



Natural Hazards Mitigation Plan

Garfield County, Colorado

Appendix D: Public Participation

The County developed an on-line survey, which was advertised on its website, and via email in multiple email distribution lists. In addition to community members, a specific audience targeted for this survey was individuals associated with some form of emergency management within the county (police chiefs, engineers, US fish and wildlife, USFS, Utilities, key business owners, hospitals, directors of key community agencies, fire chiefs, etc.) and key community stakeholders.

The survey was also distributed to representatives from each jurisdiction for distribution to their constituent groups. A summary of survey results, including geographic distribution of participants, is included in Appendix D.

Respondent Profile

| Residence of Respondents | Percent of Respondents | Number of Respondents |
|----------------------------|------------------------|-----------------------|
| Study Area 1 | 24.8% | 25 |
| Study Area 2 | 20.8% | 21 |
| Study Area 3 | 37.6% | 38 |
| Study Area 4 | 1.0% | 1 |
| Study Area 5 | 0% | 0 |
| I don't live in the County | 15.8% | 16 |

| Area of familiarity | Percent of Respondents | Number of Respondents |
|----------------------------|------------------------|-----------------------|
| Study Area 1 | 37.5% | 39 |
| Study Area 2 | 17.3% | 18 |
| Study Area 3 | 40.4% | 42 |
| Study Area 4 | 0.0% | 0 |
| Study Area 5 | 2.9% | 2 |
| Not familiar with any area | 2.9% | 3 |

| Location of Employment | Percent of Respondents | Number of Respondents |
|----------------------------|------------------------|-----------------------|
| Study Area 1 | 37% | 37 |
| Study Area 2 | 11% | 11 |
| Study Area 3 | 25% | 25 |
| Study Area 4 | 0% | 0 |
| Study Area 5 | 14% | 14 |
| I don't work in the County | 12% | 12 |

Study Area Risk Assessments

Study Area 1

According to the Risk Assessment, Area 1 experiences the highest risk from geologic hazards – unstable soil and landslide. A significant number of assets in Area 1 are located on hazardous slopes. The soil type found on these slopes and across Area 1 may amplify various hazards and put municipal buildings, water infrastructure, roads and information / communication facilities, residential development, some industrial and commercial zones at risk of damage and disruption of service. Communication facilities and the road network in Area 1 incur specific risk from landslides and debris flows. Population centers such as churches and schools also experience greater than average risk. Additionally, the highway and tunnels along I-70 through the Glenwood Canyon are at risk and could become unusable during a fire incident. The Glenwood Springs viaduct, which is a primary source of water for the community, is at high risk of damage from fire.

| | Very Accurate | | | | Not Accurate |
|--|---------------|-------|-------|------|--------------|
| Based on your understanding of Area 1, how accurate are these results for the Area 1 section of Garfield County? | 50.0% | 35.3% | 11.8% | 2.9% | 0.0% |

Responses

- In the case of fire, air is/could be a problem. It was during the previous fires because the smoke lingered over the City.
- Shoshone dam and Hydro-electric plant. Transport of Hazardous chemicals I-70 & RR hot springs, faults, earthquakes
- Wildland fires occur with significant frequency in eastern Garfield County
- Rock fall along Hwy 82 is a concern. Not having a alternate way of reaching Hwy 82 from South Glenwood Springs (near four mile road) is also a concern.
- I disagree that a significant number of assets are located on hazardous slopes. I also disagree with paragraph 3 which starts "Communication..."
- Doesnt the City of Glenwood have an emergency Roaring Fork River intake, does that mitigate the risk to the viaduct, or at least allow drinking water to be delivered to the GWS customer during damage and repair of that damage? I would add something about South Canyon as well. Perhaps the risk of both directions of the I-70 closed simultaneously is small; but if we are taking about a fire event it could be that folks who work in GWS and live elsewhere along the I-70 corridor would be cut-off, and vice versa. Also, I imagine the majority of goods is supplied through the I-70 corridor; could shortages of food, supplies, etc be possible due to a disaster impacting both canyons?
- Also susceptible to chemical spills by train derailment, truck tankers, etc.
- I believe that the transportation of hazardous materials on Interstate 70 & State Hwy 82 within populated areas also poses a risk.
- Fire risk affects more than I-70 and Glenwood Canyon. Not sure how high this area goes but if it goes up to Sunlight then avalanche risk might be considered.

