McKinley County and Gallup Mitigation Plan 2005

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McKinley County and Gallup Mitigation Plan 2005

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The development of the McKinley County Mitigation Plan occurred with the assistance of the McKinley County LEPC and efforts to gain input from the general public through the use of public outreach meeting and the use of questionnaires. The results of the public and working group meetings are located in Attachment A, and the results of the questionnaires are located in Attachment B. The members of the McKinley County LEPC are:

Peter J. Flores, BIA
Tom D. Trujillo, McKinley Co.
Nina Tsethlikia, DOP
Hilda Bowman, McKinley Co.
Clybert Zunie, Gallup EM
Robert Garcia, Gallup FD
Brenda Graham, MCMDA
Dolores Parra, DOH
Glandora Orphey, MCMDA
Charlie Allen, Transwestern Pipeline
Bobby Silva, Gallup PD
Syverson Homer, Zuni Police
Jerome Haskie, Zuni Fire and EMS
Eliseo Urios, PNM Gas Service
John Henderson, Vanderwagen VFD
Robert Baca, DPS/MTD
Peter J. Gonzales, Gallup
Andrew A. Carbzjal, Gallup FD
Louie A. Leyba, DPS/MTD
Raymond R. Ross, Gallup FD
Jim Lehner, NMSP
J. Upshaw, DPS/MTD
Philip Lopez, Gallup FD
Patricia Browne, MCMDA
Stanley Henderson, Gallup PW
Dale Parish, Gallup Streets
Ann Parker, GIMC
Sherri Schuman, RMCHCS
John Pijawka, NMED
Scott Field, DPS/OEM
Rich Friedman, MC GIS
Brent Mowrer, Gallup FD
Bernard Leekity, McKinley West VFD
Davina Nelson, McKinley West VFD
Hysa Hernandez, MCMDA
Joe Henley, Gallup Schools
Brian W. Nellist, NMSP
Pat C. Sanchez, Gallup Waste Water
Tobias R. Sandoval, ARC

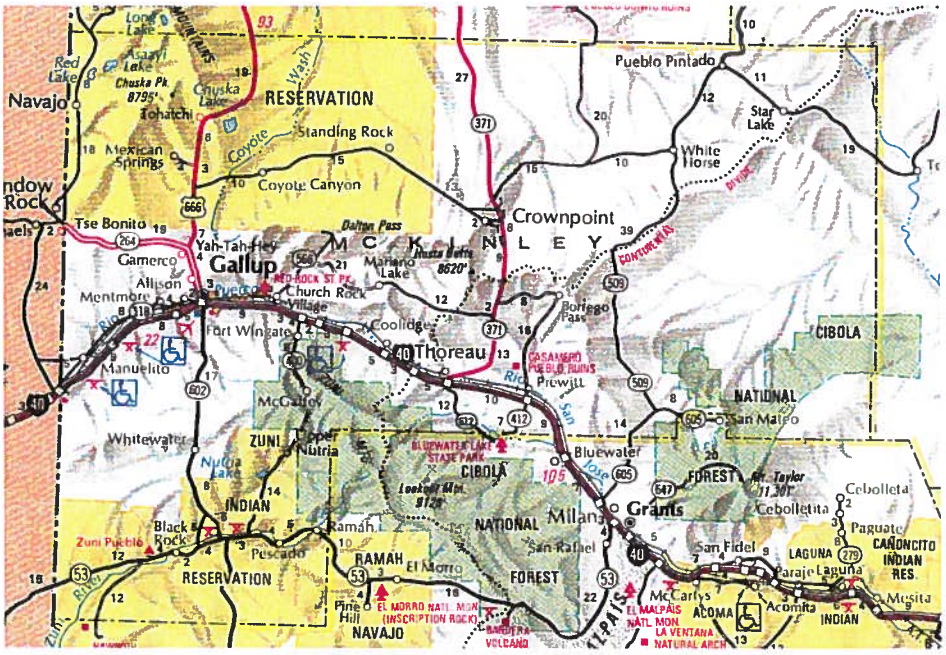
Charles Arnold, Giant Refinery
Beverly Cox, Conoco Philips
Faye Platero, NMDEM
Sandra Sweeney, MCMDA
Steven Munoz, Gallup MED Flight
Alex Ashley, Med Star Ambulance
Brenda Eddy, Med Star Ambulance
Jana Gunnell, DOH
Sherri Schuman, RMCHCS
Larry Chee, NMFD
James A. Madrid, UNM PD
Tomus Rosers NDPS
Tobias Sandoval, ARC
Kathy Landers, NMSU
Joe Armenta, MC Schools
Joe Henley, MC Schools
Ed Oliver, USDA
Eliseo Urias, PNM
Donna Fambrough, MC Fire
Billy Moore, Giant Refinery
Robert Crohn, NMSP
Dion Lalu, Zuni FD
Robert Garcia, Gallup FD
Nicholas Yuselew, Zuni FD
Gerald Hoose, Zuni PD
Glendoro, Orphey, MCMD
Sharolyn Shetima, MCMD
Meg Simons, HIS
Raymond R. Rose, Gallup FD
Andrew Carbajal, Gallup FD
Syverson Homer, Zuni PD
William Tsikewa, Gov. Ofc.
Arlen Quetawki, Gov OFc.
Carmelila Sanchez, Gov. Ofc.
Charlton Albern, Gov. Ofc.
Charlotte Bradley. Gov. Ofc.
Mark Diaz, MC Fire
Darren Soland, NMSP
Julian Upshaw, DPS/MTD

McKinley County Mitigation Plan
2005

Part 1
Introduction

Section 1. Project Statement

McKinley County
Mitigation Project



The McKinley County Mitigation Project is a multi-jurisdictional plan between McKinley County and the City of Gallup created in an effort to reduce or eliminate the possible loss of life, damage or destruction of property, and danger to the environment caused by natural hazards, man-made hazards, and man-caused hazards. It is recognized that within McKinley County, there exist situations that threaten the lives and property of its citizens. The risks caused by any of these situations may differ and complete solutions may never be possible; however, the risks to life and property caused by these events can be reduced. Additionally, it is acknowledged that when a hazardous event occurs, there are great economic effects on the community, and in many cases businesses never recover. The purpose of the McKinley County Mitigation Project is to identify the hazards that exist within the county, determine the level of risk these hazards represent, devise methods of either reducing or eliminating these effects, and to establish a plan to implement the identified strategies in a logical and orderly manner.

The McKinley County Mitigation Plan is a living document, and as such will be reviewed and updated as necessary in order to (a) evaluate the progress made in the reduction or elimination of hazardous situations within the county, and (b) identify new hazards and new techniques available to reduce or eliminate hazards that have previously been identified.

Under the provisions of the Federal Emergency Management Agency Disaster Mitigation Act of 2000 (DMA 2000), each county or parish within the United States of America should have in place a plan for the mitigation of the identified hazards that exist within their jurisdiction. In addition, these plans should be coordinated with those of surrounding counties, the state, and neighboring states, when necessary. This coordinated approach to hazard mitigation will ensure

that the actions taken in one jurisdiction will not adversely affect the residents in surrounding areas.

Additionally, by identifying existing hazards and the areas that can be affected by them, prospective growth into these areas can be avoided. This in turn will ensure that potential damages will not be increased still further.

Historically, planning to avoid hazardous environments was not a priority, and subsequently many communities were established within areas that could be affected by local hazards. In addition, new, man-made hazards are constantly being created as new industrial areas are developed, hazardous material dumps are filled, and by the construction of new road projects. When hazards occur and the same population and property is affected repeatedly, a repetitive loss is created. By identifying these areas of repetitive loss, the reasons behind them and solutions for them, a plan to reduce the threat to persons and property can be developed.

Hazards can be broken down into three main categories, as follows:

Natural hazards. A natural hazard is anything that occurs due to weather and geological events that is outside man's control. Such events include floods, earthquakes, severe storms, tornados, landslides, forest fires, and drought.

Man-made hazards. A man-made hazard is an event caused by human construction or design failure. Such events could include dam failure, pipeline break, erosion, landslide or flooding due to construction, and hazardous material spills.

Man-caused hazards. A man-caused hazard is any event that has been caused due to the intentions or negligence of man. Such events could include hazardous material transport accidents, arson or accidental fires, and acts of terrorism.

The overall purpose of the McKinley County Mitigation Plan is to reduce or eliminate hazardous conditions, thereby improving the quality of life for its citizens. To this end the administrations of McKinley County and the participating jurisdiction of Gallup have approved this plan with the intention of developing and implementing the projects outlined to mitigate the identified hazardous conditions.

The task of creating the McKinley County Mitigation Plan began with the establishment of a working group by ~~Tom Trujillo~~, Clybert Zunie, and ~~Hilda Bowman~~, City of Gallup. McKinley County has only one incorporated jurisdiction, the City of Gallup. There are also two Indian reservations in McKinley County: the Navajo Nation and Zuni Pueblo. Although both tribal governments were invited to participate in the mitigation planning they declined the invitation. The working group is comprised of members of the county and city staffs, and included the McKinley County LEPC. The working group met regularly to identify and analyze the hazards that could affect McKinley County. In addition to meetings of the working group, the public was invited to participate in the planning process through advertised public meetings and through use of a questionnaire. (See Attachments A and B for additional details of meetings, advertising, and questionnaire.) The project eventually became the responsibility of Mark Diaz, who was hired as

the McKinley County Emergency Manager. ~~The county hired Southwest Training Institute and Consulting (STIC) to create the McKinley County Mitigation Plan and assist the working group~~.

Once the hazards were identified, an effort was made to determine the risk each hazard posed to county residents and its historic frequency of occurrence. In addition, the hazard risk was projected from the aspect of worst case scenario for both the present population and the projected increase in population five years from now.

With the identification of the hazards and the risks they pose to the community, action plans were formulated in order to reduce or eliminate each hazardous situation. These plans were developed by the working group, public input and research of information from state drought planners, the National Weather Service, the U.S. Army Corps of Engineers, FIRM floodplain maps, and the University of New Mexico. These action plans were prioritized based on risk factors and frequency of occurrence. Once the plan strategies and priority were established by the working group, they were presented to the McKinley County Commission and the Gallup City Council and to the public by posting at the public libraries for review and comment. ~~The final McKinley County Mitigation Project of 2003-2004 was then completed and approved by the McKinley County Commission and the Gallup City Council~~. The strategies and action plans established to mitigate hazards within McKinley County and the participating jurisdictions are located in Part III, Implementation Strategies.

As a living document, the McKinley County Mitigation Plan has also established the provisions for its review and updating on an annual basis. Not only is this process set forth in Part IV, Implementation Plan and Monitoring, it is established by resolution by each governing body represented in this plan, Part I, Section 3, Resolutions.

Section 2. Executive Summary

Introduction. The McKinley County Mitigation Project is a multi-jurisdictional plan that encompasses the mitigation concerns of McKinley County and the City of Gallup. The purpose of mitigation is to identify the hazards that exist and develop strategies to reduce or eliminate either the hazard or the damage potential that it poses. Additionally, the Federal Emergency

Management Agency (FEMA) has established every county's need to create and maintain a mitigation plan by ~~June 2004 in order to be eligible for future funding under the Disaster Mitigation Act of 2000~~.

Goal. The goal of the McKinley County Mitigation Project is to identify the potential hazards that exist within the county, and then to develop strategies that will reduce or eliminate them in the future. Additionally, this project is developed to comply with the requirements of the Disaster Mitigation Act of 2000 in order to obtain future funding for specific mitigation projects.

Plan development. The McKinley County Mitigation Project came into being on January 30, 2003 with a meeting at the McKinley County Emergency Management Office in Gallup, New Mexico. That meeting established a working group that included members from McKinley County and the City of Gallup. The chairman of this working group is Hilda Bowman. Regular meetings of the McKinley County working group were held, including public meetings and the mailing of questionnaires, in order to identify the region's potential hazards and to develop strategies for their reduction or elimination.

Hazard identification and strategies. The McKinley County Mitigation Project has identified four major types of hazard within the county and the City of Gallup that cause significant concern. These hazards are flooding, drought, wildfire, and hazardous material release. Although other hazards such as severe weather, tornados, and earthquakes can occur, it was determined that the possibility of their occurrence was less probable than that of flooding, drought, wildfire, or hazardous material releases. These additional hazards will be addressed as part of the on-going mitigation efforts that will take place within McKinley County and the affected jurisdictions.

Flooding. Flooding conditions in the unincorporated areas of McKinley County occur mainly in the form of flash floods, which are localized in various canyons and arroyos that lie throughout the county. Although the effects of a flash flood can be quite destructive, the sparse population reduces the threat to human life and property. It should, however, be noted that deaths have occurred due to flash floods in the county. Additionally, flash flooding has washed out roads within the county, which disrupted traffic. Earlier this year a section of one of the state highways was damaged, also disrupting traffic. In addition, McKinley County is not presently a member of the National Flood Insurance Program (NFIP).

Flooding in Gallup is a serious problem with several root causes. The city lies in a valley so that all storm waters naturally move into the city. Additionally, many areas of the city lie within known flood plains. When flooding occurs in Gallup it is generally in the form of sheet flooding and water ponding into natural basins. Recent severe storms caused the storm drainage system to be overwhelmed and clogged by sleet and hail. Once this occurred, the water flooded through the community's downtown areas. Additionally, runoff water from Interstate 40 and surrounding uphill areas collects at Maloney Street between Fourth and Eleventh Streets and can extend north past Princeton, where waters can reach a depth of 3 to 4 feet.

Recommendations. Within the county, strict enforcement of building and zoning codes will minimize damages resulting from flooding. Additionally, waterways within the county need to

be monitored and cleared of debris and unwanted vegetation in order to reduce the likelihood of roadways being damaged due to clogged culverts and other drainage methods. McKinley County will also begin the process of becoming a member of the NFIP.

Increasing demand on storm drainage due to severe rainstorms and new construction in the areas where flooding has been identified as a problem has caused the storm drainage system to fail to provide adequate handling of runoff in Gallup. Building codes can be revised to require the construction of water retention systems. This will require builders to pond, on site, the amount of water that could fall on any site during a 100-year rain storm. This requirement will reduce the strain on the present storm drainage system by keeping storm waters on site instead of simply running out of the area. In addition, the storm drainage system for Gallup requires further evaluation and possible upgrading to include the possible city purchase of properties to be converted into larger retention basins to eliminate the large amounts of water ponding along Malone Street. Where the potential for flooding exists, building/zoning codes can mandate specific construction requirements and establish land uses that will not conflict with this potential threat to life and property. Lands within flood zones can be developed into recreational areas that can greatly reduce the damage potential during floods. Any area that sustains damage due to flooding that requires redevelopment needs to follow the newer zoning codes or remain undeveloped.

HAZMAT. The release of hazardous material within McKinley County and Gallup is another issue of concern. McKinley County and Gallup are traversed by a major interstate highway, I-40, and railroads. In addition to these transportation routes, there are fixed facilities in the county that have the potential of releasing hazardous material. Presently the McKinley County LEPC is very active in visiting and evaluating the fixed facilities lying within the county and the local response to possible HAZMAT events. Although the railroads carry larger volumes of hazardous material on a daily basis than the highway, there is a higher probability that a roadway accident will cause a HAZMAT incident. This is due to changing weather conditions, multiple access points located along the highway system, and the actions of transport drivers and those of other vehicles on the roadway.

Recommendations. Weather conditions along I-40 should be carefully monitored during all periods of inclement weather through close cooperation between local law enforcement agencies, the New Mexico Department of Transportation, and the National Weather Service. Additionally, strict enforcement of present traffic laws throughout the area will assist in reducing accidents that could cause a hazardous material release.

Long range planning should consider the possible construction of a commercial trucking bypass that would reduce the possibility of a hazardous material release by keeping the through transport of hazardous material out of the county's populated areas.

Drought. As the entire Southwest continues to feel the effects of a severe reduction in rain and snowfall, continuing demands for water put a strain on this limited resource. At present, the extent and duration of this drought remain unknown. Speculation concerning the severity of this drought ranges from a ten year drought cycle to a two thousand year drought cycle. Whatever the duration of this drought cycle, two facts remain: (1) there is a drought at this time that is

straining McKinley County's water resources, and (2) the county's water needs will continue to climb as its population increases. Mitigation strategies concerning drought cannot eliminate its existence. However, they can help ease demands on the limited water supply to create continuation of sustainable growth in the county and its affected jurisdictions.

Recommendations. A public education program needs to be established to provide county residents with information concerning the need to conserve water, available methods of conservation, and the economic benefits they will gain from utilizing these methods. Legislation to restrict use of water resources during periods of drought will ease the demand for water on delivery systems and slow overall demand. Building code revisions requiring the use of low flow toilets and shower heads in all new construction projects will promote long range water conservation and allow for a more sustainable future for the county.

Wildfire. As the drought continues to affect McKinley County, there is an increased risk of wildfire. Recent events in New Mexico, Arizona, and California demonstrate the need to evaluate the wild land/urban interface. It is incumbent on homeowners whose residences are located in heavily forested areas to take appropriate precautions. The area of most concern in McKinley County is the McGaffey area, which lies within Cibola National Forest.

Recommendations. A public education program needs to be established to provide homeowners with information concerning defensible spaces, as well as fire retardant and fire resistant materials that can be used to reduce fire risk around their residences. In addition, McKinley County's building and zoning codes need to be modified to require that any future construction in areas designated as wild land/urban interface use materials that reduce fire risk.

Conclusion. The adoption of the McKinley County Mitigation Plan will establish initial measures to reduce or eliminate the hazards that exist within the county. This resolution establishes a commitment by McKinley County and the City of Gallup to the ongoing process of mitigation. The strategies set forth in this plan strive to create a better quality of life and a more sustainable future for the residents of McKinley County. In addition, these mitigation strategies take into consideration the limiting factors of available funds, political opinion, and the county's patterns of growth.

The McKinley County Mitigation Plan further establishes a process whereby the mitigation strategies and the progress made toward implementing them will receive an annual review and evaluation. This review and evaluation will determine if projects have been completed, and whether pending projects will continue to effectively reduce or eliminate the intended hazards. The annual review of the McKinley County Mitigation Plan will also identify new or changing hazardous conditions within McKinley County and design mitigation strategies to reduce or eliminate them.

Section 3. Resolutions

McKinley County Plan Adoption Resolution

The McKinley County Commission acknowledges that natural and man-made hazards exist within the county. These hazards have the potential of causing harm to the citizens, property, economy, and environment within McKinley County.

The hazards identified for immediate consideration include flooding and hazardous material transport.

A McKinley County Mitigation Plan has been developed that provides strategies for elimination or reduction of these hazards.

The McKinley County Mitigation Plan is the result of a cooperative effort of governmental agencies and community input.

Be it resolved by the McKinley County Commissioners that:

The McKinley County Mitigation Plan be adopted as the county's official plan.

McKinley County will ensure that all future planning, including comprehensive plans, will take into consideration the hazards that can affect future construction projects. In addition, the building inspector's office will consult with both the McKinley County Mitigation Plan and the county emergency manager prior to the approval of future construction projects in the county to ensure that they do not conflict with the process of mitigating existing hazards.

The County's Emergency Manager will monitor the progress in implementing the strategies of the McKinley County Mitigation Plan.

McKinley County officials and agencies, identified by the McKinley County Mitigation Plan as responsible for specific mitigation tasks under this plan, will provide the County's Emergency Manager a progress report by July 1 of each year.

The County's Emergency Manager, with input from governmental planning agencies and the public, will review and modify the McKinley County Mitigation Plan as necessary to reflect the progress made in implementing this plan and any new hazard strategies that have been identified.

The County's Emergency Manager will provide an annual progress report to the County Commission concerning these efforts by September 1 of each year. This report will (1) identify the progress of mitigation efforts in meeting the plan's goals and objectives, and (2) include all new strategies that have been developed.

City of Gallup Plan Adoption Resolution

The City Council for the City of Gallup acknowledges that natural and man-made hazards exist within the county. These hazards have the potential of causing harm to the citizens, property, economy, and environment within the city.

The hazards identified for immediate consideration include flooding and hazardous material transport.

A McKinley County Mitigation Plan has been developed that provides strategies for elimination or reduction of these hazards, including those of the City of Gallup.

The McKinley County Mitigation Plan is the result of a cooperative effort of governmental agencies and community input.

Be it resolved by the Gallup City Council that:

The McKinley County Mitigation Plan be adopted as the city's official plan.

Gallup will ensure that all future planning, including comprehensive plans, will take into consideration the hazards that can affect future construction projects. In addition, the building inspector's office will consult with both the McKinley County Mitigation Plan and the county emergency manager prior to the approval of future construction in the county to ensure that it does not conflict with the process of mitigating existing hazards.

The City Manager will monitor the progress in implementing the strategies of the McKinley County Mitigation Plan.

Gallup city officials and agencies, identified by the McKinley County Mitigation Plan as responsible for specific mitigation tasks under this plan, will provide the County's Emergency Manager a progress report by July 1 of each year.

The County's Emergency Manager, with input from governmental planning agencies and the public, will review and modify the McKinley County Mitigation Plan as necessary to reflect the progress made in implementing this plan and any new hazard strategies that have been identified.

The County's Emergency Manager will provide an annual progress report to the City of Gallup concerning these efforts by September 1 of each year. This report will (1) identify the progress of mitigation efforts in meeting the plan's goals and objectives, and (2) include all new strategies that have been developed.

Section 4. Description of McKinley County

McKinley County is located in northwestern New Mexico, bordering San Juan County to the north, Sandoval County to the east, Cibola County to the south, and the State of Arizona to the west. The county consists of 5,455.22 square miles, with a population density of 13.7 persons per square mile. Approximately 20% of McKinley County's land area, some 1,100 square miles, is in the Navajo Reservation. McKinley County's economy is mainly agricultural. There are approximately 224 farms with an average size of 14,094 acres, most of which produce cattle, sheep, horses, pigs, or angora goats.

McKinley County is traversed by Interstate 40, which runs from Cibola County in the southeast to the Arizona state line in the west. The tracks of the Burlington Northern and Santa Fe Railroad lie along this same route. In addition, U.S. Highway 491 (formerly U.S. 666) and N.M. Highway 371 enter McKinley County from San Juan County to the north. U.S. 491 terminates in Gallup, and N.M. 371 terminates in the unincorporated community of Thoreau. N.M. 602 runs south from Gallup into Cibola County through part of the Zuni Reservation in the county's southwest corner.

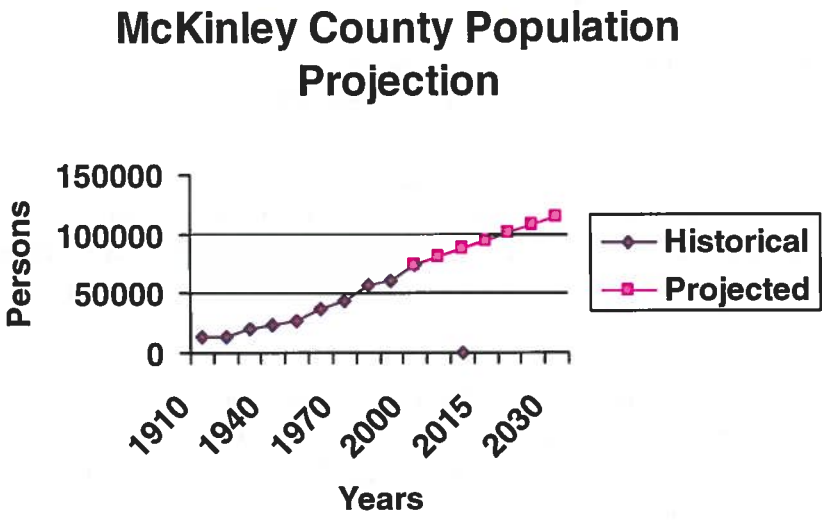
McKinley County is governed by a County Commission and has a County Manager, who runs day-to-day operations from the county seat in Gallup. Public safety for McKinley County is provided by the county sheriff's department and the county fire administration. Public safety efforts are further augmented by the Gallup City Police Department, the New Mexico State Police, and Bureau of Indian Affairs police on the reservations. Fire protection for McKinley County is supplied by the Gallup Fire Department and various volunteer fire departments located throughout the county.

According to the Gallup Chamber of Commerce, McKinley County's economy is largely based on agriculture, petroleum refinery operations, and retail sales. In 1998 the county had gross receipts totaling $652,998,050. During the same period Gallup had receipts totaling $396,300,557. Gallup's economy is based on retail sales from Wal-Mart, the Rio West Mall, American Heritage Plaza, El Mercado Plaza, and Zecca Plaza, and petroleum refinery operations from the Conoco fractionation plant and the Giant gasoline refinery. Both plants are located to the east of Gallup on Interstate-40. Presently the largest growth in McKinley County occurs in the city of Gallup and along the Interstate-40 corridor.

The 2000 United States Census shows that McKinley County has a population of 74,798 people. This is a 23.0% increase over the 1990 census, which showed a population of 60,686. In addition, McKinley County's projected population in 2005 is 81,484, based on calculations from the University of New Mexico, Bureau of Business Economic Research.

McKinley County Population History										
Year	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000
Population	12,963	13,731	20,643	23,641	27,451	37,209	43,208	56,536	60,686	74,798

McKinley County Population Projection							
Year	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
Population	74,798	81,484	88,163	95,044	101,750	108,316	114,854



According to the 2000 U.S. Census, there are 26,718 housing units in McKinley County. Of these units, 21,476 were occupied, leaving 5,932 units vacant. The number of housing units in McKinley County continues to rise as the population increases.

McKinley County Building Permits			
Year	**Type**	**Number of Units**	**Cost**
2000	Single Family Units	29	$4,066,401
	5+ Family Units	13 (115 units)	$7,524,800
2001	Single Family Units	15	$1,921,309
2002	Single Family Units	28	$2,990,000
	5+ Family Units	7 (52 units)	$2,500,000

Source: 2000 U.S. Census data

Section 5. Description of Gallup

Gallup is the largest community in McKinley County and its only incorporated area. Located in the far west central portion of the county, Gallup is the center of economic activity. The city was founded in 1881 with the Atlantic and Pacific Railroad establishing a right-of-way in the area for a southern transcontinental railway route. Incorporated in 1891, Gallup became the county seat in 1901. Gallup contains 13.35 square miles at an elevation of 6,468 feet, and has a population density of 1,513.7 persons per square mile.

The city is traversed by Interstate 40, which runs east to west through the entire city. Paralleling the highway are the tracks of the Burlington Northern and Santa Fe Railroad, which also maintains an active freight yard in the center of town. U.S. 491 enters Gallup from the north and N.M. 602 enters from the south. Just to the east of Gallup is Fort Wingate, which was an active U.S. Army post until the 1980's.

Gallup is governed by a Mayor/City Council system, with a city manager running day-to-day operations. The community's public safety is provided by municipal police and fire departments. These departments are further augmented by the McKinley County Sheriff's Department, the New Mexico State Police, and various volunteer fire departments.

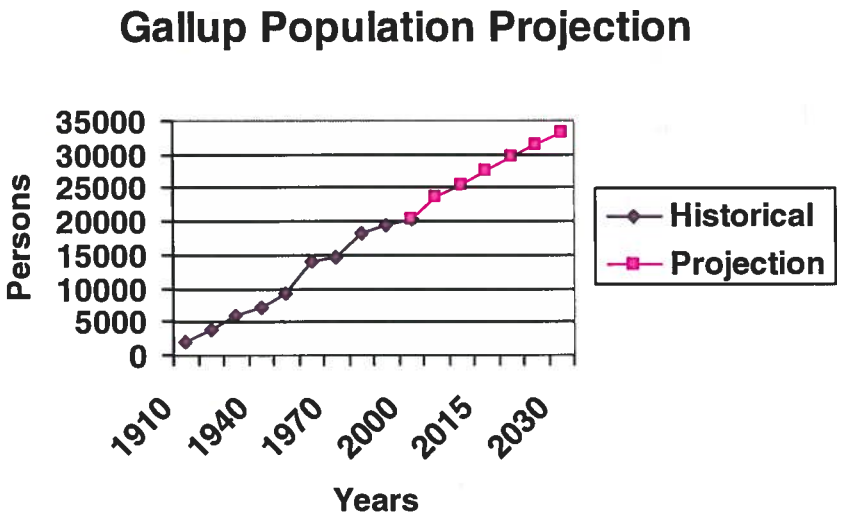
Gallup's economy is based mainly on sales from five retail centers within the city, Wal-Mart, Rio West Mall, American Heritage Plaza, and El Mercado Plaza, which are located along U.S. 491 on the north side of Gallup, and Zecca Plaza, which is located at Aztec Avenue and Verdi Drive south of Interstate-40. Presently Gallup is growing toward the north from Maloney Street and along U.S. 491.

