



**PRE-DISASTER MITIGATION PLAN
FOR
THE NORTHERN CHEYENNE TRIBE**



December 2006

**Prepared by: Northern Cheyenne Tribe PDM Steering Committee
With technical assistance from Cossitt Consulting**

**NORTHERN CHEYENNE INDIAN RESERVATION
PRE-DISASTER MITIGATION PLAN
TABLE OF CONTENTS**

Plan Adoption..... iii
Executive Summary..... iv
Acronyms Used in This Plan v

1. Introduction..... 1-1

Authority 1-1
Scope and Plan Organization 1-1
Preparation of the Plan..... 1-2
Project Area Description 1-3
 General..... 1-3
 Physical Characteristics 1-4
 Population 1-5
 Economy 1-5
 Land Ownership 1-6
 Transportation 1-7
 Land Use and Land Use Management..... 1-8
 Infrastructure, Utilities, and Other Services 1-10
 Development Trends 1-12
 Emergency Services 1-12
 Climate and Weather 1-13

2. Planning Process 2-1

Overall Approach and Philosophy 2-1
Process 2-1
 Understanding Purpose and Need for
 the Plan—Getting Started..... 2-2
 Public Involvement and Outreach 2-3
 Document Development and Review..... 2-4
 Plan Approval..... 2-4

3. Hazard Evaluation and Risk Assessment..... 3-1

Methodology 3-1
Identified Hazards..... 3-2
Drought/Extreme Heat..... 3-5
Flooding..... 3-9
Winter Storms/Extreme Cold 3-14
Severe Thunderstorms, Hail, Wind, and Tornadoes..... 3-16
Hazardous Materials/Transportation-Related Accidents..... 3-20

Earthquakes	3-22
Volcanic Eruptions	3-24
Landslides	3-28
Power Outages/Loss of Communication	3-25
Wildland Fire.....	3-27
Epidemics/Water Contamination	3-30
Assets and Vulnerable Populations	3-33
4. Mitigation Strategy	4-1
Methodology	4-1
Goals and Mitigation Actions	4-2
Project Ranking and Prioritization.....	4-3
Project Implementation.....	4-12
5. Plan Maintenance and Coordination.....	5-1
Responsible Parties.....	5-1
Review Triggers.....	5-1
Criteria for Evaluating the Plan	5-1
Procedures	5-1
Incorporation into other Plans.....	5-2
Sources	6-1

APPENDICES

- Appendix A: Meeting Materials**
- Appendix B: Selected portion of the Big Horn County Community Wildfire Protection Plan: Goals, Objectives, Strategies (Northern Cheyenne Fire Departments cooperated in development of the plan)**
- Appendix C: Record of Review (Exhibits 4a and 4b from FEMA “How to Guide #8)**

Resolution of Adoption- Northern Cheyenne Tribe

RESOLUTION Number: _____

A RESOLUTION TO APPROVE AND ADOPT THE NORTHERN CHEYENNE PRE-DISASTER MITIGATION PLAN

WHEREAS, the Northern Cheyenne Tribe has prepared a Pre-Disaster Mitigation Plan ("the Plan");

WHEREAS, the Plan covers the entire Northern Cheyenne Indian Reservation; and

WHEREAS, the Plan meets all requirements of the Interim Final Rule published in the Federal Register on February 26, 2003, at 44 CFR Part 201 as part of the Disaster Mitigation Act of 2000;

NOW, THEREFORE BE IT RESOLVED,

The Pre-Disaster Mitigation Plan for the Northern Cheyenne Tribe is approved and adopted.

The Pre-Disaster Mitigation Plan for the Northern Cheyenne Tribe is to be followed and incorporated into planning for the Northern Cheyenne Reservation.

PASSED and APPROVED by the Northern Cheyenne Tribal Council this ____ day of _____, 200_.

FOR THE NORTHERN CHEYENNE TRIBE

By: _____
Eugene Little Coyote, President

Attest: _____

Print Name: _____

Executive Summary

The Northern Cheyenne Indian Reservation intends to become disaster resistant by preparing and implementing this Pre-Disaster Mitigation (PDM) Plan. The plan identifies hazards and mitigation measures to reduce or prevent effects of those hazards, and raises the awareness about the importance of taking personal and collective (public and private) responsibility for reasonably foreseeable natural disasters.

The plan was developed with leadership from Northern Cheyenne Tribal Administration. Throughout the process, from identifying hazards to developing mitigation measures, efforts were made to encourage public involvement and to draw all interested parties into the preparation of the plan whether formally at the series of public meetings, or informally through one-on-one conversations. A Steering Committee oversaw the preparation of the plan by a contractor. The mitigation goals, objectives, actions and projects were developed utilizing a wide range of expertise and interests.

The natural disasters of most concern to participants in the planning process were (in order of priority) winter storms, wildland fire, hazardous materials, floods, and water quality. Each of these priority hazards and other hazards is profiled in the plan with a discussion of historic occurrences and vulnerability.

Generally speaking, there are no specific patterns to the ways in which various disasters strike the Reservation. Just about any area of the Reservation has potential for effects from drought, winter storms, wildfire, severe thunderstorms, and wind storms.

Eight goals with corresponding objectives and projects were developed for the identified hazards of concern:

1. Improve emergency response and general disaster preparedness
2. Reduce impacts of power outages
3. Reduce potential for fires and improve fire response
4. Reduce potential for hazardous materials spills and other Transportation-related accidents
5. Reduce potential for water quality contamination
6. Reduce effects of floods
7. Improve ability to respond to winter storms
8. Improve ability to respond to drought

This plan serves all of the Northern Cheyenne Indian Reservation. There are no incorporated municipalities on the Reservation.

ACRONYMS USED IN THIS PLAN

BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CWPP	Community Wildfire Protection Plan
DES	Disaster and Emergency Services
DNRC	Department of Natural Resources and Conservation
EMS	Emergency Medical Services
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map (prepared by FEMA)
FSA	Farm Service Agency (US Department of Agriculture)
FWP	Montana Fish, Wildlife and Parks
HFRA	Healthy Forests Recreation Act
IHS	Indian Health Service
LEPC	Local Emergency Planning Committee
MACO	Montana Association of Counties
MDOT	Montana Department of Transportation
MFWP	Montana Fish, Wildlife and Parks
NFIP	National Flood Insurance Program
NFP	National Fire Plan
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
PDM	Pre-Disaster Mitigation
PPE	Personal Protective Equipment
SCBA	Self Contained Breathing Apparatus
SHELDUS	Spatial Hazard Events and Losses Database for the United States
TERC	Tribal Emergency Response Commission
USGS	U.S. Geological Survey
WUI	Wildland Urban Interface

CHAPTER 1: INTRODUCTION

Authority

The Northern Cheyenne Reservation intends to become disaster resistant by preparing and implementing this Pre-Disaster Mitigation (PDM) Plan.

The Disaster Mitigation Act of 2000, passed by the U.S. Congress, stated in its findings that greater emphasis needed to be placed at state, local, and tribal government levels on identifying risks from natural disasters, implementing measures to reduce losses from natural disasters, and ensuring that critical services and facilities of communities will continue to function after a natural disaster. The purpose of the Disaster Mitigation Act is to reduce losses resulting from natural disasters, and to provide a source of pre-disaster hazard mitigation funding to assist those states, local governments, and Indian tribes with approved plans and strategies for implementing effective hazard mitigation measures. This plan meets requirements of the Interim Final Rule published in the Federal Register on February 26, 2003, at 44 CFR Part 201, which specifies the criteria for local Pre-Disaster Mitigation Plans

The Northern Cheyenne Tribe operates under a constitution consistent with the Indian Reorganization Act. Tribal government consists of a Tribal Council (with representation based on population in the various districts), headed by a President, elected at large for a four year term.

The Northern Cheyenne have elected to submit this plan through the State of Montana's Disaster and Emergency Services Division. Funding for the development of the plan came from the Montana Disaster and Emergency Services Division. The Northern Cheyenne provided in-kind services to provide the matching contribution for the state's funding.

Scope and Plan Organization

This plan is organized into five major chapters.

- Chapter 1. Introduction

This chapter provides background material to put the plan and mitigation strategies into the context of the Northern Cheyenne Reservation's unique assets, resources, and hazards. This chapter includes a general description of land uses and development trends on the Reservation.

- Chapter 2. Planning Process

This chapter describes how the plan was developed, including public involvement.

- Chapter 3. Hazard Evaluation and Risk Assessment

This chapter identifies the type, location, and extent of natural hazards that can affect the Reservation. It also describes the Reservation's vulnerability in terms of critical facilities and potential dollar losses.

- Chapter 4. Mitigation Strategy

This chapter includes the long-term goals and specific mitigation actions and project intended to reduce the effects of each hazard. It includes an action plan on how the plan will be implemented.

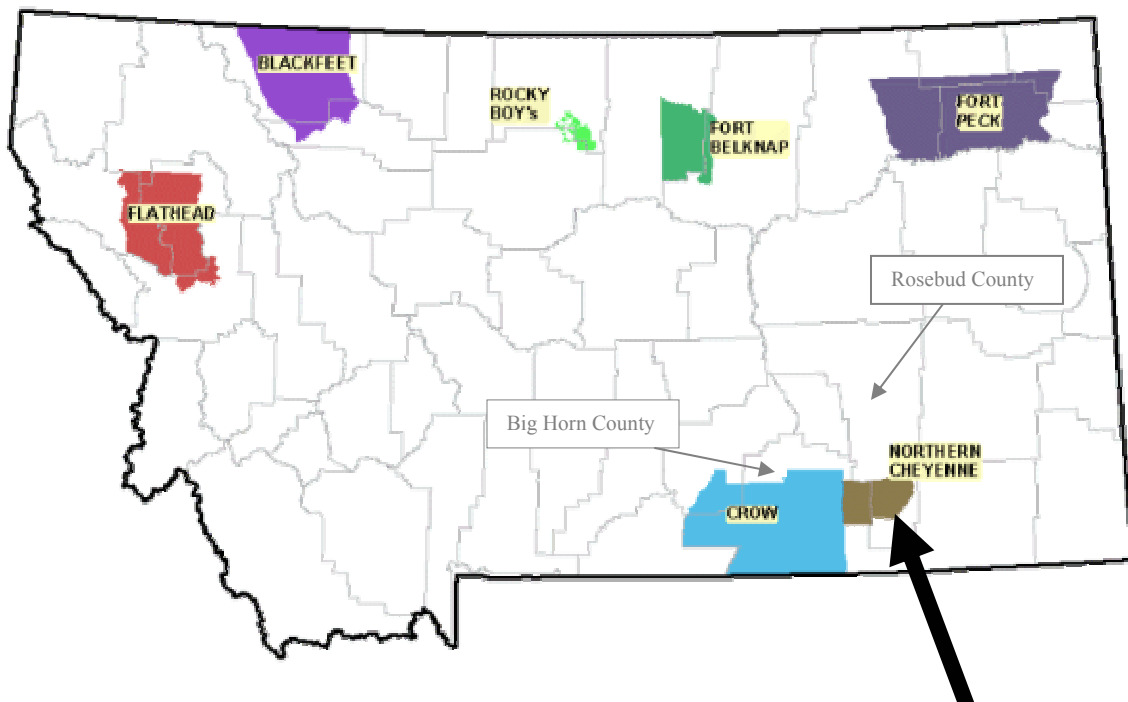
- Chapter 5. Plan Maintenance

This chapter describes how the plan is to be maintained and kept current.

Preparation of the Plan

The plan was developed with leadership from the Northern Cheyenne Tribe. Throughout the process, from identifying hazards to developing mitigation measures, public involvement was encouraged at a variety of levels. (Details of public involvement are included in Chapter 2.) The Northern Cheyenne Tribe hired Cossitt Consulting of Park City, Montana to assist in developing the plan, including writing the plan document.

Figure 1.1 Location of the Northern Cheyenne Indian Reservation



Source: Montana Natural Resource Information System

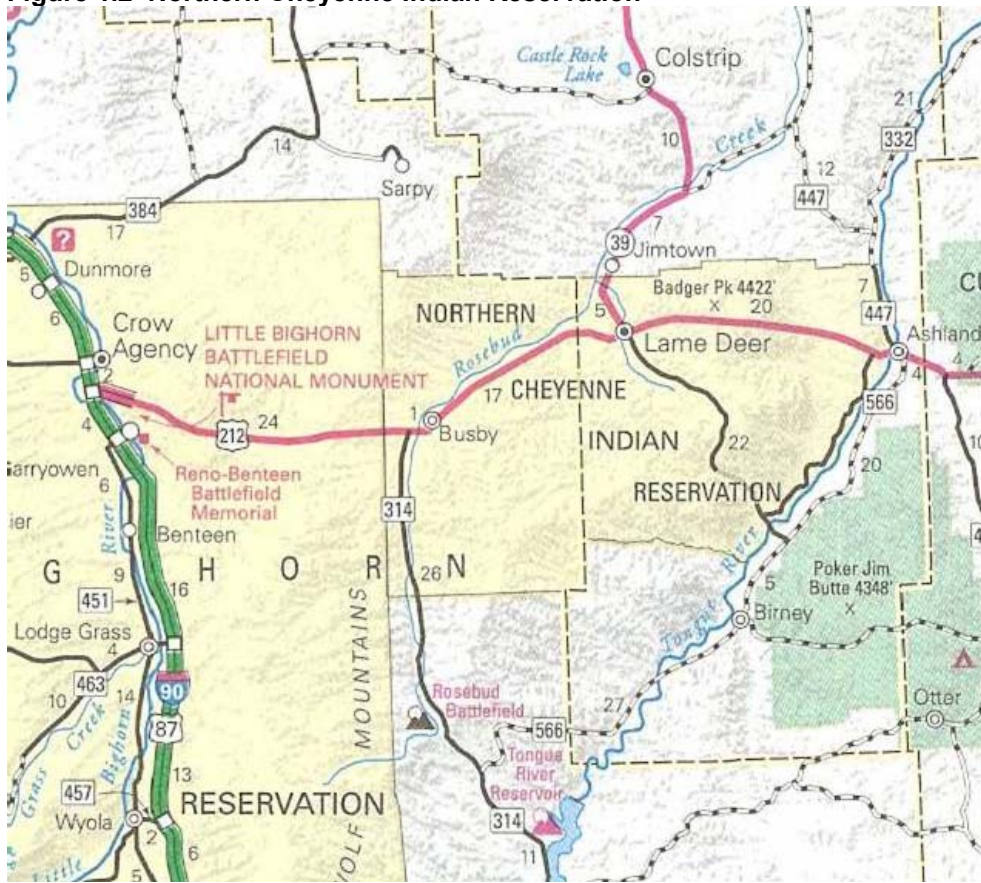
Project Area Description

General

The project area for this plan is the Northern Cheyenne Indian Reservation. The Northern Cheyenne Reservation was created by the Executive Order of the President of the United States in November 1884.

The Northern Cheyenne Reservation is located in southeastern Montana and encompasses 442,193 acres. The Crow Indian Reservation borders the Northern Cheyenne Reservation to the west. The nearest town with additional emergency services beyond reservation boundaries is Hardin, approximately 55 miles west of Lame Deer (on Interstate 90 to the west, north of Crow Agency). The next closest resource center is Billings, the largest city in Montana (2000 population of 89,847)

Figure 1.2 Northern Cheyenne Indian Reservation



Source: Montana 2003-2004 Highway Map

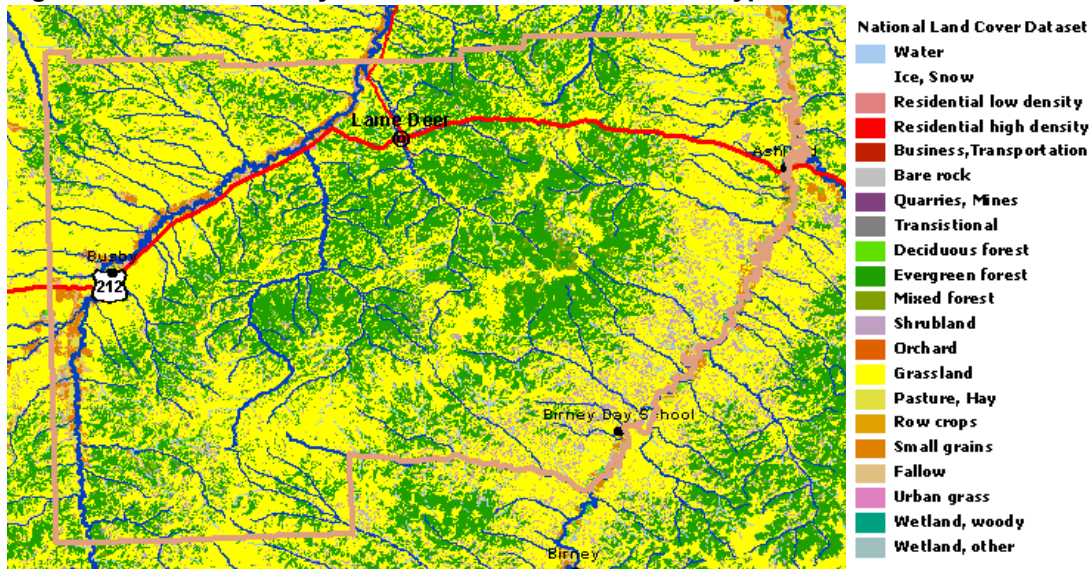
Lame Deer is the center of Northern Cheyenne tribal government. Other communities include Busby and Birney (on-reservation, north of the off-reservation town of Birney shown in Figure 1.2).

The Northern Cheyenne Tribe also owns off-reservation lands. One parcel is near the Tongue River Reservoir, south of the Reservation. At the time this plan was prepared, that land remained undeveloped, but there is a possibility of building a casino on the property at some time in the future. Another parcel is south of the reservation, east of the off-reservation community of Birney. This parcel is ranch land and with no current plans for development. The third parcel is located in the Black Hills of South Dakota and currently there are no plans for development of this parcel. There is an existing house on the parcel.

Physical Characteristics

The Northern Cheyenne Reservation is in the open, rolling country of southeastern Montana. Much of the landscape is dry open rangeland, with smaller areas of irrigated farmland along river bottoms. The area also contains some forestland, primarily in the hills. Elevations range from approximately 3,000 to 5,000 feet above sea level.

Figure 1.3 Northern Cheyenne Reservation Land Cover Types



Source: Montana Natural Resource Information System

Major rivers and creeks include Tongue River, Rosebud Creek, Muddy Creek, Lame Deer Creek, and Cook Creek. The Tongue River forms the eastern boundary of the Reservation. Rosebud Creek flows along the western border of the Reservation and then crosses the northwest portion of the reservation. Both the Tongue River and Rosebud Creek flow northeastward in broad, alluvial valleys.

Mineral resources on the Reservation consist primarily of coal. There are no known occurrences of metallic minerals. Nonmetallic minerals include building stone, sand and gravel, bentonite, claystone, and clinkers. (US Geological Survey and U.S. Bureau of Mines)

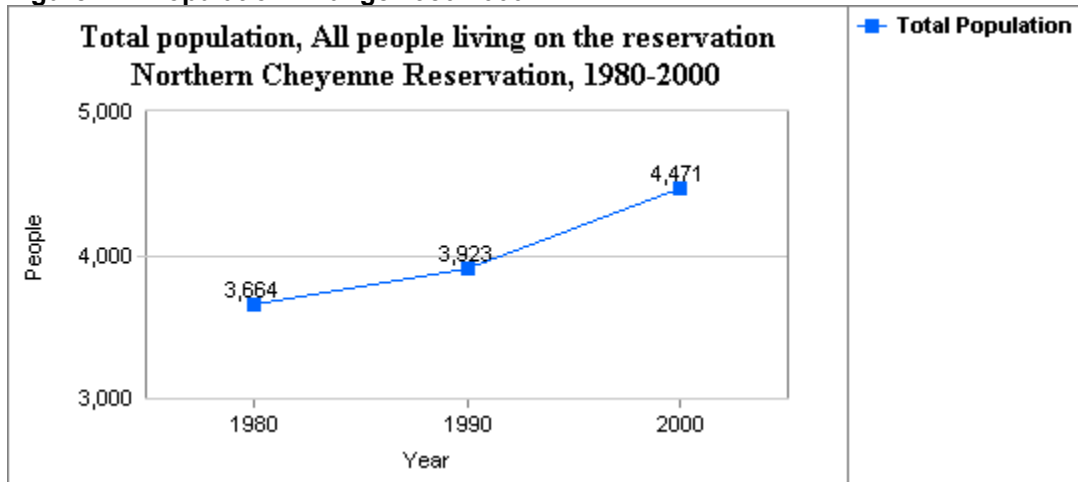
Coal beds underlie the entire Northern Cheyenne Reservation, although much is at too great a depth for surface mining. A substantial amount (estimated at 5-6 billion tons in

1975) of low-sulfur coal could be extracted with surface mining. (US Geological Survey and U.S. Bureau of Mines) These coal reserves remain mostly undeveloped on the Reservation. (Northern Cheyenne Emergency Operations Plan)

Population

The Northern Cheyenne Reservation population is on the rise. Between 1990 and 2000, the number of persons living on the Reservation increased by 14%. There were 4,471 persons living on the Northern Cheyenne Reservation in 2000, according to the U.S. census.

Figure 1.4 Population Change 1980-2000



Graphic prepared by the Northwest Area Foundation, using data from the U.S. Bureau of the Census

Table 1.1 Population of Lane Deer, Busby, Muddy Cluster 1990-2000

Location	2000	1990	Numeric Change 1990-2000	% Change 1990-2000
Lane Deer	2,018	1,918	100	5.21
Busby	695	409	286	69.93
Muddy Cluster (area)	627	387	240	62.02

Source: U.S. Census

Economy

The Northern Cheyenne Reservation private sector economy is based primarily on livestock. Businesses within the boundaries of the Reservation include a laundromat, hardware store, restaurants, bank, gas station, and a grocery store. With a few exceptions, all private commercial businesses are located in Lane Deer.

Government employment accounted for roughly half of all workers on the Northern Cheyenne Reservation according to the 2000 census (U.S. Bureau of the Census, Table DP-3) Major government employers on the Reservation include the Northern Cheyenne Tribe, Bureau of Indian Affairs (BIA), Indian Health Service, and educational institutions.

Per capita income on the Northern Cheyenne Reservation in 1999 was \$8,224, compared to the national per capita income of \$21,587. In 1999, 46% of all persons on the Reservation were at or below poverty level, compared to a national poverty rate of 12%. (U.S. Bureau of the Census)



Downtown Lama Deer

Unemployment is a major issue, recognized by tribal members and others to be considerably understated by census data, which in 2000 indicated that a total of 55% of all adults over the age of 16 were either unemployed or not considered as part of the "labor force."

Land Ownership

More than 97% of all of the land within the reservation remains in tribal hands, most of it held in common by the tribe and in trust with the federal government. The private land holdings not held by tribal members are primarily agricultural land along the Tongue River and within the town of Lama Deer (Northern Cheyenne Reservation Emergency Operations Plan).

Transportation

Main transportation routes on the Northern Cheyenne Reservation consist of state highways and BIA roads.

