp ground.


EVACUATION CENTER HARMONY SCHOOL
YELLOW - Primary Evacuation Route
ORANGE - Development Location
BLUE - Secondary Evacuation Route
Lake Mtn
Iron Mtn
Foxpark
FOXPARK WORK CENTER
Chimney Park
Chimney Park Camp (BSA)
Miller Lake
Grindstone Park
Hay Park
Douglas Pt
Horatio Rock
Gramm
Ladora
Mtn Home
Ox Yoke Ranch
Boswell Rch
Jelm
Pollock
Cathy
PARALLEL
STANDARD
ALBANY
LARIMER
ROOSEVELT
COLORADO
NATIONAL FOREST
Johnson
Mine Shafts (Aband)
SARATOGA
WALDEN
R. 79 W.
R. 78 W.
R. 77 W.


16
OX-YOKE RANCH
SUB-DIVISION
BOSWELL SPUR HA
BOSWELL SPUR H
OX YOKE RANCH
12N 78W
CR526
21

Evacuation Preplan

for

Porter Ranch

Pelton Creek Properties

June 2008

Porter Ranch, Pelton Cr. Properties Evacuation Plan

If a fire is near these developments use the following table to help decide appropriate action.
Under reciprocal agreement other agencies can be call on to help monitor and decide on a course of action.

Location	Trigger Points	Action
OUTSIDE 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER ERC 90% OR ABOVE	Merits close attention, but will not require an evacuation unless the fire moves closer and / or conditions change Consider evacuation alert.
2 - 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	May soon require an evacuation. A change in wind speed, rate of spread or increased fire behavior could trigger an evacuation. Preparations for evacuation should be made. Start an evacuation alert.
2 MILES	HIGH FIRE DANGER, WIND BLOWING TOWARDS WUI	Evacuation is likely. The wind is or is expected to be moving the fire towards the community. An increase in wind speed or increase in fire behavior could require immediate evacuation. Start evacuation alert or an evacuation.
INSIDE 2 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	Immediate action should be taken. An evacuation should be ordered if time permits and evacuation route safety can be assured.

Critical contacts when considering an evacuation:

Albany County Fire Warden
Albany County Sheriff
Highway Patrol
Laramie Area Records and Communication
Casper Interagency Dispatch
EMA (Laramie Fire Department)
Rawlins Interagency Dispatch

Guidelines:

1) Incident Command will make the decision to start notification or to start an evacuation.
2) Suggested Evacuation Command Area - Highway 230 and FS road 898
3) ACSO will be primary agency to contact homeowners in coordination with the fire service.
4) All fire units may be used to facilitate evacuation.
5) FS Road 898 will be primary evacuation route to Highway 230.
6) Pelton Creek Properties use FS road 898B to FS road 898.
7) **There are no alternate routes out of the area**.
8) Road Closures in the area should be done as soon as practical to facilitate movement of the public and fire equipment.
9) Incident Command channel should be USFS, Black Hall may be the only repeater channel to work.
10) Evacuation Coordination Channel should be AC - Jelm (May not work)
11) Other common non repeated work channels, FERN, Fire 2, USFS work

Evacuation Command Area:

Highway 230 and FS road 898

`

Evacuation Center:

Primary: Harmony School Secondary: Centennial School

Special Considerations:

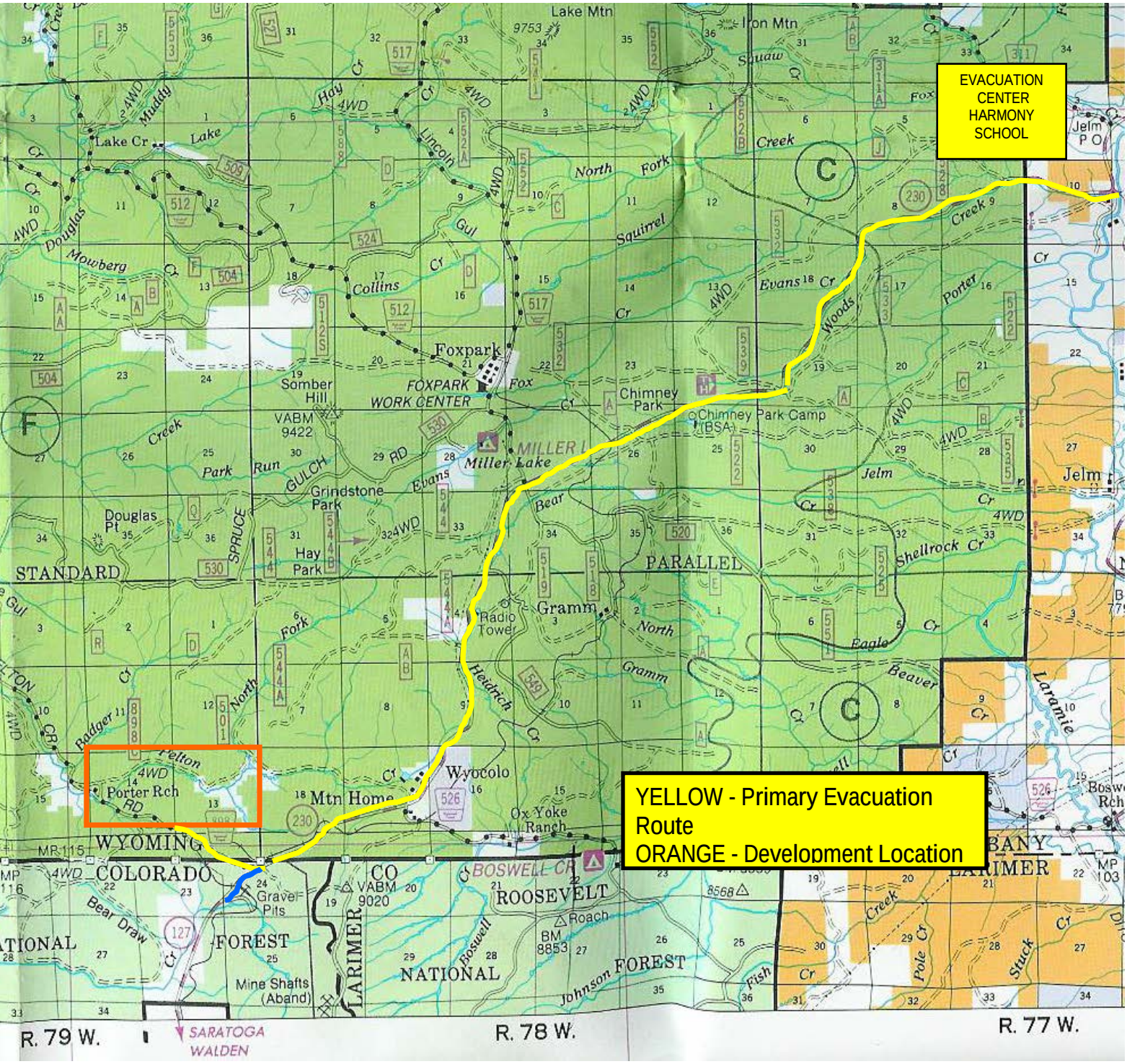
Some Meadows may work as Safety Zones with preparation.