Gallup's present population is 20,209, which is a 5.5% increase over the 1990 population of 19,340. In addition, the city has 7,349 housing units, of which 539 are vacant.

Gallup Population History										
Year	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000
Population	2,204	3,920	5,992	7,041	9,133	14,089	14,596	18,167	19,340	20,209

Gallup Population Projection							
Year	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
Population	20,209	23,630	25,567	27,562	29,507	31,411	33307

Population projections for Gallup were based on the historical average percentage of Gallup's population as it relates to the county, 29%. This percentage was then applied to the population projections for McKinley County by the Bureau of Business Economic Research of the University of New Mexico.



Gallup Building Permit History			
Year	**Type of Unit**	**Number of Units**	**Cost**
1996	Single Family Unit	36	$4,166,000
1997	Single Family Unit	41	$4,933,805
1998	Single Family Unit	34	$3,382,631
1999	Single Family Unit	43	$4,489,498
	3-4 Family Unit	5 (20 Units)	$1,780,545
2000	Single Family Unit	29	$4,060,401
	5 + Family Unit	13 (115 Units)	$7,524,800
2001	Single Family Unit	15	1,921,309
2002	Single Family Unit	28	$2,990,000
	5 + Family Unit	7 (52 Units)	$2,500,00

McKinley County Mitigation Plan
2005

Part II

Risk Identification and Analysis

Part II
Risk Identification and Analysis

INTRODUCTION

In order to understand the problems that exist in McKinley County and Gallup, it was necessary to determine what types of hazards threaten the area. Information was collected from numerous sources to establish this list of hazards.

Risk Analysis. In order to prepare for possible hazardous events within McKinley County, it is first necessary to perform a hazard analysis. The possible hazards that exist in McKinley County are identified, the locations that can be affected by each hazard type are determined, the possible effect on human life and property are considered, and the frequency of occurrence is considered. The steps in this process are described below.

Hazard Identification. The identification of possible hazards that exist within McKinley County began with a review of hazards that have been known to occur historically within the county. SARA Title III reports and the New Mexico All Hazards Emergency Operations Plan were reviewed to consider man-made and possible man-caused hazards. Finally, the area's comprehensive plans were analyzed to determine future building trends and the potential for man-caused events.

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Hazard Profile. Once the hazards had been identified, each was then considered for its possible effect within the county and jurisdictions. Beginning with the historical data available, the frequency, duration, and locations of occurrence were determined. Although it is impossible to predict every location a hazard can occur, history can provide definite areas to examine.

Vulnerability. With the establishment of specific areas to consider, each area was examined for factors such as population density, type of structure, and geographic location to determine how it could be affected by a hazard occurrence. Consideration was given to both the present and predicted 5-year future growth of the area's population and the present and future structures that exist.

Risk Assessment. Examining an area's vulnerability provides information on both the number of lives that will be put in jeopardy by a hazard event and the possible economic damage that can be expected from any given occurrence.

Information concerning the hazards that exist within McKinley County was based on multiple sources. Among these sources were the State of New Mexico All Hazards Emergency Plan, the McKinley County Emergency Operations Plan, the McKinley County working group, McKinley County public meetings, and questionnaires sent out to the general public. As a result of this effort, the following hazards were identified as placing the county at risk.

Hazard	Level of Risk	Group Identified
Wildfire	Frequent	State of New Mexico McKinley County working group McKinley County public meetings Questionnaires
Flashflood/flooding	Occasional	State of New Mexico National Flood Insurance Program McKinley County working group McKinley County public meetings Questionnaires
Drought	Presently Occurring	State of New Mexico National Oceanic and Atmospheric Administration McKinley County working group McKinley County public meetings Questionnaires
Severe winter storm	Occasional	State of New Mexico McKinley County working group McKinley County public meetings Questionnaires
Earthquake	Low risk	State of New Mexico McKinley County working group McKinley County public meetings Questionnaires
Hazardous material release	Occasional	State of New Mexico New Mexico Traffic Safety Bureau McKinley County working group McKinley County public meetings Questionnaires
Terrorism	Low risk	McKinley County working group McKinley County public meeting Questionnaires

Table 1. Hazards placing McKinley County at risk

EARTHQUAKES

Earthquakes are seismic events in which the earth's surface moves due to pressures under its surface. Such seismic events occur naturally and are generally located along the plate boundaries deep within the earth's surface. When the ground movement is strong enough, considerable damage can be caused, as seen in the California earthquake of 1995 or the Alaska earthquake of 1964. In addition to the natural occurrence of earthquakes, man-caused seismic events have also been recorded as a result of man-made lakes.

New Mexico is not generally considered to be a very active area for seismic activity. However, there is a significant probability that a strong earthquake could occur here at some point. New Mexico is not located on a plate boundary and the closest major fault is the San Andreas Fault, located in California. Historically McKinley County has not been the center of earthquake activity. Between 1869 and 1992 about 30 seismic events have occurred in New Mexico, with only two events occurring in McKinley County. The largest of these events was a 4.7 magnitude quake that occurred in Gallup on January 5, 1976. There was no reported damage due to this quake.

The most significant area of seismic activity in the state is located in the Rio Grande River valley and is centered in Socorro, New Mexico. Eight seismic events have occurred there between 1869 and 1992. The largest recorded seismic event in New Mexico occurred in Socorro in 1906. The effects of this event were felt from El Paso, Texas to Las Vegas, New Mexico; however, little damage was reported and there were no fatalities.

Present structural building code requirements in New Mexico do not consider the possibility of seismic events. In addition, due to the low historic occurrence of seismic events in McKinley County, it has not been considered necessary to take specific mitigation measures to address seismic events at this time.

SEVERE WINTER STORMS

Severe winter storms are of concern to the citizens of McKinley County, as shown in the results of a questionnaire, which indicate that 16% of respondents considered it a high priority and 54.2% considered it a moderate priority. The occurrence of severe winter storms is fairly rare in McKinley County, including Gallup, and they do not cause a major problem throughout the area. Generally when such a storm hits, it may cause some traffic slow-down, but it rarely causes major transportation routes to be closed for more than a day. This situation creates more of an inconvenience than a hazard. During winter storms, heavy/wet snowfall can create a risk to flat-roofed residential structures, but the damage is usually limited. Generally snowfall in the McKinley County area melts off fairly quickly, and the only problem is in the use of unimproved roads outside the major population centers.

Table 2. McKinley County Weather Statistics

Average Temperatures												
	Jan.	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**
Gallup	28.6	33.7	39.1	46.0	55.0	64.6	70.3	68.7	61.4	49.1	37.0	29.3
Thoreau	27.4	32.8	37.7	44.1	54.0	62.6	66.8	65.1	58.1		35.8	27.4

Maximum Temperatures												
	Jan.	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**
Gallup	44.0	49.2	55.8	64.4	73.5	84.6	87.6	85.0	78.9	67.8	53.8	45.4
Thoreau	42.0	47.1	53.2	60.1	71.7	80.6	82.6	80.4	74.3	63.3	51.5	42.9

Minimum Temperatures												
	Jan.	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**
Gallup	13.2	18.1	22.5	27.7	36.4	44.7	53.3	52.5	43.8	30.4	20.1	13.2
Thoreau	12.8	18.6	22.3	28.1	36.5	44.5	51.0	49.8	41.8	28.6	20.2	11.9

Average Snowfall												
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Gallup	6.7	5.8	4.2	2.5	0.5	-	-	-	-	2.1	4.5	6.1
Thoreau	9.5	4.1	3.6	2.7	0.5	-	-	-	-	2.1	4.5	4.8

Overall Precipitation								
	Rain Fall					Snow Fall		
	Mean	Max.	Year	Min.	Year	Mean	Max.	Year
Gallup	11.36	15.83	1997	5.44	1989	31.5	53.2	1987
Thoreau	8.21	13.63	1957	39.2	1956	13.7	28.6	1955

Note: Data concerning weather statistics was obtained from the National Oceanic and Atmospheric Administration (NOAA). Weather statistics were not available for the overall county. However, Thoreau (an unincorporated community) is on the other side of the county.

The most significant problem that frequently occurs as a result of a severe winter storm is power outage due to downed lines. Power outages of this type generally last from 2 to 8 hours. In addition to winter storms, other severe weather such as high winds, tornados, or lightning can also occur. However, the occurrence of such events is extremely rare. Due to the low potential of these events occurring within the county, it was not considered necessary to address specific mitigation measures for them at this time.

POWER OUTAGE

The possibility of a long-term power outage is also of concern to the residents of McKinley County. Based on the questionnaire results (refer to Attachment B), 12.5% of those who responded considered this to be a high priority issue, and 70.8% considered it a moderately important issue. Electric power for McKinley County and Gallup is supplied through the Public Service Company of New Mexico. After the East Coast blackout of 2003, the New Mexico PRC met with El Paso Electric, the Public Service Company of New Mexico, Texas-New Mexico Power, Tri-State, and Xcel, which are all companies supplying electrical power to the state, and experts from Sandia Labs. The purpose of this meeting was to review New Mexico's electrical grid to determine the state's vulnerability to a similar blackout. As a result of this meeting, it was determined that the likelihood of such a blackout was low. It should be noted that a blackout did occur in New Mexico in 1996. Since that incident, progress has been made to increase the system's reliability. In addition, the electrical grids in the east are much older than those found in New Mexico. At present, the problems associated with electrical blackout are being discussed on a national level, and no complete solution has been established.

McKinley County has installed backup generators at critical infrastructure sites, which can supply limited electrical power during a blackout. In addition, the county has emergency operation plans in place that can provide resources during a blackout.

TERRORISM

Terrorism is identified as originating from either a foreign or domestic source. Foreign terrorism is defined as terrorism that is directed and funded by sources outside the United States. Domestic terrorism is funded, motivated, and directed by citizens of the United States. The possibility of a terrorism event occurring in McKinley County or Gallup does exist, but the likelihood of such an occurrence is slight. The possibility of a foreign terror event is extremely small, and no practical mitigation of this possibility is presently available. Domestic terrorism can occur in New Mexico and the surrounding region. The Santa Fe area has seen vandalism at area car dealerships, and the Earth Liberation Front has claimed responsibility. Near Los Alamos, vandalism to forest service vehicles has also occurred, with the same group claiming responsibility. The Forest Guardians are also active in New Mexico. However, most of their present activities have been in the form of protests and lawsuits. The occurrence of domestic terrorism in New Mexico is being studied by the New Mexico Department of Public Safety, which is creating an intelligence-gathering arm. Beyond this effort, however, domestic terrorism has not presently risen to a level of activity that requires a specific local mitigation effort.

Hazard	Why Identified	Group Identified
Flashflood/flooding	Historical occurrence of flooding. NFIP mapping indicates a considerable amount of Gallup is in the floodplain.	State of New Mexico National Flood Insurance Program McKinley County working group McKinley County public meetings Questionnaires
Hazardous material release	Amount of traffic through the county and jurisdictional areas that involve HAZMAT. Significant number of fixed sites containing HAZMAT considerations.	State of New Mexico New Mexico Traffic Safety Bureau McKinley County working group McKinley County public meetings Questionnaires
Drought	Drought conditions are currently occurring throughout the southwest, including McKinley County and Gallup	State of New Mexico National Oceanic and Atmospheric Administration McKinley County working group McKinley County public meetings Questionnaires
Wildfire	Dense wooded areas within the Cibola National Forest surround the community of McGaffey and Timberlake. Due to the forest's dry conditions, fire danger is high.	State of New Mexico National Oceanic and Atmospheric Administration McKinley County working group McKinley County public meeting Questionnaire

Table 3. Four most pressing hazards in McKinley County

Although it is acknowledged that each of these hazards does exist, the McKinley County working group chose to limit the scope of the present project to the four most likely hazards. Therefore, it was determined that the initial McKinley County Mitigation Project would concentrate on flooding, drought, wildfire, and hazardous material releases. It is the intent of the McKinley County working group to re-evaluate the hazards within the county on an annual basis, refer to Part IV of this plan, and address the additional identified hazards at that time based on the successful mitigation of the initial priorities.

FLOODING

Flooding has historically occurred in both McKinley County and Gallup. In 2003, a severe storm caused flooding in Gallup, damaging numerous downtown businesses. In addition, the frequency of flash floods and their unpredictability continue to occur in McKinley County. The determination to consider flooding as a concern for McKinley County and Gallup was made during meetings of the McKinley County working group and public meetings, as well as reference to National Flood Insurance Program maps, historical data, questionnaires, and the New Mexico All Hazard Emergency Operation Plan. Within McKinley County, four types of flooding are typical: riverine, flash flooding, storm drainage flooding, and low area ponding.

Riverine flooding. The Puerco River and a number of creeks are situated in McKinley County. Each has the potential of causing flooding along its paths. The amount of water flowing through a river at any given time determines the river's depth. When a higher than normal amount of water finds its way into a river or stream, the height of the water relative to its path increases. When this occurs, the river will overflow its normal banks and flood the surrounding area to the water's present height. The height of the river's banks determines how far out a flood will spread. This type of flooding, like flash flooding, will begin at some point above where the flooding occurs.

Flash flooding. A flash flood is an extremely dynamic event in which a high volume of water moves through an area at high velocity during a very short time period. This type of flooding can be very difficult to predict and can occur with little or no warning. In many cases, flash floods can move through an area miles from where rain has occurred, thereby increasing the danger to people within the flood's path.

Flash floods are created as a result of rainfall. As rain water runs into small channels, it begins to collect. As these channels merge together, the amount of water increases and picks up speed and force. This collection of water becomes a wall of water that can wash vegetation, structures, and debris along with it. This debris then increases the amount of force available and increases the flood's destructive power.

Other factors that affect the dynamics of this type of flood include slope, width, and vegetation that are in place along the banks of the water course. The slope that a flash flood traverses has a definite relation to the overall speed in which the water will travel. The steeper the incline, the faster the water will travel. The incline on which the water moves affects the width of the flooding area. Generally, the faster the water moves the narrower will be the channel that is created, since the water digs the channel deeper as it flows. When the water flows on a shallower slope, the water tends to spread out more, which can decrease its potential to cause mass damage. However, it must still be considered dangerous. Finally, the type of vegetation located along the flood's path can prevent further erosion of the channel banks. A structure lying along a flood channel that has no surrounding vegetation is at risk of having its foundation undercut, which can cause structural damage, or in some cases, the building's complete collapse.

Storm drainage flooding. During any storm, water will flow downhill through any given area. Areas that have been paved do not retain this water, and one common method of controlling it is to direct it into a storm drainage system. Generally a system of this type uses the area's slope to direct water flow into drains that then carry the water to normal waterways such as arroyos or rivers. In many cases the water flow is further directed through the use of street side curbing and belowground channels with open grates at strategically placed locations.

Flooding due to storm drainage occurs in one of two ways: either the drainage system is overwhelmed or the system is rendered ineffective. A storm drainage system becomes overwhelmed when there is a larger water flow through an area than the system can handle. When this occurs, some water will flow into the storm drains, but the remaining water will continue past it. As the overall system becomes overwhelmed, the surplus water will collect and rise, overflowing the street sides and causing the potential for flooding. In addition to the accumulation of an overwhelming amount of water, other situations can occur in which the storm drainage system can be rendered ineffective. These situations generally involve the blocking of the storm drainage system in some manner, which prevents the water from flowing into it. This blockage can be caused by debris or as a result of weather conditions such as snow or large amounts of sleet and hail.

Basin ponding. Basin ponding is simply water's natural inclination to flow toward the lowest point. In areas that have no or inadequate storm drainage systems, the water will form a temporary pond at the area's lowest point. The extent to which this occurs depends on the amount of water flowing into the depression and the lack of systems to divert water away from it.

Section 1. McKinley County

Flooding in McKinley County mainly occurs as riverine flooding, flash flooding, and basin ponding. A large percentage of McKinley County is very sparsely populated, and therefore the danger of flooding to the general population is not high. However, there are numerous draws, washes, and creeks that cross both improved and unimproved roads, which can cause travel disruption. In addition, although the Puerco River is dry for much of the year, it can be a problem during the wettest season. Generally McKinley County experiences the most rainfall during what is commonly called the New Mexico monsoon season, which lasts approximately July through September. There are also numerous small lakes throughout the county that have the potential of overflowing their banks. In addition to rainstorms, spring weather and the resulting snowmelt have also been known to cause flooding in some areas.

By far the most dangerous flooding that occurs in the unincorporated areas of McKinley County comes in the form of flash flooding. Due to the unpredictability of where flash flooding will occur, there is generally little or no warning before it moves through a given area. The likelihood of a person being caught in a flash flood is high, since many of the unimproved roads in the county cross arroyos, draws, or washes. Even when an actual

flash flood is not involved, people have been killed while attempting to cross low-lying areas filled with running water. It is difficult to tell the depth of the water or recognize how much force that even a two-foot-deep level of running water can create. Arroyos, draws, and washes run parallel to many of these roads, creating a further risk of eroding the waterway's banks during a flash flood. This erosion can in turn cause the roadways to collapse and undercut the foundations of nearby structures. The situation is further complicated by the fact that the floodplain maps for both McKinley County and Gallup have not been updated since 1978.

In addition, the National Weather Service (NWS) reports an average of four flash flood warnings per year in McKinley County. However, due to terrain blockage in the area, the NWS estimates that at least eight flash floods will occur in the county annually, with an additional four weather patterns going undetected by their present observation capability, which is blocked from covering the entire area because of the mountains. Flash flooding in McKinley County is generally expected to occur from July through September, which is considered the rainy season in New Mexico.

McKinley County presently remains vulnerable to flooding throughout its unincorporated areas where arroyos, draws, and washes either cross or run parallel to roadways. The potential for flooding in these areas has been further exacerbated by the presence of a prolonged drought throughout the southwest. This severe drought has caused vegetation to die off, which leads to bank instability along many of the waterways, thereby increasing the possibility of heavier erosion damage when storm waters flow through the area. Due to the sparse population in the unincorporated areas of the county, the economic losses due to flooding are difficult to predict. However, there is no doubt that these conditions present a danger to the single residences and small family groups located here.

The exact extent of the flooding threat within McKinley County is presently unknown. This is due in part to the fact that the county is not a participant in the National Flood Insurance Program (NFIP). As a part of the mitigation process, participation in this program will assist in determining the actual threat as it exists today.

Section 2. Gallup

The most pressing problem concerning flooding in Gallup is the fact that a large part of the city lies within the known floodplain of the Puerco River. (See Illustration 1.) Much of the city's flooding has been due to severe storms that cause sheet flooding and water ponding in natural basins that lack adequate storm drainage systems. The most recent flooding in Gallup during the summer of 2003 occurred as the result of a high volume of water falling in the area in the form of sleet and hail, which blocked up the existing storm drainage system. Once the blockage occurred, a sheet flood was created through Gallup's downtown area, causing water damage to local businesses and business closures. In addition, water in the form of runoff from I-40 and the surrounding area has a tendency to pond in several areas of the city. Such ponding has been known to reach a depth of 3 to 4 feet. Much of this flooding is due to storm water drainage that runs north

along the Little Puerco Wash, flows along Second Street under I-40, and ponds in the area of Malone Avenue. In more severe conditions the ponding can extend farther south under the highway and through the rail yards and Railroad Avenue. In addition to the storm water runoff from the Little Puerco Wash, drainage from I-40 itself runs into the same general area. Presently there is a pumping system located on Malone Avenue near Seventh Street. However, this pump requires manual activation, and apparently the key operator for this system resides in Albuquerque, which is approximately a three-hour drive from Gallup. By the time the key operator arrives, the pump is already underwater and can not be turned on due to the high risk of electrocution.

The Gallup/McKinley County Airport, on the west side of Gallup, also lies within the floodplain, and would be completely underwater during a 100-year flood. Much of this flooding would occur in the form of sheet flooding and low basin ponding. The east side of Gallup will flood under similar circumstances, due to the Indian Hills Wash, which runs into the area along Church Rock Street.

The city's vulnerability and the dangers to Gallup's citizens due to flooding remain very high. The dangers are compounded by the related health issues caused by the interruption of public utility service, and the fact that if the rail yards flood, the HAZMAT risk can be extremely high, depending on what cargos the trains are carrying at the time.

Along with the risk to the general public, such a flood could have far-reaching economic effects throughout the region. If a major flood shut down the rail lines, all east-west rail traffic would have to be diverted to alternate routes, and traffic along I-40 could face similar detours. The flooding that could occur in Gallup's downtown area would shut down a large portion of the businesses between the eastern exit from I-40 into Gallup to the area of Turquoise along Route 66; the area of Route 66 and the Perelli Canyon Wash; and from the area of McKinley along Route 66 through the rest of Gallup to the west.

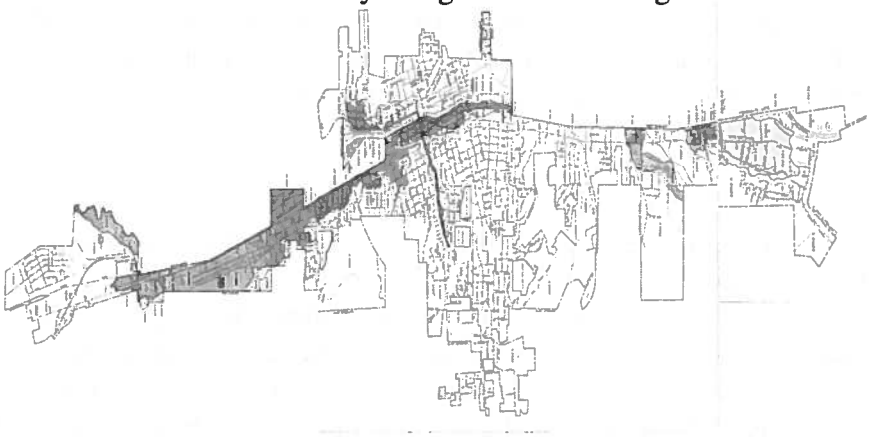


Illustration 1. Map of Gallup FEMA FIRM Panels # 3500420005D 3500420010D, 3500420015D

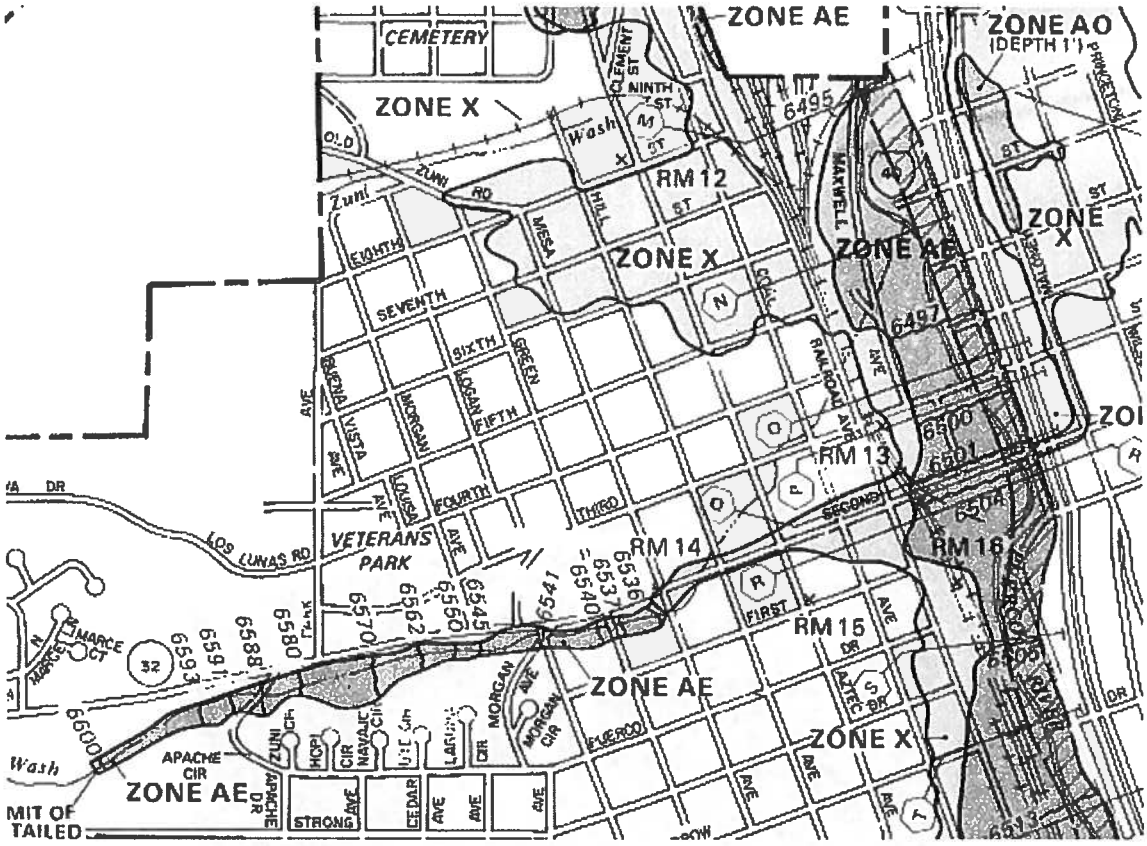


Illustration 2. Detail of Little Puerco Wash and the drainage into Maloney Street. Map FEMA FIRM Panel 3500420010D.

Illustration 3. Photographs depicting the upper end of the Little Puerco Wash in the Gallup City Limits. This area is to be developed by the U.S. Army Corps of Engineers as a retention pond in an attempt to eliminate or reduce the flooding caused by this drainage area.

Illustration 4. Photograph of the pump station on Maloney Street. This pump is maintained by the New Mexico Highway Department as part of the flooding reduction program. Behind the pump station is a raised portion of Interstate 40. This construction acts like a dam and prevents drainage of water into the Puerco River, which is on the other side of the highway. During the flooding of 1998 the water reportedly got to a depth of 4 feet at this location.

DROUGHT

The concerns for drought conditions in McKinley County and its participating jurisdictions has been established through meetings of the McKinley County working group, public meetings, questionnaires, the National Oceanic and Atmospheric Administration, the National Weather Service, the U.S. Geological Survey, the New Mexico Drought Task Force, and New Mexico State University. Drought, as defined by the National Oceanic and Atmospheric Administration (NOAA), is a period of abnormally dry weather that persists long enough to produce a serious hydrologic imbalance. The severity of the drought depends upon the degree of moisture deficiency, the duration, and the size of the affected area. Drought status is determined through use of the Palmer Drought Severity Index, the Standardized Precipitation Index, and the Surface Water Supply Index. In New Mexico, drought is known to occur every ten years on average. Drought will always be a concern in McKinley County.