Study Area 2

According to the Risk Assessment, the airport, landfill, and road network in Area 2 are at risk of soil aggravated hazards. Additionally, residential developments including single-family, multi-family, and a nursing home, have potentially unstable soil. In each of the Study Areas, a wildfire could potentially impact the suburban, rural, and isolated developments of single houses or farms more quickly and severely than the development in the urban communities. The city of Silt experiences fire risk due to the location of the coal seam that runs east-west just to the north of the town.

| | Very Accurate | | | | Not Accurate |
|---|---------------|-------|-------|-------|--------------|
| Based on your experience in Area 2, how accurate are these results for the Area 2 section of Garfield County? | 11.8% | 52.9% | 11.8% | 11.8% | 11.8% |

Responses

- Coal seam poses very little risk to Silt. There is much more risk of fire or explosion related to natural gas wells, pipelines, and compressor stations. The risk to county residents is much higher than to the town of Silt.
- I would suggest a wildfire (i.e. lightning-sparked anywhere north of the Hogback) would be extremely hazardous to the heavily populated Castle Valley/Lakota areas. Heavy rains several years ago resulted in mudslides within New Castle. Egress from the neighborhood, resulting from either one of these types of natural disasters, would be a challenge as the area has dramatically increased in the last several years.
- Potential flash flood from streams tributary to Colorado River. Potential Dillon Dam failure resulting in flooding of Colorado River.
- All surrounding areas with oil and gas development in and around public and private lands increase the chance of catastrophic wildfire to communities and suburban properties. Volatile cheat grass and typically dry wildland fuels create a constant threat due to the constant potential ignition source.
- Flood, Colorado river basin. Gas Well Fire near the Town of Silt that could result in air quality issues or contamination of water shed in the immediate area. Coal seam fire north of town is unlikely due to the terrain and lack of vegetation.
- I thought the coal seam ran along the south side of I-70 in New Castle. I have never heard about coal seam in Silt.
- add lightning started wildfires which occur several times annually. Coal seam exists but is of small concern
- The coal seam you identify runs through New Castle not Silt

Study Area 3

According to the Risk Assessment, Area 3 faces risk from potentially unstable soil around the cities of Rifle and Parachute. Areas where the Colorado River flows through Area 3 are likely to experience the most risk from flooding. Additionally, steep slopes around the river have funneled development, in some cases, dangerously close to the flood zone.

| | Very Accurate | | | | Not Accurate |
|---|---------------|-------|-------|------|--------------|
| Based on your experience in Area 3, how accurate are these results for the Area 3 section of Garfield County? | 31.6% | 34.2% | 23.7% | 7.9% | 2.6% |