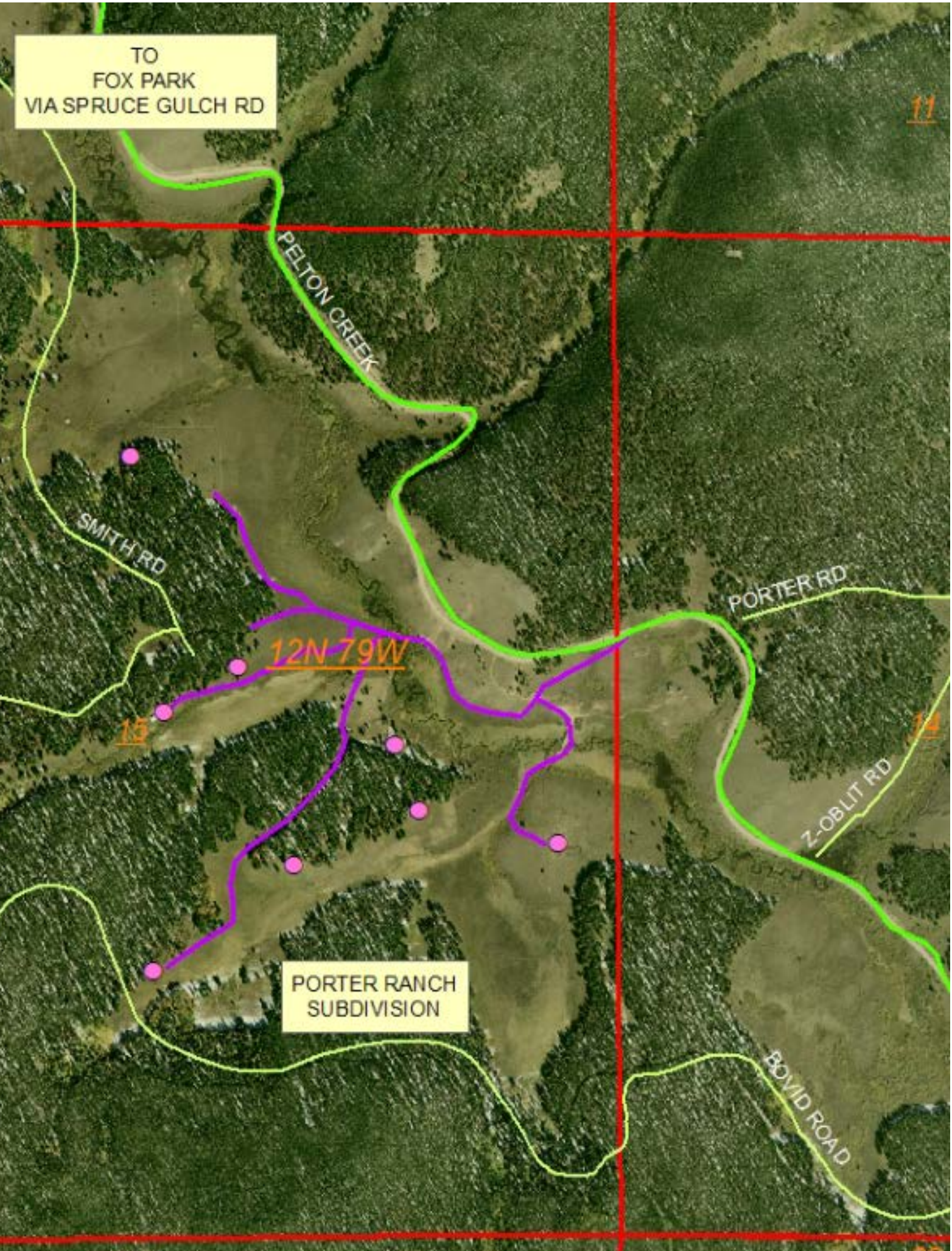
Horato Rock might be used for a lookout point.

USFS Campgrounds and dispersed Recreation Sites:

Numerous dispersed camping spots in the area.

Pelton Creek camp ground


EVACUATION CENTER HARMONY SCHOOL
YELLOW - Primary Evacuation Route
ORANGE - Development Location
Lake Mtn
Iron Mtn
Foxpark
FOXPARK WORK CENTER
Chimney Park
Chimney Park Camp (BSA)
Miller Lake
Somber Hill
VABM 9422
Grindstone Park
Hay Park
Douglas Pt
STANDARD
PARALLEL
Gramm
Radio Tower
Wyocolo
Mtn Home
Ox Yoke Ranch
Porter Rch
Pelton
WYOMING
COLORADO
CO
VABM 9020
ROOSEVELT
Roach
BM 8853
Gravel Pits
Mine Shafts (Aband)
FOREST
NATIONAL
Johnson FOREST
BOSWELL CR
SARATOGA
WALDEN
R. 79 W.
R. 78 W.
R. 77 W.


TO
FOX PARK
VIA SPRUCE GULCH RD
11
PELTON CREEK
SMITH RD
PORTER RD
12N 79W
15
14
Z-OBLIT RD
PORTER RANCH
SUBDIVISION
BOVID ROAD

Evacuation Preplan

for

Rambler

June 2008

Rambler Evacuation Plan

If a fire is near this development use the following table to help decide appropriate action. Under reciprocal agreement other agencies can be called on to help monitor and decide on a course of action.

Location	Trigger Points	Action
OUTSIDE 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER ERC 90% OR ABOVE	Merits close attention, but will not require an evacuation unless the fire moves closer and / or conditions change Consider evacuation alert.
2 - 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	May soon require an evacuation. A change in wind speed, rate of spread or increased fire behavior could trigger an evacuation. Preparations for evacuation should be made. Start an evacuation alert.
2 MILES	HIGH FIRE DANGER, WIND BLOWING TOWARDS WUI	Evacuation is likely. The wind is or is expected to be moving the fire towards the community. An increase in wind speed or increase in fire behavior could require immediate evacuation. Start evacuation alert or an evacuation.
INSIDE 2 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	Immediate action should be taken. An evacuation should be ordered if time permits and evacuation route safety can be assured.

Critical contacts when considering an evacuation:

Albany County Fire Warden

Albany County Sheriff

Highway Patrol

Laramie Area Records and Communication

Casper Interagency Dispatch

EMA (Laramie Fire Department)

Rawlins Interagency Dispatch

Guidelines:

1) Incident Command will make the decision to start notification or to start an evacuation.
2) Suggested Evacuation Command Area – Rob Roy Camp Ground. Assessment of where fire is and is going needs to be done.
3) If fire is in Savage Run Wilderness, trigger points outside of the 5 miles might be used.
4) ACSO will be primary agency to contact homeowners in coordination with the fire service.
5) Fire units may be used to facilitate evacuation.
6) Evacuation route will be FS Road 500 east to Albany. Secondary route would be FSR 500 west or FSR 543 south.
7) Road Closures in the area should be done as soon as practical to facilitate movement of the public and fire equipment.
8) Incident Command channel should be USFS - Spruce Mountain
9) Evacuation Coordination Channel should be AC - Jelm (May not work in some areas)
10) Other common non repeated work channels, FERN, Fire 2, USFS work 2

Evacuation Command Area:

Rob Roy Camp Ground

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Evacuation Center:

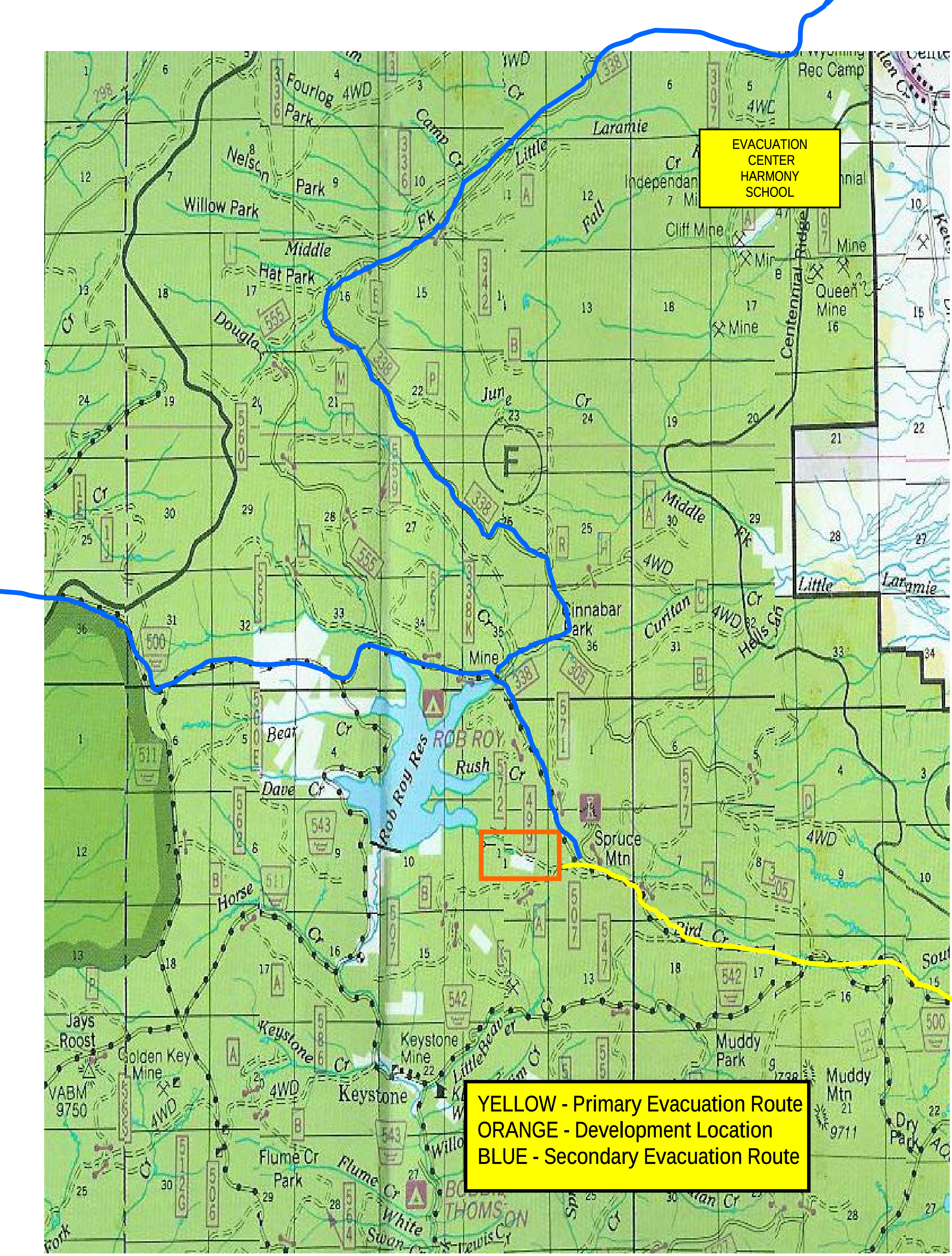
Primary: Centennial School Secondary:

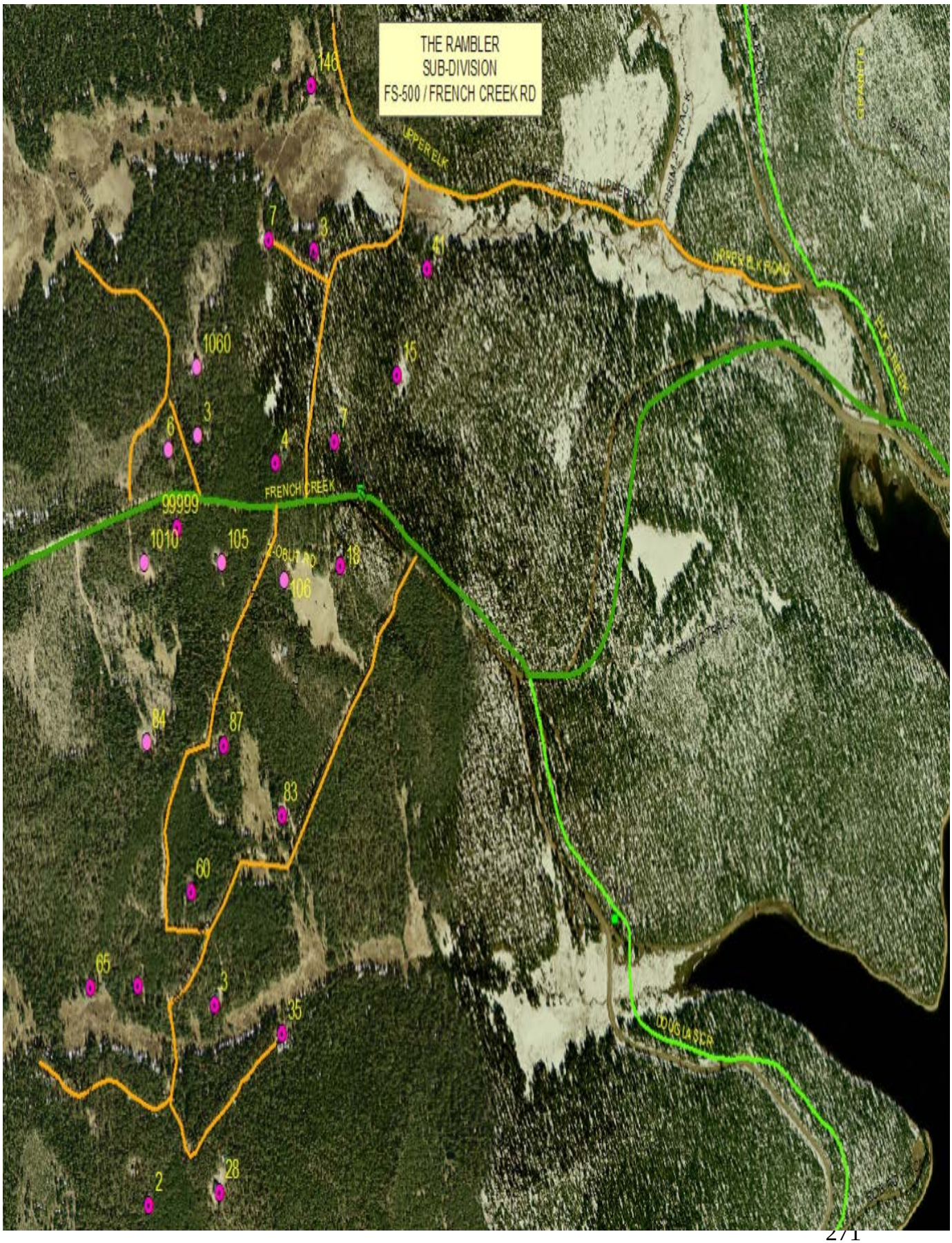
Special Considerations:

Know what the fire is doing it may make rapid runs out of the drainages to the west.