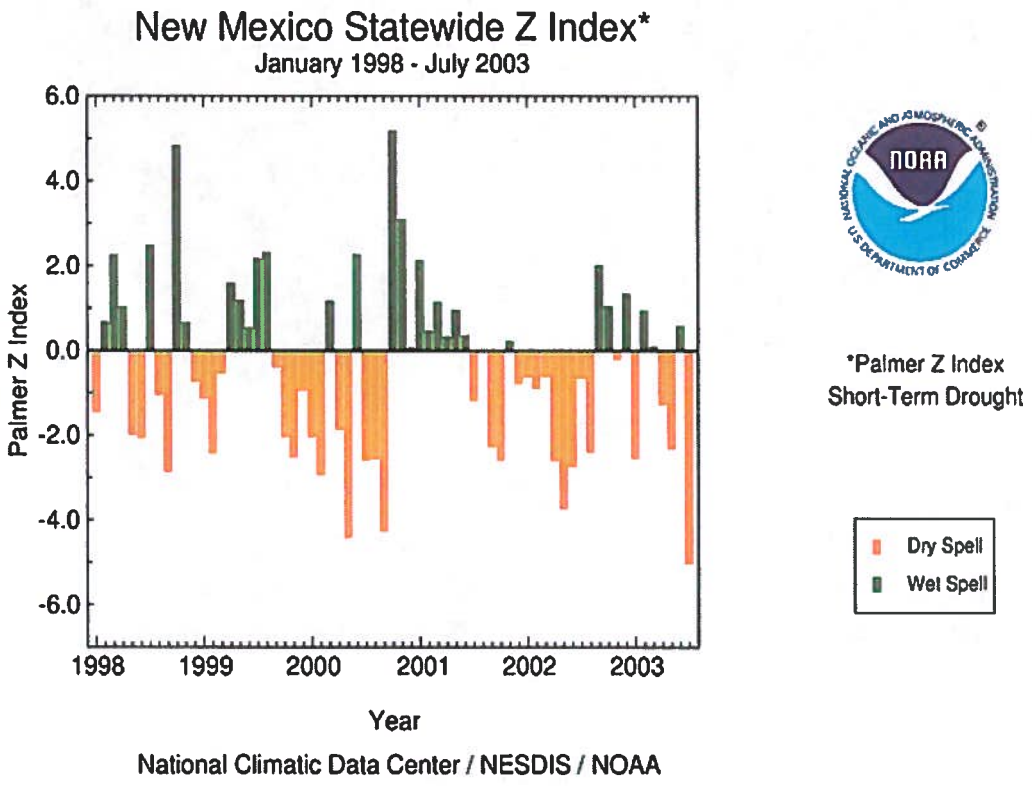


Illustration 5.

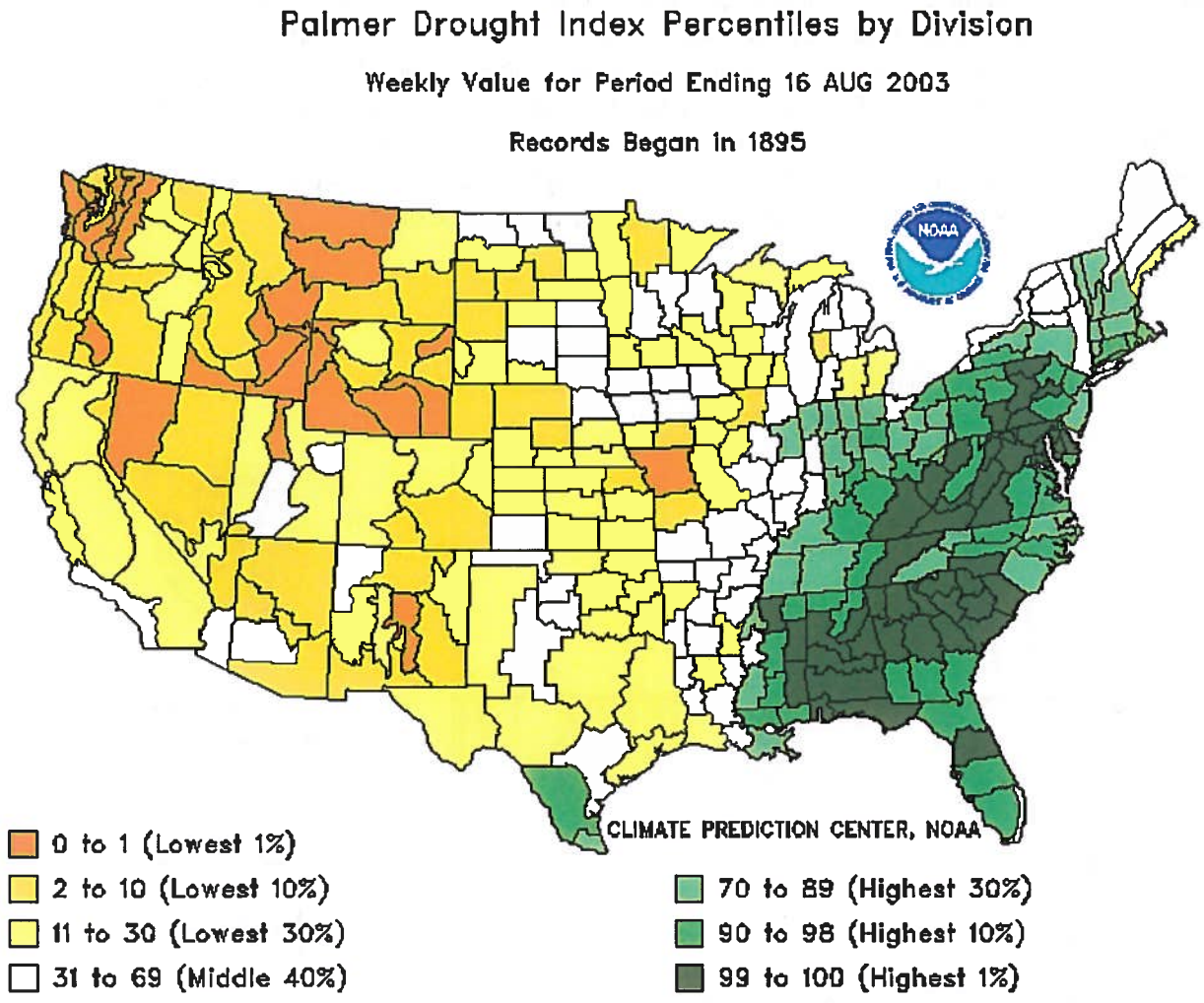


Illustration 6.

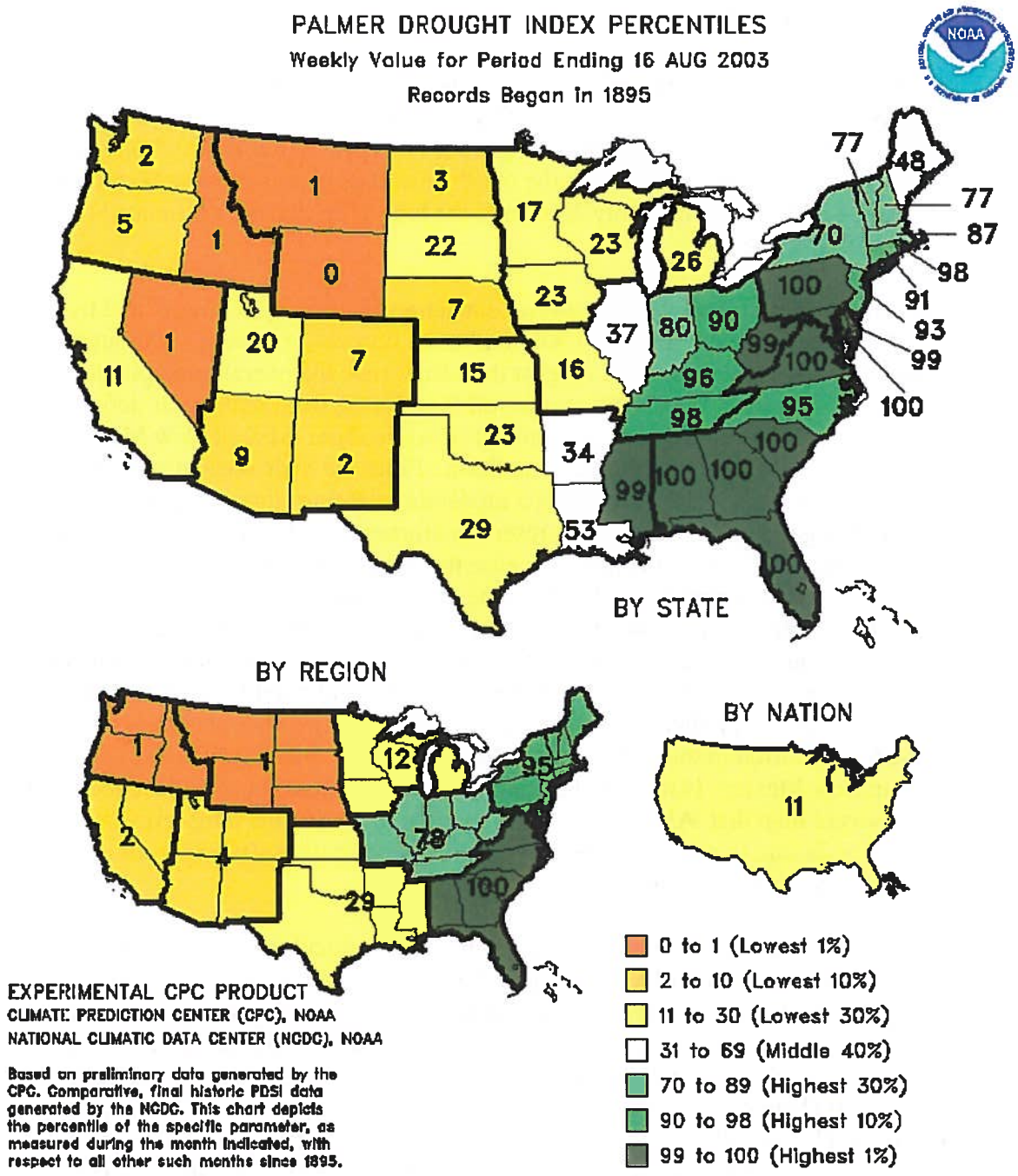


Illustration 7.

Section 1. McKinley County

McKinley County is an agricultural area, and is therefore extremely susceptible to the effects of drought. According to the NOAA, McKinley County is currently experiencing extreme drought conditions. This drought has had agricultural and hydrological impacts throughout the county. At present the Northwest Plateau area of New Mexico was at minus 1.4 inches as of mid-July 2003, and the long-term deficit is estimated to be minus three to four inches.

The impact of drought falls into several danger areas: fire, agricultural, and hydrological. The fire danger in New Mexico's wildland areas remains very high. Although this danger decreases with July and August thunderstorms, the overall precipitation deficit remains. In the area of agriculture, the soil is suffering from multi-year deficits, and according to the United States Department of Agriculture, 61% of New Mexico range and pasture land is in poor to very poor condition. From the hydrological standpoint, all river basins within New Mexico remain in a moderate (warning status) to severe (emergency status) drought condition, and most reservoir storage is well below normal. Although the July and August rains will continue to ease the fire danger and provide some benefit to range and pasture lands, their effect will be minimal on reservoir storage. As the county population continues to grow, demands for water will increase. With the present drought conditions causing water availability to shrink, resource conservation is needed to ensure a sustainable future. The duration of the present drought conditions in McKinley County is very difficult to predict. At present it is reported that weather patterns are similar to those that occurred in the 1950's. The "Great Drought" was considered to be a disastrous time in New Mexico. However, there are indications that the current drought may be even more severe than that. Although it is not possible to predict the long-term severity of this drought, it is safe to say that McKinley County is presently suffering from the effects of extreme drought conditions.

McKinley County's economy is primarily based on agriculture. The extent and duration of the current drought will have a large effect on this market. The continuation of drought in McKinley County has resulted in a reduction in the county's overall agricultural activities. In 1999 McKinley County had 39,000 head of cattle, with 16,000 head being beef cows. In 2003 the number of cattle has been reduced to 24,000 head, with 14,000 being beef cows. The reduction in cattle reflects the lack of available water for livestock, the lack of available natural feed which has been reduced due to lack of rain, and the increase in cost to ranchers in providing their cattle with supplemental feed. In addition, as water resources are reduced or become limited, the extent of sustainable growth within McKinley County will also become limited. The continuation of drought conditions within McKinley County is considered to be an issue that needs mitigation consideration. Although it is not possible to provide a mitigation plan that can eliminate the causes of drought, actions are available to reduce its effects on the community.

Section 2. Gallup

Gallup's water supply comes from two aquifers: the Gallup Sandstone and the Dakota-Westwater. The city presently has thirteen wells with a minimum depth of 900 feet. The drought reduces these aquifers' ability to recharge, which will result in the need for deeper wells in the future. In addition, as the drought continues, the demand on the city's water system will continue to rise as people attempt to maintain their residential landscapes and use their evaporative air conditioners in the summer months. Further demands on the water system will be caused by the predicted growth of the community. As the demand for water increases, Gallup's ability to grow will become limited. To insure Gallup's continued growth, the city will either need to obtain additional water rights or implement a more conservative approach to water use.

WILDFIRE

McKinley County has two areas of established wildland/urban interface located in the Cibola National Forest to the southeast of Gallup. Gallup itself has a small fuel load at its wildland/urban interface and presents a limited risk. The McGaffey and Timberlake areas are located in forest, and there is the potential for fire to destroy the residences located within these areas. The McGaffey and Timberlake areas are primarily residential areas with no industrial or major commercial structures. The urban/wildland interface in McGaffey and Timberlake includes forested areas existing in close proximity to residential structures. This area's present urban/wildland interface is similar to that of Los Alamos. The 2000 Cerro Grande fire in Los Alamos demonstrated the danger of allowing forest growth in close proximity to structures. A fire in the McGaffey/ Timberlake area could result in similar massive damage.

Illustrations 8 and 9
FEMA photographs of the 2000 Cerro Grande Fire

The risk from a wildland fire also depends on the type of fire that occurs. Generally wildland fires involve ground/surface fires or crown fires. A surface fire normally uses debris and grasses on the forest floor for fuel. Types of debris vary, but generally include such things as fallen leaves and needles, twigs, bark, and low to medium shrubs, as well as fallen branches and logs. Historically surface fires were less intense, and actually helped keep the forest floor clean, thereby reducing the risk of a major fire. Fire

suppression, along with other changes in wildland management, has resulted in a higher fuel load on the forest surface and a denser overall forest area.

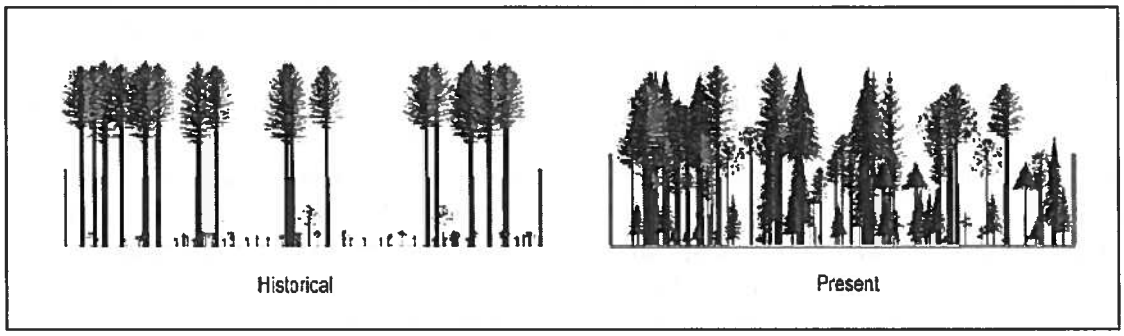


Figure 2—Representation of changes in vertical arrangement and horizontal continuity in forest stand structure. Today's forests tend to have more fuel strata, higher densities of fire-sensitive species and suppressed trees, and greater continuity between surface and crown fuel.

Illustration 10

Diagrams from USDA publication "Forest Structure and Fire Hazard in Dry Forest of the Western United States," PNW-GTR-628.

As the surface fuel load has increased, ladder fuels have also increased. Ladder fuel includes small trees and under story shrubs that allow fire to burn into the forest canopy of the larger trees. As fires move into the forest canopy, there is a greater risk of crown fire. A crown fire is considered the most dangerous type of fire to both the forest and human life. Once a fire moves into the tree crowns, it spreads more quickly by wind and jumps from tree to tree. While surface fires can be effectively fought by firefighting efforts at ground level, a crown fire requires a more complicated approach.

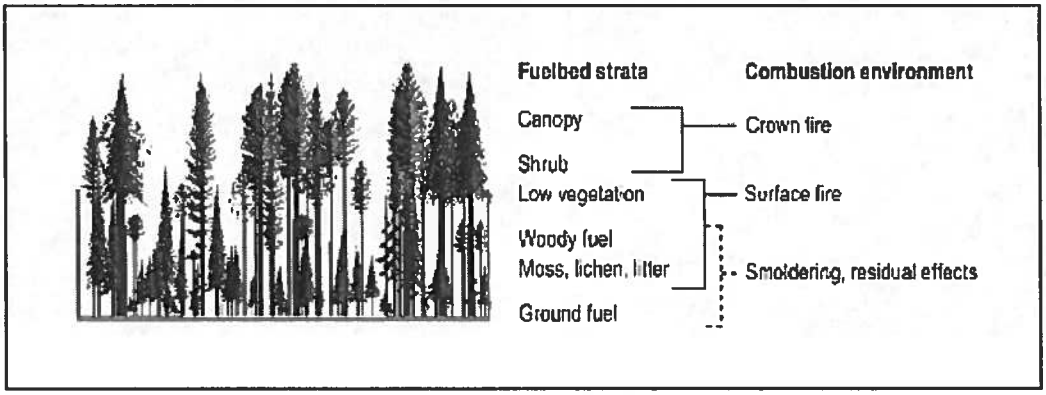


Figure 4—Fuelbed strata affect the combustion environment, fire propagation and spread, and fire effects. Note that woody surface fuel can also contribute to crown fires.

Illustration 11

The presence of a crown fire also increases the potential development of a fire storm. According to the U.S. Forest Service, a fire storm is "[v]iolent convection caused by a large continuous area of intense fire. Often characterized by destructively violent surface indrafts, near and beyond the perimeter and sometimes by tornado-like whirls." The

occurrence of a fire storm increases the speed and destructive nature of a forest fire, thereby increasing the danger to structures in its path.

The present fuel load in the Cibola National Forest has increased due both to the drought and the cessation of thinning that has been used in the past to reduce the available slash. In addition to the present drought conditions, McKinley County, like most of New Mexico, experienced a very moist period during the 1980s and 1990s. The result of this additional moisture was an increase in new growth and the invasion of wetter, higher altitude vegetation into the region's lower, normally drier areas. The present drought conditions are causing this newly-introduced vegetation to die off, which is adding to the fuel load.

Historically New Mexico's wildfire season runs from May through August. During this time period, the occurrence of two to three wild fires is normal. However, the presence of drought conditions has spread the fire danger into February, and it can last well into September. The lengthening of the season also increases the chance of fire danger.

Illustration 12. Road map and aerial photograph
of the McGaffey area

Unlike the McGaffey/Timberlake areas, there is no threat of wildland fires threatening Gallup. Although there is a wildland/urban interface, the danger is limited in scope, and does not pose the same level of risk.

Illustration 13. Typical residence in the Timberlake area built closely into the forested area and providing minimal defensible space in the event of a wild fire.

Illustration 14. Propane tank next to pine tree in Timberlake area.

HAZMAT

The production and safe transportation of hazardous materials is of great concern in most parts of the United States. Hazardous materials are substances that are harmful to life and the environment. The materials are generally man-made and some are extremely toxic. Hazardous materials and incidents dealing with their release are referred to as HAZMAT incidents. The United States Department of Transportation (USDOT) has identified 308 specific chemicals from 20 chemical categories as HAZMAT under the Emergency Planning and Right to Know Act of 1986. These chemicals cover a wide range of toxicities, and in small doses many have minimal or no effect on humans.

Various U.S. and international organizations, including the United States Environmental Protection Agency (USEPA), the USDOT, the National Fire Protection Agency (NFPA), the United States Coast Guard (USCG), and the International Maritime Organization (IMO) have defined, for regulatory purposes, the following list of HAZMAT classes:

- Toxic agents – irritants, asphyxiates, anesthetics and narcotics, sensitizes, hepatoxic and hnepharatoxic agents, carcinogens and mutagens
- Hazardous wastes
- Hazardous substances
- Toxic pollutants
- Extremely hazardous substances

In New Mexico, transportation routes and facilities including pipelines, airports, highways, railroad routes, storage facilities, and other related facilities may become involved in the release of hazardous materials. For transportation purposes, the New Mexico Department of Transportation (NMDOT) classifies HAZMAT in one or more of the following categories:

- Explosive
- Blasting agent
- Flammable liquid
- Flammable solid
- Oxidizer
- Organic peroxide
- Corrosive material
- Compressed gas
- Flammable compressed gas
- Poison – A and B
- Irritating materials
- Inhalation hazard
- Etiological agent
- Radioactive materials
- Other regulated material

The 1986 Act requires that companies report releases of designated hazardous chemicals to the USEPA, even if the release does not result in human exposure. The different types of releases can range from air emissions of gases or particles from a pressure relief valve, smokestack, ruptured reaction vessel, broken pipe, broken, loose-fitting or punctured equipment, containers or cylinders on transportation vehicles and from solid or liquid discharges onto the ground or into water; discharges into bodies of water from damaged ships, barges, underwater pipelines and trucks or railroad cars that fall into the water; outflows from sewer or drain outfalls, runoff from spills on land, runoff of water used to control fires or contaminated groundwater; discharges onto land; solid waste disposal in onsite landfills; injection of wastes into underground wells; transfers of wastewater to public sewage plants; and transfers of offsite facilities for treatment or storage.

Highway transportation of HAZMAT involves tanker trucks or trailers and specialized bulk-cargo vehicles. Railroad releases consist of two main types: (1) collisions and derailments that result in large spills or discharges, and (2) HAZMAT releases from leaks in fittings, seals or relief valves, and improper closures or defective equipment. Natural hazards that increase transportation-related accidents are heavy rain or snowfall, causing slippery road conditions.

Section 1. McKinley County

McKinley County is traversed by U.S. Interstate 40 (I-40) and the Burlington Northern and Santa Fe Railroad. These two transportation routes parallel each other while entering McKinley County from Cibola County to the south, and exiting to the west into Arizona. Two major populated areas lie along this route: Thoreau (an unincorporated area) and Gallup. In addition to these transportation routes, U.S. 491 (formerly U.S. 666) enters McKinley County from San Juan County to the north, and ends in Gallup. I-40, the railroad lines, and U.S. 491 are all used as transportation routes for hazardous materials. I-40 is also part of the transportation route for low-level radioactive waste that traverses the county en route to the Waste Isolation Pilot Plant (WIPP) in Carlsbad.

According to the New Mexico Traffic Safety Bureau, the majority of fatal and injury accidents in McKinley County occur along I-40, and secondarily on U.S. 491. (See Illustration 6.) McKinley County has had the highest rate of alcohol-related accidents in New Mexico. (See Table 4.) The county started an aggressive program in 1993 that has reduced the number of alcohol-related accidents. As in most other counties in New Mexico, the single most common cause for traffic accidents are those involving other vehicles. (See Table 5.) Passenger cars and pickups have been the two most common vehicle types involved in accidents and account for 71 percent of the total accidents in McKinley County during 2001. (See Table 6.)

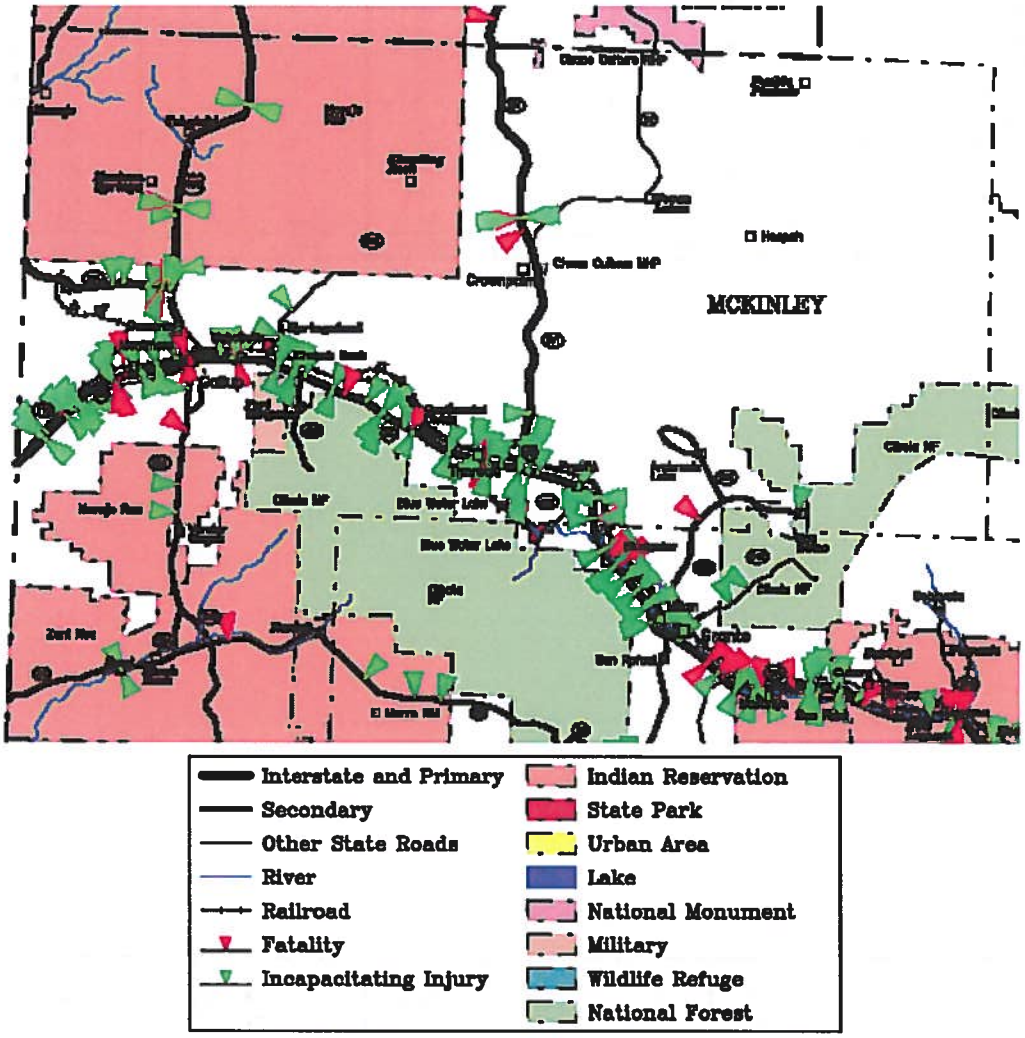


Illustration 15 Location of fatal and injury accidents in McKinley County

Crashes in McKinley County by Top Contributing Factor, 2001

Contributing Factor	Crashes					People	
	Total	% of Total	Fatal	% of Fatal	Injury	Killed	Injured
Alcohol involvement	137	17	10	48	64	10	111
Passing a red light	12	1	0	0	4	0	6
Failing to yield	27	3	0	0	13	0	20
Excessive speed	235	29	3	14	80	5	140
Driving left of center	17	2	0	0	8	0	12
Following too close	23	3	0	0	7	0	10
Improper turning	16	2	0	0	6	0	16
Improper overtaking	6	1	0	0	1	0	2
Improper backing	11	1	0	0	0	0	0
Inop. traffic control	1	0	0	0	1	0	3
Mechanical defect	35	4	0	0	6	0	8
Driver inattention	100	12	4	19	45	5	85
Improper driving	16	2	1	5	6	1	14
Other	173	21	3	14	44	3	62
Total	809	100	21	100	285	24	489

Table 4.

Crashes in McKinley County by Class, 2001

Class	Crashes					People	
	Total	% of Total	Fatal	% of Fatal	Injury	Killed	Injured
Other vehicle	259	32	3	14	98	3	173
Pedestrian	12	1	4	19	8	4	8
Fixed object	201	25	2	10	45	2	70
Veh. on other roadway	1	0	0	0	0	0	0
Parked vehicle	19	2	0	0	6	0	9
Overturn	201	25	12	57	106	15	203
Other non-collision	52	6	0	0	11	0	13
Pedalcyclist	2	0	0	0	2	0	2
Railroad train	1	0	0	0	1	0	1
Animal	51	6	0	0	8	0	10
Other object	10	1	0	0	0	0	0
Total	809	100	21	100	285	24	489

Table 5.