Responses

- Air pollution
- Most of the area that are at risk of flooding are along the toe of the slopes on the North side of the Colorado River. Very little vegetation and shallow soils are the problem. Rock fall is a concern along County Road 309 at about the 1 mile mark, just below the old KOA house. The hill side is comprised of cobbles and always sloughing off. Other areas of concern are up County Road 215 and the drainages into Parachute Creek. These areas have caused large mud flows across the county road.
- I always worry about Parachute creek flooding. We live on the creek
- Damage to bridge entering Battlement Mesa from I70 Wild fire in the area
- Flooding areas along Government Creek
- The river basin is very broad in area three. At its highest level the CO river does not threaten to leave its banks and flood.
- Please consider the risks that could be posed by the presence of drilling for natural gas-pipeline failure and drilling into radioactive material at the Rulison Test Site concern me the most.
- hillsides where vegetation hasn't taken hold after a fire
- Given the number of natural gas wells and drilling activity, there stands a risk for an above and/or below ground hazard situation that could affect public health, life, property, availability of water, and the environment
- Garfield County should be aware that Green Mountain Reservoir is being operated historically different and different than originally intended; the reservoir drawdown (late summer) is now limited (to mitigate hazard of landslides within the reservoir area) and this operation is likely to make worse the flooding we experience downstream during conditions of high runoff (spring periods); therefore, a historic local hazard may be made worse by this operation. In the spring of 1984 flood water in the Colorado River impinged on the side of the Rulison River Bridge seriously threatening it; if the same weather conditions occurred today the bridge may not survive the resulting flood flow. That was the only Colorado River bridge I saw at the time threatened seriously in study area 3. A large area landslide occurred within our community (one mile south of Exit 81) about 15 years back. The community spring fed irrigation water at the time was allowed to flow on the surface all winter down a steep hill, practiced for at least 4 decades; late winter about 1000 feet of the hill moved suddenly creating an escarpment at the top and bottom with a 10-foot vertical dimension (no serious injuries); therefore, care in dealing with wintertime wasting of irrigation water should be scrutinized; even more care for

land stability is warranted when the gas industry impounds water that may be contaminated; the fact that a practice is old or well established is little consolation and not a reliable gauge of safety. Large areas of the high country (now accessible by haul roads within Study Area 3) are on sloping ground and move almost constantly; great efforts are expended by the gas industry to build stable pads (where the vertical pipes are subject to shearing forces); however, not much can be done to protect long gathering lines against differential movement and the stress that can build over time. This may not be much of a current concern for the County; however, pressure for development with housing within some of these areas may occur in years future and if this happens the County should be very very cautious (best to require a Colorado PE engineer's seal on hazard assessment for such development).

Study Area 4

According to the Risk Assessment, Area 4 experiences the greatest risk of wildfire. Although it is mostly uninhabited, the heavily wooded landscape of Area 4 increases the potential for large and hard to control fires. The infrastructure most at risk are gas wells, pipelines, and roads. Additionally, even though the Colorado River does not flow through this study area, the roads are at risk of flooding. The highest risk in these areas come from flash floods that overwhelm culverts and roadside detention ponds, as small streams through canyons and ravines reach and exceed their carrying capacity.

Responses: No responses were submitted for Area 4

Study Area 5

According to the Risk Assessment, the assets in Area 5 are threatened by several different hazards – wildfire, flood, and sloped landscapes that can become unstable for any number of reasons. Even though there is very little population in Area 5, it holds the majority of the oil and gas infrastructure. Wildfire in Area 5 has the potential to affect the air quality of the entire county. Oil and gas infrastructure may also be directly threatened by wildfires. Wells and pipelines face a high fire risk profile and any interaction of that infrastructure with wildfire could have serious consequences. These assets are at risk of landslide, debris flow, rock falls, and general soil instability due to the steep slopes into which the haul routes and well platforms have been carved. Additionally, because the roads are so delicately woven along the walls of the canyons and ravines, one incident of a road washed out or a slide can cut off entire sections of the Area from road access. Structures (homes, storage facilities, man-camps) that rely on the road networks are also at risk of damage from flood and landslides. Flood in Area 5 would primarily induce landslides and damage the road network, cutting of access to oil and gas sites.

| | Very Accurate | | | | Not Accurate |
|---|---------------|----|----|----|--------------|
| Based on your experience in Area 5, how accurate are these results for the Area 5 section of Garfield County? | 100% | 0% | 0% | 0% | 0% |

Goal Prioritization

How would you prioritize these goals by their importance to Garfield County? (Note: you may select only one goal as "most important" or "least important.")

