

Chapter 7: Landslide

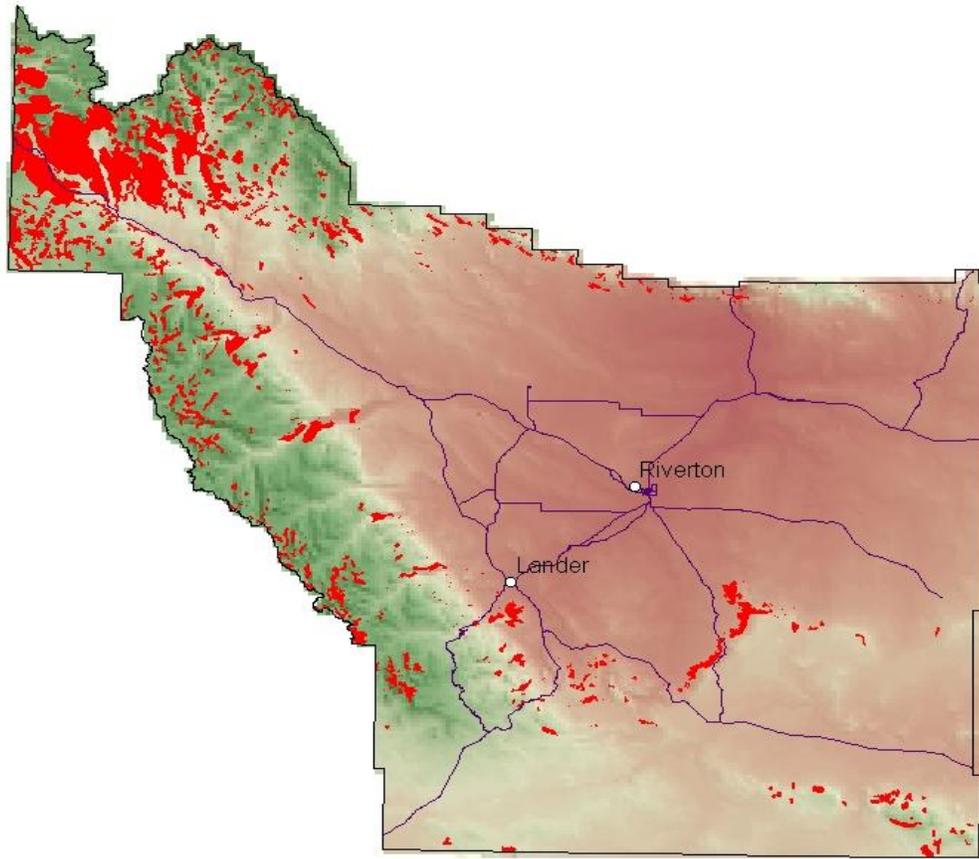
Numerous landslides are present in Fremont County as can be seen on Figure 7.1. Historically, there has been damage associated with landslides in Lander, the Wind River Canyon, Dubois, the Beaver Rim Area, and the South Pass area.

Potential Future Impacts

Although it is not possible to accurately predict when or where a landslide will occur, it is a certainty that landslides will continue to occur and cause damage in Fremont County. There is another method that can be used to analyze Fremont County for its landslide impact potential. All landslides for Wyoming have been digitized (Figure 7.2) and a 100 ft. buffer has been added to the landslide boundaries. The landslides and buffer zones have then been digitally crossed with Census block building values. (See census blocks listed in Chapter 5.) In some cases, a landslide complex 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 complex, then the values of all the buildings in the census block is assigned. Any single event could result in millions of dollars in damage, depending on the location of the landslide.

Landslides occur almost every year in Fremont County. Damaging landslides occur less frequently. It is estimated that damage from landslides occurs at least every 50 years.