Crashes in McKinley County by Vehicle Type, 2001

Vehicle Type	Vehicles					People	
	Total	% of Total	Fatal	% of Fatal	Injury	Killed	Injured
Passenger car	406	35	9	30	152	7	185
Pickup	384	33	4	13	156	2	176
Semi	138	12	5	17	35	0	16
Bus	7	1	0	0	2	0	2
Motorcycle	9	1	2	7	6	2	8
Pedalcyclist	2	0	0	0	2	0	2
Pedestrian	14	1	4	13	10	4	10
Van/4 WD	152	13	6	20	63	9	89
Other	22	2	0	0	3	0	1
Unknown	21	2	0	0	2	0	0
Total	1,155	100	30	100	431	24	489

Table 6.

In addition to the transportation of hazardous materials through McKinley County, there are numerous fixed sites that maintain significant amounts of hazardous materials. Among the larger facilities are the Phillips/Conoco fractionator and Giant gasoline facilities to the east of Gallup. A major incident at either of these facilities has the potential of causing a major disruption in traffic flow along both I-40 and the railroads.

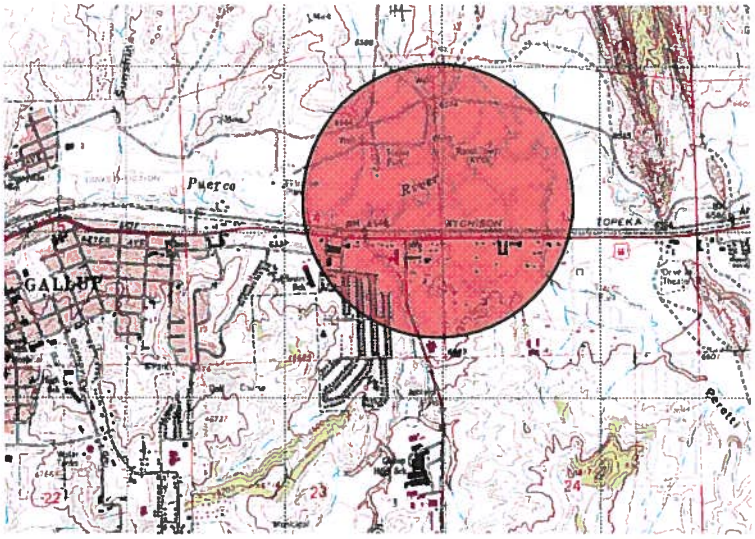


Illustration 16. Approximate affected area from accident at Phillips/Conoco Plant. Circle is 1 mile in diameter.

Illustration 17. Aerial view of Phillips/Conoco Plant.

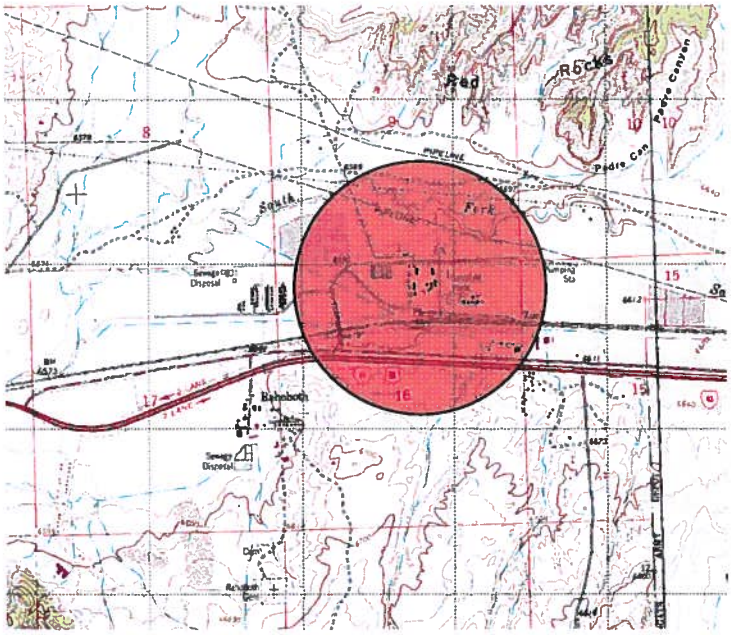


Illustration 18. Approximate affected area from accident at Giant Refinery. Circle is 1 mile in diameter.

Illustration 19. Aerial photograph of the Giant Refinery.

The danger of a possible HAMZAT incident along I-40 and the rail lines remains high within McKinley County. At present, the areas around I-40 and the rail lines are sparsely populated, with the exception of the incorporated city of Gallup and the unincorporated area of Thoreau. Due to the low population density in much of the county, the danger to the county's general population may not be high during a HAZMAT occurrence. However, the danger to the traveling public can be extremely high, depending on the materials involved in a HAZMAT incident. In addition, the occurrence of a HAZMAT incident on I-40 could cause far-reaching economic considerations throughout the county and possibly beyond if it were necessary to shut down a major east/west interstate highway. The major vulnerability within the unincorporated area of McKinley County is along the I-40 corridor and in the areas of fixed sites such as the Giant refinery and the Conoco fractionator plant.

Section 2. Gallup

Gallup is traversed along the east/west axis by both I-40 and the rail lines. In addition, U.S. 491 enters Gallup from the north and intersects with I-40. According to the New Mexico Transportation Safety Bureau, most accidents that occur in Gallup involve another motor vehicle. (See Table 7.) Passenger cars and pickups are involved in 78 percent of all accidents in Gallup. (See Table 8.) The two most common causes for accidents are following too closely and failure to yield. (See Table 9.) Additionally, of the seven most dangerous intersections in the city, six involve Munoz Drive/U.S. 491. (See Table 10.) There are five schools along these routes that could be affected by a HAZMAT incident with an isolation distance of 800 meters. (See Illustration 16.) The

rail lines that run through the center of town also have the potential of causing a grave risk to Gallup's population and economy, and could result in the temporary closure of I-40.

Crashes in Gallup by Class, 2001

Class	Crashes					People	
	Total	% of Total	Fatal	% of Fatal	Injury	Killed	Injured
Other vehicle	681	72	1	50	186	1	305
Pedestrian	22	2	1	50	18	1	18
Fixed object	97	10	0	0	19	0	19
Veh. on other roadway	3	0	0	0	2	0	5
Parked vehicle	96	10	0	0	5	0	5
Overturn	12	1	0	0	6	0	6
Other non-collision	24	3	0	0	3	0	4
Pedalcyclist	10	1	0	0	8	0	8
Animal	1	0	0	0	0	0	0
Other object	4	0	0	0	0	0	0
Total	950	100	2	100	247	2	370

Table 7.

Crashes in Gallup by Vehicle Type, 2001

Vehicle Type	Vehicles					People	
	Total	% of Total	Fatal	% of Fatal	Injury	Killed	Injured
Passenger car	837	46	3	60	240	1	198
Pickup	605	33	1	20	145	0	86
Semi	33	2	0	0	8	0	4
Bus	3	0	0	0	0	0	0
Motorcycle	5	0	0	0	5	0	6
Pedalcyclist	10	1	0	0	8	0	8
Pedestrian	22	1	1	20	18	1	18
Van/4 WD	211	12	0	0	58	0	49
Other	6	0	0	0	1	0	0
Unknown	92	5	0	0	11	0	1
Total	1,824	100	5	100	494	2	370

Table 8.

Crashes in Gallup by Top Contributing Factor, 2001

Contributing Factor	Crashes					People	
	Total	% of Total	Fatal	% of Fatal	Injury	Killed	Injured
Alcohol involvement	98	10	2	100	44	2	61
Passing a red light	64	7	0	0	21	0	32
Failing to yield	172	18	0	0	60	0	109
Excessive speed	72	8	0	0	22	0	32
Driving left of center	8	1	0	0	2	0	2
Following too close	180	19	0	0	49	0	71
Improper turning	51	5	0	0	11	0	17
Improper overtaking	12	1	0	0	1	0	1
Improper backing	50	5	0	0	0	0	0
Inop. traffic control	1	0	0	0	0	0	0
Mechanical defect	16	2	0	0	2	0	5
Driver inattention	95	10	0	0	15	0	18
Improper driving	40	4	0	0	4	0	4
Other	91	10	0	0	16	0	18
Total	950	100	2	100	247	2	370

Table 9.

The Seven Intersections in Gallup with the Most Crashes, 2001

Intersection	Crashes			People	
	Total	Fatal	Injury	Killed	Injured
2nd St @ Nizhoni Blvd	11	0	4	0	7
Aztec Ave @ Munoz Dr / NM 602	13	0	5	0	12
Jefferson Ave @ Munoz Dr / US 666	13	0	3	0	4
Jm Montoya Blvd @ Munoz Dr / US 666	38	0	8	0	8
Lincoln Ave @ Munoz Dr / US 666	23	0	12	0	24
Metro Ave @ Munoz Dr / US 666	14	0	4	0	8
Munoz Dr / NM 602 @ Nizhoni Blvd	14	0	4	0	4

Table 10.

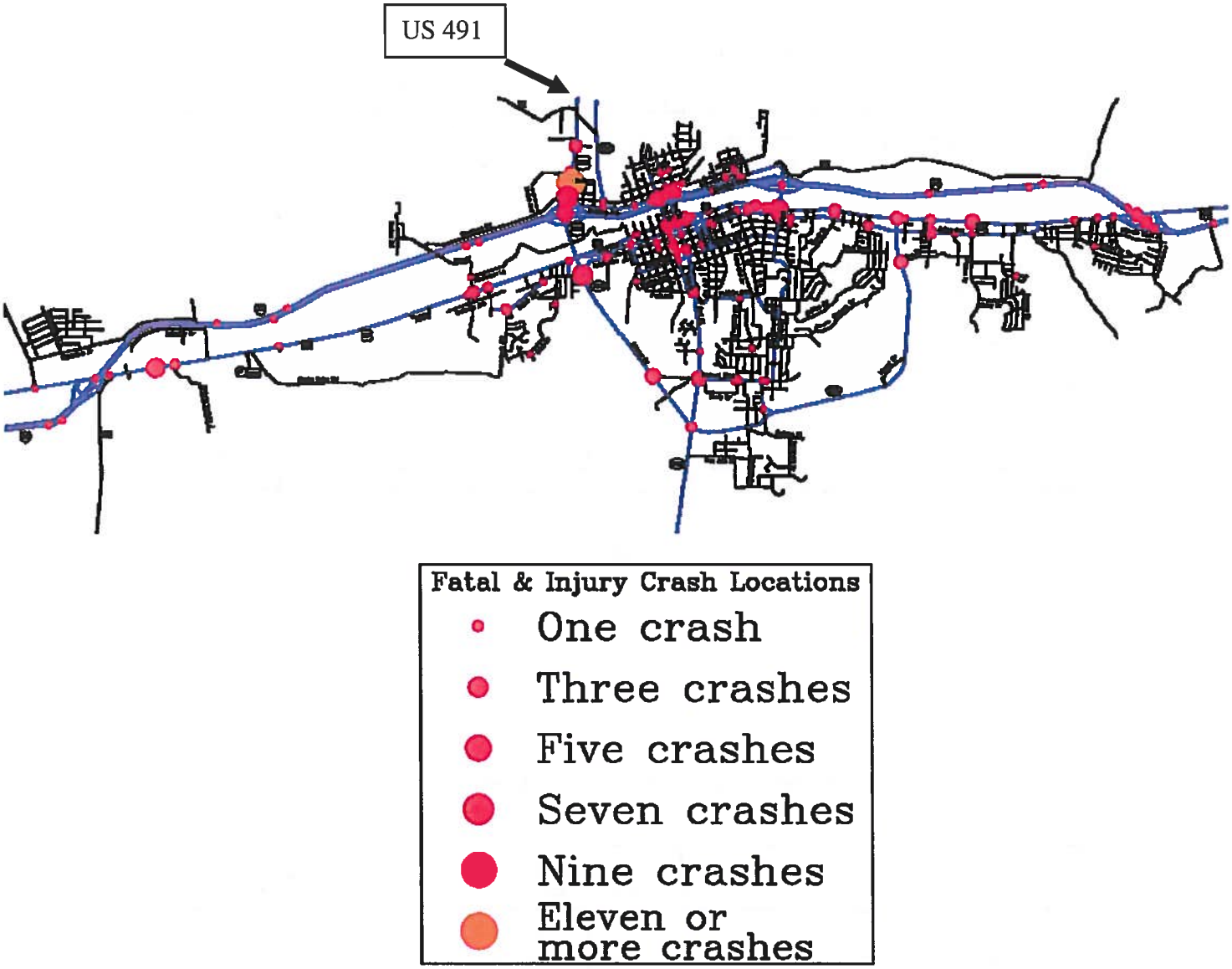


Illustration 20. Location of fatal and injury accidents in Gallup

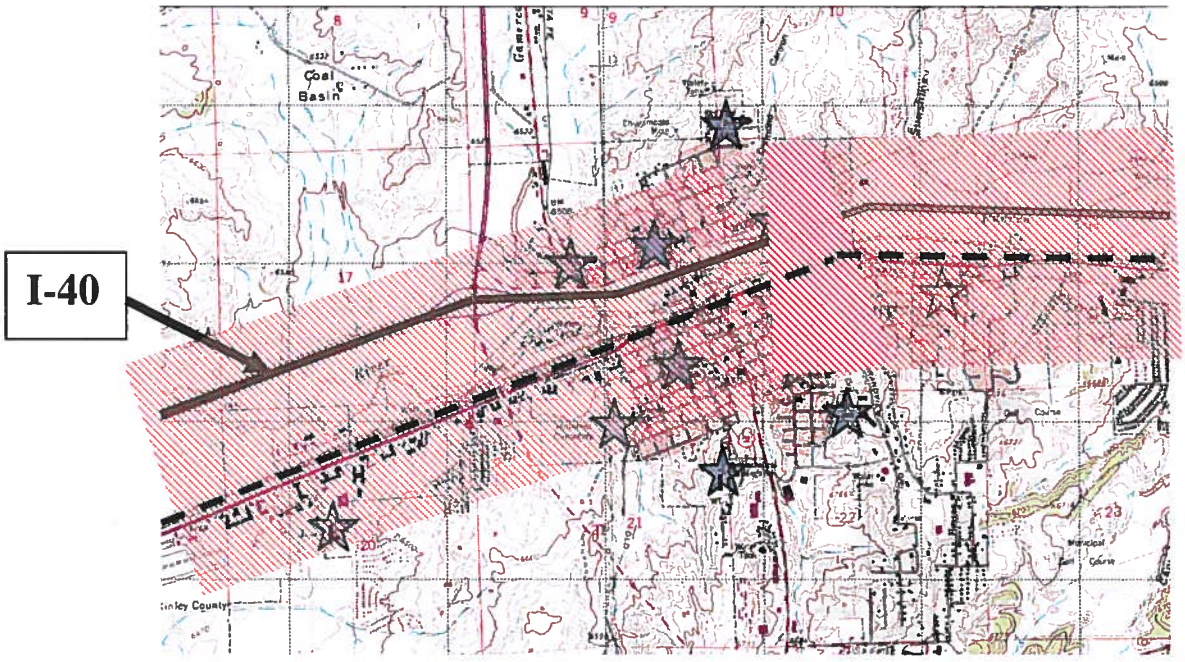


Illustration 21. Gallup area schools.
Dotted line represents location of the rail line.

The danger of a potential HAZMAT incident in Gallup must be considered high, if for no other reason than the fact that both I-40 and the rail lines run through the center of town. At least four schools lie within the possible evacuation zone that could be created by such an event. Additionally, the downtown/commercial center of Gallup lies along Route 66, which parallels I-40 through much of the town. Due to the natural geography of the area, Gallup is located in a basin that runs along the Puerco River which has higher elevations to the north and south. This terrain creates a natural passage for traffic along the town's long axis. This terrain increases the potential danger to Gallup's residents in the event of a HAZMAT occurrence because many hazardous materials are heavier than air. The lower elevation of this terrain could cause hazardous materials to pool and spread through the length of town as a result, greatly increasing the affected area. A further dangerous factor is that when severe weather strikes this area, the highway is sometimes shut down. A highway shutdown due to bad weather concentrates the semi tractor-trailer trucks carrying hazardous materials in Gallup until such time as the highways are reopened. The factor of severe weather increasing the potential for traffic accidents in town as well as on the highway, when occurring simultaneously with a highway shutdown, the

presence of hazardous material transports, and added concentration of traffic in town, greatly increase the risk potential for a HAZMAT event.

VULNERABILITY OF MCKINLEY COUNTY AND GALLUP

Section 1. Introduction

Along with identifying the hazards that exist within McKinley County and Gallup, it is also necessary to consider these hazards and their relationship to the area's existing infrastructure.

Infrastructure. According to the Encarta World English Dictionary, infrastructure, with regard to public services or systems, consists of the large-scale public systems, services, and facilities of a country or region that are necessary for economic activity, including power and water supplies, public transportation, telecommunications, roads, and schools.

The most vital factor in identifying any area's infrastructure is consideration of what facilities and functions create an improvement in public health, both physically and mentally. Power and water supplies, public transportation, telecommunications, roads, and schools are all important to the community's welfare. However, other critical services include hospitals, medical centers, public safety organizations, and other government divisions that assist in the community's response and recovery during a hazardous event.

Vulnerability. Any location's or structure's vulnerability to a hazard must be evaluated for exposure to the hazard, frequency of occurrence, and damaging effects. Any area's existing hazards will expose population and structures to their effects. However, if the frequency of occurrence is low, mitigation of any particular hazard may not be necessary. Another factor in determining whether mitigation strategies are appropriate is cost-effectiveness: if the cost of mitigation is higher than the cost of repairing potential damages, mitigation may not be worthwhile.

McKinley County's identified infrastructure, locations, and hazard or risk exposure are noted in Table 11. The hazard/risk exposure notations have the following meanings: "No specific vulnerability" indicates that the structure is not located in a potential hazard area; "Potential HAZMAT area" indicates that the structure is located within 800 meters of a HAZMAT route; "Potential flooding" indicates that the structure is located in the floodplain.

Table 11. McKinley County Infrastructure

Infrastructure	Location	Hazard/Risk Exposure
Law Enforcement instillations		
New Mexico State Police	4200 East Historic Hwy. 66, Gallup	HAZMAT
Gallup Police Department	451 State Road 564, Gallup	HAZMAT
Gallup PD substation	300 Historic Route 66, Gallup	HAZMAT, Flood
McKinley Co. Sheriff's Dept.	2105 E. Aztec Ave., Gallup	HAZMAT
McKinley SO substation	1st St., Thoreau	HAZMAT
FBI	102 West Coal Ave, Gallup	Flood
UNM Police	200 College Ave, Gallup	None
McKinley County/Metro Dispatch	Boyd Ave., Gallup	HAZMAT
Ramah Navajo Police*	BIA Route 125, Mountain View	None
Crown Point Navajo Police*	Route 9, Crown Point	None
Zuni Police Dept.*	1300 State Rd. 53, Zuni	None
Fire Stations		
Gallup Fire Dept.	1800 S. Second St., Gallup	HAZMAT
Timber Lake Fire Dept.	#745 Timberlake Rd. Ramah	Wildland Fire
Ramah Fire Dept.	4 S. Tiejen Av. Ramah	Wildland Fire
Crown Point VFD	Route 9 Chaco Blvd. Crown Point	None
McKinley West VFD	124 Historic Route 66, Gallup	HAZMAT, Flood
Whispering Cedars Fire	40 Whispering Cedars Rd.	HAZMAT
Thoreau Fire Dept.	#65 1st Ave., Thoreau	HAZMAT
Ft Wingate VFD	290 McGaffey Lake Rd., Ft Wingate	Wildland Fire
Pine Hill VFD		None
San Mateo VFD		None
Cebollrta VFB		None
Navajo Estates VFD*	#44 State Hwy 264, Yah-Ta-hey	HAZMAT
Prewitt VFD	#1669 State Hwy 122, Prewitt	HAZMAT
Pine Haven VFD	02 Pine Garden Rd, Pine Haven	Wildland Fire
Vanderwagen VFD	#08 Cousins Rd., Vanderwagen	Wildland Fire
Navajo Pine VFD		None
Mariano Lakes VFD	Mariano Lakes	None
White Cliffs VFD	#14 White Cliffs Rd., White Cliffs	HAZMAT
Chichitah VFD		Drought
Hospitals		
Gallup Indian Medical Center		None
Zuni IHS	Nizhoni Blvd., Gallup	None
Rehoboth McKinley Co. Hospital		None
Crown Point HIS	1901 Red Rock Dr., Gallup	None
Water Treatment plant		
City of Gallup		HAZMAT
Pueblo of Zuni*		HAZMAT
Navajo Nation*		HAZMAT
Thoreau Water & Sanitation		HAZMAT
Electrical Supply		
Williams Energy	Star Lake SR 197	None
Tri State Generation	Prewitt	None
City of Gallup	Gallup	None
Continental Divide	SR 602 , Gallup	HAZMAT
Schools		
Gallup High School	1055 Rico St., Gallup	Flood
Gallup Central High School	325 Magurite, Gallup	Flood
Thoreau High School	4 Hawk Circle, Thoreau	HAZMAT
Gallup Jr. High School	680 S. Boardman, Gallup	None
Gallup Middle School	1001S.Grandview, Gallup	None
JFK Middle School	600 S. Boardman, Gallup	None
Thoreau Middle School	8 Hawk Circle, Thoreau	HAZMAT
Chee Dodge Elem. School	641 N. Hwy 666, Gallup	HAZMAT

Indian Hills Elem. School	3604 Chinza, Gallup	HAZMAT, Flooding
Jefferson Elem. School	300 Molica, Gallup	None
Juan de Onate Elem. School	505 East Vega, Gallup	Flooding
Lincoln Elem. School	801 West Hill, Gallup	HAZMAT
Red Rock Elem. School	1305 Red Rock, Gallup	None
Stagecoach Elem. School	725 Freedom Trail, Gallup	None
Thoreau Elem. School	64 AV., Thoreau	HAZMAT
Washington Elem. School	700 West Wilson, Gallup	HAZMAT
David Skeet Elem. School	45 Jones Ranch Rd., Gallup	None
Ramah Elem. School*	Ramah	Drought
Roosevelt Elem. School	400 E. Logan, Gallup	Drought
Gallup Catholic School	515 Park Ave., Gallup	None
Gallup Christian School	12 Theta St. Mentmore	HAZMAT
Rehoboth Christian School	Historic Hwy 66, Gallup	HAZMAT
University of New Mexico	200 College Dr., Gallup	None
Western New Mexico	2055 State Hwy 602, Gallup	None
Government Buildings		
McKinley Co. Magistrate Court	285 S. Boardman, Gallup	HAZMAT
McKinley Co. Offices & District Court	201 W. Hill Ave., Gallup	
McKinley County Jail	285 S. Boardman, Gallup	HAZMAT
Gallup City Hall	110 W. Aztec, Gallup	HAZMAT
Nixon Federal Building	102 W. Coal, Gallup	HAZMAT
National Guard Armory	Hassler Valley Rd., Gallup	HAZMAT
Ramah Navajo Chapter* Tribal Center*	Ramah	None None
Zuni Tribal Offices*	1300 SR 53, Zuni	None
Navajo Tribal Offices*	SR 371 Crown Point	None

Section 2. Infrastructure Vulnerability

The entire infrastructure in McKinley County and Gallup has one common threat: HAZMAT. Many buildings are located on or near main hazardous material transportation routes. This situation does not mean that all of these buildings are in imminent danger of being involved in a HAZMAT event, only that they might potentially be involved if a HAZMAT incident occurs in their general area. There are occasionally exceptions to the need to mitigate parts of the infrastructure. For example, the location of several fire stations along HAZMAT routes may actually prove to be beneficial, since fire department personnel will be the first responders to any HAZMAT incidents, and their location along hazardous material routes will actually provide first responders with rapid access to the main transportation routes.

The most important infrastructure exposure in Gallup is that of five schools that are near enough to the I-40 corridor to be at risk if a HAZMAT event occurred on the highway. Because these schools are located along the hazardous material transport route, they would likely need to be evacuated if a HAZMAT incident occurred. Two major factors to consider in such an evacuation would be (a) the evacuation of a large number of school-age children and others in the area, and (b) where to shelter them. Since the schools in Gallup are considered to be primary shelter locations, there would be a major problem in identifying and moving the evacuees to a safer location.

It is impossible to predict the specific cost of damages caused by a HAZMAT incident due to the many existing variables. Cost factors that must be considered in the event of a

HAZMAT incident include the type of material and the amount spilled; the time of day and climate conditions; and where the event occurs.

In addition to McKinley County's HAZMAT concerns, the airport located at Gallup's western edge lies within the floodplain designated by the Federal Insurance Rate Maps. During times of flood, this facility could be completely shut down. Flooding is also a concern in Gallup's city limits within the rail yards, as well as portions of Historic Route 66 and Maloney, which are main traffic arterials through town, and parallel to I-40 to the north and south.

Section 3. Vulnerability of Non-Governmental Areas

The exposure of McKinley County's non-governmental areas to HAZMAT events exists along main transportation routes, but it is much less critical due to the sparse population and low number of local businesses. The main exception is the fixed site location of the Conoco plant on Gallup's east side, which could affect the city's population in the event of a major HAZMAT incident. McKinley County's larger hazard exposure comes from flooding in the Gallup area and wildfires in the McGaffey and Timberlake areas. The exact threat caused by flooding within McKinley County can not be completely assessed, since McKinley County is not presently a participant in the National Flood Insurance Program.

The Timberlake and Whispering Cedars subdivisions are located in the McGaffey/Timberlake area. Whispering Cedars contains 94 homes with an assessed value of $6,381,510 and an average value of $67,889. Timberlake contains 60 homes with an assessed value of $3,246,040 and an average value of $54,100. Approximately 50% of the residential structures in the McGaffey/Timberlake area are located in close proximity to the forest and are at risk. This creates a potential loss of 77 residential structures. Depending on the nature of the fire threat, the overall loss could be well over $7,500,000, when considering both structural and household property losses. Property values for the Timberlake and Whispering Cedars areas were supplied by the McKinley County Assessors Office.

McKinley County's hazard exposure due to drought is very difficult to predict, aside from the loss of revenue from the area's existing agricultural industry. The amount of revenue generated by the county's agricultural industry was not available from the New Mexico Economic Development Department. Also, as discussed earlier, the amount of water available within McKinley County and Gallup is a limiting factor to its continued growth, even under the best of circumstances.

Section 4. Developing Trends

McKinley County's vulnerability is further influenced by expected future growth. The 2000 U.S. Census predicts that the county's population will increase from 74,798 to an estimated 88,163 by 2010. The census further indicates that the largest concentration of the county's population is, and will continue to be, in Gallup. Additionally, Gallup's

main growth is north from Maloney Avenue and along U.S. 491. As growth occurs along U.S. 491, the population's exposure to HAZMAT will also continue to increase. Presently the major threat for HAZMAT events is along the Interstate-40 and railroad corridors, and from the Conoco fractionation refinery and the Giant gasoline refinery. Since the transportation corridors traverse Gallup, there is a considerable exposure to possible HAZMAT incidents. Such an incident has the potential of requiring the evacuation of a major portion of Gallup's downtown business district and residential areas along the northern side of the highway.

The two refineries to the east of Gallup along Interstate-40 also present the threat of a HAZMAT incident. The Conoco refinery is close enough to Gallup that if a major incident were to occur, it could affect the city's east side population. Additionally, a major HAZMAT incident at either the Conoco fractionation refinery or the Giant gasoline refinery could require the closure of Interstate-40 for the duration of the event. The U.S. Department of Transportation estimates that approximately 20,000 vehicles pass through Gallup on Interstate-40 on a daily basis, with 20% of the traffic being trucks, which is approximately 4,000 vehicles. Additionally, the interstate highway system generates between $10,000,000 and $20,000,000 annually in New Mexico, or a daily average of $27,400 to $54,800. As Interstate-40 is the main east-west ground transportation route through New Mexico, the economic impact could be far-reaching in scope. Along with the closure of Interstate-40, there are several small businesses and residences present in the area. These areas would most likely require evacuation during a major HAZMAT event at one of the refineries. However, with Gallup's major expansion occurring along U.S. 491, it is not anticipated that there will be any significant increase in the current HAZMAT risk. HAZMAT events in McKinley County are generally handled by the Gallup Fire Department. The cost of handling a HAZMAT event is extremely dependant on the materials involved and the location of the event. According to the Gallup Fire Department most HAZMAT calls are small and cost between $300 and $500 per hour. Additionally, a large event, requiring the full team and backup personnel, will cost a minimum of $3,000 per hour. Along with the cost for fire personnel and equipment, additional costs will be incurred depending on the number of law enforcement and emergency medical personnel that will also be required during a given response. Further costs can be expected when a HAMAT event occurs in an area of high population or business district.