USFS Campgrounds and dispersed Recreation Sites:

Dispersed camping in area.	Wilderness Users
Rob Roy Camp Ground	Cinnabar Park


EVACUATION CENTER HARMONY SCHOOL
YELLOW - Primary Evacuation Route
ORANGE - Development Location
BLUE - Secondary Evacuation Route


THE RAMBLER
SUB-DIVISION
FS-500 / FRENCH CREEK RD
146
UPPER ELK
7
3
41
1060
15
6
3
4
7
FRENCH CREEK
99999
1010
105
18
106
84
87
83
60
65
3
35
2
28

Evacuation Preplan

for

Rinker / Lankford

June 2008

Rinker / Lankford Evacuation Plan

If a fire is near this development use the following table to help decide appropriate action. Under reciprocal agreement other agencies can be called on to help monitor and decide on a course of action.

Location	Trigger Points	Action
OUTSIDE 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER ERC 90% OR ABOVE	Merits close attention, but will not require an evacuation unless the fire moves closer and / or conditions change Consider evacuation alert.
2 - 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	May soon require an evacuation. A change in wind speed, rate of spread or increased fire behavior could trigger an evacuation. Preparations for evacuation should be made. Start an evacuation alert.
2 MILES	HIGH FIRE DANGER, WIND BLOWING TOWARDS WUI	Evacuation is likely. The wind is or is expected to be moving the fire towards the community. An increase in wind speed or increase in fire behavior could require immediate evacuation. Start evacuation alert or an evacuation.
INSIDE 2 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	Immediate action should be taken. An evacuation should be ordered if time permits and evacuation route safety can be assured.

Critical contacts when considering an evacuation:

Albany County Fire Warden

Albany County Sheriff

Highway Patrol

Laramie Area Records and Communication

Casper Interagency Dispatch

EMA (Laramie Fire Department)

Rawlins Interagency Dispatch

Guidelines:

1) Incident Command will make the decision to start notification or to start an evacuation.
2) Suggested Evacuation Command Area – Bridge at Rob Roy or Clear-cut at the intersection of FS 507 and FS 500.Assesment of where fire is and is going needs to be done.
3) ACSO will be primary agency to contact homeowners in coordination with the fire service.
4) Fire units may be used to facilitate evacuation.
5) Evacuation route will be FS Road 507 east to FS 500 to Albany. Secondary route would be FSR 507 to FS 500 towards Rob Roy depending on fire location.
6) Road Closures in the area should be done as soon as practical to facilitate movement of the public and fire equipment.
7) Incident Command channel should be USFS - Spruce Mountain
8) Evacuation Coordination Channel should be AC - Jelm (May not work in some areas)
9) Other common non repeated work channels, FERN, Fire 2, USFS work 2

Evacuation Command Area:

Depends on fire, possible areas may be at Rob Roy of a clear-cut near the development.

`

Evacuation Center:

Primary: Centennial School Secondary:

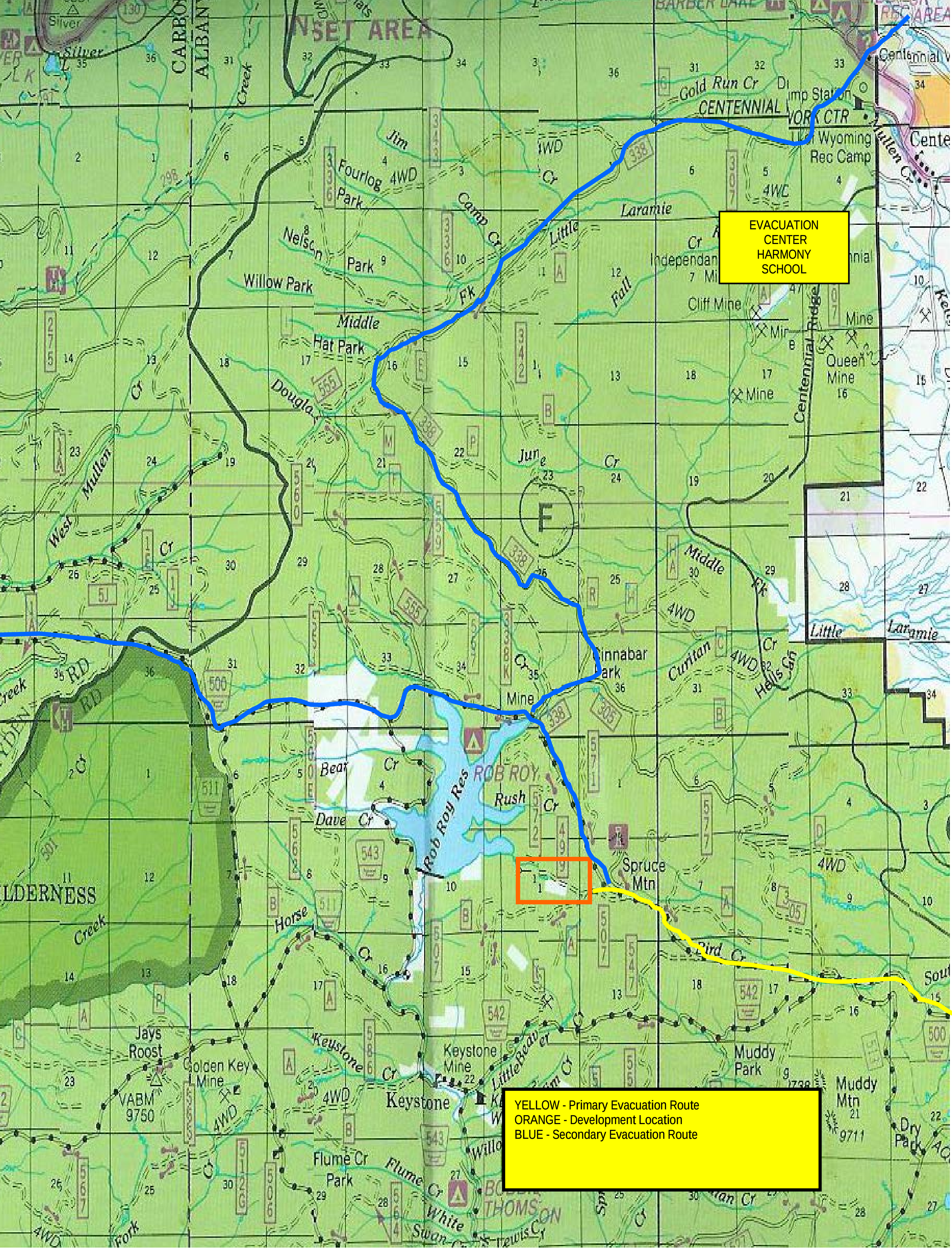
Special Considerations:

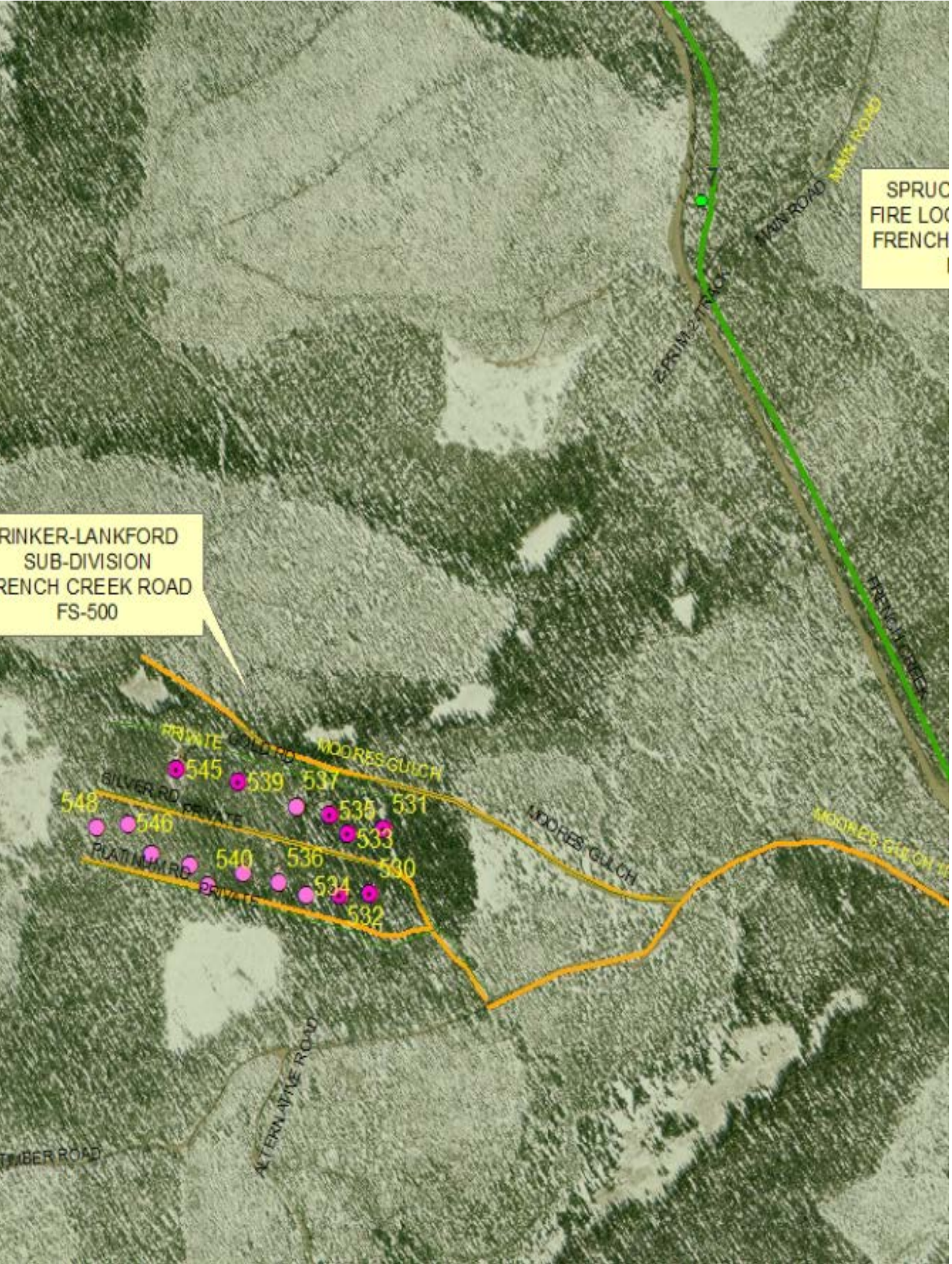
Know what the fire is doing it may make rapid runs out of the drainages to the west.

Some clear cuts may work as safety zones.

USFS Campgrounds and dispersed Recreation Sites:

Dispersed camping in area.	Spruce Mountain Lookout
Rob Roy Camp Ground	Cinnabar Park


EVACUATION
CENTER
HARMONY
SCHOOL
YELLOW - Primary Evacuation Route
ORANGE - Development Location
BLUE - Secondary Evacuation Route
CENTENNIAL
Gold Run Cr
Wyoming
Rec Camp
Laramie
Independance
Cliff Mine
Queen
Mine
Centennial Ridge
Fourlog
Park
Jim
Camp Cr
Nelson
Park
Willow Park
Middle
Hat Park
Douglas
West
Mullen
Cinnabar
Park
Curtain
Middle
Fk
Little
Laramie
ROB ROY
Rob Roy Res
Rush
Bear
Dave
Spruce
Mtn
Bird Cr
Horse
Creek
WILDERNESS
Keystone
Mine
Keystone
Muddy
Park
Muddy
Mtn
Jays
Roost
Golden Key
Mine
VABM
9750
Flume Cr
Park
Flume
White
Swan


SPRUC
FIRE LOC
FRENCH
RINKER-LANKFORD
SUB-DIVISION
RENCH CREEK ROAD
FS-500
MAIN ROAD
MAIN ROAD
FRENCH CREEK
MOORES GULCH
MOORES GULCH
SILVER RD PRIVATE
PLATINUM RD
PRIVATE
545
539
537
548
546
535
531
533
540
536
530
534
532
ALTERNATE ROAD
TIMBER ROAD

Evacuation Preplan

for

Wold Addition

June 2008

Wold Addition Evacuation Plan

If a fire is near this development use the following table to help decide appropriate action. Consider earlier notification due to number of residences.
Under reciprocal agreement other agencies can be call on to help monitor and decide on a course of action.

Location	Trigger Points	Action
OUTSIDE 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER ERC 90% OR ABOVE	Merits close attention, but will not require an evacuation unless the fire moves closer and / or conditions change Consider evacuation alert.
2 - 5 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	May soon require an evacuation. A change in wind speed, rate of spread or increased fire behavior could trigger an evacuation. Preparations for evacuation should be made. Start an evacuation alert.
2 MILES	HIGH FIRE DANGER, WIND BLOWING TOWARDS WUI	Evacuation is likely. The wind is or is expected to be moving the fire towards the community. An increase in wind speed or increase in fire behavior could require immediate evacuation. Start evacuation alert or an evacuation.
INSIDE 2 MILES	WIND BLOWING TOWARDS WUI, HIGH FIRE DANGER, FIRE RESISTING CONTROL EFFORTS	Immediate action should be taken. An evacuation should be ordered if time permits and evacuation route safety can be assured.

Critical contacts when considering an evacuation:

Albany County Fire Warden
Albany County Sheriff
Highway Patrol
Laramie Area Records and Communication
Casper Interagency Dispatch
EMA (Laramie Fire Department)
Rawlins Interagency Dispatch

Guidelines:

1) Incident Command will make the decision to start notification or to start an evacuation.
2) Suggested Evacuation Command Area - Ticks Parking lot
3) ACSO will be primary agency to contact homeowners in coordination with the fire service.
4) Fire units may be used to facilitate evacuation.
5) Primary evacuation route Highway 230.
6) Multiple structures with some limited access roads, consider early notification
7) Road Closures in the area should be done as soon as practical to facilitate movement of the public and fire equipment. Closure of Highway 230.
8) Incident Command channel should be USFS Spruce Mountain.
9) Evacuation Coordination Channel should be AC - Jelm (Fire 1 may work)
10) Other common non repeated work channels, FERN, Fire 2, USFS work

Evacuation Command Area:

Ticks parking lot.