Fremont County Landslide Map



- cities
- roads
- Landslide

0 12.5 25 50 Miles



1:1,169,336

Projection: Lambert Conformal Conic

Figure 7.1 Landslides in Fremont County

Known Landslides

Alpine Lake
Antelope Ridge
Arapahoe Butte
Bain Draw
Bargee
Birdseye Pass
Blue Gulch
Blue Holes
Bob Lakes
Boysen
Bull Lake West
Burris
Castle Rock
Christina Lake
Circle Ridge
Continental Peak
Cony Mountain
Cottonwood Pass
Coyote Springs
Crater Lake
Crooks Mountain
Crooks Peak
Crow Mountain
Del Monte Ridge
De Pass
Dickie Springs
Dickinson Park
Dishpan Butte
Downs Mountain
Dubois
Dundee Meadows
Dunrud Peak
Eagle Point
East Fork Basin
Elkhorn Springs
Emerald Lake
Esmond Park
Ferry Lake
Fish Creek Park

Fish Lake
Five Pockets
Fossil Hill
Fremont Peak North
Fremont Peak South
Gannett Peak
Gas Hills
Gravel Spring
Green River Lakes
Guffy Peak
Halls Mountain
Hardluck Mountain
Hays Park
Hudson
Indian Point
Ink Wells
Jeffrey City
Jenkins Mountain
Johnson Draw
Kates Basin
Kirkland Park
Kisinger Lakes
Lander
Lava Mountain
Lizard Head Peak
Lysite SE
Mason Draw
Maverick Spring
McIntosh Meadows
Mexican Pass
Miners Delight
Moccasin Lake
Monument Peak
Morrison Canyon
Mosquito Lake
Mount Arter
Mount Arter SE
Mount Bonneville
Mount Burwell

Muskrat Basin
Pacific Springs
Puddle Springs
Ramshorn Peak
Red Canyon
Roberts Mountain
Rongis Reservoir
Sagebrush Park
Sand Draw
Schoettlin Mountain
Sheep Ridge
Sheridan Pass
Shotgun Butte
Shoshone Pass
Simpson Lake
Snow Lake
Soap Holes
South Pass City
Split Rock
Split Rock NW
Sweetwater Gap
Sweetwater Needles
Temple Peak
Tin Cup Mountain
Togwotee Pass
Torrey Lake
Union Peak
Warm Spring Mountain
Washakie Park
Weiser Pass
Whiskey Peak
Wiggins Peak
Wilderness
Wind River
Wolf Point
Yellowstone Ranch

Known Landslides – Type and Description

The Wyoming State Geological Survey examined all quadrangles, and the following areas were determined to pose a potential hazard to homes, roads, or other facilities.

Antelope Ridge Quadrangle: A blockslide/flow complex is present in the Maverick Springs Dome Oil Field in T6N R2W Section 15. If the landslide destabilizes, damage could potentially affect oil wells or associated facilities. Heavy periods of precipitation or significant development could have an effect on slope stability.

Bain Draw Quadrangle: there are a series of slump/flow and slump complexes along the East Fork Wind River in the northern part of the quadrangle. If these landslides destabilize, they could dam or divert the river. Heavy periods of precipitation or significant development could have an effect on slope stability.

Blue Gulch Quadrangle: Blockslide and blockslide/slump/debris flow/flow complexes are present in the southwestern corner of the quadrangle in T33N R94W Section 32. If these landslides destabilize, damage could occur to the pipeline and/or telephone lines that pass through or near these complexes. Heavy periods of precipitation or significant development could have an effect on slope stability.

Blue Holes Quadrangle: A slump is present in T41N R105W Section 33. If this landslide destabilizes, damage could occur to the road that passes through the slump. Heavy periods of precipitation or significant development could have an effect on slope stability.

Boysen Quadrangle: Several debris flow/alluvial fan complexes are present in T5N R6E Section 4. If these landslides destabilize, damage could occur to structures in Boysen, the railroad line, and U.S. Highway 20. Heavy periods of precipitation or significant development could have an effect on slope stability.

Bull Lake West Quadrangle: Several landslides, including a large blockslide/rock fall/rockslide/flow complex, and debris flow/alluvial fan and debris flow/flow/alluvial cone complexes are present along Bull Lake Creek (T2N R4W Sections 9 and 10). If these landslides destabilize, they could dam the creek. In addition, alluvial fan/debris flow and debris flow/alluvial fan complexes on the northern edge of Bull Lake (T2N R3W Sections 5 and 6; T3N R3W Section 32) could be hazardous to boaters and fishermen if they destabilize. Heavy periods of precipitation or significant development could have an effect on slope stability.