Table 1.2 Major Transportation Routes

Road Name	Local Reference	Description	Paved	Maintained by
Highway 212	Highway 212	Interstate highway	Yes	State of Montana
Highway 39	Colstrip Road	Lame Deer to Colstrip and I-94	Yes	State of Montana
Highway 314	Kirby-Busby Road	Interstate Highway from Wyoming to Highway 212	Yes	In question, see below
BIA Route 11	Ashland-Birney Road	South from Ashland on west side of Tongue River	Yes	BIA
BIA Route 4	Birney-Lame Deer Road	Birney Day School site to Lame Deer	Portions	BIA
BIA Route 5	Muddy Creek Road	South from Highway 212 along Muddy Creek	Yes	BIA

Route 314, identified as a state highway on state road maps is in uncertain status, according to the Tribal Transportation Planner. It is unclear whether the state, Big Horn County, or the Northern Cheyenne Tribe/BIA has responsibility for maintaining the portion of the road within the reservation boundaries. (Roundstone)

The Northern Cheyenne Tribe recently completed an inventory of all other roads on the reservation. Primarily these roads are used for recreational purposes or hunting and are dirt roads, many of which are two-track or rough 4-wheel vehicle trails. Roads identified by the BIA as fire access routes and/or access to fire towers or the communication tower are maintained by the BIA as bladed dirt roads (Flatness).

A complete condition assessment of the roads on the reservation has not been completed in at least a decade or more (Roundstone). Some known issues with existing roadways include:

- Severe cracking on the Muddy Creek Road (BIA Route #5)
- Some homes near Busby are reached by roads that cross the creek but where there are no bridges.
- Poor road conditions, including steep grades and inadequacy or lack of bridges, can make access difficult or impossible for wildland fire fighting equipment

There are no airports or rail lines on the Reservation.

Land Use and Land Use Management

The predominant land use on the Reservation is agricultural.

Most of the population lives along the main transportation routes. Of 1,511 homes on the Reservation all but two are along the state highways or BIA routes (Northern Cheyenne Housing Authority). Development includes residential units developed privately or by the Northern Cheyenne Tribe, retail and commercial businesses, schools, churches, and other government buildings and structures. Most non-residential development is located in Lame Deer. Busby has a post office, recently constructed youth detention facility, and K-12 public school. The St. Labre School is located near Ashland.

Figure 1.5 displays the 2000 population density by census blocks.

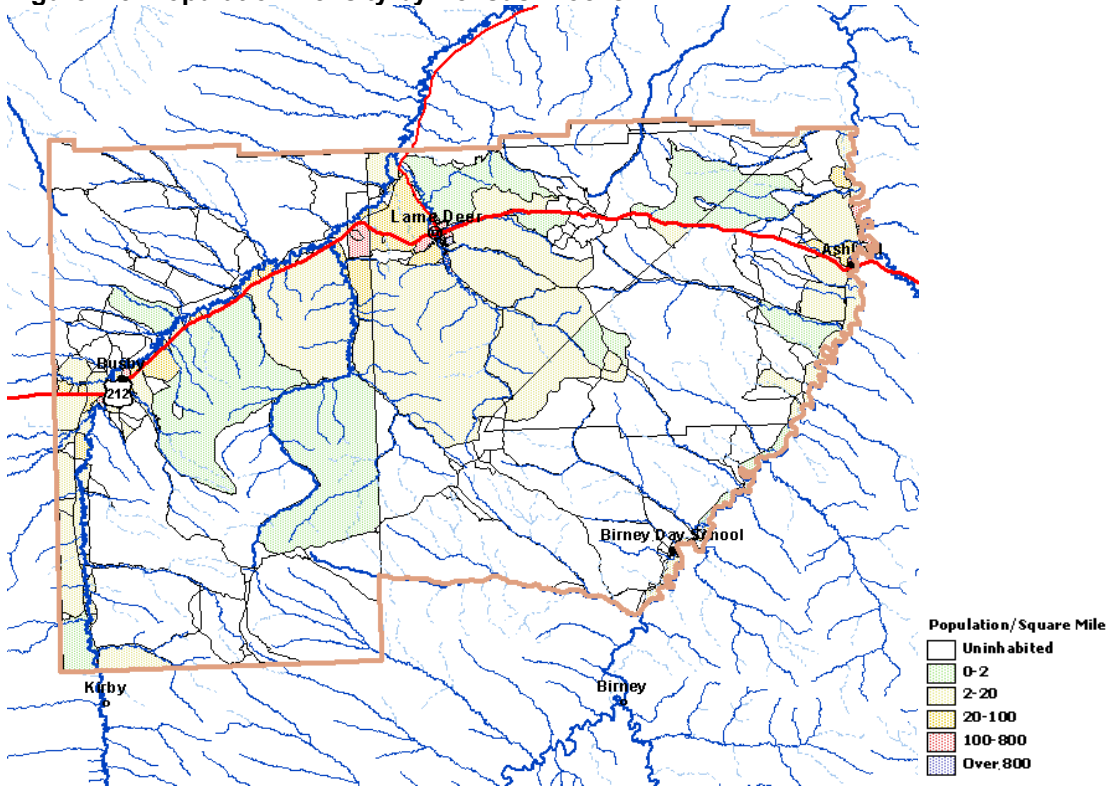
The Tribe has developed more than a dozen residential complexes, or subdivisions, in various locations on the Reservation. The Tribe generally does not sell lots within the subdivision, but rents or leases them out. There are no other developments for multiple houses on the Reservation other than the platted townsites of Busby and Lame Deer, and on lands managed directly by the federal government, such as the federal school complex and associated housing in Busby.

Subdivisions managed by the Northern Cheyenne Housing Authority include those listed below. Several of the subdivisions are known locally by other names. The Tribe has changed some of the official names to be more reflective of the Northern Cheyenne culture.



Muddy Creek Subdivision

Figure 1.5 Population Density by Census Blocks



Source: Montana Natural Resource Information System

Table 1.3 Northern Cheyenne Subdivisions

Name	Location	Locally Known As:
Busby Subdivision	Busby, near Post Office	
In process of being renamed	Busby—west end	Magic City
Eagle Feathers	Near intersection of Highways 212 and 314	
Muddy Creek	East of Busby, just west of Big Horn County-Rosebud County line	Muddy Cluster
Big Back Subdivision		Rosebud Subdivision
Ashland Walking Horse	West of Ashland	Happy Flats
Ashland Meadow Acres	West of Ashland	Rabbit Town
Allen Rowland Subdivision		
Birney Subdivision	Birney	
Two Moons	Lame Deer	
Crazyhead Heights	Lame Deer	
Sweet Medicine	Lame Deer	
Spotted Elk	Lame Deer	
Shoulderblade Heights	Lame Deer	
Ridge Walker Heights	Lame Deer	
Medicine Elk	Lame Deer	
Westside Housing	Lame Deer	

Source: Tribal Housing Authority

There are platted townsites with lots and streets in Busby and in Lame Deer, but there are no zoning regulations or subdivision regulations on the Northern Cheyenne Reservation.

The Land Committee, consisting of Tribal Council members, guides land use and development on tribal lands. The Northern Cheyenne Tribe has adopted a policy to retain and acquire as much of the Reservation in tribal ownership as possible. When privately owned lands on the reservation are available for sale, the tribal policy is to meet the highest bid to acquire the land. The Land Committee also reviews requests from tribal members to lease land for residences and identifies tribal lands for subdivisions.

Environmental review of new development may be conducted by the BIA, IHS, or Northern Cheyenne Tribe depending on the type of development. Generally, those developments funded with federal assistance would be reviewed by either the BIA or IHS. Developments on tribal lands would be reviewed by the Tribe. Developments on

privately owned lands, not requiring any federal or tribal financial assistance may not require any kind of review.



Extent of review depends on type of development. Generally, the review of individual home sites is limited to review of wastewater systems. The Land Use Committee approves location of tribal housing developments, and the Northern Cheyenne Housing Authority then takes on responsibility for site design, typically by contracting for such services. The Northern Cheyenne Tribe reviews for environmental factors, such as floodplains, for the housing developments.

Water Tower in Lame Deer (background on hill to right of telephone pole)

Perhaps the most significant factor for location of new development on the Northern Cheyenne Reservation is proximity of infrastructure. To date, virtually all new residential development on the reservation has been developed within approximately 1/8 mile of existing utilities (telephone and power). This is true for both individual residences constructed on individually owned land and housing developments on tribal land. Utilities on the reservation are limited to the main transportation corridors.

Infrastructure, Utilities, and other Services

There are a number of water supply and wastewater systems on the Northern Cheyenne Reservations. Table 1.4 indicates those that are managed by the Tribe. In addition to

the systems managed by the tribe, there are also the systems operated by the BIA for the detention facility in Busby and by the St. Labre School for the school campus.

Approximately 3,100 people are served with the Northern Cheyenne Tribal public water and waste water systems. Total estimated population on the Northern Cheyenne Reservation was approximately 4,500 persons in census year 2000. Those who are not on public systems generally rely on individual wells and septic systems.

Table 1.4 Northern Cheyenne Tribe Public Water and Waste Water Systems

Location	Population and Connections	Water Supply Wells	Water Storage Capacity	Waste Water System
Lame Deer	Population: 2,018 Connections: 537 residential; 54 commercial	5 wells, 3 currently active; depth 80-100 feet	3 tanks, only one on-line at present with 326,000 gal. capacity; est. at 1-2 days	Gravity collection system to lagoons
Muddy Creek	Population: 195 Connections: 64 residential	3 wells, one currently on line (other have inadequate flow); depth: 95 feet	2 tanks each with 30,000 gallon capacity; est. at 2 days	Gravity collection system to lagoons
Busby	Population: 615 Connections: 116	2 wells, only one on-line; depth 260-265 feet	5 storage tanks each with 20,000 gallon capacity, est. at 2-3 day	Gravity collection system to lagoons
Birney	Population: 113 est., Connections: 25 est.	1 well, 51 feet deep	2 tanks each 20,000 gallon capacity; 5-7 day supply	Gravity collection system to lagoons
Ashland Meadows (Rabbit Town)	Population: 152 est. Connections: 38 est.	1 well, 104 feet deep	2 storage tanks one with 35,000 gal capacity; one with 15,000; est. 5 day supply	Gravity collection system to lagoons

Sources:

U.S. EPA Sanitary Surveys for Lame Deer (2004), Muddy Cluster (2002), Busby (2002), Birney (2002), and Ashland (2002)

McManus, Cleve. Northern Cheyenne Utilities

Electricity and power are available along the major transportation corridors. There is virtually no cell phone coverage on the reservation. According to the 2000 census, 25% of all housing units were without any kind of telephone service (including land line service).

There are two public schools (together service grades K-12) and a community college in Lame Deer, the Northern Cheyenne Tribal School (K-12) in Busby, and the St. Labre school (K-12) outside of Ashland.

Tribal government services, BIA offices, and Indian Health Service clinic are located in Lame Deer.

Development Trends

Future development is anticipated to be similar to what has occurred over the past ten years.

Population is expected to continue to increase with resulting increased demand for additional housing. In addition, many existing homes are in severe disrepair and could necessitate complete rebuilding. The Tribal Land Committee, Housing Authority, and BIA will continue to be involved in determining where and how new housing developments are built, with consideration for environmental factors and safety hazards, such as floods.

There is a potential for the tribe to build a gaming casino on the off-reservation lands near the Tongue River Reservoir. There is also some potential that coal and gas developments could be developed in the future.

There is no information available at this time to indicate how many homes may be approved for development in the future, nor exact details regarding the potential casino or coal and gas developments.

Emergency Services

The Northern Cheyenne have an Emergency Operation Plan, coordinated by the Northern Cheyenne Disaster and Emergency Services (DES). The Northern Cheyenne Tribal Emergency Response Services have executed general mutual aid agreements with nearby emergency response services. Any disaster within the Reservation may require the coordination, communication, and cooperation of several governments and federal agencies. These include:

- Northern Cheyenne Tribal Government
- Bureau of Indian Affairs
- Indian Health Service
- Rosebud County DES
- Big Horn County DES
- Crow Tribe
- Montana Department of Natural Resources and Conservation
- Montana DES
- US Department of Interior
- US Department of Health and Human Services
- US Federal Emergency Management Agency

Fire service is provided by various entities on the Reservation including the Northern Cheyenne Volunteer Fire Department at Lame Deer, volunteer fire departments in Busby and the St. Labre Mission. The BIA in Lame Deer has wildland fire fighting capabilities. In addition, nearby towns of Colstrip and Ashland have apparatus and volunteer fire departments.

Law enforcement is provided by the Northern Cheyenne Agency BIA.

Ambulance service is provided by the Northern Cheyenne Ambulance Service, with a crew on call 24 hours/day, supported by the Quick Response Unit in Ashland.

There is a 24-hour/day emergency dispatch center at the Northern Cheyenne BIA Law Enforcement Center. The Emergency Medical Services have their own 24-hour dispatch and receive emergency calls in the BIA Law Enforcement Dispatch Center by a telephone line established in the community as a hot-line.

There is no NOAA weather radio reception on the Northern Cheyenne Indian Reservation. Severe weather warnings for the Reservation are issued by KIKC radio station out of Forsyth, Montana. KIKC is the only radio station that can be received in Lame Deer.

Climate and Weather

The Northern Cheyenne Indian Reservation is located east of the Continental Divide and subject to continental weather patterns. In general summers are hotter, winters are colder, precipitation is less evenly distributed, skies are sunnier, and winds are stronger than on the west side of the divide. (Western Regional Climate Center, Climate of Montana)

Table 1.5 Average Temperatures: Busby (1944-2005) and Lame Deer (1948-1998)

	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>	<i>Jul</i>	<i>Aug</i>	<i>Sep</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>	<i>Ann</i>
Busby													
Ave max	32	38	43	59	69	78	88	88	76	62	46	35	60
Ave min	5	11	19	29	38	46	51	50	40	30	18	9	29
Lame Deer													
Ave max	34	41	48	61	70	80	89	89	77	65	46	37	61
Ave min	5	11	19	28	38	46	51	49	39	29	19	9	29

Source: Western Regional Climate Center Period of Record Monthly Climate Summary (wrcc.dri.edu)

Average maximum and minimum temperatures recorded at Busby and Lame Deer indicate that average monthly minimum temperatures can range from as low as 5 degrees (January) to average maximum temperatures of 89 degrees (August).

Average annual precipitation ranges from approximately 14 to 24 inches, with higher precipitation in the hills. (Montana Natural Resource Information System, Map of Average Annual Precipitation 1961-1990)

Average annual snowfall is approximately 46 inches in Lame Deer, 51 inches in Busby, and 30 inches in Birney. (Western Regional Climate Center)

Extreme weather in the county can include storms with hail, lightning, and strong winds and winter storms with ice, snow, cold temperatures, and strong winds. Weather events are covered in more detail in Chapter 3.

CHAPTER 2: PLANNING PROCESS

This chapter describes:

- The overall approach to developing the plan
- The plan process, including:
 - Who was involved in the planning process and how they were involved
 - Efforts to involve the general public
 - Efforts to involve various interests including government, business, education, and others

Supporting documents in Appendix A include:

- Meeting agendas
- Meeting summaries
- Meeting sign-in sheets
- Flyers and News Releases
- Correspondence

OVERALL APPROACH AND PHILOSOPHY

The development of this plan was based on the premise that plans with the greatest likelihood of being implemented are those with local momentum, where individuals in the groups in the community(ies) are actively involved and have a stake in accomplishing goals and specific projects.

From the start it was important that any and all interested individuals be offered the opportunity to participate. Special efforts were made to invite persons representing a wide variety of interests that could be affected by disasters or that play a role in disaster response. It was recognized that a number of individuals were critical resources to the process by virtue of their knowledge and expertise. The process sought to engage both these knowledgeable individuals and the general public.

Many individuals committed considerable amounts of personal time to the development of this plan. Without their involvement, this document would not have been possible.

PROCESS

There were several key participants in the process:

- Northern Cheyenne Tribal Administration—initiated the effort and approved the plan. Tribal Council members were invited to participate in all meetings.
- Steering Committee—functioned as the planning committee (see detailed description below under “Public Involvement and Outreach”)
- General Public—encouraged to participate, attend steering committee meetings, stay informed (See more under “Public Involvement and Outreach”)
- Tribal Ambulance Services Coordinator, Ernestine Spang—lead staff person on the Reservation for coordinating with the contractor and liaison for local expertise

- Consultant—provided the staffing to research and write the report, facilitating discussion at meetings leading to hazard evaluation and risk assessment, mitigation measures (goals, objectives, projects)
- Technical Experts and Others. A number of individuals were contacted for information and were extremely responsive and helpful. These included the following:
 - Steering Committee Members
 - Tribal, BIA, and IHS staff
 - Jim Scarlett, National Weather Service-Billings Office

There were four basic elements of plan development:

1. Getting Started - Understanding the Purpose and Need for the Plan
2. Public Involvement and Outreach
3. Document Development and Review
4. Plan Approval

The process for each of these elements is described in more detail below.



Elementary School in Lame Deer

Understanding the Purpose and Need for the Plan-Getting Started

The Northern Cheyenne Tribe initiated the efforts to develop a PDM plan and already had a good understanding of the need for such a plan. In December 2005, the Northern Cheyenne Tribe contracted technical assistance from Anne Cossitt of Cossitt Consulting to complete the PDM.

Anne Cossitt met with the Tribal Emergency Response Commission (TERC) in December 2005 to review purpose and approach to the plan, identify how best to involve various interests and the general public, identify existing plans, studies, reports, and technical information, and to finalize the schedule and products. The agenda and meeting notes for that meeting are included in this chapter.

The Ambulance Services Coordinator sent out letters of invitation to participate in the Steering Committee to a number of individuals representing a variety of interests on and off the Reservation, including Tribal Council members, staff of BIA and IHS, and various tribal administrative offices, DES Coordinators from surrounding counties, business operators on the Reservation, school administrators, tribal college administrators, state FEMA staff, etc.

Public Involvement and Outreach

Efforts to include and inform the public included Steering Committee participation and public outreach via meeting announcements and general information.

Steering Committee

The Steering Committee functioned as a planning committee and guided the work of the consultant. The role of the Steering Committee was to represent a wide range of interests, serve as a technical resource, guide the planning process, and finally, review the draft document for accuracy and completeness.

The intent was to start with persons already participating on the TERC and to encourage participation from business interests, utilities, health care, education, transportation infrastructure, news media, law enforcement, neighboring communities, and local, state, and federal government. Lists of who attended each meeting are included in Appendix A.

The Steering Committee met three times:

- March 22, 2006
- April 18, 2006
- June 1, 2006

Prior to each meeting, written reminders with the date, time, and location of the meeting were sent out to each person on the list.

At the first meeting, participants identified and prioritized hazards and identified any existing plans or other resources relevant to the plan. At the second meeting, the committee worked on drafting goals. At the third meeting, participants identified and prioritized projects.

Meetings were facilitated by the planning consultant according to an agenda developed prior to each meeting. Each meeting began with introductions and an explanation of the purpose of the plan and planning process. Anyone who attended a meeting, whether they had been formally invited or had learned of the meeting through news articles or

other means, was welcome to participate and comment. Following each meeting, a meeting summary was prepared, copies of which are provided later in this chapter.

Public Outreach and Information

Public outreach began immediately following the kick-off meeting in December 2005.

Notices of each steering committee meeting were sent to local newspapers as one or more articles. Articles explained the purpose of the meetings, planning schedule, summary of past meetings, topic for upcoming meetings, and provided contact information. Flyers of each meeting were also posted around the Reservation. Notices and flyers were also sent regarding the availability of the draft document for public review.

Document Development and Review

Cossitt Consulting prepared the plan document, starting with elements identified at the various meetings. A detailed description of the methodology for the hazard evaluation and risk assessment for the PDM is included in Chapter 3. That chapter also discusses the review and incorporation of existing plans, studies, reports, and technical information.

At the initial kick-off meeting and at the initial steering committee meeting, the contractor Cossitt Consulting requested copies of any existing plans, studies, reports, and technical information relevant to the PDM planning process. The contractor received copies of the Northern Cheyenne Homeland Security Plan, Emergency Operations Plan, inundation maps for the Tongue River dam and reservoir, and Fire management plans.

Drafts of plan chapters were submitted to the Ambulance Services Coordinator for review as they were completed. Information from these chapters were summarized and presented at the Steering Committee meetings. Following the third Steering Committee meeting, a draft of the entire document was finalized and made available for public review between September 1 and October 13, 2006. On October 13, Ambulance Services Coordinator Ernestine Spang sent the contractor an email notice stating that no comments had been received. The plan was then finalized and prepared for Tribal Council adoption.

Plan Approval

The plan was finalized in December. A Draft resolution was prepared for adoption and approval of the plan by the Northern Cheyenne Tribe. The signed resolution can be found on the first pages of this plan.

CHAPTER 3: HAZARD EVALUATION AND RISK ASSESSMENT

This chapter identifies:

- Hazards to which the Northern Cheyenne Reservation is susceptible
- What effects the hazards can have on the Reservation's physical, social, and economic assets
- Which areas are most vulnerable to damage from these hazards
- Estimated costs of damage

Chapter 3 includes a short description of **methodology**; followed by a list of the **identified hazards** discussed in this chapter and rationale for why each hazard was included; detailed profiles of each hazard type including **historic occurrences** and **vulnerability and potential loss estimates**; and **assets** and **vulnerable populations** that could be affected by various hazards.

METHODOLOGY

Hazards were evaluated for the Northern Cheyenne Reservation as follows:

1. Identify hazards that may occur. Hazards that may occur were identified through:
 - a. The Steering Committee meetings (steering committee and members of the public identified past disasters and potential future disasters)
 - b. Review of hazard lists in the FEMA "How-to Guide: Understanding your Risks" and initial research on websites recommended in the Guide
 - c. Review of the State of Montana Multi-Hazard Mitigation Plan and Statewide Hazard Assessment
 - d. Researching other plans and reports (included at the end of this plan under "Sources")
 - e. Discussion with technical experts (included in the Sources section at the end of the chapter) including the NOAA staff in Billings to review weather-related natural hazards and obtain storm information
 - f. Discussion with staff of the Northern Cheyenne Tribe, Bureau of Indian Affairs, and Indian Health Service
2. Prioritize the hazards and focus on the most prevalent. Hazards were prioritized at the 1st Steering Committee meeting. (See also discussion below on "Identified Hazards" for more detail on methodology for identifying and prioritizing hazards.)
3. Profile hazard events. This step basically answers the question, "How bad can it get?" This included:
 - a. Identifying maps of the geographic extent of hazards that can occur in predictable areas
 - b. Obtaining data on historical occurrences—frequency, severity, and related damage from other plans and technical information sources. Most data sources organize information by county and state—information specific to Indian reservations is not generally readily available. For

hazards for which there was little verifiable data of occurrence on the Reservation, information on potential severity and probability of occurrence was obtained from occurrences elsewhere in Montana or the nation.

- c. Using results of the hazard ranking conducted at the first meeting. Participants ranked potential consequences and probability for occurrence of various hazards as high, medium, or low.