| | Most important | | | | Least important |
|--|----------------|-------|-------|-------|-----------------|
| 1: Reduce the loss of life and personal injuries from natural hazard events. | 93.1% | 2.3% | 3.4% | 1.1% | 0.0% |
| 2: Reduce damage to County critical, essential, and necessary assets. | 2.7% | 56.0% | 22.7% | 10.7% | 8.0% |
| 3: Reduce County and city costs of disaster response and recovery. | 2.6% | 3.9% | 26.3% | 31.6% | 35.5% |
| 4: Minimize economic losses. | 1.3% | 15.4% | 23.1% | 33.3% | 26.9% |
| 5: Reduce damage to personal property. | 6.3% | 22.5% | 22.5% | 18.8% | 30.0% |

Responses

- open & invited people to discussions
- Reduce flooding potential on Government Creek in urban areas (Rifle)
- Mitigation of Drilling
- A goal should be to mitigate or reduce the potential for these activities to occur as a first priority.
- Ya, don't overkill on the regulations you promulgate as a result of this study. You can plan and regulate for any contingency if cost is not an object, but it is.
- I assume emergency services (medical/critical care) are part of the reduction of loss of life, etc. If anything affects the ability to travel I-70 and/or Hwy 6/50, residents of Silt/New Castle are isolated from key medical/emergency services in the event of a disaster.
- Inspire and assist through building codes requiring fuels hazard mitigation around structures on private and public lands. Wildfire threats to improvements and people are high and fuels hazard mitigation gives first responders a chance to be successful.
- Once written and reviewed by agencies, a planned table top exercise could incorporate may players. It may be beneficial to have two exercises, a west end and an east end.
- Increase awareness of search and rescue issues
- I would like the other goals be to mitigate the hazards from the oil and gas drilling and fracturing chemicals.
- Protect water table from industrial pollution from fracking practices
- Due to potential drilling near homes, demand at least 1000 ft. from homes for wells.
- Reduce environmental impacts
- Maintain list of emergency responders in case of disaster
- Limit housing sprawl in areas identified as high risk fire danger. Limit lot sizes to no smaller than 30 acres in these areas. Limit density to one ADU and one PDU.
- Contract for contingent emergency services and reduce annual taxes to the maximum extent.

Assets

Population and places where people congregate

| | Most Important | | | | Least Important |
|---------------------------|----------------|-------|-------|-------|-----------------|
| Churches | 9.6% | 31.5% | 32.9% | 16.4% | 9.6% |
| Mixed Use development | 11.3% | 33.8% | 39.4% | 9.9% | 5.6% |
| Multi-family Residential | 37.8% | 37.8% | 18.9% | 2.7% | 2.7% |
| Nursing Homes | 60.8% | 27.0% | 12.2% | 0.0% | 0.0% |
| Public Buildings | 30.3% | 40.8% | 23.7% | 5.3% | 0.0% |
| Schools | 62.2% | 25.7% | 9.5% | 2.7% | 0.0% |
| Single Family Residential | 39.5% | 32.9% | 19.7% | 1.3% | 6.6% |

Responses

- It is difficult to answer this question without know what your definition of "protect" is. Does it mean spending huge amounts of money protecting from any conceivable risk or just making people aware of the risks and letting them make informed judgments on dealing with those risks
- Private property owners should be required to protect their own assets
- Don't forget the ranch lands.
- All health care facilities not just nursing homes
- Public buildings and schools should be located out of hazard areas; if in hazard then divest and relocate. For this reason I have not checked box here for these facilities.