Burriss Quadrangle: A slump/flow complex is present in the northwestern corner of the quadrangle (T4N R5W Sections 4 and 5; T5N R5W Sections 32 and 33). If these landslides activate, damage could occur to structures near Dinwoody Lake. Heavy periods of precipitation or significant development could have an effect on slope stability.

Castle Rock Quadrangle: A blockslide is located in T43N R105W Section 31. If this landslide destabilizes, damage could occur to the nearby campground. Heavy periods of precipitation or significant development could have an effect on slope stability.

Cottonwood Pass Quadrangle: A flow is present in T40N R90W Section 1. If this landslide activates, damage could occur to the Nowood Road, which passes through the flow. Heavy periods of precipitation or significant development could have an effect on slope stability.

Crater Lake Quadrangle: Large landslides are present in the southeastern corner of the quadrangle. If these landslides activate, the South Buffalo Fork could be dammed. Heavy periods of precipitation or significant development could have an effect on slope stability.

Crooks Mountain Quadrangle: Blockslide and blockslide/flow complexes are present in T28N R93W Sections 15 and 16. If these landslides destabilize, damage could occur to oil wells or to a nearby oil field road. Structures in T28N R93W Section 14 could also be damaged if the Quaternary alluvium/debris flow complex in the same section destabilizes. Heavy periods of precipitation or significant development could have an effect on slope stability.

Crooks Peak Quadrangle: Several landslides, including debris flow/Quaternary alluvium, and debris flow/alluvial fan complexes are present in the northwestern corner of the quadrangle (T28N R92W Sections 30 and 31). If these landslides destabilize, damage could occur to the road that crosses through the complexes. Heavy periods of precipitation or significant development could have an effect on slope stability.

Dishpan Butte Quadrangle: A large blockslide/slump/flow/debris flow complex is present in T32N R95W Sections 27, 28, 33, and 34. If this landslide reactivates, damage could occur to Wyoming State Highway 135 and/or the nearby pipeline, which both cross through the landslide. In addition, blockslide/slump/debris flow/flow and blockslide/flow complexes are present in the northeastern portion of the quadrangle (T32N R95W Sections 13 and 26). If these landslides destabilize, damage could occur to nearby gas wells, a pipeline, and/or a road that passes through the complexes. Heavy periods of precipitation or significant development could have an effect on slope stability.

Dubois Quadrangle: Slump/flow, flow, and blockslide/slump/flow complexes are present in the northeastern corner of the quadrangle in T42N R107W Sections 11, 12, and 13. If these landslides destabilize, damage could occur to homes and the road that passes through the complexes. In addition, a series of slumps and slump/flow complexes are present along the Wind River in T42N R107W Sections 30, 32, 33, and 34 and in T41N R107W Section 3. If these landslides destabilize, Homes built on or near the landslides could be damaged or destroyed. There is also the possibility that the Wind River could be deflected if nearby landslides destabilize. A school in T41N R107W Section 1 had to be abandoned because of creep and other soil related problems. Other facilities in the area may have similar problems. Heavy periods of precipitation or significant development could have an effect on slope stability.

East Fork Basin Quadrangle: A slump/blockslide complex is present in the western portion of the quadrangle in T43N R104W Sections 17, 18, 19, and 20. If this landslide reactivates,

damage could occur to the East Fork Guard Station. There are also a series of slump/blockslide, slump/flow, blockslide/flow, and alluvial fan/debris flow complexes along the east Fork Wind River. If any of these destabilize, there is a possibility that the river could be dammed. Heavy periods of precipitation or significant development could have an effect on slope stability.