Vulnerability and potential loss estimates were assessed for the Northern Cheyenne Indian Reservation as follows:

1. Identify the future potential for the hazard to result in damages. Potential for future damage was assessed primarily by looking at past occurrences, by considering information from existing plans and technical information sources, and by considering factors that could potentially increase risk (such as new development in hazard areas).
2. Inventory assets and identify what might be affected by the different hazard events. This includes structures, operations important to the Reservation's economy as well as vulnerable populations that could be particularly hard-hit by a disaster. Critical facilities and vulnerable populations were identified at the 1st steering committee meeting, when participants were asked to identify important features of their community that could potentially be affected by a disaster. In addition, the contractor consulted with Ernestine Spang, Director of Ambulance Services, and others to identify any other important assets. The inventories of assets in this document include location and replacement value, identified by conversations and information provided by representatives of the various facilities, and by comparison to similar structures elsewhere in Big Horn County (and documented in the Big Horn County Pre-Disaster Mitigation Plan). Because most of the hazards on the Reservation can essentially occur anywhere, the inventory of assets is included as a separate section in this chapter. Information from the inventory of assets was used to identify potential dollar loss estimates for each specific hazard.
3. Estimate losses. Loss estimates were based on:
 - a. Data on actual costs of past occurrences
 - b. Consideration of the value of assets at risk (detail included in the section on "Assets and Vulnerable Populations" at the end of this chapter)
 - c. Estimates from other information sources, such as the Montana Multi-Hazard Mitigation Plan

Because most hazards can vary in location and extent, and because there are no existing detailed hazard maps for the Reservation, estimates are often presented as a cost range.

IDENTIFIED HAZARDS

Table 3.1 includes potential hazards for the Northern Cheyenne Indian Reservation, how and why they were identified, how they were ranked at the public meeting, and where they are discussed in this chapter.

Table 3.1 Northern Cheyenne Indian Reservation Hazards

Type	How Identified	Why Identified	Location in Chapter 3	Rank at Public Meeting
Winter Storms	Steering Committee Meetings	History of Past Events	Winter Storm/Extreme Cold	1
Traffic Accidents	Steering Committee Meetings	History of Past Events	Hazardous Materials/Transportation-Related Accidents	
Hazardous Materials	Steering Committee Meetings	Concern about potential future event	Hazardous Materials/Transportation-Related Accidents	3
Wildland Fire	Steering Committee Meetings	History of Past Events	Wildland Fire	2
Structural Fire	Steering Committee Meetings	History of Past Events	Wildland Fire	
Floods of all types	Steering Committee Meetings	History of Past Events	Flooding	
Thunderstorms	Steering Committee Meetings	History of Past Events	Severe Thunderstorms, Hail, Wind, and Tornadoes	
Tornadoes and Microbursts	Steering Committee Meeting	History of Past Events	Severe Thunderstorms, Hail, Wind, and Tornadoes	
Lightning	Steering Committee Meetings	History of Past Events	Severe Thunderstorms, Hail, Wind, and Tornadoes	
Drought	Steering Committee Meetings	History of Past Events	Drought/Extreme Heat	
Insects (Grasshoppers and Mormon Crickets)	Steering Committee Meetings	History of Past Events	Drought/Extreme Heat	
Power Outages	Steering Committee Meetings	History of Past Events	Power Outages-Loss of Communication	
Water Quality Contamination	Steering Committee Meetings	History of Past Events	Epidemics/Water Contamination	5
Epidemics	Steering Committee Meetings	History of Past Events	Epidemics/Water Contamination	
Animal Disease	Kick-Off Meeting	Potential for future events	Epidemics/Water Contamination	
Earthquakes	Montana State Hazard Mitigation Plan	Potential for future events	Earthquakes	
Volcanic Eruptions	Montana State Hazard Mitigation Plan	Potential for future events	Volcanic Eruptions	
Communication Issues	Steering Committee Meetings	History of Past Events	Power Outages-Loss of Communication	

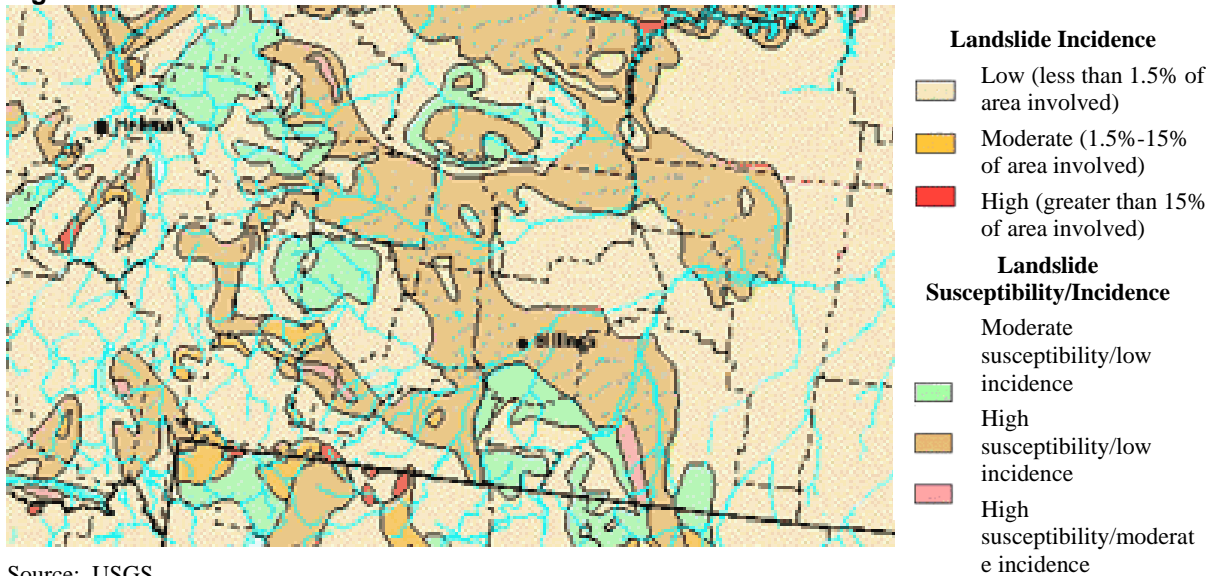
FEMA identifies seven major hazards (floods, earthquakes, tsunamis, tornadoes, coastal storms, landslides, and wildfires) to be considered in the development of a Pre-Disaster Mitigation Plan. Of these seven major hazards, five were identified as potential hazards

on the Northern Cheyenne Indian Reservation--floods, earthquakes, tornadoes, landslides, and wildfires.

The other two hazards were eliminated from more detailed review in this plan for the following reasons:

- Tsunamis are not applicable to the Northern Cheyenne Indian Reservation.
- Coastal storms are not applicable to the Northern Cheyenne Indian Reservation.
- Landslides were eliminated from further review because there was no indication that this has been a problem in the past or could be a potential problem in the future. It was not raised by the public as an issue. Furthermore, the area of the Northern Cheyenne Reservation is within an area classified as having low incidence and low susceptibility for landslides by the USGS. There is however, a considerable lack of statewide data on landslides and there is very little development on most of the Reservation. Consequently, landslides may a dormant issue for now, but one that may surface in the future.

Figure 3.1 National Landslide Overview Map



Source: USGS

National Map Legends

Susceptibility not indicated where same or lower than incidence. Susceptibility to landsliding was defined as the probable degree of response of [the areal] rocks and soils to natural or artificial cutting or loading of slopes, or to anomalously high precipitation. High, moderate, and low susceptibility are delimited by the same percentages used in classifying the incidence of landsliding. Some generalization was necessary at this scale, and several small areas of high incidence and susceptibility were slightly exaggerated.

DROUGHT/EXTREME HEAT

“Drought is an extended period of below normal precipitation which causes damage to crops and other ground cover; diminishes natural stream flow; depletes soil and subsoil moisture; and because of these effects causes social, environmental, and economic impacts to Montana.” (Montana Drought Response Plan, 1995)

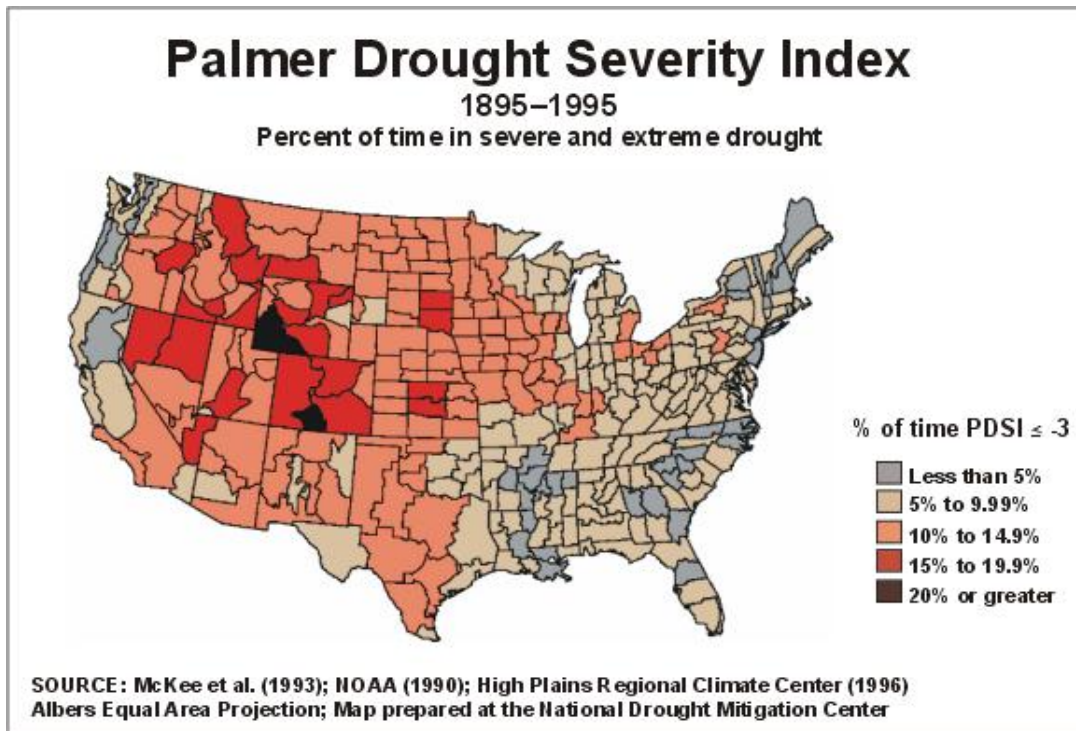
Drought and extreme heat (with or without drought) can occur throughout the Reservation.

Historic Occurrences

Legendary drought occurred in eastern Montana in the 1930s. Impacts were severe across not just Montana, but the entire Great Plains and led to changes in farm practices that have lessened the impacts of subsequent droughts, such as the one in the 1950s.

Figure 3.2 shows drought severity in the 100 years between 1895 and 1995, and is based on the Palmer Drought Severity Index (PDSI), which quantifies drought in terms of moisture demand and moisture supply. The Northern Cheyenne Indian Reservation has been in severe or extreme drought approximately 10-15% of the time between 1895 and 1995.

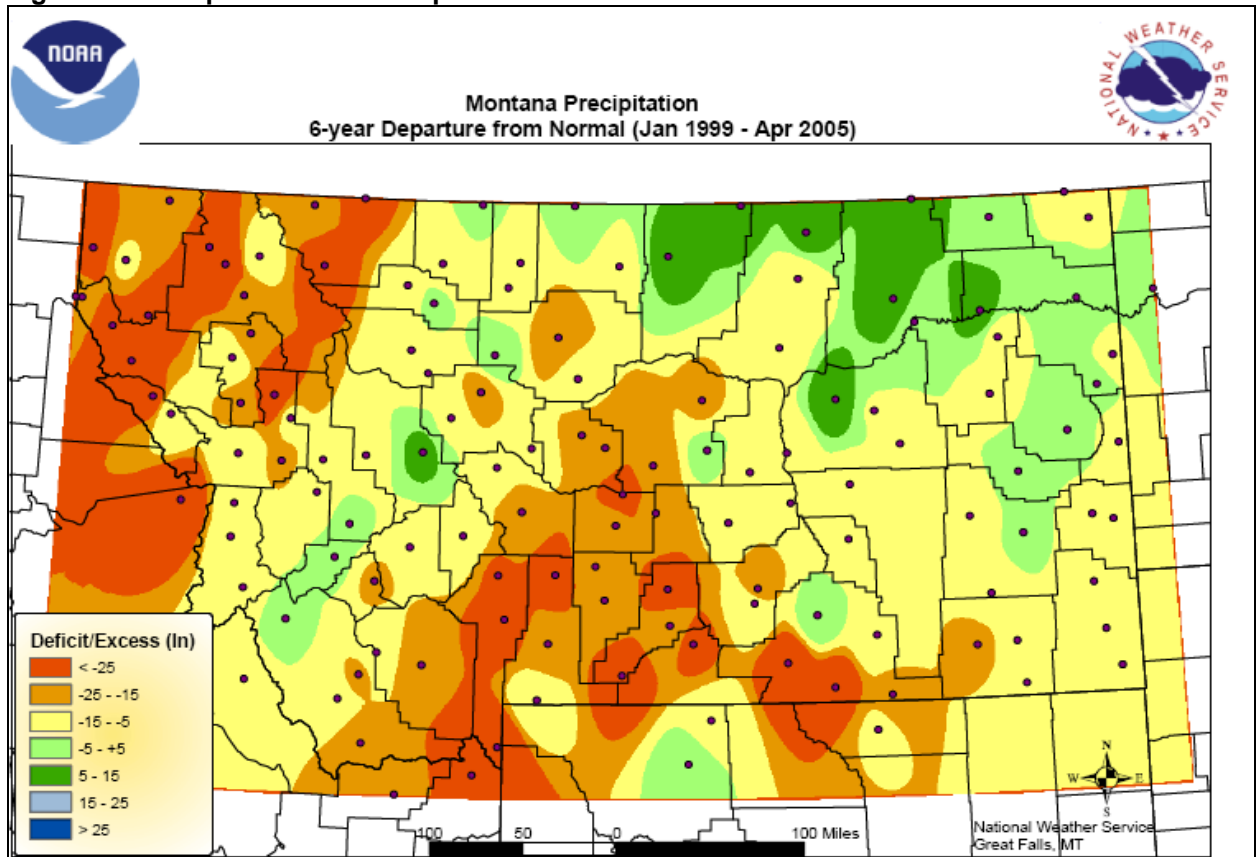
Figure 3.2 Palmer Drought Severity Index



Average annual precipitation ranges from approximately 14 to 24 inches, with higher precipitation in the hills. (Montana Natural Resource Information System, Map of Average Annual Precipitation 1961-1990)

Figure 3.3 shows the 6-year departure from normal precipitation between January 1999 and April 2005. The cumulative decrease over the six years from January 1999 to April 2005 was estimated at between 5 inches and 15 inches for the area of the Northern Cheyenne Indian Reservation.

Figure 3.3 Precipitation-6 Year Departure from Normal



Source: NOAA. http://www.wrh.noaa.gov/tfx/pdfs/hydro/mt_1999.pdf

Drought brings or intensifies other related hazards—reduced water supplies, grasshoppers, plant disease, wind erosion, and wildfires. Table 3.2 lists declarations related to drought (excluding wildfires, which are covered later in this chapter).

Reports from steering committee members and other persons interviewed for information indicated that multiple years of drought may have affected surface and ground water supplies. Some persons at the meetings indicated wells have dried up; others stated that there has been no effect. Participants indicated that Lame Deer Creek used to flow year round, but over the past couple of decades has become an intermittent stream. Participants indicated that water pressure can be extremely low in the public systems from time-to-time, but it was unclear if that was a result of drought or the storage and distribution systems.

Grasshoppers can destroy vegetation. Participants in the steering committee indicated that grasshoppers cleared vegetation between Busby and Muddy Cluster approximately 25 years ago.

Table 3.2 Drought-related Disaster Declarations

Date	Type	Area Affected	Designation Type
1997	Drought	Big Horn and Rosebud Counties among many in state	USDA
1998	Drought	Big Horn County one of many in state	USDA
1999	Drought and excessive heat	All Montana Counties receive designation	USDA
1999	Drought, early frosts and fire conditions	Rosebud County one of 10 counties receiving this designation	USDA
2000	Grasshoppers	Powder River, Big Horn, Carter, Custer, and Rosebud Counties	USDA
2000	Hail and Grasshoppers	Rosebud, Big Horn, Custer, Garfield, Musselshell, Petroleum, Powder River, Treasure, Yellowstone	USDA
2001	Drought	All Montana Counties	USDA
2002	Drought	All Montana Counties	USDA
2003	Drought	Big Horn and Rosebud Counties among many in state	USDA
2004	Drought	Big Horn County, Carbon, Carter, Powder River Counties and counties in Wyoming	USDA

Source: USDA Disaster Declaration Summary

In addition, extreme heat with or without prolonged drought can stress humans, crops, and animals, causing heat-related illness and in some cases, death. Temperatures of 109 degrees have been recorded in Busby (July 14, 2002) and Lame Deer (August 6, 1949). (Western Regional Climate Center)

Vulnerability and Potential Loss Estimates

Based on past history, there is continued probability that drought will occur in the future on the Northern Cheyenne Indian Reservation. Although there may be periods of higher than average precipitation, the Palmer Drought Severity Index long-term trend data indicate that the Reservation is in severe or extreme drought up to nearly 15 percent of the time.

Drought produces a complex web of impacts that spans many sectors of the economy. Direct effects of drought include:

- reduced crop, livestock, and rangeland productivity
- increased fire hazard
- reduced water levels and potential for reduced drinking water supply
- damage to wildlife and fish habitat.

Indirect effects include those impacts that ripple out from the direct effect. Indirect effects include reduced business and income for local retailers, increased credit risk for financial institutions, capital shortfalls, loss of tax revenues and reduction in government services, unemployment, and out-migration.

There is no standardized method for tracking economic losses related to drought in Montana. Historical data for direct economic effects of drought include the following:

- 42 out of 44 livestock producers on the Northern Cheyenne Indian Reservation participated in the American Indian Livestock Feed program in drought years when such assistance was available (Denny).
- Due to drought and lack of water for livestock, pipelines have been established over the past decade that carry water from the Tongue River to stock watering locations up to 9 miles from the River (participants at Steering Committee meeting and McManus).
- In 2001, the Montana Department of Livestock estimated a decrease in Montana cattle herds of approximately 450,000 head of cattle, or 18%, due to drought. The loss estimate consisted primarily of cattle moved out of state for change of pasture (and includes those that were sold). (Drought Relief Activities of the Montana Department of Livestock and Montana Agricultural Statistics Service)
- In May 2005, the USDA Farm Services Agency approved Emergency Conservation Program (ECP) funding to assist producers with cost-share assistance to provide emergency water in pastures where the previously adequate water source had failed.
- Damage Assessment Reports filed by the Farm Service Agency in Big Horn County in 2004 and 2005 indicated that 84% of all producers were experiencing production losses of 40% or more.

Drought does not directly affect structures and infrastructure in the same dramatic and immediately costly ways that other hazards, such as flooding, can and to which there are existing disaster aid responses, such as through FEMA. The primary effect of drought is on land and water resources. Because agricultural production on the Northern Cheyenne Indian Reservation is predominately livestock and associated hay production, the biggest impacts of drought are on livestock and hay.

Direct and indirect costs of a drought could be in the millions of dollars. For example, the estimate of losses to hay crops alone in one year in Big Horn County was approximately \$3.5 million (Big Horn County PDM Plan). Indirect cost effects, such as reduced business with local merchants, etc.), would be in addition to direct losses to agricultural producers. The combined direct and indirect costs of drought are estimated to be double that of the direct costs alone (Aber, personal communication).

Livestock ranchers and others can experience any number of economic impacts from drought that include:

- Reduced productivity of rangeland.
- Forced reduction of foundation stock
- Reductions of irrigation water from the Tongue River Dam
- Cost of supplemental feed and/or cost of moving to other locations with pasture
- High cost/unavailability of water for livestock

- Cost of new or supplemental water resource development (wells, etc.)
- Increased feed transportation costs
- Disruption of reproduction cycles (delayed breeding, more miscarriages, etc.)
- Decreased stock rates
- Range fires
- Reduced groundwater well yields

Measures that have been taken to reduce drought effects on the Northern Cheyenne Indian Reservation have included:

- Piped in water to cattle “Tongue River Dam Project”—stored in 20,000 gallon tanks—this project is now completed—it was done in 2-3 areas along the Tongue River divide
- Water conservation education
- Guidelines for water use (for public water in Lame Deer/Busby)—restrictions on lawn watering, for example
- Water monitoring stations along the river and creeks

FLOODING

“A flood is a natural event for rivers and streams. Excess water from snowmelt, rainfall, or storm surge accumulates and overflows onto the banks and adjacent floodplains.” Flash floods are events “occurring with little or no warning where water levels rise at an extremely fast rate.” (FEMA, *Understanding Your Risks*).

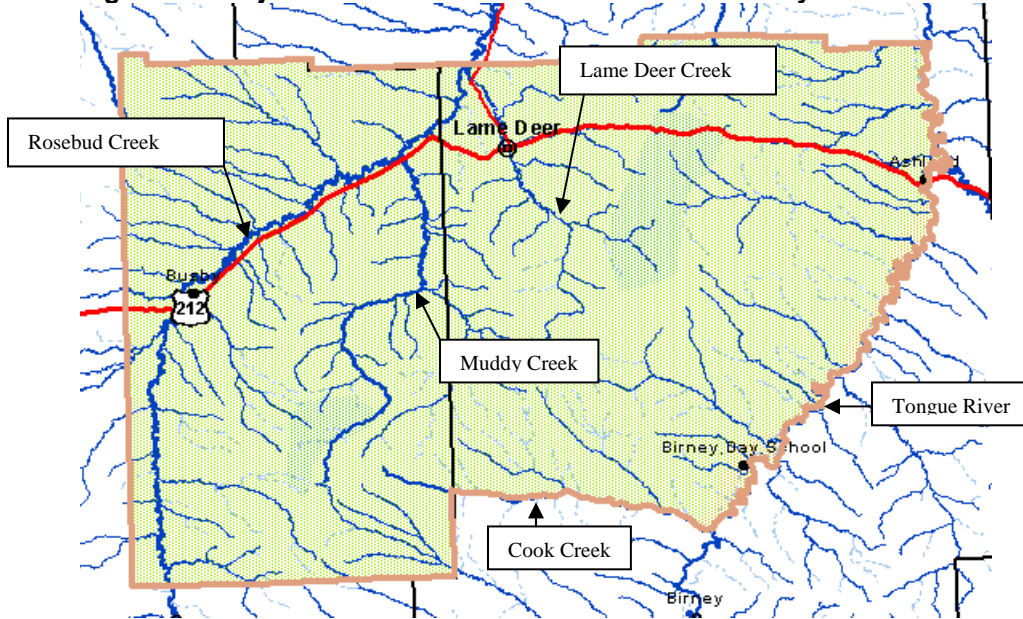


Bridge on Tongue River east of Birney Day School

Flooding can occur throughout the Reservation as a result of snowmelt, widespread rainfall, or intense thunderstorms. High soil moisture, frozen ground, and rainfall on melting snowpacks contribute to the most severe floods (Zelt). In addition, there is potential for flooding from dam failure.

Major rivers and creeks include Tongue River, Rosebud Creek, Muddy Creek, Lame Deer Creek, and Cook Creek. In addition there are a number of tributaries to these rivers and creeks.