Concerns over flooding, though not completely known, can also affect the county. The county's unincorporated areas have numerous roadways that travel along or through potential flood areas, based on present FIRM data. Although flooding in these areas will have a minimal impact on the county as a whole, it will affect the transportation needs of area residents. In Gallup the present potential for flooding can disrupt much of the town's business district, and has the potential of closing the Gallup airport. The structures located at the Gallup Airport have a combined value of $1,492,030 according to the McKinley County Assessors Office. However, although the airport falls within the floodplain there has been no historical event when it was flooded. Flooding has occurred in the area of 2nd Street and Maloney where there are two residential properties and three commercial properties at this intersection. The combined residential potential structural

lose is $88,420 and the potential commercial structural lose is $112,400 according to the McKinley County Assessors Office. Flooding has also occurred in the area of 4th Street and Maloney where there are presently one residence and three commercial structures. The potential residential lose is $63,810 and the combined potential commercial lose is $142,490. It should be noted that these figures do not include furnishings or commercial produces. Along with the disruption of Gallup's business district, if county residents are unable to travel to Gallup, there would be a large economic impact on the city's retail operations. Presently the number of structures and roadways threatened by flooding in McKinley County is incomplete. In order to address this issue the 5 year mitigation planning process for McKinley County will include an effort to identify the specific exposure created by flooding to county citizens and structures.

The construction planned by the U.S. Army Corps of Engineers to create a retention basin along the Little Puerco Wash will eliminate or at least reduce the flooding problem in Gallup's downtown business district. Additionally, since Gallup's growth is expected to continue north of Maloney Avenue, it should not create an increase in flood risk in new construction areas.

Drought conditions have affected the county's agricultural economy and are a factor in the reduction of the area's cash receipts. Although the income from crops in the county has rebounded, the cattle industry has continued to decline. Additionally, drought conditions in the unincorporated areas of the county will increase the demand on wildland firefighting operations.

Table 12.

Livestock cash receipts		
2000	2001	2002
$20,997,000	$16,560,000	$10,046,000
Crop cash receipts		
2000	2001	2002
$1,058,000	$745,000	$1,192,000

Data collected from the New Mexico Department of Agriculture

The effects of drought on Gallup have to date remained fairly minor and sufficient water rights are presently available to meet the community's needs. However, the continuation of drought conditions in the county will eventually reduce the level of the subsurface

aquifer, requiring deeper wells. Additionally, the water rights available to the city will limit its long-term population growth.

The issue of wildfire, which is compounded by the drought, will remain a problem in the Timberlake and McGaffey areas, and as new construction takes place in these developments, an increase in the potential loss due to fire can be anticipated. By 2005, McKinley County is expected to increase in population by 8%. Assuming similar growth in the Timberlake/McGaffey areas, it can be anticipated that 12 additional homes may be built in these areas. These 12 residences represent an increase of $814,668 in potential loss based on the average present value of property in the area.

Section 5. Historical Data

There have been no major HAZMAT incidents in McKinley County to date. There have, however, been incidents that have resulted in temporary road closures. On one occasion a semi truck transporting military munitions jackknifed on I-40 within Gallup's city limits. As a result of this accident, the highway was closed until the incident could be resolved. One of the primary causes of this accident was icy conditions on the roadway, which were limited in duration. However, the fact remains that the potential for a HAZMAT event increases as road conditions degrade. In addition to the normal transport of hazardous material, I-40 is also part of the Waste Isolation Pilot Plant route. As such, low-level radioactive material is transported through the county. While no incidents involving radioactive materials have yet occurred, numerous emergency exercises have been run in order to prepare an appropriate emergency response.
Flooding in McKinley County has periodically caused damage in Gallup. The last incident occurred on August 2, 2001. This flooding, which was precipitated by a severe storm, occurred as a result of several factors, including the suddenness and intensity of the event, the design of the highway in the area of Maloney Street, lack of maintenance to the area's storm drainage channels, and the inability to timely engage the area's control pumps. As a result of this situation, flood waters accumulated in the area of Maloney Street between 2nd and 9th Streets to a maximum depth of 4 feet. Property damage occurred during this incident and area law enforcement was required to divert traffic out of the area until the situation could be resolved.

Flash flooding occurs on an average of eight times yearly. In 1998 one person was killed as the result of a flash flood. One problem existing due to flash flooding is that the National Weather Service radars are limited due to the mountainous terrain in the area.

Wildland fires occur in McKinley County on an average of two to three times each year. Although the McGaffey/Timberlake areas have not been damaged during past events, the possibility exists and must be considered for mitigation, based on the area's growing fuel load and the continuation of the present drought conditions. The regional drought has contributed to fire danger statewide and can result in a limitation of available fire fighting resources, depending on circumstances in other parts of the state or region.

In addition to increasing fire danger, drought affects the county in other ways. The lack of rainfall throughout the region continues to cause limited water table recharge and results in a lowering of the water table. The water table is further lowered because there is a higher demand on the water system in the absence of rainfall. In addition, as the water table continues to decrease, deeper wells are required to tap into them. Deeper wells are more expensive to drill and larger pumps are required to bring the water to the surface. Finally, the limited water available in the county will eventually limit the amount of population growth that can take place. The only possible mitigation to enable further population growth will be the purchase of additional water rights in the future.

McKinley County Mitigation Plan
2005

Part III
Implementation Strategies

Part III
Implementation Strategies

INTRODUCTION

Upon completing the risk identification and analysis of the existing hazards in McKinley County and Gallup, the working group considered potential mitigation strategies. The first stage of this process was the establishment of goals and objectives concerning each identified hazard. Goals are defined as general long-range statements that refer to the overall approach to a specific problem. Objectives are concerned with specific approaches and steps to be taken in arriving at the established goals.

Once the goals and objectives were established for each identified hazard, specific action plans were developed in order to achieve each objective leading to the overall goal. FEMA has grouped mitigation strategies into six broad categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects.

Prevention is the foundation of mitigation. Preventive actions that eliminate the hazardous condition that threatens the community also eliminate the threat itself. These types of actions can be implemented in many forms, including administrative and regulatory actions such as zoning and building codes. Such actions prevent additional potential damages by restricting development and use of hazardous areas such as floodplains, or requiring builders to utilize specific construction applications that will reduce or eliminate a hazard.

Property protection refers to the modification of existing structures to reduce or eliminate a hazard's potential dangers. One example would be elevating a building in order to raise its ground floor above the projected 100-year flood level.

Public education and awareness are designed to make the community's citizens aware of local hazards and provide them with information that they can use to mitigate the situation. These types of programs include outreach projects, real estate disclosure, and education of both children and adults.

Natural resource protection includes actions that will reduce damage to natural systems or help to preserve or restore them. Typical actions could be forest thinning projects, erosion control, or watershed management.

Emergency services are actions that provide protection of the community and property during an actual hazard event. Such actions include early warning systems, emergency response agencies, and the protection of critical infrastructure.

Structural projects refer to the actual building of structural elements that reduce or eliminate the hazard's impact. Such structures include retaining walls, flood control dams, or storm shelters.

In order to create mitigation strategies for each of the identified hazards, flooding, drought, wildfire, and hazardous material spills, input was sought from the working group, the public in the form of a public hearing, the county and participating governing bodies, the New Mexico Office of Emergency Management mitigation office, and surrounding counties and states. Agencies and departments identified as having a role in the completion of specific objectives were also given the opportunity to provide additional input into the final portion of this process, the implementation plan.

The implementation plan is designed to project possible completion dates for the strategies developed for each hazard. It provides for progress reports concerning these projects, evaluation of each project's success, and an annual report of the overall mitigation process within McKinley County and Gallup. Based on evaluation of the progress reports and successful completion of the mitigation objectives, new objectives can be established to continue the hazard mitigation process. Since mitigation is an ongoing process as each hazard is eliminated or reduced to a satisfactory level, other hazards identified as requiring mitigation will be added, new strategies will be developed, and goals and objectives established.

FLOODING

Section 1. McKinley County

McKinley County has a number of roadways that cross arroyos, draws, and washes, many of which do so at low water points without the benefit of raised roadways or culvert systems. Due to this situation there is a danger of loss of life during rainstorms and particularly during flash floods. In addition to the potential for flooding, there are also problems with roads that parallel these arroyos, draws, and washes where erosion can cause the collapse of the road surface or, in some cases, undercut structural foundations. Erosion is presently exacerbated due to drought conditions that are causing the vegetation that stabilizes the waterway's bank systems to die off. A further problem is that the present floodplain maps have not been updated since 1978.

Goals and objectives to resolve these problems are as follows.

Goal:

1. Ensure that all floodplains in McKinley County are identified and that building/zoning codes are enforced in the construction of all new structures and the modification of all existing structures in the floodplain.

Objectives:

1.1 Begin participating in the National Flood Insurance Program.

1.2 Seek an update of floodplain maps for McKinley County.

1.3 Review all present floodplain related building/zoning codes for McKinley County to ensure that future construction projects will not create the potential for loss due to flooding.

Goal:

2. Evaluate all county roads to ensure the safety of the county transportation system relating to flood danger.

Objectives:

2.1 Inspect county road system for flood-prone crossings and develop safety crossings for county transportation use.

2.2 Inspect county road system for the possibility of roadway collapse potential due to the erosion of waterway banks.

Action Plans:

1. **Participation in National Flood Insurance Program.** McKinley County will apply for admission into the National Flood Insurance Program (NFIP) and identify a floodplain manager.

   Funding Source:
   McKinley County

   Responsible Agencies:
   County Commission
   County Emergency Manager

   Achievable Results: McKinley County is not presently participating in the NFIP, and therefore people whose property is located in identified floodplains are not eligible for FEMA flood insurance. In addition, no clear inventory of structures presently at risk in the county has yet been developed. By becoming a participant in the NFIP, a more organized and realistic approach to floodplain management can be achieved throughout the county. Building and zoning codes can be modified or created that (1) reflect the county's efforts toward mitigating the problems associated with flooding; (2) reduce the threat of repetitive losses; and (3) stop further growth into the county's presently identified floodplains.

2. **Update Floodplain Maps.** A petition to FEMA requesting the updating of McKinley County floodplain maps will be made. The present maps for McKinley County and its incorporated areas date from 1978.

   Funding Source:
   FEMA

   Responsible Agencies:
   County Floodplain Manager
   FEMA

   Achievable Results: By updating the floodplain maps for McKinley County, a more comprehensive inventory can be established showing the existence of structures located in floodplains. Additionally, new areas susceptible to floods due to erosion and construction will be identified. At present, management of known county floodplains has not followed NFIP guidelines, and development and construction in county floodplains has not been examined since 1978. Reexamining county floodplains will not only establish their current status, but will also ensure identification of a true inventory of structures that could be at risk. The establishment of current floodplain locations will further assist in planning growth and development in a controlled and safe environment.

3. **Review and Update of Building/Zoning Codes.** A review of the present county building and zoning codes will be conducted in order to reveal any gaps that may exist. The identified deficient areas of the codes will be amended and brought before the county commission for adoption.

   Funding Source:
   McKinley County

   Responsible Agencies:
   County Floodplain Manager
   County Engineer
   County Planning Office
   County Commission

   Achievable Results: The evaluation and modification of the present county building and zoning codes will ensure that new construction will be avoided within floodplain areas and that the most up-to-date construction methods are employed in flood-prone areas in the future. These actions will ensure that losses due to flooding do not increase due to expansion into these areas and that existing structures in these areas, when damaged, are rebuilt to withstand future incidents or are not rebuilt in the area.

   Instituting new floodplain regulations and modifying present standards in the county floodplain will not correct the present situation. The value of existing

residences will continue to increase due to inflation, thereby increasing the potential loss during flood events. However, no new exposure would be created due to restrictions in the construction of new buildings in floodplain areas. In addition, if a flood were to occur, rebuilding presently at-risk structures will be regulated so as to reduce or even eliminate the possibility of repetitive losses.

4. **Inspection and redesign of water crossings.** An inspection of all water crossings by county roads will be conducted to evaluate their safety based on present acceptable practices. Those roads found to be deficient will be identified, prioritized, and brought to acceptable levels of safety.

   Funding Source:
   McKinley County

   Responsible Agencies:
   County Floodplain Manager
   County Engineer
   County Public Works

   Achievable Results: Redesigning county roads will reduce the risk of flood-related deaths. Due to the number of roads involved, a priority list based on frequency of use and level of danger will be established in order to deal with the most hazardous situations first. The recent death of an individual attempting to negotiate a low water crossing in McKinley County illustrates the inherent dangers that exist during a flood event. Although the number of deaths due to flooding occurring over the years is small, the potential for further loss of life is high. Evaluating low water crossings in the county will identify locations that need special attention and possible redesign. In addition, evaluating updated floodplain maps may identify new problem locations. There will always be risk associated in negotiating a low water crossing when water is present; however, this risk can be reduced.

4. **Safe Crossing Program.** A public education program will be developed to teach school age children and adults about the dangers associated with negotiating low water crossings when water is present.

   Funding Sources:
   McKinley County
   New Mexico Department of Transportation
   Federal Department of Transportation

   Responsible Agencies:
   County Commission
   County Emergency Manager
   County Floodplain Manager
   County Public Information Officer

Achievable Results: Instituting a public awareness program concerning the dangers associated with low water crossings can ensure that the general public is educated about the present dangers existing in the county. Research has shown that instituting awareness programs in schools has resulted in a higher awareness not only for the children, but also for their parents. Public awareness programs will be instituted to run just prior to the most likely times, such as the rainy season, when the dangers associated with low water crossings are generally at their peak. Understanding the dangers associated with low water crossings will help reduce potential loss of life.

5. **Evaluation of waterway banks in relationship to county roads.** An inspection of all county roads paralleling arroyos, draws, and washes will be conducted in order to evaluate the condition of the waterway banks and the danger of erosion causing roadway collapse. Those roads that are identified as being susceptible to this condition will be identified and plans made to stabilize them.

   Funding Source:
   McKinley County

   Responsible Agencies:
   County Floodplain Manager
   County Engineers
   County Public Works

   Achievable Results: A reduction in flood-related deaths and roadway damage can be expected due to the stabilization of waterway banks located in areas that could cause erosion and subsequent roadway collapse. When flooding occurs, over time the power of the water rushing through the county's waterways erodes soil along its banks and changes the course of the waterway. The use of riprap and other bank stabilization techniques can reduce or even eliminate the erosion caused during flooding. Many county roads throughout McKinley County use low water crossings instead of the more costly culverts, bridges, or other elevated roadways. In addition, some of these roadways run parallel to waterways. When flooding occurs in areas without bank stabilization in place, these road surfaces can be washed out and possibly destroyed. The application of bank stabilization in these areas can reduce or eliminate the need to rebuild these roads after flooding occurs. These bank stabilization projects will reduce the possibility of repetitive loss.

Section 2. Gallup

Gallup suffers from many problems related to flooding. These problems have been compounded by construction taking place in the city within identified floodplains. In addition to the problems known to exist, continuing construction within the city has altered and possibly created new areas of potential flooding. Gallup's present floodplain

maps were created in 1979 and seriously require updating. In addition, the present storm drainage system is inadequate to handle known amounts and locations of runoff within the city. This system requires evaluation and updating.

Goals and objectives to resolve these problems are as follows:

Goal:

1. Identify and prevent growth into floodplains in Gallup.

Objectives:

1.1 Seek an update of floodplain maps for Gallup.

1.2 Review all present floodplain-related building/zoning codes for McKinley County to ensure that future construction projects will not create the potential for loss due to flooding.

Goal:

2. Evaluate the existing storm drainage system in Gallup and upgrade as required.

Objectives:

2.1 Redesign the system presently in place for the activation of the pumping station in the Maloney Ave. area in order to avoid future flooding.

2.2 Locate areas within Gallup's present drainage system where diversion channels or retention basins can be created to reduce the demands on the present storm drainage system.

2.3 Based on updated floodplain maps, evaluate and redesign the present storm drainage system to provide adequate drainage in Gallup during storm situations.

Action Plans:

1. **Update Floodplain Maps.** A petition to FEMA requesting the updating of Gallup's floodplain maps will be made. The present maps for Gallup date from 1978.

    Funding Source:
        FEMA

    Responsible Agencies:
        City Floodplain Manager
        FEMA

Achievable Results: By updating Gallup's floodplain maps, a more comprehensive inventory can be established showing the existence of structures in floodplains. Additionally, new areas susceptible to floods due to erosion and construction will be identified. At present, management of known county floodplains has not followed NFIP guidelines, and development and construction in county floodplains has not been examined since 1978. Reexamining county floodplains will not only establish their current status, but will also ensure identification of a true inventory of structures that could be at risk. The establishment of current floodplain locations will further assist in planning growth and development in a controlled and safe environment.

2. **Review and Update of Building/Zoning Codes.** A review of the present city building and zoning codes will be conducted in order to reveal any existing gaps. The identified deficient areas of the codes will be amended and brought before the City Council for adoption.

    Funding Source:
        City of Gallup

    Responsible Agencies:
        City Floodplain Manager
        City Engineer
        City Planning Office
        City Council
        City Attorney

    Achievable Results: The evaluation and modification of the present city building and zoning codes will ensure that new construction will be avoided within floodplain areas and that the most up-to-date construction methods are employed in flood-prone areas in the future. These actions will ensure that losses due to flooding do not increase due to expansion into floodplains and structures in these areas, when damaged, are rebuilt to withstand future incidents or relocated.

    Utilizing strong building and zoning codes will ensure that financial losses due to flooding do not increase. They will also reduce potential losses over time as older structures are razed and new construction replaces them.

    Along with strengthening building codes in flood-prone areas, new regulations restricting runoff will be needed. At present, builders are not required to create on-site ponding for potential storm water runoff. The retention of storm water runoff will prevent increased demands on the storm drainage system and will ensure that new flooding problems are not created as a result of future construction.

3. **Pump activation method.** Identify the authority responsible for activating the pumping station located in the basin along Maloney Avenue, and either (a) obtain access to the pump to avoid critical delays in activation, or (b) redesign the pumping station in order to provide for automatic activation when drainage into the area occurs.

   Funding Source:
   - New Mexico State Highway Department
   - City of Gallup

   Responsible Agencies:
   - City Attorney
   - Pump station owner

   Achievable Result: As the flooding of August 2, 2001 illustrates, the existing pumping system operated by the New Mexico Highway Department did not function as required due to delays in activation. The result of this failure was the accumulation of water to a depth of over 4 feet. The elimination of delays in activating this pumping system will reduce the likelihood of flooding in the area along Maloney Avenue during storm conditions. At present, the authorized operator for this pump resides in Grants, New Mexico, which involves a 62 mile trip in order to activate the pumping system. In addition, due to lack of maintenance, debris had collected in the pump intakes, which limited its efficiency in removing the water from the area. Faster activation of the pump station at 4th Street and Maloney Ave., as well as consistent maintenance, will reduce the likelihood of flooding in the future.

4. **Construction of diversion channels and required retention basins.** The present storm drainage system is inadequate to handle the demands of storm water runoff in Gallup. One area that has been identified as creating flooding is along 2nd Street to Maloney Avenue. Water currently runs into 2nd Street from the Little Puerco Wash, where it continues to Maloney Avenue and then collects. Building a series of diversion channels and required retention basins will help resolve this problem.

   Funding Sources:
   - City of Gallup
   - Federal Government

   Responsible Agencies:
   - City Floodplain Manager
   - City Engineer
   - City Public Works
   - City Council
   - City Attorney
   - U.S. Army Corps of Engineers

Achievable Results: The creation of diversion channels will direct excess storm waters away from the overstressed storm drainage system and into retention ponds where the waters can be maintained. In addition, all future site construction in Gallup will require that water that would fall on the site during a projected 100-year flood be retained on site, thereby avoiding additional demands being made on the present storm drainage system. This lessening in demand will reduce the likelihood of sheet flooding through the downtown and lower elevation areas of Gallup.

The U.S. Army Corps of Engineers has been working to create a retention basin at 2nd Street to prevent the drainage and collection of storm waters on 2nd Street and Maloney Avenue. To this end, the Corps has been acquiring land for the creation of the retention basin. It is anticipated that many of the present flooding problems will be eliminated when this project is completed, in conjunction with the resolution of the pump station problem at 4th and Maloney Avenue.

5. **Evaluation and upgrading of storm drainage system.** After Gallup's present floodplain maps have been updated, the city's storm drainage system will be evaluated and upgraded.

    Funding Source:
        City of Gallup
    Responsible Agencies:
        City Floodplain Manager
        City Engineer
        City Public Works

    Achievable Results: Upgrading Gallup's present storm drainage system, coupled with the requirement for on-site ponding for all new construction, will greatly reduce the risk of structural flooding within the city. As a result, the city could expect a reduction in insurance rates based on the reduced or eliminated risk of repetitive loss by flooding. In addition, a reduction in flooding will ensure the continued uninterrupted operation of local businesses, which will help maintain a steady economy in the area.

DROUGHT

Section 1. McKinley County

Presently McKinley County has very few measures in place to deal with the problems of drought. While some cities have drought plans that restrict the use of water during drought conditions, county residents are free to use water as they like. These types of restrictions are generally based on a sliding scale, with higher restrictions occurring as drought conditions worsen or having the restrictions relaxed as the drought conditions improve. Implementing a realistic plan of water restrictions and providing for its enforcement will not only help make the available water last longer, it will also help

prevent an area's water system from being overstressed. As the demand for water increases, the stress on water pipes increases, which in turn increases the possibility of pipe failure and service interruptions.

The amount of water used in McKinley County is further restricted based on water rights. Presently the amount of water being used in the unincorporated areas of McKinley County is not being monitored, and the actual amount of water being used is unknown.

Goals and objectives to resolve these problems are as follows:

Goal:

1. Establish a countywide water conservation program, through educating the general public, about methods that can be used to reduce present water use.

Objectives:

1.1 Provide the public with information concerning actions they can take to reduce their personal water use.

1.2 Provide the public with information concerning drought-resistant landscaping materials and the use of reusable water sources.

Goal:

2. Reduce overall water use in the county during times of drought.

Objectives:

2.1 Enact legislation that restricts water usage in McKinley County based on existing drought conditions.

Action Plans:

1. **Personal water use reduction.** The county will work with the New Mexico State Engineer's Office to provide the citizens of McKinley County with methods they can use in reducing their water use. This education will concern the benefits of installing low flow toilets and low flow shower heads in their homes.

   Funding Source:
   McKinley County

   Responsible Agency:
   McKinley County

Achievable Results: The use of low flow toilets and shower heads is recognized as one area in which the water usage of the general public can easily be reduced. Most toilets in use today use approximately 7 gallons of water per flush, while a low flow toilet uses less than 2 gallons per flush. The construction industry estimates that a low flow toilet saves approximately 10,000 gallons of water annually. The population of McKinley County is expected to increase to approximately 13,365 people or 3,300 families (based on a family of four) by 2010. If low flow toilets were installed into this additional housing, the result would be a savings of 33,000,000 gallons of water annually.

Low flow showerheads also reduce the amount of water used by a household. The average amount of water used in a shower accounts for approximately 22% of household water use. Based on the present water usage of a standard showerhead, the average family will use approximately 42,000 gallons of water per year for showers. A low flow showerhead reduces this amount by approximately 50%, or 21,000 gallons of water. Based on the same population increase, the installation of low flow shower heads in the additional housing would result in a savings of 69,300,000 gallons of water annually.

The overall savings from just these two measures would be approximately 102,300,000 gallons of water annually. Additional savings could be expected if present residential property owners retrofitted low flow toilets and low flow shower heads in their residences. Educating the general public is an effective method of providing them with this information. The reduction of water usage provided by low flow systems will extend the population that can be sustained by the presently available water in McKinley County.

Revising the county's building code to require the mandatory installation of low flow toilets and shower heads in new construction can insure that the predicted savings are achieved.

2. **Reusable water source.** The State of New Mexico has recently passed legislation concerning the use of gray water for irrigation. Information concerning the use of gray water, installation of gray water recovery systems, and the benefits gained will be provided to the general public.

Funding Source:
McKinley County

Responsible Agency:
McKinley County

Achievable Results: With the installation of gray water recovery systems in new residences expected to house the increased population projected for 2010, a savings of 21,000 gallons of water per household would be available by recycling the shower water alone. Additional recycling of water would also be available

from washing machines and sinks. As a result, more than 69,000,000 gallons of water would be available for use in landscaping and gardening for these residences alone. There will be additional savings as other county residents install gray water recovery systems. By providing the public with this information, people will have the knowledge to further reduce their water usage. The reduction in the annual water usage of the present population of McKinley County will result in an overall increase in the population that can be sustained by the water presently available.

Revising the county's building code requiring the mandatory installation of gray water recovery systems in new construction can insure that the predicted savings are achieved.

3. **Drought usage restrictions.** The County Commission will draft a water use restriction program based on a sliding scale with increasingly restrictive measures based on the severity of existing drought conditions.

Funding Source:
McKinley County
Responsible Agency(s):
McKinley County Commission

Achievable results: By enacting a sliding scale of water restrictions based on the severity of a drought, available water will be used in a more efficient manner. It is understood that sustaining human life is of primary importance during drought conditions. Therefore, the loss of ornamental landscaping becomes acceptable in order to meet the basic water needs of county residents. Presently there are no formal water restrictions in place in the county. Therefore, residents can use water any way they want. By enacting water restrictions, the use of the water that is available can be regulated.

Legislation of this type has been instituted in many areas of New Mexico to reduce the stress on available water resources that occurs during drought conditions. The need for such legislation is due to the fact that the threat of drought is always present in the Southwest, and must be recognized as an event that will continue to be cyclic in McKinley County.

Section 2. Gallup

Gallup uses subsurface water as its main water supply, and therefore the present drought conditions do not put its water supply in jeopardy in the short term. However, the drought does reduce the amount of aquifer recharge that is taking place, and it will result in a lowering of the water table, creating a need to drill wells deeper in order to continue to utilize these sources. In addition, the city is restricted in the amount of water it can draw from the aquifers, which in turn limits the potential for population growth to a finite amount. Population growth can be extended by enacting realistic water restrictions and

requiring residents to utilize water saving devices. These actions will also reduce the overall demands on the present city water delivery system, thereby slowing the need for its costly expansion.

Goals and objectives to resolve these problems are as follows:

Goal:

1. Reduce the city's water use during times of drought.

Objective:

1.1 Enact legislation concerning the restricted use of water during periods of drought.

Goal:

2. Reduce the annual usage of water by residential customers.

Objectives:

2.1 Create a public education program on the use of drought resistant plants for use in landscaping.

2.2 Create a public education program on methods of reducing water usage.

2.3 Revise the city's building code to require the use of low flow toilets and shower heads in new construction.

2.4 Revise the city's building code to require the use of gray water recovery systems in new construction.

Action Plans:

2. **Public Education Campaign.** The city will create a public education program to increase awareness of actions city residents can take to reduce their household water use. This program will include details of water restriction legislation, the use of drought resistant landscaping materials, the use of low flow toilets and shower heads, and the use of gray water recovery systems.

Funding Source:
City of Gallup

Responsible Agencies:
Gallup Public Information Officer
Gallup Water Department

Achievable Results: The use of educational programs in the school systems has proven highly successful in getting information to parents and teaching concepts of water conservation to future generations.

Presently non-native vegetation with a high demand for water is typically used for landscaping in most areas of the Southwest, including Gallup. The presence of an extended drought throughout the Southwest has redirected thinking concerning landscaping with native plants that require less water. In addition, many other wasteful water use habits are being reevaluated. Limited water resources in the Southwest, coupled with a growing need for water due to population growth and irrigation, requires that new water conservation measures become the normal operating philosophy for both public and private water use.