Esmond Park Quadrangle: Large landslides, including Quaternary deposits, slumps, slump/flow and alluvial fan/debris flow complexes are present on the east side of Du Noir Creek (T43N R108W Sections 9, 15, 16, 22, 23, 26, 27, and 35; T42N R108W Section 2). If these landslides destabilize, damage could occur to the nearby road, which passes through the landslides. Structures in T43N R108W Section 15, at the Glade Ranch (T43N R108W Section 27), and at the Highland Meadow Ranch (T43N R108W Section 23) could also be damaged if the landslides destabilize. In addition, U.S. Highway 26/287 could sustain damage if the blockslide/slump/flow complex in T42N R109W Section 1 destabilizes. There are many landslides on both sides of Du Noir Creek that could dam the creek if they destabilize. Heavy periods of precipitation or significant development could have an effect on slope stability.

Fish Creek Park Quadrangle: A slump/flow complex is located in the northern portion of the quadrangle in T41N R109W Sections 20 and 29. If these landslides activate, damage could occur to the road that crosses through the complex. Heavy periods of precipitation or significant development could have an effect on slope stability.

Fish Lake Quadrangle: Slump/flow complexes are present in T42N R109W Sections 23 and 26. If these landslides destabilize, they could damage the Warm Spring Road. Heavy periods of precipitation or significant development could have an effect on slope stability.

Fossil Hill Quadrangle: A debris flow/Quaternary alluvium complex is located in the northern portion of the quadrangle in T32N R100W Section 18. If this landslide destabilizes, damage could occur to the Sinks Canyon Road, which passes through the complex. In addition, if the blockslide/slump/flow complex in T32N R101W Sections 24 and 25 destabilizes, damage could occur to the Louis Lake Road. Heavy periods of precipitation or significant development could have an effect on slope stability.

Gas Hills Quadrangle: A rockslide/flow complex is present in T33N R90W Section 14. If this landslide destabilizes, damage could occur to the nearby transmission line and/or road. Heavy periods of precipitation or significant development could have an effect on slope stability.

Gravel Spring Quadrangle: A blockslide and a debris flow are present in the northwestern portion of the quadrangle (T30N R99W Section 1). If these landslides activate, damage could occur to State Highway 28. Heavy periods of precipitation or significant development could have an effect on slope stability.

Indian Point Quadrangle: Large landslides, including blockslide/slump/rockslide, blockslide/slump/flow, blockslide, and blockslide/slump complexes are present on the eastern side of Wiggins Fork. If these landslides destabilize, the river could be dammed. In addition, landslides in the southwestern corner of the quadrangle (T43N R106W Sections 30, 31, 32; T42N R106W Section 5) could dam Horse Creek if they activate. These landslides could also

damage the Livingston Cabin, either directly or by flooding. Heavy periods of precipitation or significant development could have an effect on slope stability.

Kirkland Park Quadrangle: A series of landslides, including rock fall/ rockslide/ Quaternary terrace, debris flow/rockslide/Quaternary terrace, rockslide/debris flow/Quaternary terrace, rockslide/Quaternary terrace, debris flow, debris flow/rockslide/ alluvial cone, rock fall/rockslide/debris flow/Quaternary terrace, debris flow/alluvial cone, debris flow/Quaternary terrace complexes, are present along Bull Lake Creek in the southern portion of the quadrangle. If these landslides destabilize, the creek could be dammed. Heavy periods of precipitation or significant development could have an effect on slope stability.

Kisinger Lakes Quadrangle: Large blockslide/slump/flow complexes are present along U.S. Highway 26/287. If these landslides destabilize, damage could occur to the highway, which passes through the complexes. These landslides could also damage the Falls Campground, the Griffith Ranch (T43N R109W Section 21), and a first aid station (T43N R109W Section 21). Blockslide/slump/flow complexes and/or Quaternary landslides in the northwestern corner of the quadrangle could also damage the Brook Lake Road and structures and campgrounds along the road. Heavy periods of precipitation or significant development could have an effect on slope stability.

Lander Quadrangle: A slump/blockslide complex is present along the Middle Fork Popo Agie River in Lander in T33N R100W Section 18. If the landslides destabilize, Buena Vista Drive could be damaged or destroyed. A retaining wall at the base of the landslide partially failed in 1999. There are also landslides present beneath the Taylor ditch in southeast Lander. A leaky ditch could destabilize the landslide, which could in turn damage the ditch.