`

Evacuation Center:

Primary: Harmony School Secondary:

Special Considerations:

Multiple structures consider early notification or evacuation

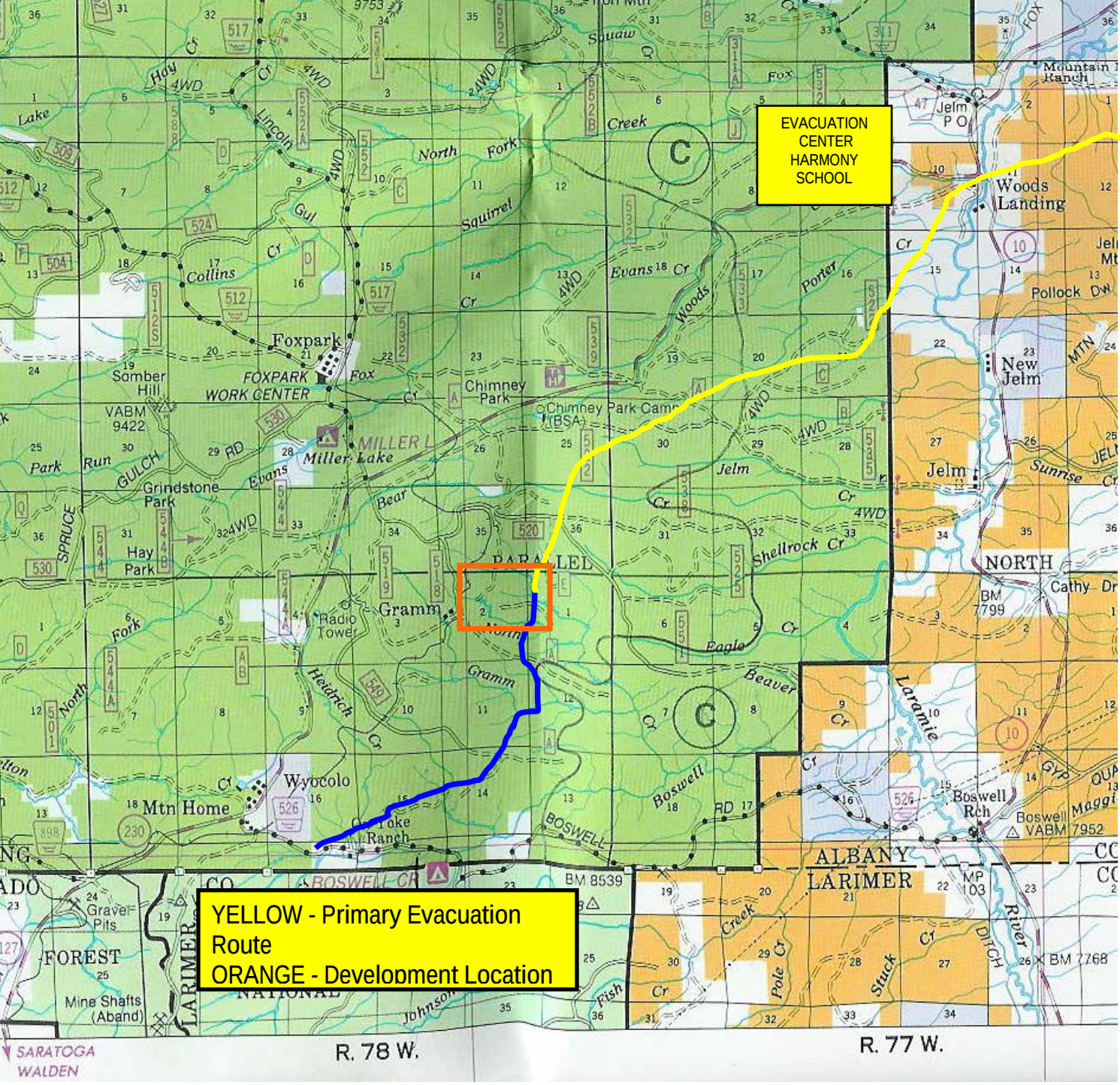
Limited clearance roads.