Figure 3.4 Major Rivers and Creeks on the Northern Cheyenne Reservation



Source: Montana Natural Resource Information System

- Streams**
- Major river or stream
 - Other stream
 - Un-named stream

Historic Occurrences

Flooding on the Northern Cheyenne Indian Reservation has occurred from storm events, snow melt, ice jams, and flash floods. The Western Regional Climate Center states:

The greatest volume of flow in Montana’s rivers occurs during the spring and early summer months with the melting of winter snowpack. Heavy rains falling during the spring thaw constitute a serious flood threat. Ice jams, which occur during the spring breakup, usually in March, cause backwater flooding. Flash floods, although restricted in scope are probably the most numerous and result from locally heavy rainstorms in the spring and summer. (<http://wrcc.dri.edu/narratives/MONTANA.htm>)

Table 3.3 provides information on flood events on the Northern Cheyenne Reservation. There has not been a major flood event in many years on the Reservation. Winters have been generally warmer over the past decade with little associated ice formation and potential for ice jams. Despite general drought conditions over the past decade, rainfall can be intense and erratic with potential for flash flooding in localized areas. For example, on July 31, 1998 an inch of rain fell in 28 minutes in Ashland.

Table 3.3 Selected Flood Events – Northern Cheyenne Indian Reservation

Date	Location	Nature of Flood	Damage Cost Estimate	Loss/Damage and Notes
1960s exact date unknown)	Lame Deer and Lame Deer Creek	Spring time flood	No information	The entire valley floor flooded in some areas. Culverts got jammed and backed up in snow/ice melt runoff. There was not much damage at the time, but there wasn't as much infrastructure as there is now in the valley.
1969	Ashland	Ice jam	No information	
1971	Ashland	Ice jam	No information	
May 1978	Flooding along Tongue River at St. Labre and other developments near Ashland	Widespread rain on saturated soils combined with snowmelt runoff	\$3.83 million in federal aid to local governments; \$.62 million to individuals (in 7 counties)	Part of widespread flooding in the Yellowstone River Basin on the Big Horn, Tongue, and Powder Rivers and the Yellowstone River from Billings to Miles City. No specific \$ damage for the Northern Cheyenne Reservation. People were evacuated; homes and structures flooded. It had rained for 11 days on the Reservation prior to the flood crest.
1980s (exact date unknown)	Birney Day School	Ice jam	No information	As noted by Steering Committee participants
June 30, 2001	Ashland	Flash flood	No information	Several roads washed out

Sources:

Public Participation

NOAA weather data

Environmental Setting of the Yellowstone River Basin (by Zelt, et.al)

US Army Corps of Engineers, CRREL. <http://www.crrel.usace.army.mil/ierd/ijdb/>

Vulnerability and Potential Loss Estimates for a Flood from a Natural Event

For the purposes of this discussion, a natural event is any event that triggers a flood except for dam failure. Natural events include widespread precipitation, rapid snowmelt, ice jams, and localized heavy precipitation.

The geographic extent of the 100-year flood (a flood magnitude with a probability of occurring every 100 years) has been mapped by the U.S. Geological Survey (USGS) for Lame Deer Creek, Muddy Creek, Rosebud Creek, and the Tongue River. The Northern Cheyenne worked with the U.S. Geological Survey to develop these maps in the 1990s to make determinations of suitability of sites for new housing and other development. With only a handful of exceptions, all existing development falls outside of the mapped 100-year floodplain. (U.S. Geological Survey maps)

The 100-year flood is also referred to as the base flood, a national standard that has been adopted for the National Flood Insurance Program (NFIP). (FEMA, *Understanding Your Risks*) There is actually a range of floods that could occur, other than just the 100-year flood. For example, an “annual flood” occurs much more frequently and produces less damage than a 100-year flood. The 100-year flood would produce much greater damage but occur less frequently. The flooding at St. Labre, Birney, and at Lame Deer included large flooded areas outside of the 100-year flood boundary.

The Northern Cheyenne Reservation is not a participant in the National Flood Insurance Program (NFIP), managed by the Federal Emergency Management Agency (FEMA). In order to participate, a community must adopt and enforce floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners. (<http://www.fema.gov/business/nfip/index.shtm>)

Cost estimates of past damage are not readily available for Indian Reservations on existing nationwide databases, but are tracked for counties in the Spatial Hazards Events and Data Base for the United States (SHELDUS) data base, compiled and maintained by the University of South Carolina. Based on SHELDUS information, nine flood events in Big Horn and Rosebud County between 1960 and 2000 resulted in \$.85 million in property damage and \$1 million in crop damage. SHELDUS data however is not always accurate, can include cost information for a broader area than just one county, and may not include all major floods for the specified time period (for example the major flood of 1978 was not included in the data base).

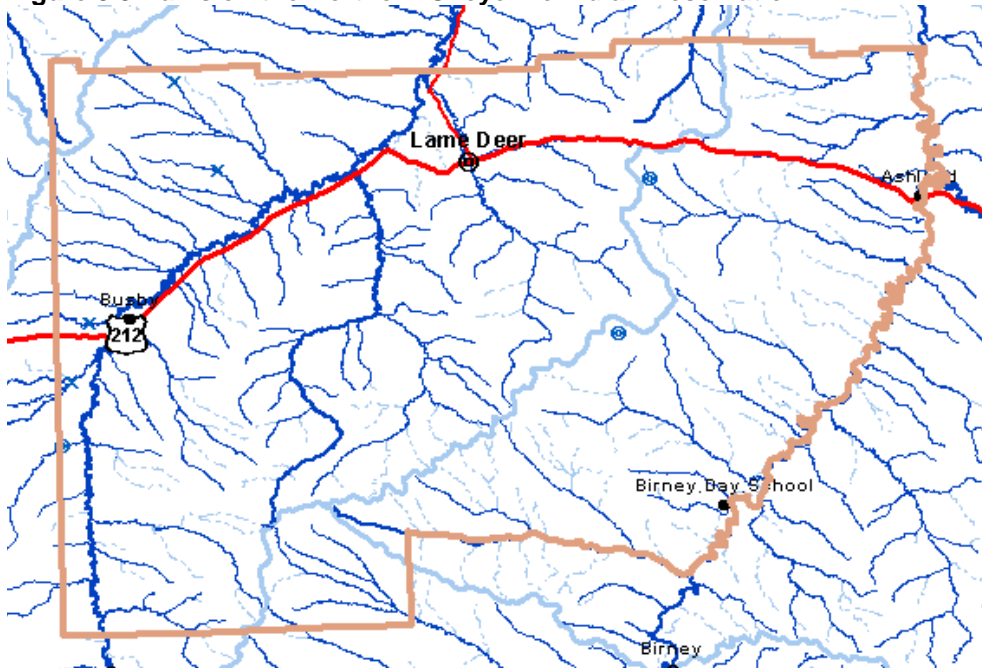
Flash flooding can occur anywhere on the reservation, and can be exacerbated by recent wildfires which may leave large areas without vegetation to retain water runoff.

Vulnerability and Potential Loss Estimates for a Flood from a Dam Failure

There are seven small dams on the Northern Cheyenne Indian Reservation registered with the National Inventory of Dams. Of these, the highest is 34 feet and one of four managed by the BIA (Cook Creek, Crazy Head Fork, Davis Creek, and Thompson Creek). The other three are located in the Rosebud Creek drainage in the northwest corner of the Reservation. Refer to Figure 3.5.

All seven dams on the Reservation are classified as low hazard dams in the National Inventory. There are no dams upstream of the Reservation rated as significant hazards and one dam upstream of the Reservation with a high rating. The dam with the high hazard classification is the Tongue River Dam. All high hazard dams are required to be inspected at least once every five years and to have an Emergency Operations Plan.

Figure 3.5 Dams on the Northern Cheyenne Indian Reservation



Source: Montana Natural Resource Information System

- Dams by Height**
- × 0-20
 - ⊗ 20-50
 - ⊕ 50-100
 - Over 100

The Tongue River Dam is owned and operated by the State of Montana. The dam is earthen, finished in 1938 and rehabilitated in 1999. The dam is 93 feet high and 1,824 feet long. Total capacity of the reservoir at the spill way crest is 79,071 acre-feet.

The Tongue River Dam Emergency Operations Plan describes potential inundation from two different breach scenarios. One is a clear-weather breach, or a sudden breach from an earthquake or a piping failure. The second scenario is a storm-induced breach resulting in the probable maximum flood for the Tongue River. The storm-induced breach is the worst-case scenario, resulting in catastrophic wave height at Birney Day School of 44.8 feet within 5.5 hours and a wave eight of 34.1 feet at Ashland within 8 hours. (Montana Department of Natural Resources and Conservation)

A literature search did not reveal any past dam failures on the Northern Cheyenne Indian Reservation, nor were any identified in the public meetings.

Hazard Classification of Dams

The following defines the high, significant, and low hazard ratings used by the National Inventory.

High: Where failure or misoperation will probably cause loss of human life.

Significant: where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

Low: Where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

The potential for dam failure on the Tongue River is low, based on past experience and the procedures and safeguards required at high hazard dams, but the severity would be catastrophic in the event of failure or breach of the Tongue River Dam.

WINTER STORMS/EXTREME COLD

Extreme winter weather events occur throughout the Northern Cheyenne Indian Reservation and include blizzards, extreme cold temperatures, heavy snow, ice storms, and freezes. Winter weather events have occurred on the Reservation from October through May. Winter storm events can be particularly severe in spring or fall. Storms may start off in relatively warm weather and snow can be accompanied by thunder.

A blizzard is defined as a storm with winds over 35 mph with snow and blowing snow reducing visibility to near zero. (Montana Multi-Hazard Mitigation Plan)

Historic Occurrences

Total annual snowfall averages 46 inches in Lame Deer and 51 inches in Busby. Record snowfall years were 1955, when a total of 107 inches fell in Lame Deer, and 1989, when Busby received a total of 94 inches. (Western Regional Climate Center)



Snow Storm, October 2005 (Photo courtesy of Ernestine Spang)

The average wintertime low temperature in Lame Deer and Busby is about 8 degrees, but lows of -51 (Lame Deer) and -52 (Busby) were recorded December 22, 1989.

Major winter storm events in the past two decades are displayed in Table 3.4.

Table 3.4 Major Winter Storm Events

Date	Event Type	Description
April 1, 1999	Heavy Snow	Heavy snow across southern Montana. Birney received 6 inches of snow.
April 9, 2001	Heavy Snow	4-5 foot drifts in Kirby/Decker area. 8-10 inches of snow in Busby (started as thundersnow). An estimated 600 power poles were knocked down by heavy, wet snow, ice, and wind. Thousands of people were without power for up to 7 days. The hardest hit area was along Route 314 in the Kirby/Decker area as well as the western end of the Northern Cheyenne Indian Reservation.
March 14, 2002	Heavy Snow	5 inches in Birney
April 18, 2002	Heavy Snow	8 inches in Lame Deer
Dec 26-28, 2003	Heavy Snow and Blizzard	18-24 inches of snow in Lame Deer. Gusts of 25 to 40 mph produced significant blowing snow, producing 4-5 drifts around Lame Deer
March 24, 2005	Heavy Snow	8 inches in Birney
May 12, 2005	Heavy Snow	10 inches 10 miles southwest of Lame Deer
October, 2005	Heavy Snow	Heavy snow in Lame Deer resulted in significant tree damage that took several days to clear from roads

Sources: NOAA data

Vulnerability and Potential Loss Estimate

Given the location of the Northern Cheyenne Indian Reservation and weather patterns for the northcentral United States, winter storms, ice storms, and related cold weather events (e.g., extreme cold) will continue to be a potential hazard for the Reservation.

Winter storms are one of the major weather-related causes of death in the United States. Nationally, 100 deaths occur directly or indirectly from winter weather on average each year—more than hurricanes, tornadoes, or lightning. Statistics on winter storm related deaths are difficult to track because the actual cause of death may be a traffic-related accident, heart attacks from overexertion (such as snow shoveling), and from hypothermia. (Montana Multi-Hazard Mitigation Plan)

As reported by steering committee participants, the April 2001 winter storm that created drifts of 4-5 feet from Decker to Busby was a particularly problematic storm for the Northern Cheyenne. Power was out for several days, and people needed water, lanterns, and heat. (See the “Power Outages” section of this chapter for more information on effects of power loss.) Coordinating the effort was chaotic at times. Distribution of needed supplies was not immediate and the collection of such supplies after the event was not successful.

Based on past events, the single highest economic impact of winter storms is damage to power facilities. It cost approximately \$750,000-\$850,000 to repair/replace the downed power lines from the 2001 event in the Kirby-Decker area . (Rugg)

Winter storm events on the Reservation can have a number of potential effects and related costs:

- Loss of human life and other human risks—hypothermia, stranded motorists
- Damage to electric transmission facilities and power outages
- Livestock loss and stress
- Crop losses and stress
- Road closures
- Snow removal
- Business interruption expenses
- Overtime loads on emergency and law enforcement personnel
- Vehicle accidents
- Other property damage (e.g., structural to buildings)
- Damage to trees and vegetation (spring and fall storms with heavy wet snow) and related damage to buildings (e.g., trees and tree limbs falling on buildings)

Based on past events and public comment, the severity of a winter weather event can range from moderate to severe, and the probability of occurrence is high. Costs of severe winter storms could be in the millions of dollars, when one considers costs to individuals, emergency shelter and supplies, costs to repair power lines downed by winter storms, etc.

SEVERE THUNDERSTORMS, HAIL, WIND, AND TORNADOES

The entire area of the Northern Cheyenne Reservation is subject to severe thunderstorms, lightning, hail, wind, and tornadoes.



Photo: National Oceanic and Atmospheric Administration

A severe thunderstorm is a thunderstorm that produces tornadoes, hail 0.75 inches or more in diameter, or winds of 50 knots (58 mph) or more. (Montana Multi-Hazard Mitigation Plan)

A tornado is a violently rotating column of air in contact with the ground and extending from the base of a thunderstorm. Tornadoes are categorized by the Fujita scale. The Fujita scale ranges from F0 (with estimated speeds less than 73 mph) to F5 (with

estimated wind speeds greater than 261 mph). (Montana Multi-Hazard Mitigation Plan)
The wind speeds are an estimate only. The Fujita scale is a damage scale. The worse the damage, the higher the F scale rating. In southeastern Montana, with plenty of wide open spaces, if a really wide, fast spinning tornado hits an area with no buildings, it still has a rating of F0. (Fransen)

High wind events (exceeding 50 knots) can and do occur at any time of the year. When combined with snow, they create blizzard conditions and are discussed in the section above on "Winter Storms." Straight line winds are more likely to occur in eastern Montana than tornadoes, and the resulting damage can be worse than a tornado. (Fransen) A microburst is defined as "a small downburst with its outburst damaging winds extending only 4 km (2.5 miles) or less. In spite of its small horizontal scale, an intense microburst could induce damaging winds as high as 75 m/sec (168 mph). (Caracena)

Historic Occurrences

NOAA data for 1996 through April 2006 on the Northern Cheyenne Reservation indicated:

- 39 hail events
- 11 wind events (60+ mile per hour winds)
- 1 dry microburst in Lame Deer

On July 20, 1993, a tornado (F0 on the Fujita scale) tore through an area two miles south of Lame Deer. It destroyed two mobile homes and resulted in three injuries. (Montana Multi-Hazard Mitigation Plan and Tornado Project)

The Northern Cheyenne Reservation experiences significant lightning events. Figure 3.7 displays positive (+) and negative (-) lightning strikes between 6:00 p.m. on June 6 and 1:15 a.m. on June 7, 2005. There were several hundred strikes during this seven-hour period on the Northern Cheyenne Indian Reservation. Much of these are in the hilly areas of the Reservation.

Thunderstorms occur frequently, particularly during the summer months, however, there is little reference in NOAA data to thunderstorms on the Northern Cheyenne Reservation. This may reflect in part on the rural nature of the Reservation and relative scarcity of weather reporting by individuals. Weather incident reporting by individuals, rather than via equipment at NOAA monitoring stations tends to be more frequent in urban areas with more population. (Montana Multi-Hazard Mitigation Plan)

Vulnerability and Potential Loss Estimate

Thunderstorms, windstorms and related weather events will continue to be a hazard for the Reservation for existing and future development wherever it may be located.

Severe thunderstorms, high winds, tornadoes, and hail have the potential for:

- loss of life and injury
- property damage (complete destruction possible in the case of tornadoes and extreme winds, other damage to roofs, siding, windows, vehicles, equipment, from strong winds, tornadoes, and hail)
- power outages and related effects
- crop damage (particularly from hail)
- livestock fatalities and injuries
- damage to utility infrastructure (power lines, etc.)

The heavy rain from some thunderstorms may trigger flash flooding. High winds, microbursts, and tornadoes may only affect a relatively small area, but can potentially result in the most devastating destruction, requiring complete rebuild in some cases. Hail results in damage to vehicles, crops, and structures. Lightning generally causes little direct damage, but it is responsible for starting wildfires in the right conditions, which can result in significant damage.

SHELDUS data for Big Horn County (which overlaps with a portion of the Northern Cheyenne Reservation) indicates property and crop damage from severe thunderstorms, hail, lightning and wind events could be several hundred thousand dollars or more depending on the severity of the event.

Table 3.5 Damage Summary of Thunderstorm/Wind Events from SHELDUS data (Big Horn County, 1960-2000)*

Type	# of Events	Property Damage	Crop Damage
Hail	10	\$ 721,414	\$ 1,019,141
Tornado	4	154,000	100,000
Severe Thunderstorm (includes events with hail and wind)	10	1,145,444	721,934
Strong Winds (includes thunderstorm and blizzards)	10	1,127,701	424,173

Source: SHELDUS data base; Data unavailable for Reservations

Based on past events, all areas of the Reservation are vulnerable to damage from severe thunderstorms, wind events, hail, lightning, and tornadoes, but damage is typically localized rather than reservation-wide.

Steering Committee participants ranked the probability and severity of events as follows:

<u>Hazard</u>	<u>Probability of Occurrence</u>	<u>Risk Severity</u>
Thunder Storms	High	Low
Tornadoes/Microbursts	Low	Medium
Lightning	High	Low

The data indicate a high potential for occurrence for strong winds and for hail. Severity of damage for both could be high on a localized basis.

HAZARDOUS MATERIALS/TRANSPORTATION-RELATED ACCIDENTS

Hazardous materials are chemical substances, which if released or misused, can pose a threat to the environment or health. Hazardous materials come in the form of explosives, flammable and combustible substances, poison, and radioactive materials. These substances can be released because of transportation accidents, pipeline releases or accidents, mechanical or human error at various facilities. (Montana Multi-Hazard Mitigation Plan) A hazardous material incident could occur anywhere on the Northern Cheyenne Indian Reservation.

As many as 500,000 products pose physical or health hazards and can be defined as “hazardous chemicals.” Nationwide, most discharges are from fixed facilities (52%) and discharges from mobile facilities (railroads, trucking, etc.) are about 18%. (Montana Multi-Hazard Mitigation Plan)

On the Northern Cheyenne Indian Reservation fixed facilities are limited to storage tanks (commercial or residential). There are no pipelines that cross the Reservation.

Highways and roads are the transportation elements on the Reservation. There are no public airports, and no railway. Traffic accidents (other than hazardous materials-related) were also cited as potential disasters, especially when they involve multiple injuries, since the local clinic in Lame Deer has limited capabilities for multiple emergency patients.

Historic Occurrences

The National Response Center is the national point of contact for reporting oil and chemical spills in the United States. Data from the National Response Center for the period 1990 to 2005 indicated a total of 2 reported incidents on the Northern Cheyenne Indian Reservation, as shown in Table 3.6.

Table 3.6 National Response Center Reported Spills 1990-2005 by Location

Location	#	Notes
Busby	1	November 15, 1996. A truck accident resulted in the release of 50 gallons of diesel fuel that was contained in a snow filled drainage ditch.
Lame Deer	1	March 4, 1997. A truck backed into the pump at the Cheyenne Depot gas station, causing a spill of approximately 460 gallons and a fire. Most of the fuel was consumed in the fire
Total	2	

Source: National Response Center

The Montana DEQ also keeps a data base of reported incidents. The data are organized somewhat differently than that of the National Response Center website. DEQ spill data for the period from 1996 through 2005 indicated a total of 15 spill reports

on the Northern Cheyenne Reservation. Ten of these incidents related to vehicle accidents/incidents, two were from releases at schools, one was for releases from the Rabbit Town wastewater system, and two were stationary spills at other locations (Cheyenne Depot and another location south of Lame Deer). (Coleman)

Traffic accidents can occur anywhere on the reservation. The Montana Department of Transportation keeps records of reported traffic accidents on state highways. In the three-year period from January 1, 2003 through December 31, 2005, there were a total of 52 traffic accidents between mile post 21.5 and mile post 61.5 on Highway 212 on the Northern Cheyenne Indian Reservation. Of the 52 total accidents, 18 involved semi-trucks, and the stretch between mile posts 51 and 53 accounted for five of those semi-truck crashes. During the same period there were seven accidents on Highway 314 between mile posts 31 and 44. (Williams)

Participants in the planning process indicated that there had been three accidents involving school buses in the past year. One of these was weather related, one had to do with glare on the road, and the third was related to a road construction site. There were injuries in at least one of the accidents and two of those injuries were serious enough that they required a trip to Billings for medical care.

Currently there are no tribal traffic regulations, although there is an effort ongoing to establish such regulations. (Williams, and planning participants)

Vulnerability and Potential Loss Estimate

The major concern for hazardous materials expressed by steering committee participants was the potential for spills on Highway 212. Most of the population on the Reservation lives within ¼ mile of Highway 212 and the highway transects the town of Lame Deer.

An automatic traffic counter, located off-reservation, 13 miles east of Ashland on Highway 212 shows that traffic increased from average daily traffic of 650 vehicles in 1992 to 719 vehicles in 2005. Large trucks make up 46.2% of all traffic on that stretch of highway. (Montana Department of Transportation)

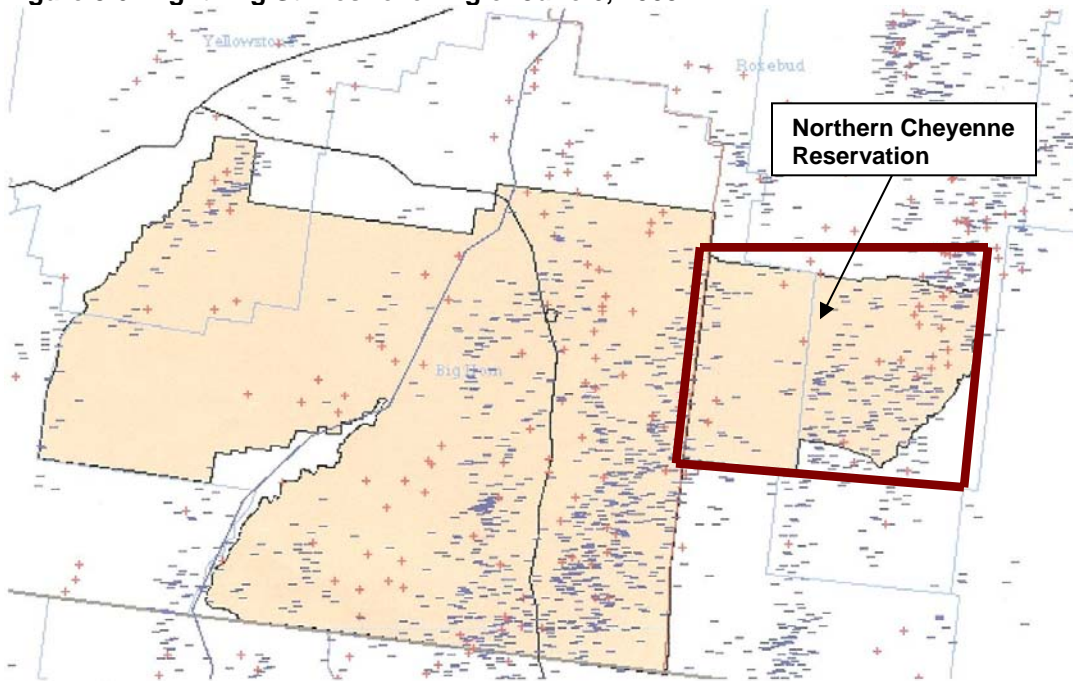
Lame Deer is located at the junction of Highway 39 (Colstrip road) and Highway 212 so there is potential for truck and other traffic coming from four directions. There is a stop light at the intersection.