Lava Mountain Quadrangle: Blockslide/slump/flow, Quaternary deposits, and blockslide/slump complexes are present in the northeastern corner of the quadrangle. If these landslides destabilize, damage could occur to U.S. Highway 26/287, which passes through the complexes. Heavy periods of precipitation or significant development could have an effect on slope stability. The Wind River could also be dammed by the landslides.

Mason Draw Quadrangle: Quaternary deposits, flow, and blockslide/slump/flow complexes are present in the northwestern corner of the quadrangle (T42N R106W Sections 8, 17, and 19). If these landslides destabilize, damage could occur to the Horse Creek road that passes through the complexes. Heavy periods of precipitation or significant development could have an effect on slope stability.

Maverick Springs Quadrangle: A blockslide/slump complex is present in the Maverick Springs Dome Oil Field T6N R2W Section 16. If the landslide destabilizes, damage could potentially affect oil wells or associated facilities.

Mexican Pass Quadrangle: Several debris flow/alluvial fan complexes are present in T6N R4E Section 34. If these landslides activate, damage could occur to the nearby transmission lines. In addition, the Eagle Ranch in T6NR3E Section 34 could be damaged if the debris flow/alluvial

fan complex in the same section destabilizes. Heavy periods of precipitation or significant development could have an effect on slope stability.

Miners Delight Quadrangle: Rock fall/rockslide, blockslide, flow, blockslide/flow, and blockslide/rockslide complexes are present along State Highway 28 in T30N R99W Sections 8, 9, 10, and 17. If these landslides reactivate, damage could occur to the highway. A blockslide along Beaver Creek in T30N R99W Section 35 could dam the creek if it destabilizes. Heavy periods of precipitation or significant development could have an effect on slope stability.

Moccasin Lake Quadrangle: A slump/blockslide/flow complex is located in the northwestern corner of the quadrangle (T1S R3W Sections 9 and 16). If this landslide destabilizes, damage could occur to the nearby road, either directly or by flooding if the Timmoco Creek became dammed. In addition, the landslides along the South Fork Little Wind River (T1S R3W Sections 13, 14, 23, and 24; T1S R2W Sections 18, 19, and 20) could potentially dam the river if they destabilize. Heavy periods of precipitation or significant development could have an effect on slope stability.

Mount Arter Quadrangle: A series of landslides, including rock fall/rockslide/Quaternary terrace, rockslide/rock fall, rock fall/rockslide/debris flow, debris flow/alluvial fan, debris flow, debris flow/rockslide, rockslide/rock fall, and blockslide/rockslide/flow complexes are present along the North Popo Agie River (T33N R102W Sections 12 and 13; T33N R101W Sections 2, 3, 4, 5, 6, 7, 8, and 9). If these landslides destabilize, they could dam the North Popo Agie River. These landslides could also damage nearby ranch structures, either directly or by flooding. Heavy periods of precipitation or significant development could have an effect on slope stability.

Ramshorn Peak Quadrangle: Numerous landslides, including slump/flow, flow, alluvial fan/debris flow, blockslide/slump/flow complexes, are present in the eastern portion of the quadrangle. If any of these landslides destabilize, damage could occur to the road and Horse Creek. The Hough Ranch (T42N R107W Section 2), the Adams Ranch (T43N R107W Section 35), and the Fisher Tie Camp (south of Rainbow Lake) are also at risk of being damaged if nearby landslides destabilized. Heavy periods of precipitation or significant development could have an effect on slope stability.

Sand Draw Quadrangle: A blockslide/slump/debris flow/flow complex is present in T33N R94W Section 32, T33N R95W Section 31, T32N R95W Section 1, and T32 R94W Section 6. If this landslide activates, damage could occur to a nearby pipeline and/or telephone line. Heavy periods of precipitation or significant development could have an effect on slope stability.

Snow Lake Quadrangle: Several debris flow/alluvial fan complexes are present along Wiggins Fork and Frontier Creek in the northern portion of the quadrangle. If these landslides destabilize, they could potentially dam the creeks. Heavy periods of precipitation or significant development could have an effect on slope stability.