Programs that expose the public to water conservation techniques, including use of native, drought-resistant vegetation, can reduce overall water use considerably. Over the last several years, Albuquerque has successfully implemented a public education program on water conservation, resulting in a 10% reduction in annual water use.

2. **Water use restrictions.** The City Council will draft a water use restriction program based on a sliding scale with increasingly restrictive measures based on the severity of existing drought conditions.

Funding Source:
City of Gallup

Responsible Agency(s):
Gallup City Council

Achievable results: By enacting a sliding scale of water restrictions based on the severity of a drought, the available water will be used in a more efficient manner. It is understood that sustaining human life is of primary importance during drought conditions. Therefore, the loss of ornamental landscaping becomes acceptable in order to meet the basic water needs of city residents. By enacting water restrictions, the use of the water that is available can be regulated. Regulations limiting the time of day and day(s) of the week that residents can use water for landscaping will be considered. These types of limitations are effective methods for reducing the overall daily demand for water and will reduce the stress placed on the water delivery system.

Legislation of this type has been instituted in many areas of New Mexico to reduce the stress on available water resources that occurs during drought conditions. The need for such legislation is due to the fact that the threat of drought is always present in the Southwest, and must be recognized as an event that will continue to be cyclic in Gallup.

3. **Revision of the City's Building Code.** The Gallup City Council will revise the city's building code to require the use of low flow toilets and shower heads in all new construction.

Funding Sources:
- City of Gallup
- Property owners

Responsible Agencies:
- City Council
- City Attorney
- City Planning and Zoning
- Building inspectors

Achievable Results: The mandatory use of low flow toilets and showerheads will reduce the amount of water used on a daily basis. Initial benefits would be modest but would increase over the long term. Most toilets in use today use approximately 7 gallons of water per flush, while a low flow toilet uses less than 2 gallons per flush. The construction industry estimates that a low flow toilet saves approximately 10,000 gallons of water annually. It is estimated that Gallup's population will increase by 5,356 people by 2010, which is the addition of approximately 1,300 families. Residential building starts indicate that there is an average of 40 new residential units added to the city annually. Assuming each residence has one toilet, an annual savings of 400,000 gallons of water can be realized. By 2010, with a steady increase in residential construction, 240 new residences will be completed, with an annual savings of 2,400,000 gallons of water. The reduction of waste water will also reduce the demands on the present waste water system with the potential of increasing its service life.

Low flow showerheads also reduce the amount of water used by a household. The average amount of water used in a shower accounts for approximately 22% of household water use. Based on the present water usage of a standard showerhead, the average family will use approximately 42,000 gallons of water per year for showers. A low flow showerhead reduces this amount by approximately 50%, or 21,000 gallons of water. The annual savings from the estimated 240 new homes will be approximately 5,040,000 gallons of water. The combined water demand will be reduced by approximately 7,440,000 gallons of water annually. It is possible that additional housing will be required, based on the population projections of a 1,300 family increase. If an additional 1,060 housing units are required for the increased population, there will be an additional annual savings of 32,240,000 gallons of water.

4. **Required installation of gray water recovery systems.** The City Council will enact legislation requiring the installation of gray water recovery systems in all new construction in the city.

Funding Source:
City of Gallup

Responsible Agency(s):
Gallup City Council
Gallup City Attorney's Office

Achievable results: The mandatory use of gray water recovery systems will reduce the amount of water used on a daily basis. Initial benefits would be modest but would increase over the long term. Gray water is water that has been used for washing and is no longer considered to be potable, but it is not in the same category of waste water as toilet water. A gray water recovery system captures the non-toilet water used and recycles it for use in irrigation. In 2003 the State of New Mexico enacted legislation that allows the use of gray water for irrigation. Average household water usage is approximately 186,363 gallons annually, including standard toilet use of approximately 12,000 gallons. By recycling gray water, approximately 160,000 gallons of water would be available annually for irrigation use. Considering the projected number of new residences in Gallup by 2010, the reduction in municipal water use would be significant. Based solely on the construction of 240 new homes by 2010, there could be a savings of almost 38,400,000 gallons annually.

WILDFIRE

Section 1. McKinley County

Wildfire is of concern to two isolated communities in McKinley County, Timberlake and McGaffey. In these areas, the potential for loss of life or property from wildfire is high due to the urban/wildland interface. Although it is acknowledged that the threat of wildfire can not reasonably be eliminated, it is possible to reduce its effects in these areas.

Goals and objectives to resolve these problems are as follows:

Goal:

1. Increase the safety of the residents in the Timberlake and McGaffey areas by reducing the threat of wildfire in the area.

Objectives:

1.1 Provide the residents of areas identified as urban/wildland interface with information concerning the creation of defensible space around their residences.

1.2 Provide the residents of areas identified as urban wildland interface with information concerning the use of fire resistant landscaping materials.

1.3 Establish revised building codes for areas identified as urban/wildland interface to require the use of fire resistant and fire retardant construction materials.

Action Plans:

1. **Defensible Space Education.** McKinley County, working with the State Forest Service and the National Forest Service, will identify the areas of urban/wildland interface and provide residents with information concerning the principle of defensible space. Additional town hall sessions will be made available to these residents as needed to ensure that an awareness and understanding of defensible space is created.

   Funding Sources:
   McKinley County
   New Mexico Forest Service
   National Forest Service

   Responsible Agency(s):
   McKinley County

   Achievable Results: Providing the residents of urban/wildland interface areas with information concerning defensible space increases their awareness of actions they can take in order to create a safer living environment. The historic tree population in forest areas is approximately 20 to 25 trees. Presently the number of trees in most forest areas in New Mexico is approximately 200 to 250 per acre, which has created an extremely high fuel load and actually reduces the available ground water to support the area's vegetation. In many cases the foliage is so dense that rain never reaches the ground due to the thickness of the canopy. The implementation of a defensible space effort can reduce the fire load in these areas. It is difficult to determine a cost benefit relationship to this program, since there is no requirement for residents to institute the suggested methods. However, increasing residents' knowledge will increase the potential for a reduction in risk.

2. **Landscaping Material Education.** McKinley County, working with the New Mexico Forest Service and the National Forest Service, will provide the residents of urban/wildland interface areas with landscaping suggestions that have been proven to be fire resistant.

   Funding Sources:
   McKinley County
   New Mexico Forest Service
   National Forest Service

   Responsible Agency(s):
   McKinley County

Achievable Results: Providing the residents of urban/wildland interface areas with information concerning the use of fire resistant landscaping materials increases their awareness of actions they can take to reduce their personal risk of loss due to wildfire. The use of fire resistant plants and the institution of defensible space can reduce area residential risk of loss due to wildfire. It is difficult to determine a cost benefit relationship for this program since there is no requirement to comply with these methods. However, increasing residents' knowledge will increase the potential for a reduction in risk.

3. **Revision of building codes.** The McKinley County Commission, working with the County's planning and zoning offices, will identify areas of urban/wildland interface. In addition, construction requirements will be revised for these areas to ensure that fire resistant and fire retardant materials are used in all future construction.

Funding Source:
McKinley County

Responsible Agencies:
McKinley County Commission
McKinley County Planning Office

Achievable Results: The institution of new construction standards for structures in the urban/wildland interface will minimize future losses due to wildfire as new building projects are introduced in the area. In addition, if a wildfire occurs and existing structures are destroyed, the new construction standards will be used, which will further reduce the potential of losses due to fire.

HAZMAT

Section 1. McKinley County

Due to the major transportation routes that traverse McKinley County, the potential for a HAZMAT incident will always remain high. It is extremely unlikely that the threat of a HAZMAT event can be eliminated in the county. However, the impact can be reduced through thoughtful planning.

Goals and objectives to resolve these problems are as follows:

Goal:

1. Reduce the consequences of a HAZMAT incident when it occurs in McKinley County.

Objectives:

1.1 Develop an alternate route around known potential HAZMAT event locations.

1.2 Create building/zoning codes that limit the exposure of major transportation routes to potential fixed site HAZMAT events.

Action Plans:

1. **Creation of localized bypasses.** Create frontage roads around the potential impact zones of known fixed site hazardous material users/handlers.

    Funding Sources:
    United States Department of Transportation
    New Mexico Department of Transportation
    McKinley County

    Responsible Agencies:
    United States Department of Transportation
    New Mexico Department of Transportation
    County Emergency Manager
    County Engineer
    County Attorney
    County Commission

    Achievable Results: Creating localized bypasses can ensure that even if a HAZMAT event occurs at a known fixed facility, the disruption in the transportation route can be minimized by having an established secondary route already in place. It is acknowledges that this route may not be as efficient as the primary route. However, it will keep the transportation system from being completely shut down.

2. **Evaluate and revise building/zoning codes.** Evaluate and revise the county's building/zoning codes to prevent new construction of fixed site hazardous material users/producers from building within a proximity that could affect major transportation routes or populated areas in the event of a HAZMAT event.

    Funding Source:
    McKinley County

    Responsible Agencies:
    County Emergency Manager
    County Attorney
    County Commission

Achievable Results: By eliminating new fixed site hazardous material users/producers within the potential HAZMAT zone of effect, no new potential transportation interruptions or risks to populated areas will be created. It is understood that this will not reduce the present threat level to the transportation routes or present population. However, it will eliminate the addition of new risks to these interests.

3. **Review and Revision of the All Hazards Emergency Operations Plan.** McKinley County has an All Hazards Emergency Operations Plan that is used during emergency response to events occurring in the county. This plan requires regular review and updating to ensure that it remains an effective tool in responding to emergency/disaster events.

    Funding Sources:
    - McKinley County
    - New Mexico Office of Emergency Management
    - FEMA

    Responsible Agencies:
    - McKinley County Emergency Manager
    - Area law enforcement agencies
    - Area fire departments
    - Other identified response agencies
    - Area volunteer agencies

    Achievable Results. The review and revision of the present McKinley County All Hazards Emergency Operations Plan will ensure that it continues to function effectively during the response to emergency/disaster events occurring in McKinley County. With new awareness of the threat of both domestic and foreign terrorism, the McKinley County plan requires updating. As various area response agencies gain new equipment and personnel, these changes need to be reflected in the plan.

    In addition, the review and possible revision of the McKinley County All Hazard Emergency Operations Plan provides a forum for area response agencies to review each agency's response priorities, functional responsibilities, and relationship to other responding agencies.

3. **Public Education Program.** The county will create a public education program to increase awareness of actions county residents can take during emergency/disaster events to assist in protecting themselves. This program will go beyond a single hazard type and will include information concerning actions that people can take to prepare for possible hazards and what actions to take during an emergency situation.

Funding Sources:
McKinley County

Responsible Agencies:
McKinley County Emergency Manager
McKinley County Fire Administration

Achievable Results. Prior to the occurrence of an emergency/disaster event, there are numerous actions that the public can take to be prepared when it occurs. Being prepared for an emergency not only helps provide for a family's peace of mind, it provides for their welfare during an emergency situation. A prepared population will allow first response agencies to be able to concentrate their efforts on the incident and reduce the number of calls into central dispatch.

The McKinley County Fire Administration is developing information that will be distributed throughout the county to assist the public in preparing for and reacting to emergency situations. This information will cover hazardous material incidents, lightning, fire, wildland fire, winter storm, earthquake, flood, and tornado/downbursts.

Section 2. Gallup

The presence of major transportation routes within Gallup city limits creates the potential for HAZMAT incidents. The effect of such an event could very likely be magnified by the city's location and geographic features. It is acknowledged that relocating the rail lines running through Gallup is presently economically infeasible. However, certain actions can be taken to reduce the risk of a potential HAZMAT event occurring within the city limits. Additionally, further actions can be taken to minimize the potential future risk to the community.

Goals and objectives to resolve these problems are as follows:

Goal:

1. Reduce or eliminate the potential effects of a HAZMAT incident in Gallup.

Objectives:

1.1 Review and evaluate Gallup's building/zoning codes and restrict the construction of new hazardous material users/producers within city limits.

1.2 When new infrastructure or schools locations are considered, ensure that they are located outside the potential affected zones of a HAZMAT incident.

1.3 Evaluate the possibility of creating a hazardous material bypass around Gallup.

Action Plans:

1. **Review and amend building/zoning codes.** Evaluate and revise the county's building/zoning codes to determine any planning gaps and amendments necessary to restrict the construction of new fixed site hazardous material facilities from building within a proximity that could affect major transportation routes or populated areas in the event of a HAZMAT event.

   Funding Source:
   City of Gallup

   Responsible Agencies:
   City Emergency Manager
   City Engineer
   City Planner
   City Attorney
   City Council

   Achievable Results: Future expansion within Gallup will be controlled in order to ensure that no new fixed site hazardous material facilities will be built within city limits. Although this will not reduce the present risk, it will ensure that the risk to the community is not increased.

2. **Comprehensive review prior to new construction.** The city will adopt a policy in which no new infrastructure or public schools will be built in areas that contain the potential for a HAZMAT incident.

   Funding Source:
   City of Gallup

   Responsible Agencies:
   City Emergency Manager
   City Engineer
   City Council

   Achievable Results: Although it is acknowledged that some present infrastructure and public school facilities exist within the potential affected area of a HAZMAT incident, no new facilities will be built in areas known to contain such a hazard. This action will result in preventing new hazard material threats to the Gallup's infrastructure.

3. **Creation of a hazardous material bypass.** The long-term solution to reduce the potential of a HAZMAT incident in Gallup would be the establishment of a hazardous material bypass around the city.

Funding Sources:
United States Department of Transportation
New Mexico Department of Transportation

Responsible Agencies:
United States Department of Transportation
New Mexico Department of Transportation
City Emergency Manager
City Engineer
City Planner
City Public Works

Achievable Results: The creation of a bypass around Gallup will substantially reduce the potential of a HAZMAT incident occurring within the city. It is acknowledged that localized transportation of hazardous materials will still exist. However, routing such traffic around the city instead of through it will reduce the overall risk to the community. Constructing an alternate hazardous material transportation route is the only way to ensure that accidents involving large amounts of hazardous material affect the minimum number of residents. An alternate route will never completely eliminate the possibility of a hazardous material release in a populated area of the city; however, it will minimize such exposure. In addition, future growth in Gallup can limit the exposure of increased population in these areas.

ALTERNATIVE PLANNING: FLOODING

Section 1. McKinley County

The county could plan to pave all unimproved roads within the county. In addition, all roadways in the county could be raised above waterways and have culverts installed at their low points to ensure that the road surface remains above the potential water level.

Section 2. Gallup

The city could purchase all property located in existing floodplain areas. All structures located on these properties will be relocated or razed and the area converted into recreational park areas.

ALTERNATIVE PLANNING: DROUGHT

Section 1. McKinley County

1. The county could install water meters to monitor water use. The use of water meters would allow the county to monitor water usage and ensure that water users did not exceed their given water right allotments.

2. A rebate system could be established in McKinley County to provide a yet-to-be-determined rebate to residents who (1) retrofit their existing homes with low flow toilets and shower heads, or (2) install gray water recovery systems.

Section 2. Gallup

1. A no growth policy could be established which would prevent new construction or development being annexed to the city. This would ensure that the city's present population would be secure at its current level of water use.

2. An increase in water prices could be instituted to discourage the community's present level of water usage. The cost of water could be increased depending on the amount used. Heavy water users would pay higher prices in the form of a higher cost per gallon than those that use less.

ALTERNATIVE PLANNING: WILDFIRE

Section 1. McKinley County

1. All property within the Timberlake and McGaffey areas would be condemned and taken over by the county. Structures in these areas would be razed and the area would become a designated wild land preserve.

2. Legislation could be passed requiring property owners residing in Timberlake and McGaffey to create defensible space around all structures on their property. Refusal to cooperate could result in fines followed by county crews creating the space and charging the property owner for the work.

ALTERNATIVE PLANNING: HAZMAT

Section 1. McKinley County

The county could bar the creation of all new facilities that engage in the use or manufacture of hazardous material. Additionally, the county could pose high insurance and safety requirements on existing facilities and prevent their future expansion.

Section 2. Gallup

The city could institute a moratorium on the construction of all new facilities involved in the use or manufacturing of hazardous material. Additionally the city could pose high insurance and safety requirements on the existing facilities within the city and prevent their future expansion.

McKinley County Mitigation Plan
2005

Part IV
Implementation and Monitoring Plan

Part IV
Implementation and Monitoring Plan

INTRODUCTION

The McKinley County Implementation and Monitoring Plan is designed to take the action plans described in Part III and make them reality. In order for this to occur, each participating jurisdiction has evaluated the action plans and placed them into a priority of completion. This priority is based on the jurisdiction's hazard assessment for the immediate need for action, the action's ability to meet the goals and objectives of the mitigation plan, the action's value to the jurisdiction as a whole, the action's value to the county as a whole, the jurisdiction's capability to complete the action, the ease of implementation, and the action's ability to meet the goals and objectives of multiple jurisdictions.

PRIORITY OF ACTIONS

Immediate need for action. The need for any specific action is considered a priority if the impact caused by the hazard and the potential for its occurrence are considered high. In such cases the action to be taken can have an immediate impact in reducing or eliminating the effects of the potential occurrence.

Action to meet goals and objectives. Each action must be evaluated on its ability to further the goals and objectives in the effective mitigation of the given hazard. Does the action provide the most forward progress toward the jurisdiction's established goals and objectives?

Value to the jurisdiction. How much of the jurisdiction will benefit from a given action? The larger the overall effect of the action, the higher its priority should be.

Value to the county. Beyond the benefit to a specific jurisdiction, consideration should be given to the action's benefit to the county as a whole. Priority may be given to actions that provide the most benefit to the entire county and not just to the specific jurisdiction.

Capability to complete action. There are a multitude of possible solutions to every hazard. However, it must be realized that while all of these solutions may be accomplished given enough money and time, the reality is that no jurisdiction has unlimited funding. Therefore, we must consider the question of the jurisdiction's ability to complete the action. Actions that are presently within the jurisdiction's capability may be accomplished while plans are made toward the accomplishment of more costly actions. Consideration must also be given to the cost versus benefit that can be obtained from any given project. The mere fact that a project may be within the jurisdiction's financial means is not the only consideration. The extent of the project's benefit to the largest number of residents should also be considered. Certain projects with lower costs could have a more comprehensive effect on larger populations compared to higher-priced

efforts. A project with a small cost but greater positive impact on the community would be considered to have a better cost-benefit ratio, and therefore could be considered for implementation prior to higher-priced, less beneficial projects.

Ease of implementation. Consideration should be given to the ease of implementing any specific action plan. While some actions may take years to analyze, obtain funding for, secure property, and design, others can be completed without much delay. For example, the construction of a dam is much more complicated then the enacting of legislation preventing construction within a known floodplain.

Implementation of plans. Once each action plan is evaluated and prioritized, it is necessary to ensure that each action plan is carried out. In order to ensure that progress is made toward completing any given action, it is necessary to establish the action's details, including when it should be completed, the requirements for its completion, where the action is to be taken, what benchmarks are appropriate, and who will be responsible for its progress.

Evaluation of plan's results. Along with establishing the priority of action and identifying specific actions and responsible agencies, it is necessary to evaluate the progress toward the completion of each action and its effective results. Periodic progress reports and evaluations are necessary to accomplish this. Each progress report should reflect the work accomplished to date, the work still outstanding, and the action's impact in implementing the success of the goals and objectives that have been identified for a given hazard. If it is determined that modification of the initial action plan is required, this will be accomplished during the evaluation process.

Plan review and revision. In order to ensure a continuation of the mitigation process, it is necessary to perform a periodic review of the plan and, when necessary, revise it. During this process, the progress of the specific action plans will be reviewed and additional action plans created as needed. This plan review and revision will be accomplished by engaging the county's working group and the public in order to ensure that the mitigation of hazards within the county and its jurisdictions is being accomplished.

IMPLEMENTATION OF ACTION PLANS

The action plans identified in Part III of the McKinley County Mitigation Plan describe mitigation plans to either eliminate or reduce potential threats to the community as a result of potential future hazardous occurrences in the county and its participating jurisdictions. Each of these action plans requires scheduling for implementation, and progress and completion of these actions must be monitored. In addition, McKinley County and Gallup want to ensure that the future growth of their communities does not add to or create new exposure to existing hazards. Finally, the McKinley County Mitigation Plan will continue to be kept current and up-to-date by ensuring that the plan is periodically reviewed and new input is added.

Implementation. The action plans described in Part III of the McKinley County Mitigation Plan have been scheduled for implementation as described below. It is understood that this proposed schedule outlines a preferred calendar to achieve the goals of the mitigation process, but that it may not be possible to complete all scheduled action plans in the time frames established. If completion goals are not achieved on schedule, the action plans will remain the achievable goals of this plan and will be rescheduled as needed.

SCHEDULE OF ACTION PLANS

Flooding

Section 1. McKinley County

Participation in National Flood Insurance Program. McKinley County plans to begin the process of becoming a participant in the National Flood Insurance Program during 2004. It is anticipated that this process may be completed by 2005.

Updating of floodplain maps. The McKinley County floodplain manager will work with FEMA to request an update of the county floodplain maps. This process will be initiated after the approval of this plan; however, it is a long-range project with an anticipated completion date of 2010.

Review and updating of building and zoning codes. The McKinley County building and zoning codes will be reviewed and updated to reflect the county's entrance into the FEMA floodplain management program. This project will be accomplished by the county's floodplain manager, county planning office, and building inspector's office. This process is expected to be completed within one year. These codes will be further reviewed and modified when the updating of the floodplain maps is completed.

Inspection and redesign of water crossings. McKinley County Public Works will inspect the low water crossings located in the county and evaluate them for possible redesign. This process will be accomplished during 2004 and reviewed annually. Low water crossings found to be in need of improvement will be prioritized and corrected as funds become available.

Safe crossing program. The McKinley County Emergency Manager and floodplain manager will create a public awareness program concerning the dangers of crossing low water areas during times when water is present. This project is expected to be completed in one year and will be used annually prior to the major rainy periods of July through September.

Evaluation of waterway banks in relation to county roads. Waterways falling within the county's responsibility will be inspected to ascertain the need for bank stabilization. Upon completion of the inspection process, potential problems will be determined, and bank stabilization projects will be established to remedy the situation. This process will

be accomplished during 2004 and reviewed annually. Locations of needed bank stabilizations will be scheduled for work depending on the level of risk posed and the availability of funding.

Section 2. Gallup

Updating floodplain maps. The Gallup floodplain manager will work with FEMA and the McKinley County floodplain manager to request an update of the city's floodplain maps. This process will be initiated after the approval of this plan; however, it is a long-range project with an anticipated completion date of 2010.

Review and updating of building and zoning codes. The Gallup building and zoning codes will be reviewed and updated to reflect the city's annexation of areas identified as being in the floodplain, and require all new construction in these areas to comply with the city's floodplain building and zoning requirements. This project will be accomplished by the city's floodplain manager, city planning office, and building inspector's office. This process is expected to be completed within one year.

Pump activation methods. The McKinley County Emergency Manager will continue to work with the New Mexico Highway Department to ensure that the pumping station located on Maloney Street is maintained and that adequate procedures remain in place for its timely activation during flooding events. An annual review of procedures and notification will be conducted.

Construction of diversion channels and required retention basins. The U.S. Army Corps of Engineers is currently working to construct a retention basin on the Little Puerco Wash in order to reduce or eliminate the threat of flooding along 2nd Street and into the area of Maloney Street. This project is anticipated to be completed by 2006.

Evaluation and upgrading of storm drainage system. The Gallup Department of Public Works will monitor the current storm drainage system to ensure that it remains functional and clear of debris. Additionally, the Department of Public Works, in conjunction with the City Engineer's Office, will evaluate the need for additional storm drainage or the construction of diversion channels and retention basins to reduce or eliminate potential flooding.

Drought

Section 1. McKinley County

Personal water use reduction. The McKinley County Emergency Manager will work with the city water utility and the New Mexico State Engineer's office to create a public education and awareness program that will provide the citizens of McKinley County with methods they can use to reduce their annual water use. This program will be presented at least annually for the general public, and also through the public school system, when possible.

Reusable water sources. Working with the State Engineer's Office, a public education program will be developed and made available throughout the county concerning water use and the benefits of gray water recycling. This program will begin in 2004 and become an ongoing process.

Drought usage restrictions. The McKinley County Commission will enact legislation to decrease water use during periods of drought. These water usage restrictions will increase based on an assessment of the available water at any given time. This legislation is expected to be completed within one year.

Section 2. Gallup

Public education campaign. Working with the State Engineer's Office, a public education program will be developed and made available throughout the county concerning water use and water saving techniques. This program will begin in 2004 and become an ongoing process.

Water usage restrictions. The Gallup City Council and the city water utility will review the present water use restrictions and ensure that all possible areas of conservation have been explored. The water usage restrictions will be modified as necessary. This project is expected to be completed in one year.

Revision of the city's building code. Legislation will be enacted by the Gallup City Council recommending the use of both low flow toilets and showerheads in all new construction. This legislation is anticipated to be completed within the year. In addition, legislation requiring the use of low flow toilets and shower heads in all new construction will follow in approximately three years.

Required installation of gray water recovery systems. Legislation will be enacted by the Gallup City Council that will recommend the use of gray water recovery systems in all new construction. This legislation is anticipated to be completed within the year. In addition, legislation requiring the use of gray water recovery systems in all new construction will follow in approximately three years.

Wildfire

Defensible space education. The McKinley County Emergency Manager, working with the County Fire Marshal, will create a public education program to inform those living within wildfire danger areas, particularly in the urban/wildland interface, how to create defensible space around their residences. This program will begin immediately and will become an ongoing process.

Landscaping material education. The McKinley County Emergency Manager, working with the County Fire Marshal, will create a public education program to inform those living in wildfire danger areas, particularly in the urban/wildland interface, of plant

materials that are considered fire resistant for use around their residents. This program will begin immediately and will become an ongoing process.

Revision of the building code. The McKinley County Emergency Manager, working with the County Fire Marshal, will assist in revising the present county building code to require the use of fire resistant and fire retardant materials in future construction in areas considered as being in the urban/wildland interface. It is anticipated that this revision will be completed by 2005.

HAZMAT

Section 1. McKinley County

Creation of localized bypasses. The McKinley County Emergency Manager will work with the County Department of Public Works, the New Mexico State Police, and the New Mexico Highway Department to develop localized bypasses in areas where a fixed site HAZMAT event could cause the closure of Interstate 40. If it is deemed appropriate to consider this project, it will be a long-term process, with completion expected no sooner than 2010.

Evaluation and revision of building codes. The McKinley County Commission will evaluate the possible revision of the current building and zoning codes to ensure that the future construction of fixed hazardous material sites will not be located in areas where a HAZMAT event could disrupt travel on Interstate 40. This evaluation and modification of the county building and zoning codes will be completed by 2006.

Updating of the McKinley County Emergency Operations Plan. The McKinley County Emergency Manager and the Local Emergency Planning Committee will review and update the county's emergency operations plan. This project will be completed by 2005 and be reviewed annually after its completion.

Public education program. The McKinley County Fire Administration and the Emergency Manager will create and distribute information to the general public to assist them in preparing for and reacting to emergency situations. This project will be completed in one year and be evaluated annually.

Section 2. Gallup

Review and amendment of the building and zoning codes. The McKinley County Emergency Manager will work with the Gallup City Planning Office to review current building and zoning codes and suggest modifications as needed to ensure that future development in Gallup is not planned or approved in areas of potential hazard risk. This review and modification is anticipated to be completed by 2005.

Comprehensive review prior to new construction. The Gallup City Council will enact legislation requiring the City Planning Office and the Building Inspector's Office to

ensure that no future construction is approved without consideration of its planned location in relation to the McKinley County Mitigation Plan and areas identified as potential hazardous areas. This legislation should be completed by 2005.

Creation of a hazardous material bypass. Planning of the HAZMAT bypass route will depend on the outcome of the transportation and response surveys. If it is deemed appropriate to consider this project, it will be a long-term process, with completion expected no sooner than 2010.