Hazardous materials incidents can result in:

- injury or loss of life
- damage to structures (e.g., explosions)
- business interruption (e.g., during evacuations)

Between 1982 and 1991, there was an annual average of 6,774 hazardous materials transportation incidents nationwide that resulted in 10 deaths and 436 injuries. The most common type of transportation hazardous material incident is from highway crashes, followed by railroad incidents. (Montana Multi-Hazard Mitigation Plan)

Figure 3.6 Lightning Strikes--evening of June 6, 2005



WARNING - Due to the limited accuracy of the lightning data, this map is not to be used to make tactical fire suppression decisions.

Source: BLM

Such storms can be intense as noted by one of the few NOAA entries specifically referencing a thunderstorm:

*June 30, 2001
Ashland—2.5 inch hail*

A large thunderstorm moved over the town of Ashland, Montana at about 1 a.m. on the morning of June 30th. The storm reached a height more than 13 miles high. In addition to the baseball size hail...the storm produced winds up to 80 miles per hour. As a result....there were many smashed windows and windshields...as well as...trees stripped of branches, bark, and leaves. In addition...many birds were also knocked out of trees and killed. The St. Labre School in Ashland was damaged with many windows smashed.

Between 1998 and 2004, Big Horn County and Rosebud County, both of which include portions of the Northern Cheyenne Reservation, were included in one USDA disaster declaration for high wind and one for hail.

Potential losses can vary from relatively small spills and leaks to major events. Clean-up and damages are typically borne by the responsible party, but in some cases, effects can be widespread and far-reaching with public cost and public health implications.

A single incident can have serious effects. For example, an April 1996 rail crash in Alberton, Montana, resulted in the second largest chlorine spill in the history of the nation. Monetary damage was estimated at \$3.9 million. Although there is no rail line on the Reservation, there is transport of hazardous chemicals on the highways.

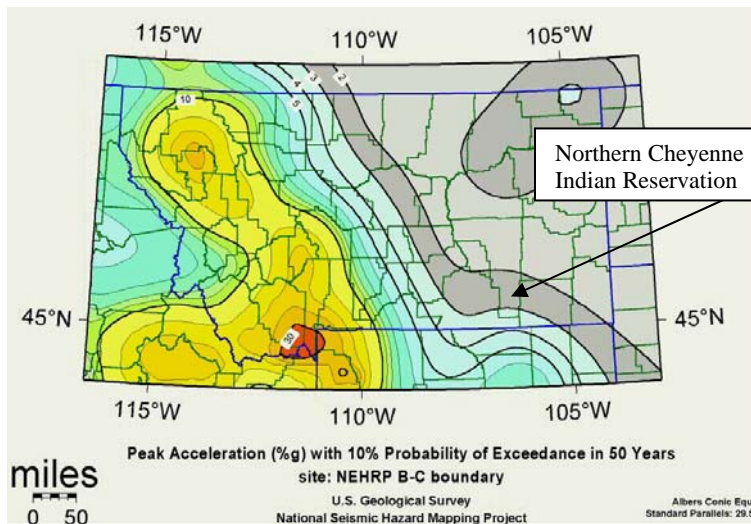
Participants in the PDM planning process identified hazardous materials and transportation-related incidents as having potentially severe impacts, and a low probability of occurrence.

EARTHQUAKES

An earthquake is “a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of Earth’s tectonic plates. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure.” (Understanding Your Risks)

The FEMA guidebook “Understanding Your Risks: Identifying Hazards and Estimating Losses” recommends that if there is an area of 3% g peak acceleration or more then the hazard should be profiled more closely. Earthquake severity is often expressed as a comparison to the normal acceleration due to gravity and is expressed as “g” force. A 100% g earthquake is very severe. The Northern Cheyenne Indian Reservation falls within an area of peak acceleration values of 3% (dark grey area in Figure 3.7) as determined by the USGS.

Figure 3.7 Peak Acceleration Values in Montana.



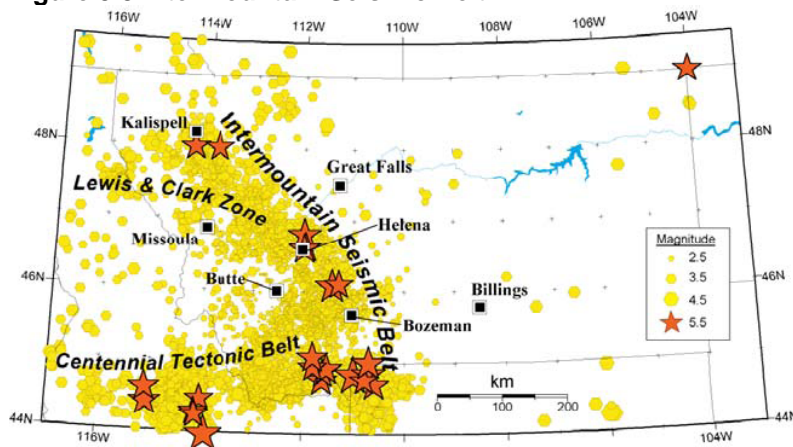
Source: Montana Multi-Hazard Mitigation Plan

Historic Occurrences

The most seismically active portion of the state is in the southwestern Montana as shown in Figure 3.8. (State of Montana Multi-Hazard Mitigation Plan)

There have been 27 earthquakes in and around Big Horn County between 1943 and 2004. The magnitude ranged from 1.9 to 4.3 on Modified Mercalli Scale. (Stickney)

Figure 3.8 Intermountain Seismic Belt.



Source: Montana Multi-Hazard Mitigation Plan

Vulnerability and Potential Loss Estimate

Earthquakes will continue to occur in Montana, however the precise time, location, and magnitude of future events cannot be predicted.

The Montana Multi-Hazard Mitigation Plan identified earthquake losses for the 10 Montana counties with the highest potential for earthquake damage. All of these counties were in the western portion of the state. Annualized loss estimates ranged from \$225,000 in Madison County to \$2.3 million in Gallatin County. Estimates were made using the HAZUS (beta v 28.b) Earthquake model developed by the Federal Emergency Management Agency (FEMA).

The Montana Multi-Hazard Mitigation Plan identified potential for an earthquake in the vicinity of the Northern Cheyenne Indian Reservation to have less probability of occurring than in Madison County. Therefore, the annualized loss estimate for the Northern Cheyenne Indian Reservation as a result of an earthquake would be less than \$225,000, according to the calculations of the state plan.

Plan participants did not identify earthquakes as a potential disaster.

VOLCANIC ERUPTIONS

The state of Montana is within a region with potential for volcanic activity. The two volcanic centers affecting Montana in recent geologic time are: 1) the Cascade Range of Washington, Oregon and California; and 2) the Yellowstone Caldera in Wyoming and eastern Idaho.

Volcanic eruptions are generally not a major concern in Montana due to the relatively low probability of events in any given year (compared with other hazards). Volcanic eruptions in the Cascade Mountains are more likely to impact Montana than Yellowstone eruptions, based on the historic trends of past eruptions. (Montana Multi-Hazard Mitigation Plan)

The primary effect of the Cascade volcanic eruptions on Montana would be ashfall. According to the Montana Multi-Hazard Mitigation Plan, ashfall can create significant damage including:

- Short-circuiting and causing failure of electronic components, especially high-voltage circuits and transformers
- Interrupting or preventing radio and telephone and radio communication
- Damage to air filters and affecting internal combustion engines
- Making roads, highways, and airport runways slippery and treacherous
- Reducing visibility to near 0
- Causing crop damage depending on the thickness of ash, type and maturity of plants, and timing of subsequent rainfall.
- Posing health risks, especially to children, the elderly, and people with cardiac or respiratory conditions

Historic Occurrences

The Mount St. Helen eruption in the state of Washington is the most recent volcanic event that has significantly affected Montana. After the eruption of Mount St. Helen in May 1980, a coating of up to 5.0 mm (0.2 inches) of ash fell on Western Montana. Ash deposits were thickest in the western portions of the state, tapering to near zero on the eastern part of the state. (Montana Multi-Hazard Mitigation Plan)

Vulnerability and Potential Loss Estimate

The Montana Multi-Hazard Mitigation Plan assesses vulnerability as follows:

Due to the numerous variables involved, it is difficult to assess the vulnerability of the State of Montana to a volcanic eruption. The primary hazard to which the State may be vulnerable at some future time, is ashfall from a Cascade volcano. The effect would depend on the interaction of such variables as source location, frequency, magnitude and duration of eruptions, the nature of the ejected material and the weather conditions. Therefore, the entire state may be considered vulnerable to ashfall to some degree in the event of a volcanic eruption.

Although the probability is minimal, there is the potential for a catastrophic eruption in the vicinity of Yellowstone National Park that would have very serious consequences for Montana and neighboring states. Again, assessing the vulnerability of the State to such an event is impossible due to the numerous variables and uncertainties that must be considered.

The Summer 2005 edition of Yellowstone Science magazine discussed advance notice for a volcanic eruption:

The science of forecasting a volcanic eruption has significantly advanced over the past 25 years. Most scientists believe that the build-up preceding a catastrophic eruption would be detectable for weeks, and perhaps months to years.

They added that for the most likely type of volcanic eruption in Yellowstone, "everywhere would be safe except in the immediate vicinity of the advancing lava flow."

Based on existing information, the probability of a volcanic event is low but potential impacts could be very severe to catastrophic. Costs of a major ashfall event could be in the millions. It is estimated that the ashfall cost Missoula County nearly \$6 million in cleanup and lost work time. The statewide cost has been estimated at between \$15 and \$20 million. (Montana Multi-Hazard Mitigation Plan)

POWER OUTAGES/LOSS OF COMMUNICATION

Power outages were identified at the public steering committee meetings as a serious issue for critical facilities and residents on the Northern Cheyenne Indian Reservation. Power outages can occur throughout the Reservation.

Power outages can be caused by local hazard events (e.g., ice storm), accidents (e.g., vehicle accidents resulting in downed lines), wildfires, or from events outside of the Reservation that affect power generation or transmission. Hazards most likely to cause serious damage to power and communications facilities are those that will affect overhead transmission. The key hazards are high winds and ice. Flooding can affect a pole or poles in a few places, but high winds and ice can take out hundreds of poles at a time.

Problems with communications facilities were also identified by participants in the PDM planning process.

Historic Occurrences

The Northern Cheyenne Indian Reservation has a history of power outages, the most severe of which are typically associated with ice storms. Power outages can last up to several days or more. In April 2001, for example, hundreds of homes in Busby and the western part of the Reservation were without power for up to seven days.

Communications have been an issue in the past, as evidenced by comments at the PDM planning meetings.

Vulnerability and Potential Loss Estimate

The Northern Cheyenne Indian Reservation has a high potential for occurrence and severity of power outages. Risks include potential for:

- Loss of life/injury and economic losses
- Downed lines sparking fires
- Risk to people who need power-supplied medical equipment (e.g., people in their own homes without back-up power generation)
- Damage to appliances, etc.; loss of frozen goods
- Inability to heat structures, cook, etc., in places where electricity is the source, resulting damage to water lines, etc. in freezing temperatures.
- Inability to run public water supply and wastewater systems.
- Inability to access fuel. Gas stations don't typically have back-up power supplies. Without power, no gas can be pumped.
- Inability to access information via radio, television
- Lack of function for power-generated communications (e.g., some residential phones, some communications facilities such as radio stations without back-up power)
- Business interruption and associated costs

Tribal Emergency Response Committee members and other participants of the Steering Committee meeting were uncertain as to which critical facilities had back up power supplies. If power supplies were out for any extended period of time, public water supply systems could be drained within a couple of days or less, depending on the amount of water in storage at the time of the power outage. All of the public water supply systems on the reservation are from wells which require power to pump from the source to the storage/distribution systems. Virtually all homes in areas not served by public systems are also on wells. There are a number of springs on the Reservation, which could be used to some extent as back-up water supply in an emergency, but severe weather, snow, or wildfires could hinder ability to access these springs.

There are some serious communication issues. For example, there is no public phone in Busby for those without phones to make an emergency call. According to the 2000 census, 25% of all housing units were without any kind of telephone service (including land line service). Virtually all of the Reservation lacks cell phone coverage. There is no NOAA weather radio reception on the Reservation. Existing warning systems include sirens in some locations.

Efforts to improve interoperability among emergency responders will help to improve future emergency communications. The Northern Cheyenne have been participating in the regional interoperability project.

Costs of downed power lines can be extremely high. It cost approximately \$750,000-\$850,000 to repair/replace the downed power lines from the 2001 event in the Kirby-Decker area. (Rugg) The costs of power outages, excluding direct effects to power generation and transmission as a result of other hazards, are not well-documented. Nationally, power outages and black-outs are estimated to cost approximately \$80

billion, when costs of business interruption are included (Berkeley Lab) Approximately 2% of the national total is residential loss, 73% is commercial, and 25% is industrial.

WILDLAND FIRE

A wildland or rangeland fire is an uncontrolled fire, a term which includes grass fires, forest fires, and scrub fires, human caused or natural in origin. The wildland/urban interface (WUI) is defined as the zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuel. (Montana Multi-Hazard Mitigation Plan)

Wildland fire can occur throughout the Northern Cheyenne Reservation.

Historic Occurrences

Participants at the first Steering Committee meeting identified several fires that had occurred on the Reservation, including fire around Ashland-Birney, the “Baby Dean” fire near Busby, and the “Slick” fire south of Lame Deer. Approximately 115 fires burn an average of 12,107 acres per year on the Northern Cheyenne Reservation. In the 10 year period between 1987 and 1996, approximately one-quarter of the Northern Cheyenne Reservation was burned by wildland fires. The majority of acres burned during that time resulted from arson, debris-burning, and lightning caused fires during high fire danger periods. In 1994, 87 fires burned 61,400 acres. Of that total, the “Baby Dean” fire accounted for 60,300 acres. (U.S. Bureau of Indian Affairs).

At the time that the BIA’s Fuel Management Plan for the Northern Cheyenne Reservation 2000-2009 was prepared, the Northern Cheyenne was considered the highest complexity in the Billings Area, and one of the highest complexity units in the nation.

In 2000, the Northern Cheyenne Indian Reservation was included with more than 40 counties and Indian Reservations in Montana in a Presidential Disaster Declaration

Multiple concurrent fires are not atypical. The Windmill Complex fire, which burned nearly 25,000 acres in 2003, was actually four different fires in an area near Busby.

Structural fires and vehicle fires are also a concern on the Northern Cheyenne Indian Reservation. The Northern Cheyenne Tribal Fire Department estimates they respond to 30-40 structural fires per year and another 100-120 vehicle fires. (Sioux)

Vulnerability and Potential Loss Estimate

Based on history, risk and hazard assessment information, and planning participants’ comments, the potential of occurrence and severity of wildfire are high.

There are factors that increase vulnerability, which include areas of wildland urban interface (Lame Deer, Muddy Cluster and scattered developments), availability of water for suppression, and fuels conditions. There are also factors that reduce vulnerability and risk and these include the fire departments on the Reservation, the fuels reduction

that has already occurred in the wildland urban interface, and the continued implementation of the existing fuels management and fire suppression plans.

The Northern Cheyenne Reservation is served by three fire departments – the wildland fire department of the BIA, the Northern Cheyenne Tribal Fire Department that is the primary responder for structural fires on the Reservation, and the Northern Cheyenne Tribal Schools Fire Department, located in Busby.

Table 3.7 Fire Departments on the Northern Cheyenne Reservation

Department	Area Covered	Equipment Locations	Capabilities	Paid Staff	Volunteers
Northern Cheyenne Fire and Aviation (BIA)	Northern Cheyenne Indian Reservation	Lame Deer	Wildland Fire	11-12 FTE 20-24 Seasonals	0 (but many available for paid on-call as Montana "Casual" Firefighters)
Northern Cheyenne Tribal Fire Department	Northern Cheyenne Reservation	Lame Deer	Structural Fire Wildland Fire	2 FTE 13 part-time/seasonal	
Northern Cheyenne Tribal Schools	Busby	Busby	Structural Fire Wildland Fire	0	3

Sources: Various departments

Members of all three departments participated in the development of the Big Horn County Community Wildfire Protection Plan (CWPP). The goals portion of that plan is attached as an Appendix to this plan. The Northern Cheyenne may wish to implement those actions relevant to the Northern Cheyenne Reservation. Participants in the Big Horn County CWPP planning process encouraged cooperation among jurisdictions on fire suppression-related activities. Rosebud County may also have a CWPP plan, with goals that may be of use to the Northern Cheyenne. It is understood that counties do not have authority on lands under the jurisdiction of the Northern Cheyenne Tribe.



Hydrant in Lame Deer

Both the Northern Cheyenne Tribal Fire Department and the BIA have fire plans in place. The BIA has prepared a Fuels Management Plan for the Northern Cheyenne Reservation, as well as a specific mitigation plan for Lame Deer and Muddy Cluster.

Many of the recommendations have been implemented and work continues on the plan.

The locations served with public water systems have fire hydrants, but according to the Northern Cheyenne Tribal Fire Department approximately 75% are inoperable (Sioux). The Fire Departments have painted the tops of the fire hydrants as an aid to quickly determine which are usable.

Outside of the public water systems, water is available directly from creeks, rivers, and reservoirs. Drought has affected many of the reservoirs, reducing or in some cases totally eliminating potential sources for fire suppression. Drought can also affect the flow in the streams and rivers. Where water is available, it may be difficult to access because of brushy or boggy conditions. When water is not accessible locally, pumper trucks have to travel to where water is available, obtain water, and then return to the fire.



Inoperable hydrant at Muddy Creek

Other factors that increase vulnerability include lack of access. In developed areas such as Lame Deer or Muddy Creek, access to structures can be obstructed because of abandoned vehicles and other materials. In the country, fire suppression equipment can take off over grassy areas with level or rolling grades, but areas of steep slopes and heavy brush can be a problem. Existing roads in the country may have steep grades or other conditions that make them impassable for heavy fire-fighting equipment. There is a home near Busby that is on the other side of Rosebud Creek that does not have a bridge. A bridge would be helpful for access to the home as well as for providing access for firefighting equipment for fires in other locations on that side of the creek.

The most recent fire near Busby was the Windmill Complex Fire of 2003, which cost \$3.5 million to suppress. Total area burned was 24,895 acres. According to one fire staffer, the town of Busby almost burned. The only reason it didn't burn was because the volunteer fire department (a handful of volunteers) were there putting out flames among the houses. (Collins) Costs of a fire that damaged or destroyed a number of homes could be much higher.

Other direct and indirect costs of wildland fire include:

- Structural damage/loss
- Loss of livestock, agricultural production
- Damage to roads and bridges
- Increased potential for weed invasion, erosion, and flash flooding after the fire

EPIDEMICS/WATER CONTAMINATION

Participants at the first steering committee identified West Nile Virus and other potential epidemics as issues of concern. They also cited concern about the potential for water contamination through the public water systems on the Reservation. Disease and/or water contamination could occur anywhere on the Reservation.

West Nile Virus

West Nile Virus can cause serious illness and death in humans, horses, and birds. The following was extracted from the Montana Department of Health and Human Services website:

West Nile virus is carried primarily by birds but can be transmitted by mosquitoes to humans, horses, and some other animals. The first documented case in the United States occurred in New York in 1999, and the disease has since spread westward into nearly every state. Only Alaska, Hawaii, and Washington have so far been virus-free, according to the U.S. Centers for Disease Control and Prevention (CDC).

Montana's first confirmed case of West Nile virus involved a horse in Shepherd in late August 2002.

Pandemic Influenza

Pandemic influenza is a global outbreak of disease that occurs when a new influenza A virus appears in humans, causes serious illness, and then spreads easily from person to person worldwide because we have no built-up immunity to it. Influenza A viruses are found in many different animals and include avian or bird flu. (Montana Department of Public Health and Human Resources)

Water-Borne Illnesses

Numerous types of water-borne illnesses include e. coli bacteria, salmonella, giardia, norovirus, and other Norwalk-like viruses. Water-borne viruses and bacteria can cause symptoms of nausea, vomiting, and diarrhea. (Mosher)

Diseases Affecting Livestock and Wildlife

A number of diseases can affect livestock and wildlife. The Montana Department of Livestock identifies a number of potential diseases for livestock including:

- Anthrax - history of cases in Montana
- Rabies - history of cases in Montana
- Vesticular Stomatitis (history of cases in Montana)
- Bovine Spongiform Encephalopathy (Mad Cow Disease) -- no reported cases in Montana

- Foot and Mouth Disease – no records of disease in Montana records back to 1907

Chronic wasting disease is a fatal disease of the central nervous system of captive and free-ranging mule deer, white-tailed deer, and Rocky Mountain elk.

Historic Occurrences

West Nile Virus

Participants indicated that one person on the Reservation had died from West Nile Virus. Since 2003, there have been 14 cases in humans in Rosebud County, and 11 in Big Horn County.

Pandemic Influenza

Since the beginning of the 20th century, there have been three pandemic flu outbreaks in the United States. The following is excerpted from the Montana Department of Public Health and Human Resources website:

- **1918 Spanish flu:** More than 20 million people died worldwide, an estimated 500,000 in the United States . Contagion was exacerbated by troop movements at the end of World War I.
- **1957 Asian flu:** Responsible for about 69,800 deaths in the United States . Unlike the 1918 virus, this pandemic virus was quickly identified due to advances in scientific technology, allowing for fast production of vaccine.
- **1968 Hong Kong flu:** Responsible for about 33,800 deaths in the United States . This was the mildest true pandemic of the 20th century. The lower death rate might have been due to immunity to a related flu strain and/or to the fact that the pandemic was at its peak during the Christmas holiday, when schoolchildren were home.

Water-Borne Illnesses

Participants indicated that a dead dog was found in the water supply in Lame Deer about five years ago.

Diseases Affecting Livestock and Wildlife

There were two cases of anthrax diagnosed in cattle in Montana in the summer of 1999, one in May and one in August. The two incidents were unrelated, having occurred far apart from each other in isolated parts of eastern Montana. Both cases were contained early and led to no additional problems. Prior to 1999, the last case of naturally occurring anthrax in Montana was reported in 1985. The organism naturally occurs in the soil in many parts of Montana, as well as other states.

Over 60 cases of rabies are diagnosed annually in Montana, with most cases occurring in skunks and bats.

In 2005, horses were found positive for vesicular stomatitis in Big Horn and Rosebud Counties, as well as other locations in Montana. Premises with the infected horses were quarantined. By November 2005, quarantines were released on all locations.

There have been no reported cases of Mad Cow Disease in Montana.

There have been no cases of Chronic Wasting Disease in Montana's wild deer and elk populations (Montana Department of Fish, Wildlife and Parks).

Vulnerability and Potential Loss Estimate

The Northern Cheyenne Reservation is vulnerable to a number of insect-borne and other diseases that can affect animals and humans. Potential direct losses can include:

- human sickness and death
- sickness and death in domestic and wild animals

In a pandemic, the federal government has indicated that the most effective and fast responses will come locally, not at the federal level. The Northern Cheyenne IHS is currently working on an emergency plan (Allies).