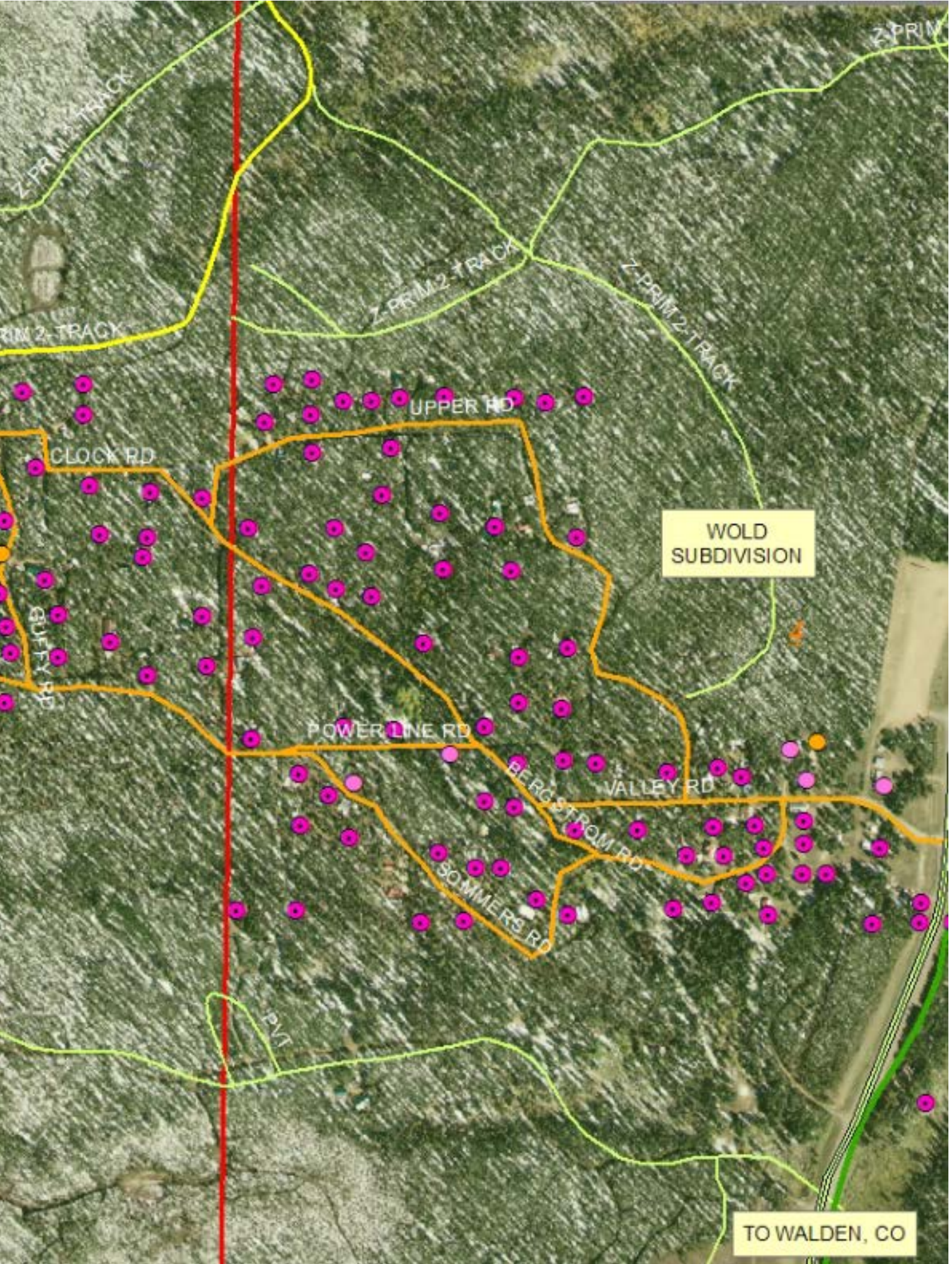
Watch for traffic congested roads

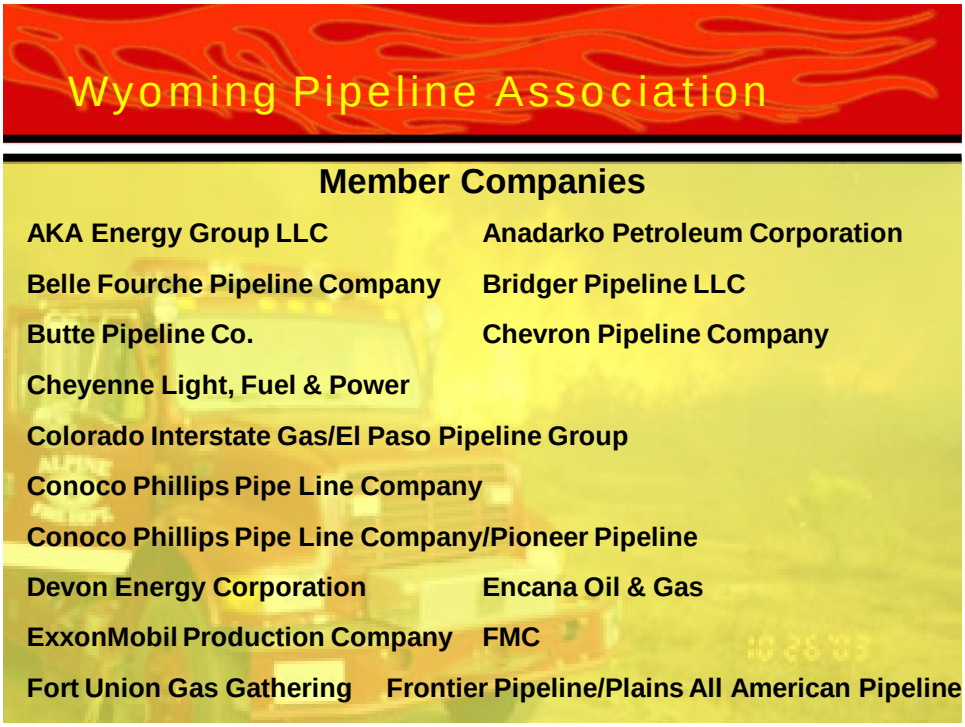
USFS Campgrounds and dispersed Recreation Sites:

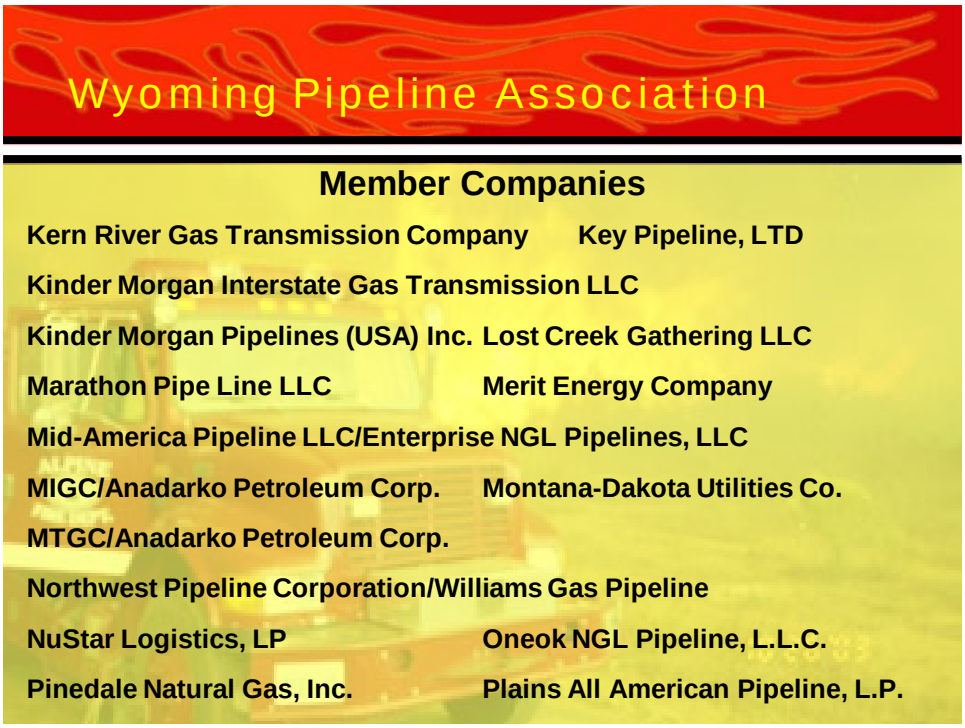
Dispersed camping spots in the area.


Valley Road
Upper Road
Power Line Road
Sommers Road
Usfs Road 544 Ab
N
W
E
S
© 2008 Tele Atlas
Pointer 41°02'18.70" N 106°09'50.00" W
Streaming 100%


EVACUATION CENTER HARMONY SCHOOL
YELLOW - Primary Evacuation Route
ORANGE - Development Location
Foxpark
Somber Hill
FOXPARK WORK CENTER
Chimney Park
Chimney Park Camp (BSA)
Miller Lake
Grindstone Park
Hay Park
Gramm
Radio Tower
Wyocolo
Mtn Home
Loke Ranch
Woods Landing
New Jelm
Jelm
NORTH
Boswell Rch
Boswell VABM 7952
ALBANY
LARIMER
Gravel Pits
FOREST
Mine Shafts (Abandl)
SARATOGA
WALDEN
R. 78 W.
R. 77 W.