Infrastructure

| | Most Important | | | | Least Important |
|--|----------------|-------|-------|-------|-----------------|
| Airport | 8.0% | 40.0% | 28.0% | 10.7% | 13.3% |
| Bridges | 74.7% | 18.7% | 6.7% | 0.0% | 0.0% |
| Communication facilities | 72.2% | 22.8% | 5.1% | 0.0% | 0.0% |
| Dam | 57.3% | 22.7% | 16.0% | 4.0% | 0.0% |
| Electric Utility Lines and Substations | 62.3% | 35.1% | 1.3% | 1.3% | 0.0% |
| Federal Building | 6.8% | 28.4% | 33.8% | 18.9% | 12.2% |
| Fire Stations and Police Facilities | 60.8% | 32.9% | 5.1% | 0.0% | 1.3% |
| Highways | 50.7% | 32.9% | 16.4% | 0.0% | 0.0% |
| Hospital | 83.3% | 11.5% | 5.1% | 0.0% | 0.0% |
| Landfill | 4.0% | 9.3% | 24.0% | 33.3% | 29.3% |
| Municipal Building | 13.2% | 28.9% | 39.5% | 13.2% | 5.3% |
| Natural Gas Facility | 31.0% | 32.4% | 33.8% | 1.4% | 1.4% |
| Pedestrian Bridge | 10.5% | 11.8% | 27.6% | 28.9% | 21.1% |
| Railroad Station | 11.0% | 11.0% | 30.1% | 28.8% | 19.2% |
| Railroad Bridges and Tunnels | 18.4% | 28.9% | 25.0% | 22.4% | 5.3% |
| Roads | 48.1% | 41.6% | 9.1% | 1.3% | 0.0% |
| Water Tanks and Viaducts | 63.5% | 28.4% | 6.8% | 0.0% | 1.4% |

Responses

- Very difficult to choose - Communications, medical, safety and police to keep order. Second would be those facilities/infrastructure to keep commerce moving.
- Well they're all intertwined - you can't have a communication network without electricity
- If the church or other building has no workers in it at the time, then it would not be so important on the list.
- All public infrastructure comes first!
- A single county person unprepared to rely on others in an emergency can do much harm. Many of these assets are complicated and involve elaborately prepared emergency response plans. Many such assets and people involved can be harmed more by someone acting with scant or outdated knowledge than the harm of no action at all. Therefore, I am not checking certain boxes I believe to be sensitive in this way.

Economy

| | Most Important | | | | Least Important |
|----------------------------------|----------------|-------|-------|-------|-----------------|
| Agriculture and Natural Resource | 35.9% | 35.9% | 25.6% | 1.3% | 1.3% |
| Commercial and Retail | 39.0% | 36.4% | 16.9% | 3.9% | 3.9% |
| Gas Wells | 12.0% | 33.3% | 26.7% | 13.3% | 14.7% |
| Industrial | 17.6% | 44.6% | 21.6% | 13.5% | 2.7% |
| Pipeline | 14.5% | 39.5% | 26.3% | 9.2% | 10.5% |
| Shopping Mall | 8.2% | 27.4% | 26.0% | 26.0% | 12.3% |
| Tram | 4.0% | 14.7% | 34.7% | 18.7% | 28.0% |
| Tourism Site | 6.8% | 20.3% | 36.5% | 18.9% | 17.6% |

Responses

- In the Parachute area, at this time. Natural gas and the related industries are is the predominate source of economy for most residents. Another large group of local residence work up valley in the construction trades.
- The school district is a major contributor to our local economy and should be added to this list. I am not sure why 'tram' is included here, unless you are referencing the tram in Glenwood and this part of the survey is not restricted to section 3.
- Everything that is replaceable is replaceable - and insured - everything that cannot be replaced is invaluable
- Again, it depends on which particular tourist site & if people are there. The gas facilities need protection in order to protect the people from a blowout or fire, etc.
- Why is shopping mall separated from commercial/retail?
- Gas Wells should never be the county's responsibility; the county and fire departments have received no detailed mapping of these facilities and the county has been instructed by this industry to take no interest in these affairs; sounds rude but probably good advise. Best approach is to protect the industries that support gas.