Generally, there are any number of insects, pests, and diseases that could harm humans, livestock, crops, and the economy of the Northern Cheyenne Indian Reservation. Information and assistance on these issues through a number of sources including the Agricultural Extension in Lame Deer, Montana Departments of Health and Human Services, Agriculture, and Livestock), and federal programs.

Water-borne illnesses could occur on private or public system wells, but there is greater potential for more persons to become ill if the contamination occurs within the public systems at Lame Deer, Birney, Muddy Creek, Busby, or Ashland Meadows (Rabbit Town). Sanitary Survey reports issued by the U.S. Environmental Protection Agency have identified a number of security and other issues related to the water supply systems on the Northern Cheyenne Reservation. Many of the areas of concern have been addressed in the past few months (Sinnott).

ASSETS AND VULNERABLE POPULATIONS

This section provides more information on physical, social, and economic assets on the Northern Cheyenne Indian Reservation that might be affected by a hazard. Information on assets includes types and numbers of various buildings and infrastructure and estimates of replacement costs where available.

The information in this section was used to identify potential costs of specific hazards. Any of the hazards could occur almost anywhere on the Reservation. The information in this section is intended to provide a general guide for estimating cost of damages from potential hazards.

Disasters could affect **critical facilities**, facilities essential to health and welfare. Critical facilities include medical facilities, transportation systems, utility systems (such as potable water and wastewater distribution systems), and high potential loss facilities.

Social assets include **vulnerable populations**, people who may be at special risk for a hazard. Identifying these populations assists in providing emergency assistance if and when it may be needed during a disaster.



Northern Cheyenne Administration Offices

Assets and Critical Facilities

Table 3.8 identifies key assets on the Northern Cheyenne Indian Reservation and their estimated replacement value in the event of a complete loss. The table is intended to provide an initial yardstick measurement of loss because actual damages could range from relatively minor damage to complete destruction, and interruption of service or business. Costs of providing services in temporary locations and loss of business revenue would be additional to the replacement costs.

Information for Table 3.8 came from U.S. census data, phone conversations with property owners and managers, and estimated replacement costs as identified in the FEMA How-To Guide, "Understanding Your Risks: Identifying Hazards and Estimating Losses."

Table 3.8 Detailed Inventory of Assets by Community

Name or Description of Asset	Critical Facility	Vulnerable Population	Economic Assets	Special Considerations	Historic/Other Consideration	Replacement Value	# of Facilities/Units	Other
Busby								
Residential			x	x		\$53,200/unit	243 units	per 2000 census—median housing unit value and total units
Commercial	x		x			\$67/ square foot	one convenience store	no gas station in town; nearest station in Hardin or Lame Deer; replacement value based on FEMA "Understanding Your Risks" page 3-10
U.S. Post Office	x		x				1	
Northern Cheyenne Tribal School	x	x	x			\$8.7 million	1	Estimate from school administrator
Youth Detention Facility	x	x	x			\$7.6 million	1	based on recent construction costs
Busby Public Water Supply	x		x			\$500,000- \$1 million	1	General estimate from MT DEQ for system serving 100-200 homes
Busby Wastewater System	X		X			\$315,000- \$525,000	1	Based on cost of \$450-\$750 per person for new treatment lagoons (estimate from McKee Engineering)
Christ the King Catholic Church	x		x	x		\$113/square foot	1	replacement value based on FEMA "Understanding Your Risks" page 3-10
Lame Deer								
Residential			X	X		\$40,800/unit	590	per 2000 census—median housing unit value and total units
Commercial	x		x			\$67-\$151 per square foot	10-12 businesses	Commercial includes private and tribally owned facilities: bank, hardware store, grocery store, gas station-convenience store, car wash, casino, restaurant; replacement value based on FEMA "Understanding Your Risks" page 3-10
U.S. Post Office	x		x				1	
K-12 Public School facilities	X	X	X			\$22.5 million	Various buildings	Insured replacement value for the Kindergarten, Elementary, Jr. High, Sr. High, school housing, administration, etc. (per school clerk)
Chief Dull Knife College	X	X	X			\$115/square foot	1	replacement value based on FEMA "Understanding Your Risks" page 3-10
Headstart	X	X	X			\$91/square foot	1	replacement value based on FEMA "Understanding Your Risks" page 3-10

Northern Cheyenne Tribal Offices	X	X	X			\$88-\$130 per square foot	Multiple Buildings	Includes various tribal office buildings, emergency response (fire, ambulance, etc. senior center, Headstart, etc.; replacement values based on FEMA "Understanding Your Risks" page 3-10
IHS Hospital/Clinic	X	X	X			\$225/square foot		Estimate of \$225/square foot from Gary Carter, IHS in Billings
BIA Offices and Facilities	X		X			\$11.5 million	Agency Headquarters and facilities (56 structures)	Replacement costs from David Omen, BIA, Billings, Montana
BIA Law Enforcement and Adult Detention Center	X		X			\$1.7 million	2 structures	Replacement costs from David Omen, BIA, Billings, Montana
Churches	X		X	X		\$113/square foot	4-5	replacement value based on FEMA "Understanding Your Risks" page 3-10
Water Supply System	X		X			\$1 million +	1	The water supply system consists of several wells and storage tanks. Replacement value estimated by Jay Sinnott, EPA Environmental Engineer
Wastewater System	X		X			\$908,000-\$1.5 million	1	Based on cost of \$450-\$750 per person for new treatment lagoons (estimate from McKee Engineering)
Muddy Creek Area								
Residential			X	X		\$64,100/unit	127	per 2000 census—median housing unit value and total units
Church facility	X		X	X		\$113/square foot	1	replacement value based on FEMA "Understanding Your Risks" page 3-10
Water Supply System	X		X			\$500,000-\$1million	1	General estimate from MT DEQ for system serving 100-200 homes
Wastewater System	X		X			\$312,750-\$521,250	1	Based on cost of \$450-\$750 per person for new treatment lagoons (estimate from McKee Engineering)
Ashland Area								
Residential			X	X		\$47,700/unit	38	Units based on estimated hook-up for water and sewer; replacement value based on 2000 census—reservation-wide median value
Water Supply System	X		X			\$500,000-\$1million	1	General estimate from MT DEQ for system serving 100-200 homes
Wastewater System	X		X			\$68,400-\$114,000	1	Based on cost of \$450-\$750 per person for new treatment lagoons (estimate from McKee Engineering)—assume 4 persons per house unit
St. Labre School	X	X	X			\$69/square foot for shops	multiple	School facilities, dormitories, 90 housing

						to \$113/square foot (churches)		units (including single family and multiple units), shops, garages, print shop, church (Yarlott); replacement value based on FEMA "Understanding Your Risks" page 3-10
Birney								
Residential			X	X		\$47,700/unit	25	Units based on estimated hook-up for water and sewer; replacement value based on 2000 census—reservation-wide median value
Water Supply System	X		X			\$500,000-\$1million	1	General estimate from MT DEQ for system serving 100-200 homes
Wastewater System	X		X			\$45,000-\$75,000	1	Based on cost of \$450-\$750 per person for new treatment lagoons (estimate from McKee Engineering)—assume 4 persons per house unit
All other Areas of Reservation								
Residential Reservation-wide			X	X		\$47,700/unit	306	per 2000 census—median housing unit value and total units for the reservation (less units accounted for above)
Historical/Cultural Properties				X	X		Numerous	Sites with historic and cultural significance are located throughout the reservation.
Roads and bridges	X		X			\$100,000 per mile for paved roads; bridges on average \$240,000 each	780 miles approximate	Based on U.S. census TIGER files (via Montana NRIS website)

Sources: Various as noted in the table

Vulnerable Populations

The following were identified as populations that may require special care or assistance during or after a disaster or who may be at particular risk to a disaster.

- People in need of medical care. There is one medical facility on the Northern Cheyenne Indian Reservation—the IHS clinic in Lame Deer. In addition, there are a number of people who have special medical needs who are not hospitalized, but live in their homes on the reservation. According to the 2000 census, 816 persons (18.3% of the total population) on the reservation had some type of disability.
- Seniors and Elderly. There were 265 persons (5.9% of total Northern Cheyenne Reservation population) aged 62 or older, according to the 2000 census. Approximately half of the persons over age 65 had some type of disability, according to the 2000 census.
- Children. There are schools in Lame Deer and Busby. Tribal Head Start program is also in Lame Deer. On the Northern Cheyenne Reservation, 43.3% of the total population is under the age of 18.



Northern Cheyenne IHS Clinic

SUMMARY

Table 3.9 provides an overall summary description of the reservation's vulnerability to each identified hazard. Table 3.9 also includes a brief summary of the potential impacts that are described in more detail elsewhere in this chapter.

Table 3.9 Summary of Hazards on the Northern Cheyenne Indian Reservation

Hazard	Geographic Area	History of Previous Occurrence	Risk Severity	Probability of Future Occurrence	Existing Structures at Risk	Future Structures at Risk	Potential Loss Estimate
Drought	Throughout the Reservation	In severe or extreme drought 10% to 14.9% of the 100 years between 1895 and 1995	Moderate to High Severity--severe direct and indirect effects to livestock, agriculture and economic effects	High	0 from direct effects	0	<ul style="list-style-type: none"> • Direct and Indirect losses could be in the \$ millions • direct losses to crops and livestock production • Potential for loss of life/illness from prolonged heat • Reduced drinking water supply
Extreme Heat	Throughout the reservation	Temperatures of 109 have been officially recorded in Busby and Lame Deer	Low Severity—no recorded illness or death as result, but potential for both	Moderate-High	0	0	<ul style="list-style-type: none"> • Loss of life/illness to humans and animals • Livestock losses would contribute to increased economic losses
Grasshoppers (Drought-related pests)	Throughout the reservation; not likely reservation-wide, but in localized area(s)	2 USDA Disaster Declarations for Grasshoppers in 6 year period (1998-2004) for Rosebud County; grasshoppers between Busby and Muddy Cluster approx. 25 years ago (as reported by Steering Committee members)	Within localized area, effects could be moderate to severe, e.g., total de-vegetation	Low	Could happen anywhere—all structures potentially at risk	Same as for existing	<ul style="list-style-type: none"> • Loss of vegetation and related agricultural income • Could also result in some damage to structures
Flood-Ice Jam	Along rivers and streams	2 ice jams in Ashland (1969 and 1971); one in Lame Deer in the 1960s; one in Birney approximately 20 years ago (per Steering Committee participants)	High Severity—More development now in potential flood areas	Low	St. Labre School area; Rabbit Town (near Ashland); Birney, Busby, low-lying areas of Lame Deer	Same as for existing	<ul style="list-style-type: none"> • A single event with widespread damage beyond the 100-year floodplain could result in \$millions in losses • Loss of life; injury; illness (related to interruption of water supply, etc.) • Damage and potential loss to structures (houses, bridges, roads, culverts)

Hazard	Geographic Area	History of Previous Occurrence	Risk Severity	Probability of Future Occurrence	Existing Structures at Risk	Future Structures at Risk	Potential Loss Estimate
Flash Floods	Along rivers, streams, coulees	July 31, 1998 1 inch rain in Ashland in 28 min June 30, 2001 – Ashland—several roads washed out 1 reported in Birney approximately 20 years ago	High	Low	Development near rivers, streams, and coulees	Development near rivers, streams, and coulees	<ul style="list-style-type: none"> • A single event with widespread damage beyond the 100-year floodplain could result in \$millions in losses • Loss of life; injury; illness (related to interruption of water supply, etc.) • Damage & potential loss to structures (houses, bridges, roads culverts)
Other Floods	Along rivers, streams, coulees	Major springtime flood on Tongue River in 1978; Lame Deer Creek flooded valley floor in 1960s	High	Low	Development near all rivers, streams, and coulees	Development near rivers, streams, and coulees	<ul style="list-style-type: none"> • A single event with widespread damage beyond the 100-year floodplain could result in \$millions in losses • Loss of life; injury; illness (related to interruption of water supply, etc.) • Damage & potential loss to structures (houses, roads, bridges, culverts)
Dam Failure	Downstream of Tongue River Dam; downstream of 7 4 different BIA dams (Cook Creek, Crazy Head Fork, Davis Creek, and Thompson Creek)	No history	Tongue River Dam-Catastrophic (wave height at Ashland 34.1 feet) BIA dams all low hazard risk (no risk to humans; low risk to property)	Low	All in Ashland and Birney	All built within the potential inundation area	<ul style="list-style-type: none"> • Catastrophic cost for Tongue River Dam failure: Total destruction of communities, loss of life, cost of displacement and rebuilding • Loss of life; injury; illness (related to interruption of water supply, etc.) • Damage & potential loss to structures (houses, bridges, culverts)
Winter Storms	Reservation-wide; impacts can be localized	April 2001; 4-5 foot drifts in Kirby area; power outage for a week (Kirby, Busby, Muddy Cluster) October 2005—heavy snow, downs trees and cuts power in Lame Deer)	High	High	Could happen anywhere—all structures potentially at risk	Same as for existing	<ul style="list-style-type: none"> • Costs could be in \$millions for a single major event • Power outages • Loss of life/illness/injury humans and livestock • Structure damage (e.g., roofs)

Hazard	Geographic Area	History of Previous Occurrence	Risk Severity	Probability of Future Occurrence	Existing Structures at Risk	Future Structures at Risk	Potential Loss Estimate
Extreme Cold	Reservation-wide	Extreme lows: -51 degrees in Lame Deer in 1989; -52 in Busby same year	Moderate	Moderate	Could happen anywhere—all structures potentially at risk	Same as for existing	<ul style="list-style-type: none"> Power outages Loss of life/illness/injury humans and livestock Insufficient heat could cause pipe damage and structural damage (e.g., water from broken pipes)
Severe Thunderstorms/Hail	Reservation-wide; impacts can be localized	39 hail events reported 1996-Apr 2006 June 30, 2001 2.5 inch hail in Ashland-St.Labre damaged with many broken windows	Low – High (on localized basis)	High	Could happen anywhere—all structures potentially at risk	Same as for existing	<ul style="list-style-type: none"> Losses of hundreds of thousands of dollars per incident possible Power outages Loss of life/illness/injury humans and livestock Structure damage
High Winds/Microbursts and Tornadoes	Reservation-wide; impacts can be localized	11 wind events (60+mph) between 1996-2006 1 tornado (F0) in Kirby May 13, 1996	Low, generally; High (on a localized basis)	High	Could happen anywhere—all structures potentially at risk	Same as for existing	<ul style="list-style-type: none"> Losses of hundreds of thousands of dollars per incident possible Loss of life /injury humans and livestock Structure damage
Lightning	Reservation-wide; impacts localized	Area known for strong thunderstorms and lightning	Low (direct from Lightning)—High (indirect from lightning caused fires)	High	Could happen anywhere—all structures potentially at risk	Same as for existing	<ul style="list-style-type: none"> Loss of life /injury to humans and livestock Losses from lightning-caused fire could be extensive
Wildland Fire	Reservation-wide potential	2003 Windmill Complex Fire—nearly lost Busby 1988 Slick Fire – near Lame Deer nearly 25% of No. Cheyenne Res burned between 1987 and 1996	High	High	Areas in wildland urban interface particularly susceptible	Same as for existing	<ul style="list-style-type: none"> Costs of suppression alone could be \$3-4 million or more (per Baby Dean fire). Loss of structures, agriculture, livestock would be in addition and could also total several million dollars. Loss of life/injury to humans, livestock, wildlife Structural damage and loss Loss of agricultural production

Hazard	Geographic Area	History of Previous Occurrence	Risk Severity	Probability of Future Occurrence	Existing Structures at Risk	Future Structures at Risk	Potential Loss Estimate
Structural Fire	Reservation-wide potential; impacts localized usually to 1-2 structures per incident	Northern Cheyenne Tribal Fire Dept responds to approximately 30-40 structural fires per year and 100-120 vehicle fires per year	Low, generally; high on individual basis	High	Could happen anywhere—all structures potentially at risk	Same as for existing	<ul style="list-style-type: none"> Loss of life/injury to humans, livestock, wildlife Structural damage and loss
Traffic Accidents	Along roadways	59 accidents in three years	Med-High	High	Along roadways	Along roadways	<ul style="list-style-type: none"> Injury, death to humans, livestock, wildlife Some potential for utility poles and other structures to be damaged
Hazardous Materials Accidents-Spills	Primarily along roadways	15 spills reported to MDEQ between 1996-2005	Med-High	Low-Moderate	Along roadways	Along roadways	<ul style="list-style-type: none"> Losses could be in the \$millions based on events elsewhere in Montana Injury, illness, death to humans, livestock, wildlife
Power Outages	Reservation wide; impacts typically localized	Power outages reported with winter weather and high winds	High	Medium-High	Could happen anywhere—all structures potentially at risk	Same as for existing	<ul style="list-style-type: none"> Economic costs could be in the hundreds of thousands of dollars or more per incident, based on national figures Loss of life/illness/injury humans and livestock Impacts to water/sewer Structural damage possible (e.g., broken pipes during extreme cold)
Water Quality Contamination	Public and private (e.g., individual wells throughout Reservation)	Approx 5 years ago-dead dog in water supply in Lame Deer	High	Low	No impact to structures	No impact to structures	<ul style="list-style-type: none"> Illness, loss of life
Epidemics	Reservation wide-potential	One death from WNV	High	Low	No impact to structures	No impact to structures	<ul style="list-style-type: none"> Illness, loss of life
Earthquake	Some risk on reservation; however, there are no identified faults in the area	History of earthquakes in area in and around Big Horn County	Moderate-High	Low	Could happen anywhere—all structures potentially at risk	Same as for existing	Less than \$225,000 benchmarking against counties with higher probability of occurrence

Hazard	Geographic Area	History of Previous Occurrence	Risk Severity	Probability of Future Occurrence	Existing Structures at Risk	Future Structures at Risk	Potential Loss Estimate
Volcano	Reservation at risk from ashfall; no volcanoes on the reservation or within a several hundred mile area	Ashfall from the 1980 eruption of Mt.St. Helen?	Moderate-High	Low	Could happen anywhere—all structures potentially at risk	Same as for existing	Costs for dealing with ashfall could be \$6 million or more based on experience in Missoula County. A catastrophic event in Yellowstone National Park would have extremely severe consequences on the Reservation

Notes:

Probability Rating:

Low = 0-1 major incidents in a 5-year period

Moderate = 2-9 incidents in a 5-year period

High = 10 or more incidents in a 5-year period, or prolonged ongoing (e.g., drought lasting several years)

CHAPTER 4: MITIGATION STRATEGY

This chapter identifies the “blueprint” for reducing losses associated with the hazards described in Chapter 3.

This chapter includes:

- a short description of the **methodology** used to develop the mitigation strategy, which is also discussed to some extent in Chapter 2;
- the **Goals and Mitigation Actions**
- **Project Ranking and Prioritization** and
- **Implementation** and administration of the plan

METHODOLOGY

The contractor developed initial goal statements and a preliminary list of projects from information discussed at the steering committee meeting/public meeting held on March 22. The contractor reviewed each identified hazard with participants at the meeting to ensure that all hazards were considered for mitigation measures.

On April 18, participants at the meeting reviewed and revised the initial goal statements and project/mitigation measures.

Participants reviewed a range of mitigation actions that included data collection, ways to improve public awareness, better response mechanisms, and technical assistance, and regulatory mechanisms.

As part of the public review of the draft plan, the public was expressly encouraged to review the goals, objectives, and mitigation measures and suggest changes.



Chief Dull Knife College in Lama Deer

GOALS AND MITIGATION ACTIONS

The following goals were developed in response to each of the hazards.

Participants identified a number of actions that apply to a variety of hazards. They felt that there were some basic issues that needed to be addressed regardless of the type of disaster. These basic issues are addressed in the objectives and projects for Goal 1 "Improve emergency response and general disaster preparedness." Without an active TERC and a DES Coordinator, past experience indicated it would be difficult at best to make progress toward mitigating potential impacts. Communications was another critical component that needs improvement in order to reduce effects of nearly every potential disaster type.

Participants developed specific goals for power outages, fire, hazardous materials, transportation-related accidents, water quality contamination, floods, winter storms, drought. Once finished, they then reviewed the entire list of hazards that they'd developed at the start of the planning process (with the first meeting in March) to make sure that they'd addressed all hazards either specifically or generally with the first goal.

The projects would be for both new and existing buildings and infrastructure where applicable. For example, providing information to aid people in better preparing for disasters will potentially reduce structural damages on existing buildings. Using the 100-year floodplain maps to ensure new development is outside of the floodplain reduces impacts to new structures.

Project Ranking and Prioritization

Ranking projects helps to set the local priorities for accomplishing the plan. Resources to accomplish objectives can be limited in any planning process. Prioritizing helps to identify which projects to start on, given that there are typically far more projects than can be addressed at any one time.

Goals and associated projects were generally prioritized by the participants at the final planning meeting held on June 1, using the following criteria:

- Number of lives at risk
- Value of property at risk
- Infrastructure at risk
- Risk of business interruption/loss
- Cost/benefit of the project

Participants considered cost-benefit to include an emphasis on cost-effective and technically feasible mitigation actions.

The group did not get through the entire set of projects on June 1. The steering committee authorized the consultant to complete the project prioritization and scheduling, acknowledging that they would be able to review and make changes as necessary when the draft document was released for public review.

As part of the public review of the draft plan, the public was expressly encouraged to review the priorities in the draft and suggest changes.

Table 4.1 displays the mitigation actions, the cost-benefit summary, priority ranking, timetable and potential participants (resources) for implementing the action.