Split Rock NW Quadrangle: A debris flow/Quaternary alluvium complex is present in T28N R91W Sections 14 and 23. If this landslide activates, damage could occur to the road that passes

through the complex. Heavy periods of precipitation or significant development could have an effect on slope stability.

Torrey Lake Quadrangle: Several slumps and a slump/flow complex are present in the northeastern corner of the quadrangle in T41N R106W Sections 23, 24, and 25 and in T41N R105W Section 30. If these landslides destabilize, damage could occur to U.S. Highway 26/287. In addition, a blockslide/rockslide complex and a blockslide/slump/flow complex are present in T40N R106W Sections 14 and 15. If these landslides activate, damage could occur to the nearby road and/or structures at the Trail Lake Ranch. Heavy periods of precipitation or significant development could have an effect on slope stability.

Warm Spring Mountain Quadrangle: Debris flow/alluvial fan and Quaternary deposit complexes are present in the northern part of the quadrangle in T42N R108W Section 10. If these landslides destabilize, damage could occur to U.S. Highway 26/287, which passes through the complexes. These landslides may also damage Johnson Camp. In addition, Warm Spring Road could be damaged if the talus flow and slump/flow complexes in T42N R108W Sections 23 and 30 destabilize. A subdivision has been developed on a slump/flow complex in T42N R108W Sections 14,15, 22 and 23. Homes could be damaged if the landslides destabilize. Heavy periods of precipitation or significant development could have an effect on slope stability.

Whiskey Peak Quadrangle: A debris flow/Quaternary alluvium/surface wash complex is present in T27N R90W Sections 19 and 30. If this landslide destabilizes, damage could occur to the road that passes through the complex. Heavy periods of precipitation or significant development could have an effect on slope stability.

Wiggins Peak Quadrangle: A series of alluvial fan/debris flow, blockslide/rockslide, rockslide/Quaternary terrace, blockslide, rock fall/rockslide, debris flow/alluvial fan, and rockslide/flow complexes are located along Caldwell Creek. If any of these landslides destabilize, the creek could become dammed. Heavy periods of precipitation or significant development could have an effect on slope stability.

Wilderness Quadrangle: A slump and a slump/flow complex are present in T5N R5W Section 14. If these landslides activate, damage could occur to the Wind River Canal. Heavy periods of precipitation or significant development could have an effect on slope stability.

Yellowstone Ranch Quadrangle: A blockslide/slump/flow complex is located in the southeastern corner of the quadrangle in T31N R96W Sections 23, 24, 25, and 26. If this landslide reactivates, damage could occur to the nearby road. Heavy periods of precipitation or significant development could have an effect on slope stability.

Community Landslide Issues

Isolation of a Community or Road Closure

Historically, there has been damage associated with landslides in Lander, the Wind River Canyon, Dubois, the Beaver Rim Area, and the South Pass area. Even though only some areas of Fremont County could be impacted by a landslide, consideration must also be given to the fact that a landslide could cause isolation of a community causing them to need assistance or closure of a main traveled route in our county causing the need to re-route or detour around a slide area. If the damage or size of the landslide were large enough, major problems could develop from such an event.

LANDSLIDE MITIGATION ACTION ITEMS

Due to the unpredictability of a landslide or in particular which section may move and cause damage, stabilization of landslides is not addressed through the mitigation action as much as through the recovery from an event. Landslides that are a matter of record could be addressed if they continue to enlarge. However, most of the landslides would be addressed in the recovery from a slide.