Z-PRIM 2-TRACK
Z-PRIM 2-TRACK
Z-PRIM 2-TRACK
Z-PRIM 2-TRACK
Z-PRIM
UPPER RD
CLOCK RD
WOLD
SUBDIVISION
BUFFY RD
POWER LINE RD
BERGSTROM RD
VALLEY RD
SOMMERS RD
PVT
TO WALDEN, CO

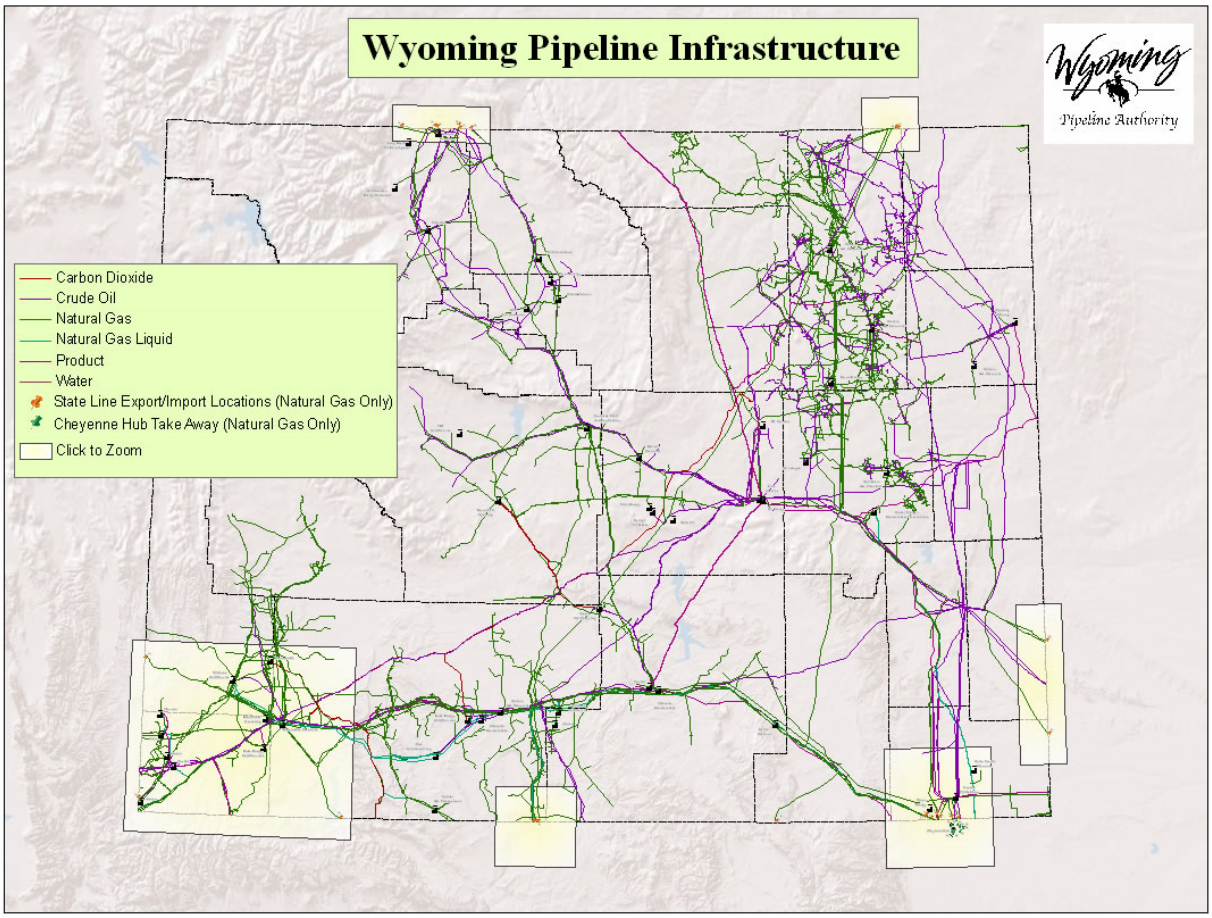

Wyoming Pipeline Association
Member Companies
AKA Energy Group LLC
Anadarko Petroleum Corporation
Belle Fourche Pipeline Company
Bridger Pipeline LLC
Butte Pipeline Co.
Chevron Pipeline Company
Cheyenne Light, Fuel & Power
Colorado Interstate Gas/El Paso Pipeline Group
Conoco Phillips Pipe Line Company
Conoco Phillips Pipe Line Company/Pioneer Pipeline
Devon Energy Corporation
Encana Oil & Gas
ExxonMobil Production Company
FMC
Fort Union Gas Gathering
Frontier Pipeline/Plains All American Pipeline


Wyoming Pipeline Association
Member Companies
Kern River Gas Transmission Company
Key Pipeline, LTD
Kinder Morgan Interstate Gas Transmission LLC
Kinder Morgan Pipelines (USA) Inc.
Lost Creek Gathering LLC
Marathon Pipe Line LLC
Merit Energy Company
Mid-America Pipeline LLC/Enterprise NGL Pipelines, LLC
MIGC/Anadarko Petroleum Corp.
Montana-Dakota Utilities Co.
MTGC/Anadarko Petroleum Corp.
Northwest Pipeline Corporation/Williams Gas Pipeline
NuStar Logistics, LP
Oneok NGL Pipeline, L.L.C.
Pinedale Natural Gas, Inc.
Plains All American Pipeline, L.P.

Wyoming Pipeline Association

Member Companies

Questar Gas Company
Questar Gas Management
Questar Pipeline Company
Rockies Express Pipeline, LLC
Sinclair Pipeline Company
SourceGas Distribution
SourceGas Transmission
Southern Star Central Gas Pipeline, Inc.
Suncor Energy (U.S.A.) Pipeline Company
Walden Gas/Pinedale Natural Gas
Whiting Oil and Gas Corporation
Williams Field Services
Williston Basin Interstate Pipeline Company
Wyoming Gas Company/NG Transmission
Wyoming Refining
Xcel Energy


Wyoming Pipeline Infrastructure
Wyoming
Pipeline Authority
Carbon Dioxide
Crude Oil
Natural Gas
Natural Gas Liquid
Product
Water
State Line Export/Import Locations (Natural Gas Only)
Cheyenne Hub Take Away (Natural Gas Only)
Click to Zoom

APPENDIX F: RESOLUTION OF ADOPTION

Albany County Multi-Hazard Mitigation Plan
Adoption Resolution
(Resolution No._____)

WHEREAS Albany County, Wyoming, and municipalities therein, have the potential to experience disasters that can damage commercial, residential, and public properties, displace citizens and businesses, close streets and bridges dividing the County and municipalities, and present general public health and safety concerns; and

WHEREAS the County and municipalities have prepared a Multi-Hazard Mitigation Plan that identifies goals and mitigation actions to reduce overall impact and potential for loss of life and loss or damage to property from natural hazards and hazardous material incidents; and

WHEREAS the Albany County Multi-Hazard Mitigation Plan has been made available for review by elected officials and the public, and has been developed to meet current state and federal requirements:

Now, therefore, be it resolved that:

1. The Albany County Multi-Hazard Mitigation Plan is hereby adopted as an official plan of Albany County and all of its incorporated municipalities including; Bosler, Buford, Centennial, Garrett, Laramie, Rock River, Tie Siding and Woods Landing/Jelm.
2. The Board of County Commissioners delegates the responsibility for annual review and monitoring of implementation to the County Emergency Management Coordinator.
3. Each local government shall pursue implementation of the projects contained in the plan as resources allow.
4. Each local government shall consider and incorporate into other plans, elements of the Multi-Hazard Mitigation Plan as appropriate.

County of Albany

Chair, County Commission_____

County Commissioner_____

County Commissioner_____

County Clerk_____

Emergency Management Coordinator_____

Incorporated Municipalities

Town of Rock River Mayor_____ Date_____

City of Laramie Mayor_____ Date_____

ADDITIONAL REFERENCES

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Case, J.C., 2000, Probability of damaging earthquakes in Wyoming: Wyoming State Geological Survey, Wyoming Geo-notes No. 67, p. 50-55.

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