Table 4.1 Mitigation Project Prioritization, Cost-Benefit Summary, Schedule, and Potential Resources/Participants

<i>Goals, Objectives, Projects</i>	<i>Benefits</i>	<i>Estimated \$ Costs*</i>	<i>Schedule</i>	<i>Rank</i>	<i>Responsible Dept (underlined for each objective below) and Potential Resources</i>
Goal 1: Improve emergency response and general disaster preparedness.				High	
Objective 1.1 Hire a DES Coordinator for the Northern Cheyenne Tribe. <ul style="list-style-type: none"> • Ensure that DES Coordinator has direct line of communication with the Tribal President and Council (similar to the way County DES Coordinators have direct line of communication with County Commissioners) • DES Coordinator should be active coordinator of various disaster-related activities among the various tribal departments 	Reduced risk of injury/loss because of better preparation and coordination among responders	Medium	Completed	High	IHS and <u>Tribal Health</u>
Objective 1.2 Develop and maintain an active Tribal Emergency Response Committee <ul style="list-style-type: none"> • DES Coordinator is leader and motivator for the TERC • DES Coordinator leads TERC in annual review of progress on PDM goals and objectives, assessment of next tasks necessary to accomplish goals 	Reduced risk of injury/loss because of better preparation and coordination among responders	Low (annual cost)	By end of 2006	High	<u>DES Coordinator</u> , Ambulance Services, BIA and Tribal Fire Departments, Law Enforcement, IHS, Tribal Health, etc.
Objective 1.3 Develop systems and infrastructure to respond to emergencies. <ul style="list-style-type: none"> • Identify an Emergency Operations Center 	Reduced risk of injury/loss because of better communication among responders during disasters	Medium	By end of 2007	High	<u>DES Coordinator</u> , Cadre Consulting could assist (talk to Ed Auker, Big Horn County DES regarding Cadre and potential funding sources)
<ul style="list-style-type: none"> • Regularly conduct training exercises, including table-top and field test exercises for various disaster scenarios and evacuations 	Reduced risk of injury/loss because of better preparation and coordination among responders	Low-Medium	Begin exercises in 2007; then ongoing	High	<u>DES Coordinator</u> , TERC, Broad cross-section of stakeholders, including American Red Cross, FEMA

Goals, Objectives, Projects	Benefits	Estimated \$ Costs*	Schedule	Rank	<u>Responsible Dept</u> (underlined for each objective below) and Potential Resources
<ul style="list-style-type: none"> Identify evacuation routes for various types of disasters, including hazardous materials 	Reduced risk of injury/loss because of better preparation and coordination among responders	Low	By end of 2007	High	<u>DES Coordinator</u> , TERC, FEMA
<ul style="list-style-type: none"> Develop systems for distributing emergency supplies and for their collection after the disaster 	Reduced risk of injury/loss and reduced costs if supplies are inventoried and maintained	Low	By end of 2008	Medium	<u>DES Coordinator</u> , FEMA
Objective 1.4 Improve capabilities to forecast weather events and provide warning notifications to the public					
<ul style="list-style-type: none"> Obtain NOAA weather radio reception in Lame Deer 	Reduced risk of injury/loss through better advance warning	Low	By end of 2008	High	<u>DES Coordinator</u> , TERC, NOAA, FEMA
<ul style="list-style-type: none"> Work with critical facilities and public building occupants to ensure each has working NOAA weather radios. 	Reduced risk of injury/loss through better advance warning	Low	By end of 2008	High	<u>DES Coordinator</u> , TERC, NOAA, FEMA
Objective 1.5 Improve public preparedness for disasters					
<ul style="list-style-type: none"> Provide education and training for the public regarding how to prepare for serious weather and other disaster types 	Reduced risk of injury/loss through better preparation	Low	Begin in 2007; then ongoing	Medium	<u>DES Coordinator</u> , FEMA
Objective 1.6 Improve Disaster-Related Communications					
<ul style="list-style-type: none"> Identify existing warning systems (such as sirens in Birney and Magic City) and resources (such as the telephones in the water pump houses; identify inefficiencies and needed improvements and implement 	Reduced risk of injury/loss through improved warning systems	High	Begin in 2007; implementation complete by end of 2008	High	<u>DES Coordinator</u> , TERC, American Red Cross, FEMA
<ul style="list-style-type: none"> Northern Cheyenne continue to participate in the Big Sky 11 Interoperability project (communications among various emergency service providers/systems and jurisdictions in the area) 	Reduced risk of injury/loss with better communication among responders	Low	Ongoing	High	<u>DES Coordinator</u> , TERC, FEMA

Goals, Objectives, Projects	Benefits	Estimated \$ Costs*	Schedule	Rank	<u>Responsible Dept</u> (underlined for each objective below) and Potential Resources
<ul style="list-style-type: none"> Improve cell phone coverage on the Reservation 	Reduced risk of injury/loss through improved communication	Low cost (to Tribe)	By end of 2008	High	<u>DES Coordinator</u> , cell phone companies
<ul style="list-style-type: none"> Improve communication with Birney 	Reduced risk of injury/loss in an area with currently inadequate communication systems (e.g., phone, emergency warning, etc.)	Low	By end of 2007	High	<u>DES Coordinator</u> , TERC, Birney residents, FEMA
Goal 2: Reduce the impacts of power outages					
Objective 2.1	Put back-up power in place for critical buildings that do not have back-up power sources.	Medium	By end of 2008	Medium	<u>DES Coordinator</u> , TERC, critical facilities managers, FEMA
<ul style="list-style-type: none"> Identify critical buildings/facilities according to standard criteria (e.g., need of facility during emergencies, shelter for special needs, children, elderly, etc., and get back-up power in place 	Reduced risk of injury/loss	Medium	By end of 2008	Medium	<u>DES Coordinator</u> , TERC, critical facilities managers, FEMA
<ul style="list-style-type: none"> Identify regular maintenance to ensure back-up power functions when needed. 	Reduced risk of injury/loss	Medium	By end of 2008	Medium	<u>DES Coordinator</u> , TERC, critical facilities managers, FEMA
Objective 2.2	Ensure adequate water supplies during power outages				
<ul style="list-style-type: none"> Install monitors to track water quantities in storage facilities 	Improved ability to maintain adequate water supplies during emergencies and power outages	Low-Medium	By end of 2006 (already completed?)	High	<u>Northern Cheyenne Utilities</u> ; <u>DES Coordinator</u> , US EPA—technical assistance and help with funding sources
<ul style="list-style-type: none"> Public education on how to prepare for adequate water supplies during power outages 	Improved ability to maintain adequate water supplies during emergencies and outages	Low	By end of 2008	Medium	<u>DES Coordinator</u> , <u>Northern Cheyenne Utilities</u> , FEMA

Goals, Objectives, Projects	Benefits	Estimated \$ Costs*	Schedule	Rank	<u>Responsible Dept</u> (underlined for each objective below) and Potential Resources
Objective 2.3 Reduce power outages					
<ul style="list-style-type: none"> Identify causes of power outages. (e.g., downed lines, system under-designed, other?) and implement needed changes 	Reduced risk of injury/loss	Medium to High	By end of 2009	Low-Medium	DES Coordinator , power companies --with TRECO, Range Telephone and with local area representatives on their boards
<ul style="list-style-type: none"> Install air flow spoilers where needed to keep lines from coming down due to winds/weather events 	Reduced risk of injury/loss	Medium to High	By end of 2009	Low-Medium	<u>DES Coordinator</u> , power companies --with TRECO, Range Telephone and with local area representatives on their boards
Goal 3: Reduce potential for fires and improve fire response					High
Objective 3.1 Ensure water systems are adequate for fire suppression needs.	Reduced risk of injury/loss	High	By end of 2010	High	<u>BIA and Tribal Fire Departments</u> , DES Coordinator, N.Cheyenne Public Utilities, Tribal Council, Tribal Chair, Congressional Delegation, FEMA
<ul style="list-style-type: none"> Bring all fire hydrants into working order Ensure adequate water supplies and pressure for concurrent fire suppression and basic public needs Build additional storage as needed Install water supply monitors at storage facilities Identify needs for dry hydrants and install as needed 	Reduced risk of injury/loss	High	By end of 2010	High	<u>BIA and Tribal Fire Departments</u> , DES Coordinator, N.Cheyenne Public Utilities, Tribal Council, Tribal Chair, Congressional Delegation, FEMA

Goals, Objectives, Projects	Benefits	Estimated \$ Costs*	Schedule	Rank	<u>Responsible Dept</u> (underlined for each objective below) and Potential Resources
Objective 3.2 Continue to implement existing fire plans <ul style="list-style-type: none"> • BIA Wildland Fire plan 	Reduced risk of injury/loss	Medium-High	Ongoing	High	<u>BIA and Tribal Fire Departments</u> , DES Coordinator
<ul style="list-style-type: none"> • Tribal Fire Plan/Community Fire Plans 	Reduced risk of injury/loss	Medium-High	Ongoing	High	<u>BIA and Tribal Fire Departments</u> , DES Coordinator
<ul style="list-style-type: none"> • Applicable portions of the Big Horn County/Rosebud County CWPP 	Reduced risk of injury/loss through better coordination	Medium-High	Ongoing	High	<u>BIA and Tribal Fire Departments, N. Cheyenne DES Coordinator</u> , DES Coordinators and Fire Departments of Rosebud and Big Horn Counties
Objective 3.3 Ensure clear access for firefighting equipment					
<ul style="list-style-type: none"> • Identify critical roads and bridges in need of improvements (grade, slope, other) for access by firefighting equipment and implement needed changes 	Reduced risk of injury/loss by improving access to structures and resources at risk	Medium-High	By end of 2009	Medium	<u>BIA and Tribal Fire Departments</u> , BIA and Tribal Road Departments, DES Coordinator
<ul style="list-style-type: none"> • Keep streets in town clear of abandoned vehicles and other items that can restrict access by firefighting equipment 	Reduced risk of injury/loss by improving access to structures	Low	By end of 2007, then ongoing	High	<u>BIA and Tribal Road Departments, Tribal Housing, Tribal Council</u> , DES Coordinator, BIA and Tribal Fire Departments,
Objective 3.4 Continue fuel reduction in the wildland urban interface	Reduced risk of injury/loss	Low-Medium	Ongoing	High	<u>BIA and Tribal Fire Departments</u> , DES Coordinator, Tribal Housing

Goals, Objectives, Projects	Benefits	Estimated \$ Costs*	Schedule	Rank	<u>Responsible Dept</u> (underlined for each objective below) and Potential Resources
Objective 3.5 New development will be "fire-wise"					
<ul style="list-style-type: none"> Construction will be of "fire-wise" materials (less subject to fires) 	Reduced risk of injury/loss	Low-Medium	Ongoing	High	<u>Tribal Housing</u> , BIA and Tribal Fire Departments, DES Coordinator
<ul style="list-style-type: none"> New development will be designed and built to ensure access by fire suppression equipment 	Reduced risk of injury/loss	Low-Medium	Ongoing	High	<u>Tribal Housing</u> , BIA and Tribal Fire Departments, DES Coordinator
<ul style="list-style-type: none"> Enforce existing Housing Authority ordinances related to fire reduction and suppression 	Reduced risk of injury/loss	Low-Medium	Ongoing	High	<u>Tribal Housing</u> , BIA and Tribal Fire Departments, DES Coordinator
Goal 4: Reduce potential for Hazardous Materials spills and other Transportation-related accidents/disasters.				Medium	
Objective 4.1 Obtain more active enforcement of speed limits on state highways	Reduced risk of injury/loss through prevention	Low	By end of 2007	Medium	<u>Tribal Council</u> , DES Coordinator, Montana Department of Transportation
<ul style="list-style-type: none"> Get more law enforcement on the highways 	Reduced risk of injury/loss through prevention and improved response	Low	By end of 2007	Medium	<u>Tribal Council</u> , DES Coordinator, Montana Department of Transportation
Objective 4.2 Ensure timely response to hazardous materials events					
<ul style="list-style-type: none"> Conduct field training and exercises 	Reduced risk of injury/loss through preparedness and improved communication	Low	Begin by end of 2007, then ongoing	Medium	<u>DES Coordinator</u> , TERC, BIA and Tribal Fire Departments, other Hazardous Materials Responders (e.g. unit in Billings), FEMA
<ul style="list-style-type: none"> Update Tribal Hazardous Materials Plan (Tribal Fire Dept.) 	Reduced risk of injury/loss	Low	Completed by end of 2007	Medium	<u>Tribal Fire Department</u>

Goals, Objectives, Projects	Benefits	Estimated \$ Costs*	Schedule	Rank	<u>Responsible Dept</u> (underlined for each objective below) and Potential Resources
<ul style="list-style-type: none"> Continue to secure training and necessary equipment for hazardous materials responders 	Reduced risk of injury/loss through preparedness	Low-Medium	Begin by end of 2007, then ongoing	Medium	<u>BIA and Tribal Fire Departments</u> , DES Coordinator, TERC, other Hazardous Materials Responders (e.g. unit in Billings), FEMA
<ul style="list-style-type: none"> Improve coordination with advanced hazardous materials teams (e.g., from Billings) that need to be called in for hazardous materials events that are beyond the certified capabilities of the local tribal team 	Reduced risk of injury/loss through preparedness	Low-Medium	Begin by end of 2006, then ongoing	Medium	<u>DES Coordinator</u> , TERC, BIA and Tribal Fire Departments, other Hazardous Materials Responders (e.g. unit in Billings), FEMA
Objective 4.3 Establish comprehensive tribal traffic regulations for the Reservation	Reduced risk of injury/loss through prevention	Low	Completed by end of 2007	High	<u>Tribal Transportation Department</u> , Tribal Council, DES Coordinator
Goal 5: Reduce potential for water quality contamination				Medium-High	
Objective 5.1 Implement recommendations made by the EPA in Sanitary Surveys of public water supplies	Reduced risk of health-related impacts	Medium	Already initiated; all recommendations implemented by end of 2007	High	<u>Northern Cheyenne Utilities</u> ; DES Coordinator, US EPA—technical assistance and help with funding sources
Objective 5.2 Continue to address remediation of underground fuel storage tank leaks	Reduced risk of health-related impacts	Medium-High	Ongoing	Medium	DES Coordinator, <u>Tribal Environmental Health Department</u> , US EPA—technical assistance and help with funding sources

Goals, Objectives, Projects		Benefits	Estimated \$ Costs*	Schedule	Rank	<u>Responsible Dept</u> (underlined for each objective below) and Potential Resources
Goal 6: Reduce effects of floods					Medium	
Objective 6.1	Continue to use flood plain maps in siting new development.	Reduced risk of injury/loss through prevention	Low	Ongoing	High	<u>Tribal Housing</u> , Tribal Land Use Committee
Objective 6.2	Build a bridge to access homes on the other side of Rosebud Creek (near Busby)	Reduced risk of injury/loss by preventing "stranded" situations	Medium-High	Completed by end of 2009	Medium	<u>Tribal Road Department</u> , DES Coordinator
Goal 7: Improve ability to respond to winter storms					High	
Objective 7.1	Roads should be cleared of snow (with priority for evacuation routes, main travel routes)	Reduced risk of injury/loss	Medium-High (depending on annual snow conditions)	Process to address should be identified and implementation begun by end of 2007; then ongoing	High	<u>BIA and Tribal Road Departments</u> , DES Coordinator, TERC
Goal 8: Improve ability to respond to drought					Medium	
Objective 8.1	Continue public awareness and water conservation measures	Reduced risk to public health and economic loss	Low	Ongoing	Medium	<u>N. Cheyenne Public Utilities</u> , Agricultural Extension, DES Coordinator
Objective 8.2	Institute a grasshopper control program like Big Horn County	Reduced risk of economic loss	Medium	By end of 2009	Medium	<u>DES Coordinator</u> , Agricultural Extension, Tribal Council
Goal 9: Plan Administration						
Objective 9.1	Submit plan to the State of Montana and FEMA for approval.	Greater likelihood of project implementation and potential eligibility for project funding	Low	By end of 2006	Not rated	<u>DES Coordinator</u> , Tribal Council

Goals, Objectives, Projects	Benefits	Estimated \$ Costs*	Schedule	Rank	<u>Responsible Dept</u> (underlined for each objective below) and Potential Resources
Objective 9.2 Ensure coordination with other planning efforts <ul style="list-style-type: none"> • Incorporate elements of the PDM plan as appropriate into other plans • When updating or revising the PDM plan, incorporate elements of other plans as appropriate 	Greater assurance the projects will be implemented	Low	Ongoing	Not rated	<u>DES Coordinator,</u> Tribal Council

*Estimated costs: Low = \$ 10,000 or less, Medium = \$ 10-100,000, High = \$ 100,000 or greater

PROJECT IMPLEMENTATION

The projects listed above are the means by which the Northern Cheyenne intend to realize the goals to become more disaster resistant. Accomplishing the projects will be dependent on funding, staff, and technical resources from a variety of sources including the Tribe, state and federal government, not-for-profits, and the business community.

Some of the projects can be undertaken by the Tribe within existing resources. One example of this would be to develop comprehensive tribal traffic regulations. Another would be to provide information on how to prepare for various types of disasters.

Some of the projects can be completed but will need additional funding. The amount of funding needed depends on the project. One example would be the project to address the need for back-up power and ensuring all fire hydrants are in working order. This would take financial resources that would likely require additional funding.

Some of the projects will require a public-private partnership to accomplish. An example of this would be working with local electric companies to provide information on how to avoid power outages.

Some projects may require cooperation with other organizations outside of the Reservation. These include coordination with other fire departments (e.g., Big Horn County, Crow Reservation) on fires and projects that overlap boundaries. (For fire, mutual aid has been the standard for fire suppression for the Northern Cheyenne, who had active participants in the Big Horn County Community Wildfire Protection Plan development).

Projects will be accomplished as resources become available. Those projects with a higher priority ranking would be considered first. Implementation of the plan will be the responsibility of the TERC and the Disaster and Emergency Services Coordinator. Plan implementation also depends on the willingness of other tribal departments (e.g., public health, housing), public entities (e.g., the schools), private business (such as the electric companies), and not-for-profit organizations such as the American Red Cross to participate in specific mitigation actions and projects.

In selecting projects to compete for funding whether it is existing internal funding or funding from federal sources, emphasis should be placed on the relative benefits compared to the cost of the project. The cost of the project should be considered and weighed against the dollar value or other measure of assets protected or potential reduction of damages. Where possible a basic cost benefit and/or value analyses should be completed during the planning of the project.

The Northern Cheyenne understand that while completion of the plan will make them eligible to compete for additional funds, it is in the best interests of the local jurisdictions and residents to proceed with those projects that can be done within existing resources while exploring avenues to obtain assistance for those projects beyond local capabilities.

CHAPTER 5: PLAN MAINTENANCE AND COORDINATION

RESPONSIBLE PARTIES

The Northern Cheyenne President will be responsible for ensuring that the PDM Plan is kept current and also for evaluating its effectiveness. With the adoption of this plan, the President designates the Northern Cheyenne Disaster and Emergency Services Coordinator and the Chair of the Tribal Emergency Response Commission (TERC) as the co-leads in accomplishing this ongoing responsibility on the President's behalf.

REVIEW TRIGGERS

Any of the following three situations could trigger review of the plan's effectiveness or currency and update of the PDM Plan.

1. The occurrence of a major natural disaster either on the Reservation or nearby.
2. The passage of time.
3. A change in federal regulations with which the Reservation must comply.

CRITERIA FOR EVALUATING THE PLAN

When review of the PDM plan is triggered by one of the three situations listed above, the plan will also be evaluated for effectiveness and comprehensiveness. The criteria against which the plan will be evaluated will include, but not be limited to:

- Whether any potential natural hazards have developed that were not addressed in the plan,
- Whether any disasters have occurred which were not addressed in the plan,
- Whether any unanticipated development has occurred that could be vulnerable to natural disasters, and
- Whether any additional project ideas have been developed.

PROCEDURES

Should a major natural disaster occur on the Northern Cheyenne Reservation the TERC shall meet following the disaster to review the after action report. Upon review of this report, any changes needed to the PDM Plan will be recommended to the Tribal President and made by the Disaster and Emergency Services Coordinator following the President's decision.

In the absence of a major natural disaster, each year starting in January 2008, the TERC will meet to review the PDM Plan and recommend any needed changes. The primary emphasis of such review will be on the goals, objectives, and specific actions/projects portion of the plan. The TERC will:

- review the work of the past year, identifying key factors that may have affected accomplishing priority projects, and identifying completed projects

- identify any needed changes or additions to the mitigation strategy (new or changed goals, objectives, actions/projects)
- clarify priorities for projects for the upcoming year and the work tasks needed to accomplish those projects

The TERC meeting will be noticed in local newspapers and the public and individuals who served on the Steering Committee for development of the original plan will be encouraged to attend. In the interim, the Disaster and Emergency Services Coordinator will maintain a file into which comments or input on changes to the plan can be kept. The comments in this file will be provided at the TERC/public meeting to review the plan.

Finally, should federal regulations with which the Reservation must comply be significantly changed, the Disaster and Emergency Services Coordinator will notice and hold a TERC meeting. At this meeting he/she will inform the TERC of the new requirements and together with the TERC, determine whether changes to the PDM Plan are warranted.

Every five years, beginning in 2012, the CWPP/PDM Plan will be updated and submitted to Montana Disaster Emergency Services and subsequently to the Federal Emergency Management Agency (FEMA) for approval.



Rosebud Creek Area east of Muddy Creek

INCORPORATION INTO OTHER PLANS

Staff of the Northern Cheyenne Tribe and the BIA have been made aware of the PDM Plan throughout the planning process. The projects in the PDM Plan can be incorporated as appropriate into existing plans, annual budgets, and any other relevant plan that may be updated or developed for the Northern Cheyenne Indian Reservation.

Processes for developing and updating plans vary according to branch of government (e.g., BIA or Northern Cheyenne Tribal Administration) and can also vary depending on direction from the Tribal President and Tribal Council. The DES Coordinator will be responsible for staying informed of other relevant plans and working to incorporate pertinent elements of the PDM plan as appropriate.

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APPENDIX A

MEETING MATERIALS

AGENDAS, SUMMARIES, AND ATTENDANCE SHEETS

PDM Plan Kick-Off Meeting Agenda
Northern Cheyenne Reservation
December 15, 2005

Introductions

What is a CWPP-PDM Plan, why do one, and what is the planning process?

Quick overview by planning consultant

What is the Plan?

- Assess Hazards
- Assess Risks
- Identify goals, objectives, and projects

PDM

Why do a Plan?

- Prepare to avoid losses—economic and human
- Eligible for project funding from FEMA
- Eligible for post-disaster relief from FEMA

Roles

- Steering Committee
- Board of Health
- President
- Mayor/Others?
- Contractor

Timeframes

Work completed by end of September
3 meetings

Coordination

Meeting logistics
Meeting scheduling considerations
Communications during the project
Monthly reports and invoicing

Getting to work!

Recollections of past natural disasters
What hazards are of most concern to you?
Information sources (local or county plans, maps, knowledgeable individuals, county records, etc.)
Media contacts—Best ways to reach people
Develop list of potential Steering Committee members
Set first public meeting date, time, and location

Other items

PDM Plan Kick-Off Meeting Agenda
Northern Cheyenne Reservation
December 15, 2005

Introductions

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Quick overview by planning consultant

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What hazards are of most concern to you?
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Develop list of potential Steering Committee members
Set first public meeting date, time, and location

Other items

**NORTHERN CHEYENNE PDM PLAN
KICK-OFF MEETING
December 16, 2005
10:00 a.m. to Noon**

Participants

Twelve persons from the Northern Cheyenne Reservation participated in the Kick-Off meeting. Participants included members of the Tribal Emergency Response Commission (TERC), Board of Health, Natural Resources Department, Public Schools, Dull Knife Memorial College, and BIA.

Anne Cossitt attended as the contracted consultant hired to prepare the PDM Plan.

What is a CWPP-PDM Plan and Why Do One?

Anne Cossitt reviewed what a Pre-Disaster Mitigation (PDM) plan is and why preparing this plan will benefit the Northern Cheyenne. Cossitt explained that the plan would address the current situation of existing and potential hazards, past disasters, and develop goals and projects. Once the plan is completed the Northern Cheyenne will be eligible to develop applications for competitive funds to implement various projects identified in the plan. The State of Montana provided funding for this plan. An in-kind match will be needed from the Northern Cheyenne. Keeping track of who attends the meetings (via sign-in sheets) and including time spent by various tribal staff on the project typically more than meets the in-kind match on these PDM plans, noted Ms. Cossitt.

Roles and Timeframes

Anne reported that the plan will be completed by the end of September. She also reviewed recommended roles as follows:

- Steering Committee.
The TERC will form the core of the Steering Committee. The Steering Committee should also have representation from businesses, schools, and other sectors that could be affected by disasters or be involved in disaster response. (See list of names suggested for the steering committee below.) The Steering Committee will guide the plan development through 3 meetings of approximately 2 hours each. Steering Committee members will also be asked to read the plan, and provide comments and corrections.
- Tribal President
The President will need to formally adopt the plan.
- Mayors
There are no incorporated communities on the Northern Cheyenne Reservation.
- Cossitt Consulting.
Will facilitate the meetings, provide the written plan, and news releases.
- Bill Mason

Will be the primary contact for Ms. Cossitt on this project and will provide logistical support, including helping to set up the meetings, developing and maintaining mailing lists, and getting signatures and letters out.