Cultural and Historical Assets

| | Most Important | | | | Least Important |
|----------|----------------|-------|-------|-------|-----------------|
| Cemetery | 10.4% | 14.3% | 40.3% | 20.8% | 14.3% |
| Library | 28.2% | 33.3% | 20.5% | 11.5% | 6.4% |
| Museum | 18.4% | 42.1% | 23.7% | 11.8% | 3.9% |
| Park | 11.8% | 27.6% | 25.0% | 17.1% | 18.4% |

Responses

- Our river corridor is a cultural asset and should be included.

Risk Reduction Strategies

Do you have any specific suggestions for how the County can reduce risk of natural hazards? Examples might be increasing the capacity of culverts, providing outreach and education materials in other languages, or riparian or wetlands restoration to improve flood storage capacity.

- All of the above--just remember that residents in cities are still part of GARCO
- Communicate Communicate Communicated
- Public education & outreach, wildland fire mitigation prior to sale of subdivision lots, compliance with the comprehensive plan & land use regulations.
- Don't let people build in the floodplain or on slopes subject to movement. Make sure culverts and bridges are capable of passing severe flood events.
- ya you should first put a price tag on each proposed risk reduction determine how many people are going to benefit from it and then determine if we can afford it.
- Annual or bi-annual emergency response open houses - multi-lingual resources. Brochures outlining emergency preparedness resources in County. Review of flood mitigation culverts/holding retention ponds capacity, condition, etc. Look at health of feeder streams to the Colorado - can they be improved with wetlands, retention ponds, etc to reduce intensity of floods? Look at bridges that cross Colorado River - is the debris cleared regularly?
- Providing education and outreach in Spanish and English and keeping the current drainage systems clear and functional.
- Many rural area lack "escape routes" for people to follow in an emergency and lack "Safety Zones" that are marked for people to go to. Many roads are one way in and out with virtually no defensible space. Many houes are tucked away with no road marker that denotes there is a residence. Most homes are not built with fire resistant composition and have vegetation surrounding the homes. These threats can be prevented.
- Getting your Environmental Health Department involved in land use, emergency planning, etc. from the beginning
- No, we as a Fire District have tried to make citizens aware of mitigation funds that are available through the Colorado State Forest Service and it's either the time, cost to the participant or the paperwork that turns people off. It is however easier to get people excited about change immediately after an emergency, but then our short term memory kicks in and communities forget and go back to complacency.
- Prevention and planning
- Establish better communication system when natural disasters occur.
- Regulate industries prone to fires and explosions
- Focus on the most likely type of disaster. flood, fire, man made.
- Decrease road building into pristine areas.
- Limit drilling near the Rulison Test Site Monitor construction of pipelines for distribution of natural gas
- Add stringent safety monitoring and mitigation to the Oil and Gas industry. They cause more damage than 'Acts of God' ever can.

- I believe wildfires to be the most serious risk - with arid conditions, water in short supply and high winds. Removal of wildfire fuel, increased local training and periodic preparedness exercises would help.
- how or what to do in case of a disaster relating to the natural gas industry....emissions, aquifer/river contamination, spills, fires, etc.?
- Provide educational materials in other languages. Assess the new Comprehensive Plan 2030 for consistency with best practices and work hand in hand with all Garfield County municipalities and federal agencies. Work with local nonprofits such as the Sonoran Institute.
- Inform residents and visitors of a common radio and/or TV channel they can/should tune in to in case of an emergency.
- Ensure the county govt is working with all of the cities, towns and special districts on the development of this plan.
- Adopt appropriate codes that REQUIRE landowners to mitigate/provide defensible space for wildfire control
- Be mindful of hazards to mothers and children that spend more time in parks (many in flood hazard areas) than most people; consider providing system of warning in the event of a storm or flood upslope. In some cases a PA system may warranted that messages in both English and Spanish (initiated through a 24-hour dispatch office).
- Capacity of culverts particularly in the Canyon Creek Drainage is needed. Individual homeowner education and understanding of risks and ways to mitigate these risks are important
- These are all good ideas. What about wildfire mitigation?