Fremont County Landslides Building Exposure Values

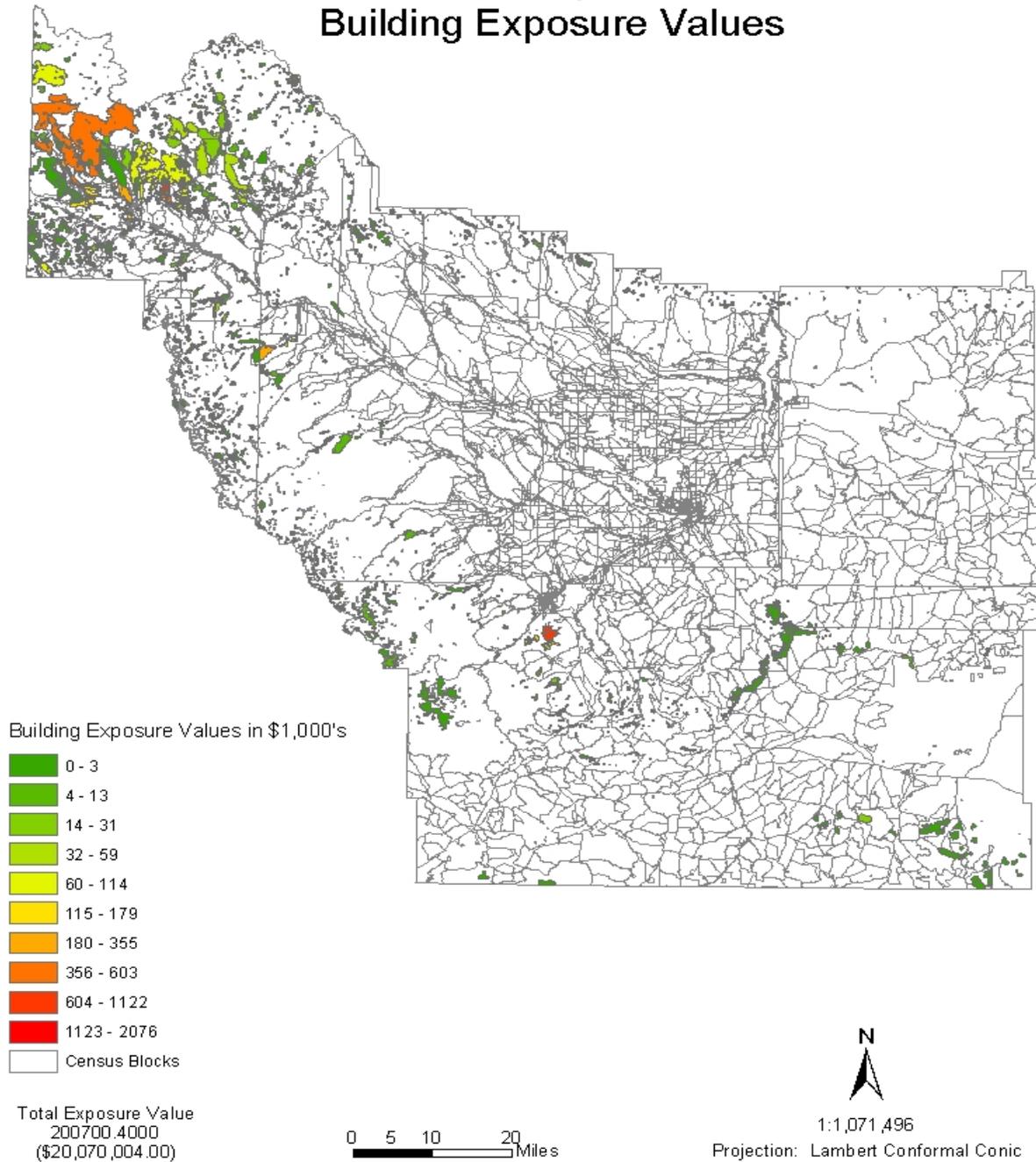


Figure 7.2 Landslides Building Exposure Values

LANDSLIDE RESOURCE DIRECTORY

At the time of preparation of this document, various emergency resources are available through the Fremont County Emergency Management Agency and the current resource listings. The resource classification is being revised on the national level which will be continuing to our level. If the item needed is not available in the county, assistance will be requested through the adjoining counties and the Wyoming Office of Homeland Security.

Fremont County Emergency Management Agency will assist with logistical support and response to all emergencies. Public education to the population of the county will be continued. Notification of the population is expanding also through the NOAA Weather Alert Radio notifications of all emergencies or hazards.

SUMMARY

PROPERTY AFFECTED:	medium
POPULATION AFFECTED:	medium
PROBABILITY:	medium
JURISDICTION AFFECTED:	County, Lander, Dubois