Priority of Actions

McKinley County and Gallup have established the following priority lists to complete mitigation actions that have been developed in the McKinley County Mitigation Plan. The determination of each project's priority was made during meetings and correspondence with members of the McKinley County Local Emergency Planning Committee. During these discussions it was determined that flooding has always been and remains the most recurring hazard. The completion of these projects will be based on (a) the priority list below, and (b) the funds available to complete them.

McKinley County Priority of Action

PRIORITY	PROJECT	LOCATION	HAZARD TYPE	COST
1	**Participation in National Flood Insurance Program.**	MCKINLEY	FLOOD	$10,000
2	**Updating of floodplain maps.**	MCKINLEY	FLOOD	$100,000
3	**Review and updating of building and zoning codes.**	MCKINLEY	FLOOD	$5,000
4	**Inspection and redesign of water crossings.**	MCKINLEY	FLOOD	$40,000
5	**Safe crossing program.**	MCKINLEY	FLOOD	$10,000
6	**Evaluation of waterway banks in relation to county roads.**	MCKINLEY	FLOOD	$30,000
7	**Defensible space education.**	MCKINLEY	WILDFIRE	$15,000
8	**Revision of the building code.**	MCKINLEY	WILDFIRE	$5,000
9	**Landscaping material education.**	MCKINLEY	WILDFIRE	$15,000
10	**Creation of localized bypasses.**	MCKINLEY	HAZMAT	$30,000,000
11	**Evaluation and revision of building codes.**	MCKINLEY	HAZMAT	$5,000
12	**Updating of the McKinley County Emergency Operations Plan.**	MCKINLEY	HAZMAT	$25,000
13	**Public education program.**	MCKINLEY	HAZMAT	$20,000
14	**Personal water use reduction.**	MCKINLEY	DROUGHT	$5,000
15	**Reusable water sources.**	MCKINLEY	DROUGHT	$5,000
16	**Drought usage restrictions.**	MCKINLEY	DROUGHT	$5,000

Gallup Priority of Action

PRIORITY	PROJECT	LOCATION	HAZARD TYPE	COST
1	**Updating floodplain maps.**	GALLUP	FLOOD	$100,000
2	**Review and updating of building and zoning codes.**	GALLUP	FLOOD	$5,000
3	**Pump activation methods.**	GALLUP	FLOOD	$2,000
4	**Construction of diversion channels and required retention basins.**	GALLUP	FLOOD	$4,000,000
5	**Evaluation and upgrading of storm drainage system.**	GALLUP	FLOOD	$10,000,000
6	**Public education campaign.**	GALLUP	DROUGHT	$15,000
7	**Water usage restrictions.**	GALLUP	DROUGHT	$5,000
8	**Revision of the city's building code.**	GALLUP	DROUGHT	$5,000
9	**Required installation of gray water recovery systems.**	GALLUP	DROUGHT	$5,000
10	**Review and amendment of the building and zoning codes.**	GALLUP	HAZMAT	$5,000
11	**Comprehensive review prior to new construction.**	GALLUP	HAZMAT	Project dependant
12	**Creation of a hazardous material bypass.**	GALLUP	HAZMAT	$30,000,000

Additional Mitigation Efforts

In addition to the specific actions listed above, McKinley County and Gallup acknowledge that it is necessary to ensure that future growth in the county should avoid or control the use of all areas containing known potential hazardous environments. Further, the mitigation of hazards will not stop even with the completion of each of the specific actions listed above. Therefore, hazard mitigation will become a county-wide ongoing and coordinated effort. The following areas of consideration will take place as part of this effort.

Evaluation of declared emergencies and activation of area emergency operations centers. In the event that an emergency declaration is made within the county or its participating jurisdictions, an evaluation of the events leading to this declaration will be made in order to identify possible mitigation actions that can be taken to reduce or eliminate this hazard in the future. In addition, the activation of an emergency operations center within the county will require this same type of evaluation to identify possible mitigation actions that can be taken.

Incorporation into existing efforts. Successful efforts at eliminating or reducing the consequences of future hazard events can not occur without controlling the growth of

new development within known hazardous areas. As part of implementing the resolutions of the McKinley County Mitigation Plan, all proposed new development must be evaluated against identified hazard-prone areas. Therefore, the building permit approval system will include a review of all newly-proposed development projects to keep them from being built in known hazard-prone areas such as floodplains. If a proposed project falls within such an area, the permit may be disapproved or additional construction requirements may be established to eliminate any dangers that could be caused by the existence of the hazard.

In addition, county and city planning staffs will ensure that all comprehensive plans that are developed based on the community's predicted growth patterns consider both hazard locations and the mitigation action plans to eliminate or reduce them. To accomplish this, the planning staff and the mitigation team will collaborate during the revision and updating of future comprehensive plans. Melding these two efforts will ensure that growth is steered away from identified hazard locations, wherever possible, and avoid increasing the potential damage risk they represent. When the hazard locations can not be avoided, building codes and zoning codes can be utilized to minimize the danger.

Additional projects may also be developed by the cooperative works of the planning staffs and the mitigation planning team during the revision and updating process of the comprehensive plans. Projects identified in this manner will be included in the revision and updating of the McKinley County Mitigation Plan.

To address the concerns and desires of the general public, efforts will be made to obtain their input. Obtaining this input will be accomplished in the form of questionnaires and advertised public meetings. In addition, the comprehensive plan will be made available through public libraries and the internet. Contact numbers and addresses will be made available to the public so that input can be generated at any time. Questionnaires and public meetings will also be scheduled after the occurrence of a major disaster to provide an avenue for public input.

Additional Functions. In addition to incorporating the ideas of hazard mitigation into all planning efforts, other programs routinely take place in McKinley County and the participating jurisdictions to provide for the general safety of the public. These are also forms of mitigation. The road departments at each government level, including the state, work to maintain a safe transportation system through such projects as repaving and maintenance of road signs. Crews also maintain street sweeping capability, which removes dangerous debris from road surfaces and aids in keeping storm drains clean, reducing the potential of flooding.

Municipal, county, and state law enforcement of traffic regulations aids in maintaining safe transportation routes. Other laws are in place concerning the illegal dumping of debris and restrictions on open burning. The New Mexico Department of Transportation further monitors and inspects commercial transports in an effort to ensure that hazardous material movement is conducted in compliance with mandated regulations.

Additionally, emergency operations plans are in place and exercised regularly in order to ensure that area response agencies coordinate their efforts during emergency situations. As a part of the exercise program, response agencies have recently been involved in Wipptrax, which evaluated area response to a nuclear waste transportation accident. The emergency operations plans are reviewed annually and revised as necessary. Training for first responders is an ongoing project and further ensures that police, fire, and emergency medical personnel are kept up-to-date in their respective areas of expertise.

MONITORING

It is critical that the McKinley County Mitigation Plan remains a living document with the goal of continuing the process of eliminating or reducing the potential threat and resulting damage due to existing hazards in the county and participating jurisdictions. In order to achieve this goal, the following schedule has been developed to keep this plan current and practical.

1. **Upon project completion:** Public announcements will be made after completion of all action plans under the McKinley County Mitigation Plan to demonstrate the ongoing efforts of the county and participating jurisdictions toward hazard mitigation within the community. In addition, public comment will be solicited as part of each of these announcements.

2. **Semi-annually:** A progress report will be published detailing the efforts made toward meeting the goals set forth in the McKinley County Mitigation Plan. This report will be available for public review and comment at the public libraries, the McKinley County Court House, and City Hall of each participating jurisdiction, and through the media. In addition, public input will be solicited and maintained for future use during review of the plan.

3. **Annually:** An advertised public meeting will be held to review the progress made in achieving the goals and objectives of the McKinley County Mitigation Plan. This public meeting will be the vehicle to provide the community with information concerning the progress or completion of mitigation efforts and to solicit public comment and input for use during review and revision of the mitigation plan.

4. **Annually:** The McKinley County Mitigation Plan will be reviewed as established in implementing resolutions signed by the county commission and city council of each participating jurisdiction. The review of the McKinley County Mitigation Plan will consist of the following efforts:

   i) Evaluate the resulting benefit of all completed action plans.
   ii) Evaluate the progress of action plans still being implemented.
   iii) Evaluate public input relating to completed projects, ongoing projects, or developing trends or concerns within the mitigation process.

iv) Determine if new hazard threats have been identified and devise action plans accordingly.
v) Revise, if necessary, the schedule of pending mitigation action plans.

5. **Annually:** The amended McKinley County Mitigation Plan will be available for public inspection and comment. Copies of the plan will be available at the public libraries, the McKinley County Court House, and City Hall of each participating jurisdiction.

6. **Five-year update:** The McKinley County Mitigation Plan will be updated at five-year intervals. This process will include identifying hazards that have not previously been listed, and evaluation of new strategies for hazard elimination or reduction based on available technology advancements and community needs. The five-year update will include both working group and public meetings to develop the updated plan. The update of the McKinley County Mitigation Plan will be the responsibility of the County Emergency Manager.

Section 1. McKinley County

The agency or person in charge of each project will make a progress report to the county emergency manager on a quarterly basis after adoption of this plan. The progress report will follow the guidelines established below. On an annual basis, the county emergency manager will compile the progress reports from the action plans, and present these findings to the county working group.

Project Title: _____ Project ID #: _____

Progress Reporting Period: _____

Location of Project: _____

Responsible Agency: _____

Contact Person: _____ Title: _____

Phone #: _____ Address: _____
_____

Supporting Agencies: _____
_____
_____

Total Project Cost: _____

Project Description: _____

_____

_____

_____

_____

_____

Progress: _____

_____

Benchmarks	Complete	Projected Date of Completion

Planning Goals and Objectives Addressed: _____

_____

_____

_____

Indicators of Success: _____

_____

Project Status: _____

_____

_____

_____

Summary of Progress: _____

_____

_____

_____

Annual Review and Revision. On an annual basis, the county's working group will review the progress reports. During this review, each action will be evaluated as to its success or progress toward accomplishing the goals and objectives for the identified hazard. In addition, at least one public meeting will be held in order to present a progress report to the public and to address any concerns that may arise.

Upon the completion of the review process, including public input, the county emergency manager and the working group will revise or add to the mitigation action plans as needed.

On an annual basis, the county emergency manager will provide a report to the County Commission and participating jurisdictions addressing the progress being made in hazard mitigation. This report will include all recommended revisions that should be added to the mitigation plan and adopted by the County Commission by amendment to the plan.

Section 2. Gallup

The agency or person in charge of each project will make a progress report to the city manager on a quarterly basis after adoption of this plan. The progress report will follow the guidelines established below. On an annual basis, the city manager will compile the progress reports from the action plans, and present these findings to the City Council and the county emergency manager.

Project Title: _____ Project ID #: _____

Progress Reporting Period: _____

Location of Project: _____

Responsible Agency: _____

Contact Person: _____ Title: _____

Phone #: _____ Address: _____
_____

Supporting Agencies: _____
_____
_____

Total Project Cost: _____

Project Description: _____
_____
_____
_____
_____
_____

Progress: _____

Benchmarks	Complete	Projected Date of Completion

Planning Goals and Objectives Addressed: _____

_____

_____

_____

Indicators of Success: _____

_____

Project Status: _____

_____

_____

_____

Summary of Progress: _____

_____

_____

_____

Annual Review and Revision. On an annual basis, the city manager and the county's working group will review the progress reports. During this review, each action will be evaluated as to its success or progress toward accomplishing the goals and objectives for the identified hazard. In addition, at least one public meeting will be held in order to present a progress report to the public and to address any concerns that may arise.

Upon the completion of the review process, including public input, the county emergency manager and the working group will revise or add to the mitigation action plans as needed.

On an annual basis, the county emergency manager will provide a report to the County Commission and participating jurisdictions addressing the progress being made in hazard mitigation. This report will include all recommended revisions that should be added to the mitigation plan and adopted by the City Council and the County Commission by amendment to the plan.

McKinley County Mitigation Plan
2005

Attachments

Attachment A
Description of Working Group and Public Meetings

In order to create the McKinley County Mitigation Plan it was necessary to form a working group. This group met on a regular basis and provided needed input into the mitigation planning process. Additionally, public meetings were held to provide the general public with the opportunity to participate in the development of the mitigation plan. Following are the minutes that resulted from these meetings. In addition to the meetings, a questionnaire was also developed and distributed. The results of the questionnaire are found in Attachment B.

Pre-Disaster Mitigation Meeting
February 28, 2003

Those in attendance:

Peter J. Flores, BIA
Tom D. Trujillo, McKinley Co.
Nina Tsethlikia, DOP
Hilda Bowman, McKinley Co.
Clybert Zunie, City of Gallup

Areas of discussion:

The initial meeting of the core group for the McKinley County Mitigation Plan. A discussion was held on the needs for a mitigation plan for the county based on the requirements of the Disaster Mitigation Act of 2000.

During this meeting it was determined that the McKinley County Chapters of the Navajo Nation were preparing their own mitigation plans and would not be part of this working group.

There was a discussion of the need for public meetings as a part of this planning process. The first public meeting was scheduled for March 3, 2003, 6:30 pm, at the McKinley County Fire Marshall's Office. A public service announcement was created to advertise this meeting.

It was determined that the McKinley County working group would be made up of the members of the established Local Emergency Planning Committee.

Pre-Disaster Mitigation
Public Meeting
March 3, 2003

Those in attendance:
Pete Flores, BIA
Robert Garcia, Gallup FD
Nina Tsethlikia, DOP
Clybert Zunie, Gallup EM

Areas of discussion:

The purpose of this meeting was to introduce the mitigation process to the general public. Discussion was held to identify the hazards that exist in Gallup and McKinley County and their possible solutions. The time line for this project was also presented. At the conclusion of this meeting the public was provided with persons to contact if they had additional information or had questions concerning this project.

Pre-Disaster Mitigation Meeting
March 11, 2003

Those in attendance:
Brenda Graham, MCMDA
Glandora Orphey, MCMDA
Bobby Silva, Gallup PD
Jerome Haskie, Zuni Fire and EMS
John Henderson, Vanderwagen VFD
Peter J. Gonzales, Gallup
Louie A. Leyba, DPS/MTD
Jim Lehner, NMSP
Philip Lopez, Gallup FD
Stanley Henderson, Gallup Public Works
Ann Parker, GIMC
John Pijawka, NMED
Robert Garcia, Gallup FD
Brent Mowrer, Gallup FD
Davina Nelson, McKinley West VFD
Clybert Zunie, Gallup EM
Eileen Ferraro, STIC
Dolores Parra, DOH
Charlie Allen, Transwestern Pipeline
Syverson Homer, Zuni Police
Eliseo Urios, PNM Gas Service
Robert Baca, DPS/MTD
Andrew A. Carbzjal, Gallup FD
Raymond R. Ross, Gallup FD
J. Upshaw, DPS/MTD
Patricia Browne, MCMDA
Dale Parish, Gallup Streets
Sherri Schuman, RMCHCS
Scott Field, DPS/OEM
Rich Friedman, MC GIS
Bernard Leekity, McKinley West VFD
Hysa Hernandez, MCMDA
Jack Dietz, STIC

Areas of discussion:

Jack Dietz explained the mitigation planning process to the members of the LEPC and the reasons why the creation of a mitigation plan are important to McKinley County. It was explained that DMA 2000 requires all states and counties to prepare a mitigation plan in

order to qualify for future federal mitigation funding. The difference between the mitigation plan and the all hazards emergency operations plan were also discussed.

A time line for the development of the plan was established which included the need for working group and public meetings.

This meeting also involved a review of the county's All Hazards Emergency Plan and an upcoming exercise concerning a radioactive transportation accident.

The next meeting will be announced.

Pre-Disaster Public Mitigation meeting
April 3, 2003

This public meeting was held at the McKinley County Fire Marshal's Office and called to order by Clybert Zunie, Civil Preparedness Coordinator.

Areas of discussion:

- Mitigation was introduced to the public at this meeting with discussions on what mitigation is and the need for a county wide mitigation plan as required by DMA 2000.

- 1990 flood was discussed in which there was one fatality. Each year flooding occurs in McKinley County and a need to establish a long term solution was identified.

- Additionally the following suggestions were made during this meeting:

    - Place public service announcements on radio and in the papers.
    - Have the Gallup Independent (local paper) do an awareness article
    - Have articles placed inn the Shiwi Messenger and Navajo Times
    - Place flyers in public places announcing next meeting
    - Invite representatives from the Zuni and Navajo nations.

Next public meeting was scheduled for April 7, 2003 at the McKinley County Fire Marshals Office at 6:30 pm.

Pre-Disaster Mitigation
Public Meeting
April 7, 2003

Those in attendance:
Pete Flores, BIA
Carmen Diaz,
Hilda Bowman, McKinley Co. Fire
Robert Garcia, Gallup FD
Nina Tsethlikia, DOP
Clybert Zunie, Gallup EM

Areas of discussion:

The purpose of this meeting was to introduce the mitigation process to the general public. Discussion was held to identify the hazards that exist in Gallup and McKinley County and their possible solutions. The time line for this project was also presented. At the conclusion of this meeting the public was provided with persons to contact if they had additional information or had questions concerning this project.

Pre-Disaster Mitigation Meeting
May 8, 2003

Those in attendance:
Jack Dietz, STIC
Joe Henley, Gallup Schools
Robert Garcia, Gallup FD
Pat C. Sanchez, Gallup Waste Water
Charles Arnold, Giant Refinery
Faye Platero, NMDEM
Patricia Browne, MCMDA
Steven Munoz, Gallup MED Flight
Brenda Eddy, Med Star Ambulance
Sherri Schuman, RMCHCS
Larry Chee, NMFD
Pedor Flores, MC Fire
Eileen Ferraro, STIC
Robert Baca, DPS/MTD
Brian W. Nellist, NMSP
Tobias R. Sandoval, ARC
Beverly Cox, Conoco Philips
Sandra Sweeney, MCMDA
Clybert Zunie, Gallup
Alex Ashley, Med Star Ambulance
Jana Gunnell, DOH
Nina Tsethlikia, DOH
Hilda Bowman, MC Fire

Areas of discussion:

- Establishment of types of hazards affecting McKinley County and Gallup
  - Winter storms
  - Flooding
  - Earthquake
  - Hazardous material release
  - Drought
  - Wildfire
  - Terrorism

- Working group members were assigned to investigate the identified hazards and establish where these hazards are most likely to occur, how destructive they have been historically, and consider strategies to reduce or eliminate these threats.

- It was decided that the information would be prepared and available on June 17, 2003.

Pre-Disaster Mitigation
Public Meeting
May 12, 2003

Those in attendance:
James A. Madrid, UNM PD
Nina Tsethlikia, DOH
Sherri Schuman, RMCHCS
Faye PLatero, NNDEM
Joe Armenta, MC Schools
Ed Oliver, USDA
Pedro Flores, MC Fire
Tomus Rosers, NDPS
Ann Parker, GIMC
Tobias Sandoval, ARC
Kathy Landers, NMSU
Joe Henley, MC Schools
Robert Garcia, Gallup FD

Areas of discussion:

- Identify the project's chairperson, vice chairperson and mission.
- Identify the type and number of hazards that will be included in the project.
- Determine what input and specific information is needed from the records of various agencies regarding the identified hazards.
- Determine meeting dates, times, and deadlines.

Pre-Disaster Mitigation Meeting
June 11, 2003

Those in attendance:
Eliseo Urias, PNM
Billy Moore, Giant Refinery
Nina Tsethlikia, DOH
Robert Crohn, NMSP
Ann Parker, GIMC
John Henderson, Vanderwagen VFD
Donna Fambrough, MC Fire
Robert Garica, Gallup Fire
Sandi Sweeney, MCMD
Robert Baca, DPS/MTD
Charles Arnold, Giant

The mitigation working group met at and toured the Giant Refinery to the east of Gallup in order to determine the impact of an incident if it occurred at that location. Additionally, information was gained on the procedures and plans that are presently in place at the refinery as part of their emergency planning efforts.

Pre-Disaster Mitigation Meeting
July 21, 2003

Those in attendance:
Dion Lalu, Zuni FD
Nina Tsethlikia, DOH
Jerome Haskie, Zuni FD
Glendoro, Orphey, MCMD
Sharolyn Shetima, MCMD
Raymond R. Rose, Gallup FD
Syverson Homer, Zuni PD
Sandra Sweeney, MCMD
Arlen Quetawki, Gov OFc.
Charlton Albern, Gov. Ofc.
Robert Garcia, Gallup FD
Nicholas Yuselew, Zuni FD
Gerald Hoose, Zuni PD
Patricia Browne, MCMD
Meg Simons, HIS
Andrew Carbajal, Gallup FD
Hilda Bowman, MC Fire
William Tsikewa, Gov. Ofc.
Carmelila Sanchez, Gov. Ofc.
Charlotte Bradley. Gov. Ofc.

This meeting was held at the Zuni Public Library.

Areas of discussion:

- The Zuni Nation is working with Cibola County on the issues of emergency preparedness.
- Zuni culture does not allow for emergency planning, it is considered taboo. There is an ongoing effort to make it a more acceptable issue in the community.
- Zuni is in the process of creating an emergency operations plan.
- Identification of hazards and the history in the area were discussed.
- Future development in the Zuni area and its impact on present emergency services were discussed.

Pre-Disaster Mitigation Meeting
October, 7, 2003

Those in attendance:
Clybert Zuni, Gallup
Mark Diaz, MC Fire
Nina Tsethlikia, DOH
Robert Baca, DPS/MTD
Sherri Schuman, RMCHCS
Roseann Coho, ARC
Robert Garcia Gallup FD
Darren Soland, NMSP
Ann Parker, GIMC
Julian Upshaw, DPS/MTD
Nicholas Yuselew, Zuni FD
Kathleen Sisneros, WIPP

Areas of discussion:

- An update was given on the progress of the mitigation plan.
- Future site visits were discussed for the Transwestern pipeline in Thoreau, El Paso Natural Gas in Thoreau, and the Ramah and Vanderwagen areas.
- An update was given on the review and rewriting of the McKinley County All Hazards Emergency Operations Plan.

Attachment B
Description and Results of Questionnaire

In addition to public meetings, the following questionnaire was used in order to gain additional input into the mitigation planning process. As a part of the questionnaire process it was printed in the Gallup Independent, which has a circulation of 19,500 during the week and 21,000 on Saturdays. The following is a copy of the questionnaire used and the responses received.

McKinley County Emergency Management
Mitigation Questionnaire

McKinley County is conducting a risk analysis to determine the types of disaster hazards that exist in our area. As a part of this analysis, we are interested in learning what hazards you would want us to prepare for. We would appreciate it if you would take a few minutes to complete the following survey and return it to _____. If you have any questions concerning this survey, please contact us at_____.

1. Please number the following hazards in order of your concern, with 1 being of highest concern and 7 being of least concern. Use each number only once.

_____Drought	_____ Hazardous material spill
_____Dam failure	_____ Power failure
_____Flash flood	_____Winter storm
_____ Wildfire	_____ Other

2. What do you feel can be done to reduce or eliminate the danger of these hazards?

_____
_____
_____
_____

3. Do you have any other recommendations we should consider?

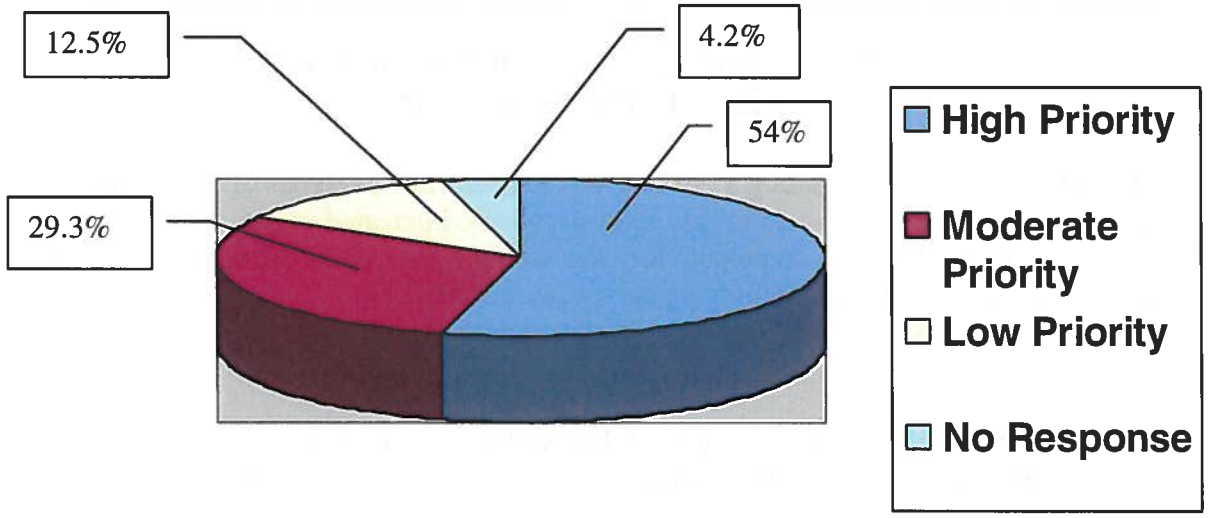
_____
_____
_____
_____

4. Do you want us to contact you? Name_____
   Address_____

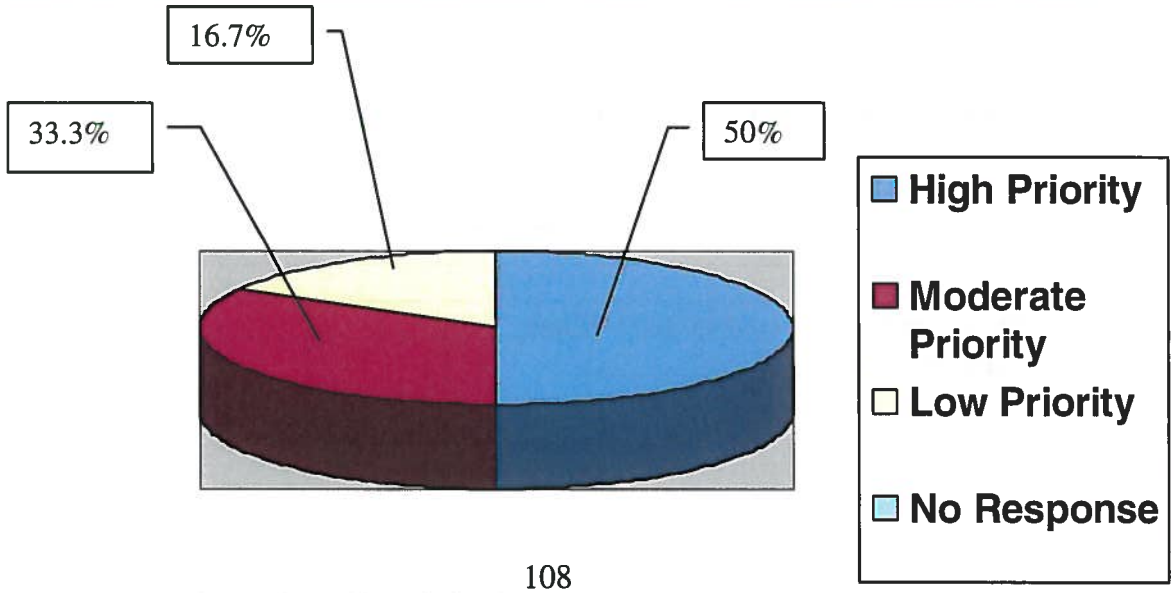
McKinley County Survey Results

The McKinley County Emergency Manager made the questionnaire available to the public during public meetings and it was also printed in the local newspaper. 25 surveys were returned to the county and the results of these are summarized below.

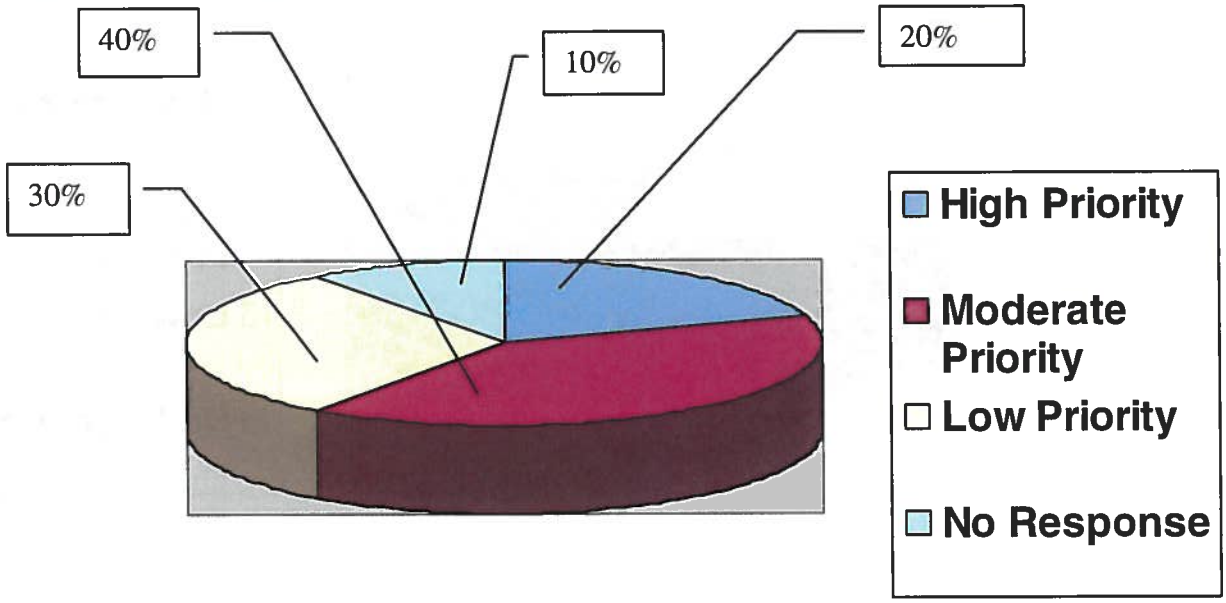
	No Response	Low Priority	Moderate Priority	High Priority
DROUGHT	1 (4.2%)	3 (12.5%)	7 (29.3%)	13 (54%)



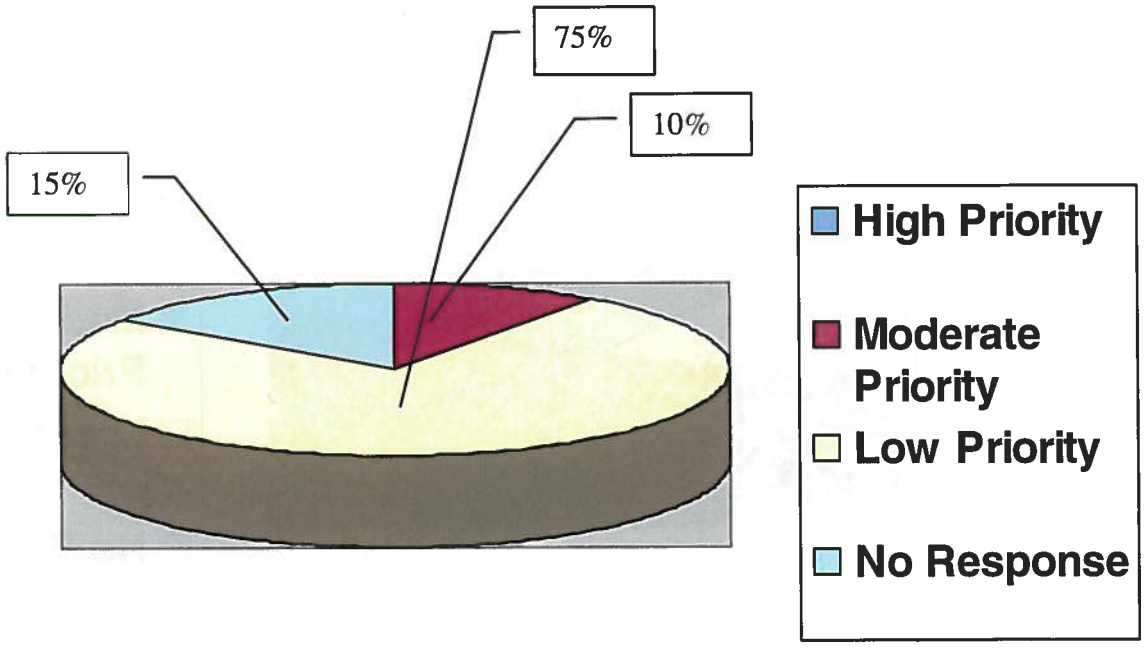
	No Response	Low Priority	Moderate Priority	High Priority
HAZMAT	0 (0%)	4 (16.7%)	8 (33.3%)	12 (50%)



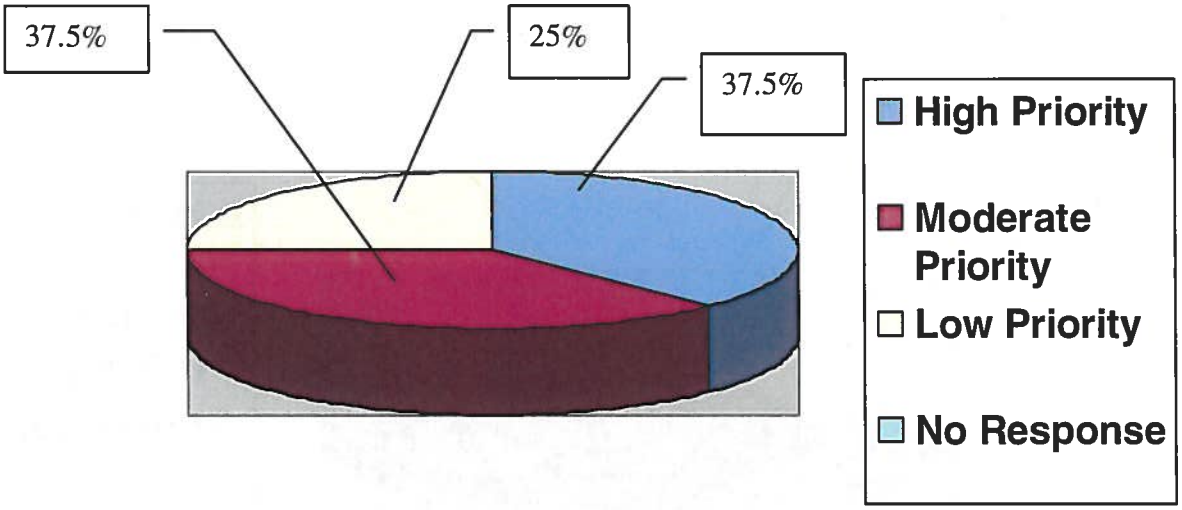
	No Response	Low Priority	Moderate Priority	High Priority
FLASH FLOOD	2 (10%)	6 (30%)	8 (40%)	4 (20%)



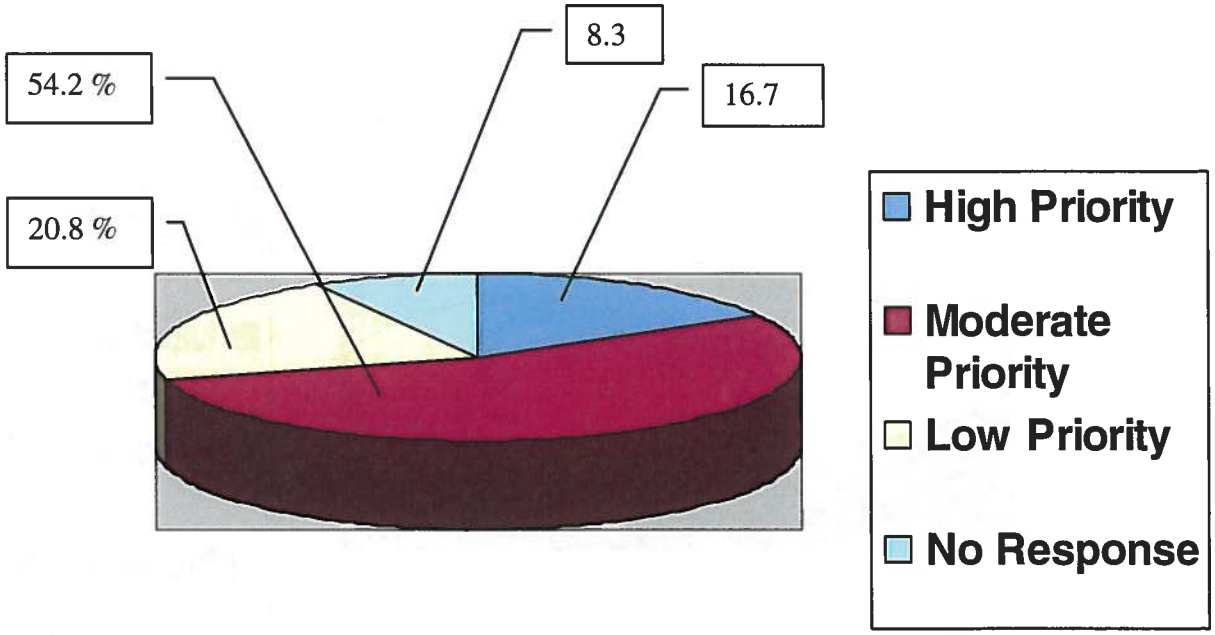
	No Response	Low Priority	Moderate Priority	High Priority
DAM FAILURE	3 (15%)	15 (75%)	2 (10%)	0 (0%)



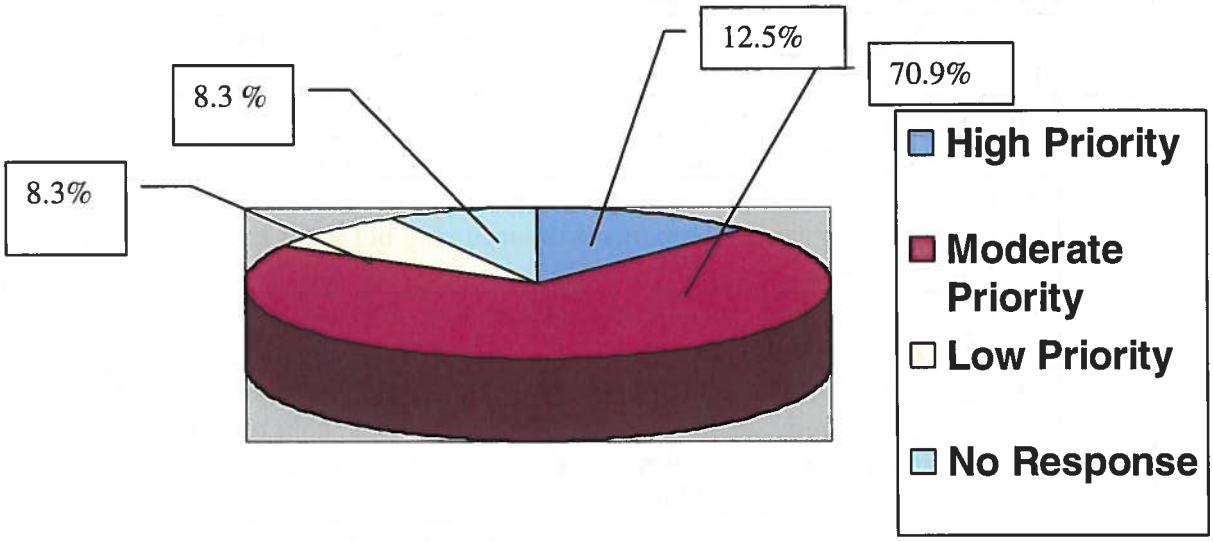
	No Response	Low Priority	Moderate Priority	High Priority
WILD FIRE	0 (0%)	6 (25%)	9 (37.5%)	9 (37.5%)



	No Response	Low Priority	Moderate Priority	High Priority
WINTER STORM	2 (8.3%)	5 (20.8%)	13 (54.2%)	4 (16.7%)



	No Response	Low Priority	Moderate Priority	High Priority
POWER FAILURE	2 (8.3%)	2 (8.3%)	17 (70.9%)	3 (12.5%)



OTHER HAZARDS NOTED IN QUESTIONNAIRE:

TERRORISM
EARTHQUAKE
HIGH WINDS

Question #2 What do you feel can be done to reduce or eliminate the danger of these hazards?

	Comments
1.	To conduct community awareness, create emergency response plans, and MOA/MOU's with native emergency management programs.
2.	Properly trained personnel to react and make provisions and plans that will safe

	guard us against known disasters.
3.	Coordinated plans between agencies involved in management of these hazards.
4.	Careful planning- elect a board of citizens to create plans and procedures in case these things do happen.
5.	Start conserving water and limit water usage in the county and the city.
6.	I don't believe we can reduce/eliminate them. We should be better prepared though. I do not believe we ate at this point.
7.	Mother Nature's call – Hazardous material spills – better regulations.
8.	Pray for rain
9.	More coordination between agencies involved.
10.	Evacuation planning and HAZMAT abating teams availability.
11.	Prepare a plan to fight or defend these types of hazards from affecting our community. You can not stop this from occurring but plans can be made to fight the problem.
12.	More shelters available for road closures, water conservation plans, training for HAZMAT for county personnel.
13.	Maintain RR crossings and mainline tracks, maintain power line easements throughout the county and substations, do a rain dance, dam runoff water in crucial canyons outside city limits, maintain drainage passages, slow down flood waters, fix pump on Malony.
14.	Education, water conservation, utilizing landscaping that does not require water, build Navajo-Gallup water pipeline.
15.	Not much can be done to eliminate natural disasters; the best is to have a plan to deal with them. If no long term relief is in sight an evacuation plan.
16.	In God's hands. Can't do much except be prepared.
17.	Another smaller truck with water. We do want more wildland fire training, if we had a heavy winter storm our ungraveled roads would be next to impassable.
18.	To have an emergency plan that will assist all or most of the rural communities in the county. Some sort of contingency plan for the communities.
19.	Cooperation and communication among all agencies involved with the plans and implementation of these plans. Need people who can do follow-up on any hazard and that has occurred and improve from these occurrences.
20.	Need railroad to cooperate more with local officials.

Question # 3 Do you have any recommendations we should consider?

Comments	
1.	To participate in neighboring native emergency management initiatives.
2.	Review plans and agencies involved to assure coordination of services – drills – table tops and actual.
3.	More coordination between agencies involved. Traffic control on Boardman Street in front of our JFK Mid., Gallup Jr. Hi Mid and Admin offices. Trucks loaded with fuel, gasoline and butane etc. may become involved in a collision due to the amount of traffic in this area.
4.	Work with red cross.
5.	Erect dams and structures to hold water and eliminate erosion.
6.	We have suffered from drought historically since this area became populated. Perhaps we can learn from what we did in the past and seek technology through research that is environment friendly.
7.	Emergency wireless communications food and water storage and fuel pre-established laws and rules of order to follow
8.	Adequate supplies, vehicles, and personnel to handle county emergencies with financial backup from other government entities (local, state, federal, tribal.)
9.	Do monthly reviews of problem areas with in the city limits and in McKinley County. Share information with all agencies.
10.	Publish and assemble simple steps people can take to not panic.

Attachment C
Hazard Location Maps
McKinley County
Gallup

Introduction. The location of the hazards identified in this project must be considered in planning McKinley County's future growth. The following maps depict the location of the infrastructure that presently exists in McKinley County and Gallup. The specific risk to the county's existing infrastructure has been identified in Part II of this report. The hazards discussed in this project are flooding, drought, wildfire and HAZMAT.

Flooding. The main flooding concerns of McKinley County and Gallup are discussed in Part II. Although there are portions of flood maps depicted in Part II, McKinley County's complete floodplain is found in the FEMA Flood Insurance Rate Maps at www.FEMA.gov.

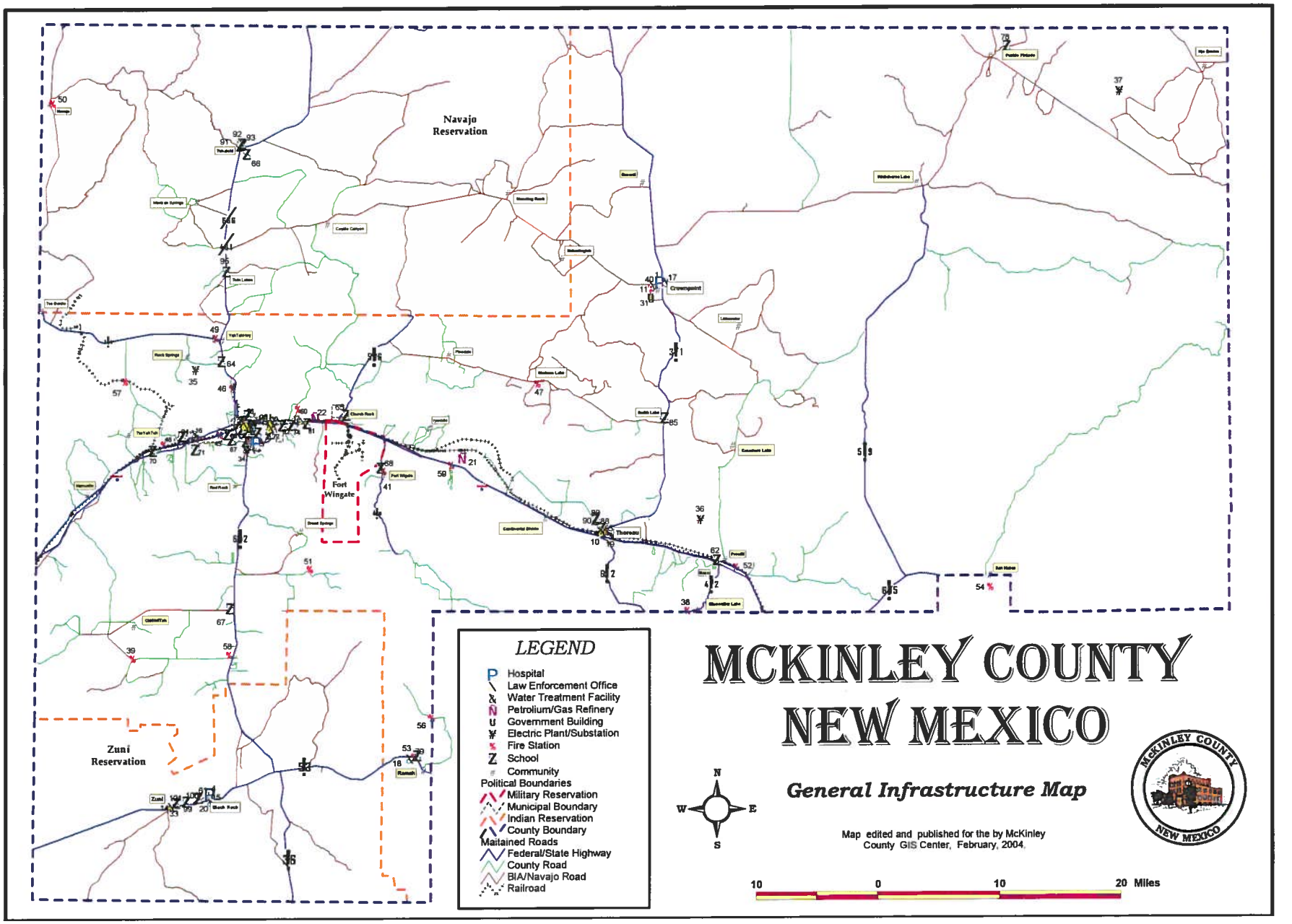
Drought. No specific maps are included illustrating drought because drought affects the entire southwest region of the United States. However, the National Oceanic and Atmospheric Administration (NOAA) maintains current information about drought conditions throughout the entire country at www.NOAA.gov.

Wildfire. The enclosed maps illustrate the major wildfire concerns in McKinley County in the Timberlake, McGaffey and Whispering Cedars subdivisions, which are located in the unincorporated area of the county.

HAZMAT. Hazardous material is transported through McKinley County mainly on Interstate-40, U.S. 491, and on the Burlington Northern and Santa Fe railway lines.

MCKINLEY COUNTY MAP LEGEND

4	Zuni Indian Health Service	55	Thoreau VFD
10	McKinley Co. Sheriff's Substation	56	Timberlake VFD
11	Navajo Police Department	57	Tse Yah Toh VFD
14	Zuni Police Department	58	Vanderwagen VFD
15	Zuni Police Department/Black Rock	59	Whispering Pines VFD
17	Crownpoint Water Treatment Facility	61	Zuni VFD
18	Ramah Water Treatment Facility	62	Baca Elementary School
19	Thoreau Water Treatment Facility	64	Chee Dodge Elementary School
20	Zuni Water Treatment Facility	65	Church Rock Elementary School
21	Giant Gasoline Refinery	66	Chuska School
31	Bureau of Indian Affairs/Eastern Navajo	67	David Skeet Elementary School
33	Zuni Tribal Headquarters	68	Fort Wingate Schools
36	Tri State Electrical Generator	70	Gallup Christian School
37	Williams Energy	78	Pueblo Pintado
38	Bluewater VFD	79	Ramah Elementary School
39	ChiChilTah VFD	85	Smith Lake School
40	Crownpoint VFS	88	Thoreau Elementary School
41	Fort Wingate VFD	89	Thoreau High School
47	Mariano Lake/Pinedale VFD	90	Thoreau Middle School
48	McKinley West VFD	91	Tohatchi Elementary School
49	Navajo Estates VFD	92	Tohatchi High School
50	Navajo VFD	93	Tohatchi Middle School
51	Pinehaven VFD	95	Twin Lakes Elementary School
52	Prewitt VFD	99	Zuni Elementary School
53	Ramah VFD	100	Zuni High School
54	San Mateo VFD	101	Zuni Middle School


Navajo Reservation
Zuni Reservation
Fort Wingate
Crownpoint
Thoreau
LEGEND
Hospital
Law Enforcement Office
Water Treatment Facility
Petrolium/Gas Refinery
Government Building
Electric Plant/Substation
Fire Station
School
Community
Political Boundaries
Military Reservation
Municipal Boundary
Indian Reservation
County Boundary
Maitained Roads
Federal/State Highway
County Road
BIA/Navajo Road
Railroad
MCKINLEY COUNTY
NEW MEXICO
General Infrastructure Map
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Map edited and published for the by McKinley County GIS Center, February, 2004.
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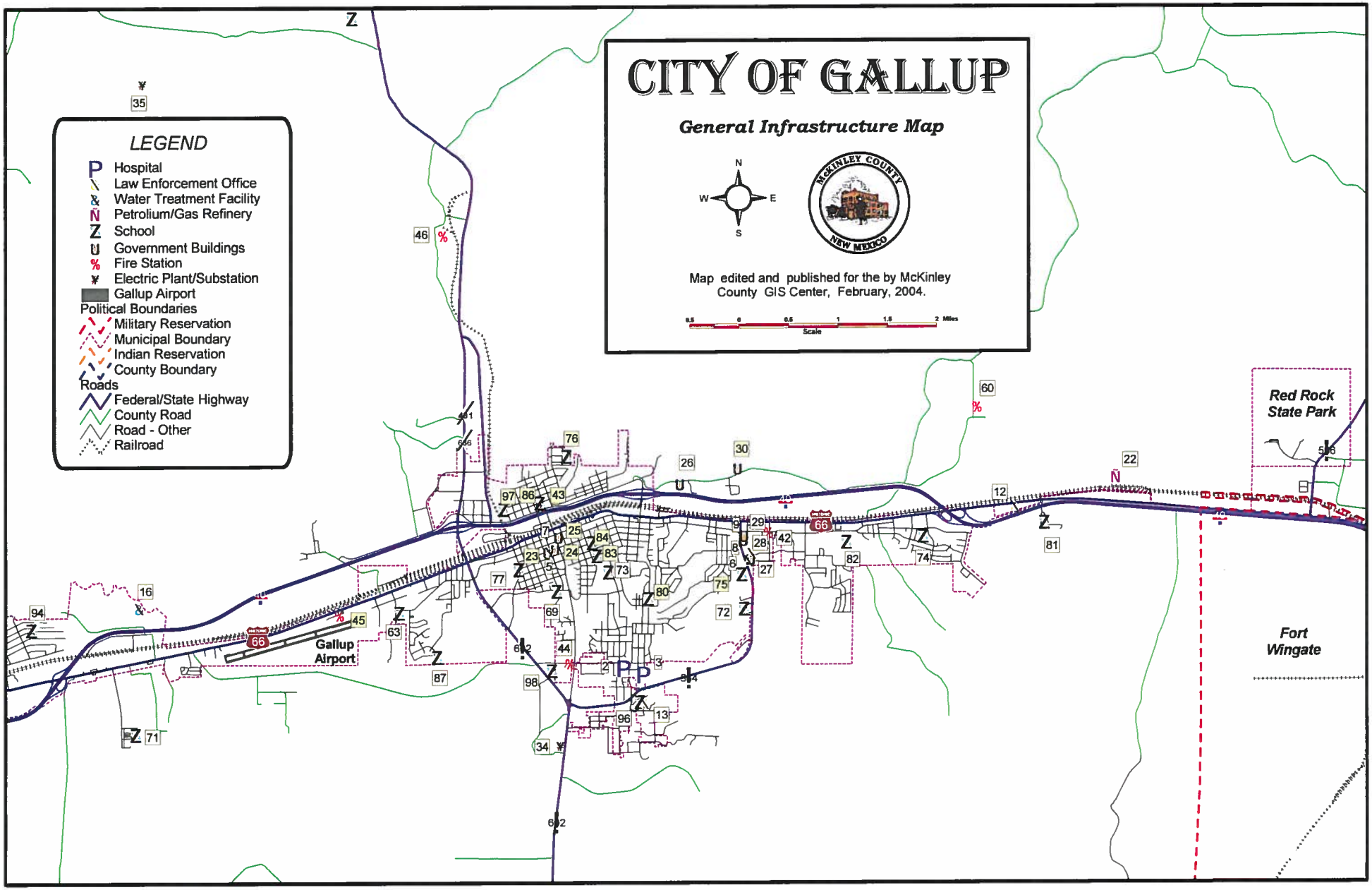
McKINLEY COUNTY
NEW MEXICO

GALLUP MAP LEGEND

2	Gallup Indian Health Service	45	Gallup Fire Station/East side
3	Rehoboth McKinley Christian Hospital	46	Gamerco VFD
5	Federal Bureau of Investigations	60	White Cliffs VFD
6	Gallup Police Department	63	Central High School
7	Gallup PD Substation	69	Gallup Catholic School
8	McKinley Co. Metropolitan Dispatch	71	Gallup High School75
9	McKinley Co. Sheriff's Office	72	Gallup Junior High School
12	New Mexico State Police	73	Gallup Middle School
13	University of New Mexico Police	74	Indian Hills Elementary School
16	Gallup Water Treatment Facility	75	JFK Elementary School
22	Conoco Refinery	76	Juan De Onate Elementary School
23	Nixon Federal Building	77	Lincoln Elementary School
24	McKinley County Court House	80	Red Rock Elementary School
25	Gallup City Hall	81	Rehoboth Christian School
26	Nation Guard Armory	82	Rocky View Elementary School
27	Gallup City Jail	83	Roosevelt Elementary School
28	Magistrate Court	84	Sacred Heart Elementary School
29	McKinley Co. Detention Center	86	St. Francis Elementary School
30	Juvenile Detention Center	87	Stagecoach Elementary School
34	Continental Divide Electrical Coop.	94	Turpin Elementary School
35	Gallup Electrical Substation	96	University of New Mexico/Gallup Campus
42	Gallup Fire Station/East side	97	Washington Elementary School
43	Gallup Fire Station/North side	98	Western New Mexico University/Gallup Campus
44	Gallup Fire Station/West side		


CITY OF GALLUP
General Infrastructure Map
N
W
E
S
McKINLEY COUNTY
NEW MEXICO
Map edited and published for the by McKinley County GIS Center, February, 2004.
Scale
LEGEND
Hospital
Law Enforcement Office
Water Treatment Facility
Petrolium/Gas Refinery
School
Government Buildings
Fire Station
Electric Plant/Substation
Gallup Airport
Political Boundaries
Military Reservation
Municipal Boundary
Indian Reservation
County Boundary
Roads
Federal/State Highway
County Road
Road - Other
Railroad
Gallup Airport
Red Rock State Park
Fort Wingate