Steering Committee

The President will send letters of invitation to persons to participate in the steering committee. Cossitt will draft the letter. The initial list of invitations is as follows, and Bill Mason will work to get mailing, phone, and email address contact information for each:

- Everyone who participated in Kick-Off meeting
- Each person/agency on the TERC
- IHS
- Law Enforcement
 - Tribal
 - BIA
 - State (?)
- Tribal Council
- President's Office
- Schools
 - St. Labre
 - Busby
 - Lame Deer
 - Head Start
- Boys and Girls Club
- County DES Coordinators
 - Ed Auker, Big Horn County DES
 - Carol _____, Rosebud County DES
- Tribal Housing
- Senior Citizen Centers
 - Lame Deer
 - Ashland
- TERO
- Private Businesses
 - Grocery Store
 - Bank
 - Ranchers—Fred Small, Peggy Fredericks)
- Northern Plains Resource Center Tracy Robinson, Jeannie Alderson
- Dull Knife Memorial College
- Land Authority (previously Land Committee)
- Natural Resources
- USDA Extension
- Utilities
 - Water and Sewer
 - TRECO (sp?) Electric
 - Big Horn Electric
 - Telephone Companies
- Churches and Ministerial Association

- Public Health Nurse
- Transportation
 - State Highway Patrol
 - Calvin ____--located in SE Division in Miles City (name mentioned by Merlin Sioux)
 - Bill Wertman
 - Zane Spang
 - James Man
- Diane McClane – (Food Bank)
- Media
 - Tribal Newspaper
 - Original Briefs
 - Big Sky Briefs
 - Local Radio
 - Tribal website

Schedule/Logistics

The plan will be completed on the plan in September 2006. The Steering Committee will hold 3 meetings of approximately 2 hours each.

Participants agreed that Lame Deer was the best place for all three meetings. They set dates for the meetings as February 7, March 22, and April 19. Meetings will be held at the school board room at 10:00 a.m. Participants wanted to have security at each of the meetings—either school security or other law enforcement.

Recollections of Past Events and Concerns About Various Hazards

Participants identified a number of past and potential disaster events:

- Chemical-Hazardous Materials spills from trucks along the highway. There have been several tip-overs, but no spills or disaster events to date.
- Flooding
 - Major flood in 1960s in Lame Deer. The entire valley floor flooded in some areas. Culverts got jammed and backed up in snow/ice melt runoff. There was not much damage at the time, but there wasn't as much infrastructure as there is now in the valley. The culverts under the highway could get plugged up and created a flood problem.
 - Flooding on Tongue River in 1978—lots of damage to St. Labre School and to houses in Ashland
- Foreign Animal Outbreaks (esp. those that can affect ranching economy—so important to this area)
 - Chronic Wasting Disease
 - Other diseases that can affect cattle/horses
- Power Outages
 - These have happened in the past—need to find alternative back-up heat sources (such as wood stoves or other)

Information Sources and Existing Plans

Cossitt indicated that getting information from federal and state information sources is often geared to counties, not to reservations. She asked what participants recommended for reservation-specific information.

She also asked for any other plans or policies that might relate to the disaster planning efforts.

Participants identified the following:

- Emergency Operations Plans (various facilities—HIS, schools, etc.)
- The Tribal Emergency Operations Plan (Ernestine Spang has this)
- Tribal Weapons of Mass Destruction Plan and Security Strategy (contact Ernestine Spang)
- Community Economic Development Plan (contact Tony Prairiebear)
- Floodplain Development Policy (contact Alan Clubfoot)
- Floodplain Maps (contact Ernestine Spang) Note however that there is no FEMA FIRM program on the Reservation.
- Dangerous Highway Intersection at Lame Deer

Participants confirmed the following communities on the reservation:

- Lame Deer
- Busby
- Birney (there are two “Birneys” –one in the county and one on the reservation—they are next to each other)
- Ashland. A part of Ashland falls on the reservation—It is referred to as “Rabbit Tongue”

Expectations

Participants shared their expectations of this PDM Planning Effort. Frank Rowland would like to see this work dovetail with an effort he is developing with the college to address disaster planning and get the various groups together. Ernestine Spang would like to get some of the projects on the TERC’s project list get accomplished through this effort.

Other

Tony Prairiebear indicated that the plan should be flexible to meet changing needs as time passes. There should be monitoring and evaluation of the plan as well.

Northern Cheyenne PDM Steering Committee
March 22, 10 a.m.
Meeting Agenda

Introductions

Pre-Disaster Mitigation Planning

- What is a PDM Plan and why do one?
- What is the role of the Steering Committee?
- What are the overall timeframes and schedule for the project?

Recollections

- Steering Committee recollections of past natural disasters in the county (what type of disaster, when, where, extent of seriousness)
- Other resources to obtain this/related information?

Critical facilities and vulnerable populations

- What are the critical facilities and infrastructure?
- What are the vulnerable populations?

Potential natural disasters

- Group brainstorm of natural hazards
- What is at risk from each hazard
- **Hazard Rating Sheet**
- Prioritize list of potential disasters

Wrap-up

- Next steps
- Next meeting date/location/time
 - April 19, Wednesday same time, same place...
 - May 24th?
- Questions and comments
- Adjourn

Tribal letterhead

Date

Dear :

You are invited to serve on the Steering Committee to guide the preparation of Northern Cheyenne Pre-Disaster Mitigation (PDM) Plan.

So, what is this plan and what purpose does it serve? The primary purpose of the Plan is to increase the Northern Cheyenne Reservation's resistance to natural disasters. Among other things, the PDM will look at historic disasters, identify those types of disasters the area is at most risk from, and propose projects to address those hazards.

And, there are important benefits for the Reservation in preparing the plan. Once the plan is done, we will be eligible to compete for federal grant funds to complete projects, and eligible for assistance from the Federal Emergency Management Agency (FEMA) in the event we do experience a disaster such as a devastating flood, wildfire, or winter storm, for example.

The commitment we are asking of you is simple. Between now and the end of August, we'd like to have you attend one or more of the three two-hour Steering Committee/Public meetings. At these meetings, the Steering Committee and interested participants will provide guidance to the contractor we've hired to write the plan. The first of these meetings is scheduled for Tuesday, March 22 at 10 a.m. in the school board room in Lame Deer. We hope to see you at as many of the three meetings as you can make, preferably all three.

Your participation will ensure that we end up with the highest quality plan possible. If you have any questions about the plan or your role as a Steering Committee member, please call me at 477-6878.

Sincerely,

Ernestine Spang
Ambulance Services

TRIBAL REPORT

FEBRUARY 2006 ■ Vol. I ■ No. 4

— FOR THE CHEYENNE PEOPLE —

On the Internet:

Disaster Mitigation Planning Tribal Programs Coordinate Effort Res-Wide

Rapid melting of snow and ice caused widespread flooding in and around Lame Deer one spring in the 1960s. Because there weren't as many buildings as there are now, damages were not major. A similar flood today could create much more damage.

Heavy snow and ice storms result in traffic accidents and serious power

outages. In October of 2005, heavy snow caused tree limbs to break throughout the area, downing power lines, roofs, and making some roads impassable.

Floods, wild fires, winter storms, hail storms, and droughts are major natural disasters the Northern Cheyenne Reservation has experienced through time.

Each natural disaster

has the potential to take lives, destroy property, and interrupt transportation and commerce. And, natural disasters are costly. For all these reasons, the Northern Cheyenne are joining other tribes across the country to prepare Pre-Disaster Mitigation Plans specific to their reservations.

[See *Mitigation*, Page 8]

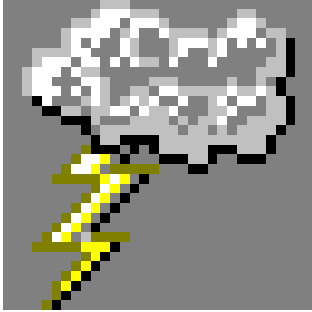
Disaster Mitigation Planning

[*Mitigation*, from Page 1] Preparing the plan is a requirement for eligibility for emergency relief funds from the Federal Emergency Management Agency should the reservation experience a natural disaster. The planning project is made possible by funding from the State of Montana. Cossitt Consulting out of Park City, Montana, will be preparing the disaster mitigation plan under the guidance of an expanded Tribal Emergency Response Commission with representation from elected officials, law enforcement, emergency medical services, fire protection, disaster emergency services, public health, public works, private businesses, transpor-

tation, utilities, college, and the public school system.

A total of three meetings to develop the plan will be scheduled over the next six months and anyone interested in participating is encouraged to do so.

As a part of developing the plan, past disasters need to be documented and analyzed. "I'm really interested in hearing from long-time residents who have memories of floods, wild fires, winter storms, or other natural disasters" stated Anne Cossitt. Anyone with information to share or questions about the project is encouraged to attend the meetings, notices of which will be sent out in advance of the meeting dates.



NORTHERN CHEYENNE PRE-DISASTER PLANNING MEETING

Wednesday, March 22

10:00 a.m.

Location: _____

Open to the public.

Anyone with an interest is encouraged to attend and participate.

For more information, contact:

Disaster Emergency Coordinator, Ernestine Spang, 477-6878



nvtech.com



nvtech.com

Meeting Summary
Northern Cheyenne Reservation PDM Steering Committee
Lame Deer Public School Administration Building
March 22, 2006

Welcome

Ernestine Spang, Northern Cheyenne Ambulance Services, welcomed the group and introduced Anne Cossitt, who gave an overview of the meeting agenda. Participants introduced themselves.

Cossitt briefly reviewed the agenda and indicated that this is the first of three meetings of the PDM Steering Committee. The purpose of this meeting is to identify and prioritize hazards. The second and third meetings will be to set goals and identify projects to reduce risks.

What is a CWPP-PDM Plan?

Cossitt presented the benefits of preparing a Pre-Disaster Mitigation (PDM) Plan and generally what goes into the plan. The resulting plan will among other things identify projects that can make the reservation more disaster-resistant. Ernestine Spang indicated that the Fort Peck and Flathead Reservations have completed their PDM Plans (and she would see about getting a copy).

Participants in the Planning Process

Cossitt discussed role and membership of the Steering Committee. The steering committee provides information and ideas, identifies projects, sets priorities and will be asked to review the draft plan. Ideally, the steering committee is made up of emergency service providers, businesses, education (schools), medical providers, agricultural services, insurance providers, and others to get a broad scope of sectors that could be affected by disasters.

Invitations to participate on the Steering Committee were sent out by Ernestine Spang to approximately two dozen individuals representing a variety of interests. In addition, Ernestine posted flyers around Lame Deer about the meeting.

The tribal council will make the decision to adopt the final product. The entire process is open to the public.

Anne Cossitt of Cossitt Consulting will research and write the plan, with guidance from the steering committee.

Time Frames and Schedule

The plan will be completed by December 31, 2006. Future meetings will be dedicated to goal setting and project identification.

Recollections of Past Disasters

Cossitt asked participants to provide information on previous disasters. Cossitt will provide detailed information on hazards and include information on these disasters as part of the background work for the plan.

What?	When?	Where?	Extent-Severity/ Other Notes
Late Spring Storm	Within last decade	Kirby, Busby, Muddy Cluster	Storm resulted in power outage that lasted for about a week; Red Cross was called in. It was major chaos for a while; no one used the existing emergency plan,. Lots of supplies such as lanterns, heaters, blankets etc. were distributed but nothing was reclaimed after the disaster. People were without water and water had to be hauled in. Approximately 1000 power poles had to be replaced
School Bus Accidents	3 within the last year	Scattered throughout the county	Weather caused 1 accident Sun—too much glare—caused 1 accident Construction-caused 1 accident—there weren't any warnings about construction coming up—there were many injuries; 2 serious enough had to go to Billings (no deaths)
Hazardous Materials Spills	Maybe once a year	On the highway	Haven't been very large or serious to date
Traffic accidents	(no specific time mentioned)		
Wildland Fire	??	Ashland-Birney	There have been a couple of fires serious to require evacuation
Wildland Fire	??	Muddy Creek-Busby	"Baby Dean" Fire nearly burned Busby
Wildland Fire	1988	South end of Lame Deer	"Slick Fire"
Wildland Fire	??	"Redistrict area" between Muddy Creek and Busby	Required evacuations
Ice Jam	20 years ago?	Birney Bridge	Didn't cause much damage then, but could now as there is more development along the river than there was 20 years ago.
Structural Fire	Ongoing	Lame Deer, Busby	Typically only one-two structures damaged at a time. Arson is a factor in many cases—particularly for abandoned buildings. Also there are problems with buildings that may not be fire-safe—safety inspections are not always current (no safety inspections are being done at current time)
Flash Flood	20 years ago	Birney	Homes were flooded. The Green Berets were doing exercises on the reservation at the time, and they were involved in rescuing folks from their flooded homes.
Flood	In the 1970s; also had a close call about two years ago	Ashland-St. Labre	Contact Alan Clubfoot for more information
Extreme Winter Weather			Early winter storm in Fall of 2005 caused considerable damage in Lame Deer—many

			branches downed and some roofs damaged Some recalled a microburst event
Tornadoes- Microburst			
Lightning Strikes			Known to have many lightning strikes, a factor in starting wildfires
Power Outages	Ongoing		This can be a really serious problem—when people are without power for days on end; which has happened in the past
Severe Summer Weather-Hail Storm	???	St. Labre	Hail storm caused damage to cars and houses
Insects— Locusts/Mormon Crickets	25 years ago	Busby-Muddy Cluster	All over the roads—took out swaths of vegetation
Insects- Disease-West Nile Virus	Last few years		One person died of West Nile Virus
Drought	Ongoing		Has been necessary to haul water to livestock and in some cases to residences as well (problems with wells)
Water Quality Contamination	5 years ago	Lame Deer	A dead dog contaminated the water supply; it took a while to clean up the water
Dam Failure	None known	None Known	Some potential for damage if Tongue River dam was to fail

Notes:

- Contact Lonnie Flatness regarding the BIA Comprehensive Plan that was developed about 12 years ago.
- It doesn't take very many injured to exceed the capabilities of the local clinic (estimated that 5 concurrent injuries) could be more than the clinic could handle
- The emergency safe shelters and emergency programs have issues with adequate supplies—e.g., enough bedding, etc. when needed

Hazards of Concern

Participants then went through a variety of hazards and identified the known or likely geographic extent of the hazard, the likelihood that a hazard event might take place, and the potential severity of an incident. Finally, the group identified the highest priority hazards (each person was given three sticky dots which they used to vote for their highest priorities).

Geographic area was essentially the entire reservation for each hazard type with the following exceptions:

- Flooding occurs along the major water ways—Tongue River, Rosebud Creek, Lame Deer Creek, and Muddy Creek, but flash flooding can also cause damage on smaller drainages as well
- Hazardous Materials spills are most likely along the Highway 212 corridor

The following table summarizes the discussion of these hazards.

Hazard	Priority Ranking	Probability of Occurrence	Risk Severity	Notes
Winter Storms	1	High	High	Potential for losses/injury to humans and livestock; damage to structures; potential for power outages
Traffic Accidents		High	Med-High	Potential for losses/injury to humans and livestock; potential for power outages
Hazardous Materials	3	Low	High	
Wildland Fire	2	High	High	
Structural Fire		Medium	Low	Usually structure fires are contained with one-two structures
Floods	4			
Ice Jams		Low	High	
Flash Floods		Low	High	
Dam Failure		Low	High	
Other Floods		Low	High	
Severe Summer Weather				
Thunder Storms		High	Low	
Tornadoes/Microbursts		Low	Medium	
Lightning		High	Low	Low damage from the lightning itself; more damage if lightning ignites a wildfire
Drought		High	Medium	Large potential for economic loss (livestock, crops)
Insects		Low	Low-Medium	
Power Outages		Medium-High	High	
Water Quality Contamination	5	Low	High	
Epidemics		Low	High	

Critical Facilities and Vulnerable Populations

Cossitt indicated that serious issues can develop when hazards affect delivery of key services or affect or interrupt business, including government business. It is important to consider what buildings and facilities might particularly be at risk. In addition, the plan will need to consider the special needs of vulnerable populations such as children, seniors, and the medically at-risk.

Cossitt quickly reviewed an initial list of critical facilities and vulnerable populations and indicated she would be working with Ernestine and others to identify any missing gaps.

Critical facilities typically include:

- Hospitals
- Government centers
- Educational facilities (schools, colleges)
- Grocery stores and other businesses

- Water/Sewer systems
- Roads/Bridges

Vulnerable populations include

- People at risk medically
- Homebound
- Children (schools, Headstart, etc)
- Senior centers

Other Items

Participants suggested that the utility companies (power and phone) should receive written invitations to participate on the steering committee, if they hadn't already been invited.

Participants indicated that a number of plans are in place or are being prepared. The IHS clinic is currently preparing its Emergency Plan. The Northern Cheyenne has a recently completed Emergency Operations Plan. The BIA also has a plan.

Participants also indicated that a major issue in preparing for and responding to disasters/emergencies is the lack of coordination among the various entities (e.g., IHS, BIA, Tribe), not the lack of planning. Participants agreed this needs to be looked into for the Pre-Disaster Mitigation Plan.

Telecommunication is an issue on the Northern Cheyenne Reservation. There is no cell phone coverage and many people do not have regular land lines. There is no public phone in Birney that is available 24 hours/day/7 days a week, creating problems for emergency reporting for people without their own phones. Participants indicated that the phone company offers some kind of no-cost or reduced-cost program for phones that are used for emergencies only.

The Northern Cheyenne Tribe is currently working on traffic regulations. There are none in place currently.

Wrap-Up

Cossitt and Ernestine Spang thanked everyone for their participation and ideas.

The next meeting dates were set for April 18 and June 1, both scheduled for 10 a.m. to noon. Location still needs to be determined. Ernestine Spang will work on finalizing a location for the upcoming meetings.

Attendance Sheet

Activity Northern Cheyenne Steering Committee Mtg - PDM Plan

Location Lame Deer Date(s) March 22, 2006

Duration 10 a.m. - Noon

Public Health Emergency Response Committee

			Agency Use Only		
Name & Title	Affiliation	E-Mail Address & Phone#	H	M	T
Name: <u>Jennie Allies</u>	<u>IHS</u>	<u>Jennifer Allies Diks. mail</u>	<u>.gov</u>		
Title: <u>safety officer</u>		<u>Lame Deer Clinic</u>	<u>477-4422</u>		
Name: <u>Clyde Wolf Black</u>	<u>N. CHEYENNE</u>	<u>NCNSP@hotmail.com</u>			
Title: <u>HEADSTART DIRECTOR</u>			<u>477-6347</u>		
Name: <u>Ginger Roll RN</u>	<u>Rosebud County</u>	<u>grille@mt.gov</u>			
Title: <u>Rosebud Co. Health Dept. Nurse</u>			<u>346-2156</u>		
Name: <u>A. Clifford Facke</u>	<u>Northern Cheyenne Tribal Division Authority Lame Deer, Mt. State</u>	<u>406 411 6919</u>			
Title: <u>Inspector</u>			<u>Fax 406 411 6229</u>		
Name: <u>Quentin Means</u>	<u>Northern Cheyenne Ambulance SRVC</u>	<u>jrmeansmo@hotmail.com</u>			
Title: <u>EMT-p</u>			<u>406-665-1064</u>		
Name: <u>Ernestine Spang</u>	<u>Northern Cheyenne Band</u>	<u>emslamedeer@rangeweb.net</u>			
Title: <u>TERC/EMS DIRECTOR</u>			<u>477-6775</u>		
Name: <u>Wilbur Spang</u>	<u>L.D.S.</u>	<u>477-6305</u>			
Title: <u>Lame Deer School</u>					
Name:		<u>Lame Deer School</u>			
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Rev. 4/23/03

FOR IMMEDIATE RELEASE

April 3, 2006

**CONTACTS: Ernestine Spang, Northern Cheyenne Ambulance Services, 477-6878
Anne Cossitt, Cossitt Consulting, 633-2213**

Northern Cheyenne begin Identifying and Preparing for Disasters

The first steering committee meeting of the Northern Cheyenne Pre-Disaster Mitigation Planning effort was held on Wednesday, March 22 at the School Administration Building. The meeting, open to the public, included persons from throughout the Reservation representing emergency service providers, medical services, Headstart, schools, and Tribal Housing. The public is encouraged to attend the next meetings, scheduled for April 18 and June 1.

Persons attending the first meeting of the Northern Cheyenne Pre-Disaster Mitigation (PDM) Plan Steering Committee on Wednesday, March 22, initiated efforts to reduce damages from potential future disasters on the Northern Cheyenne Reservation. At the end of the two-hour meeting, the group had identified 17 different types of disaster or emergency situations, and had ranked winter storms, wildland fire, hazardous materials, floods, and water quality contamination as the top five priority disaster hazards for the Reservation.

Over the course of the next two meetings, scheduled for April 18 and June 1, the group will set goals and projects to mitigate the effects of all the various hazards. Anne Cossitt of Cossitt Consulting has been contracted by the Northern Cheyenne Tribe to provide staffing and technical assistance for completing the plan. Cossitt Consulting is currently working with the Crow Tribe on their PDM plan, and has also completed the PDM plans for Big Horn County and 5 other counties in eastern Montana.

Pre-Disaster Mitigation Plans are being developed throughout the nation by states, counties, and Indian Reservations. In Montana, both the Fort Peck and Flathead Reservations have recently completed their plans. Completing the plan will make the Northern Cheyenne Reservation eligible for certain kinds of Federal Emergency Management Agency (FEMA) assistance to implement projects identified in the plan.

The public is invited to attend these meetings. The April 18 meeting will be held from 10:00 a.m. to noon at _____ ERNESTINE, PLEASE FILL IN LOCATION
HERE _____

Anyone with information to share about past natural disasters or questions about the project is encouraged to contact Ernestine Spang, Northern Cheyenne Ambulance Services at 477-6878 or Anne Cossitt at cossitt@usadiq.com.

XXXXXXXXXXXXXXXXXXXX

NORTHERN CHEYENNE
Pre-Disaster Mitigation Plan
Steering Committee/Public Meeting Agenda
April 18, 2006

- Welcome and introductions
- Recap:
 - Why do a CWPP/PDM Plan?
 - What is in the plan?
 - Discussion and products of first meeting
- Risk evaluation and hazard assessment
- Develop goal statements
- Develop preliminary list of projects
- Wrap-up
 - Comments/questions on meeting
 - Review schedule
 - Next steps, next meeting (June 1—location??)
 - Finalize, prioritize

**DRAFT LETTER OF INVITATION TO ATTEND SECOND MEETING
NORTHERN CHEYENNE PDM PLANNING**

DATE

Dear :

Thanks to all of you who attended the first meeting of the Northern Cheyenne Pre-Disaster Planning effort, held on Wednesday, March 22 in Lame Deer. We look forward to seeing you at the next meeting on April 18.

For those of you who were unable to attend the first meeting, or who are receiving this letter of invitation for the first time, please consider participating in this important effort.

There will be two more meetings, on April 18 and June 1. Both meetings will be held from 10 a.m. to noon. LOCATION????

At the first meeting on March 22, the group identified past disasters and prioritized potential hazards. At the next meeting on April 18, participants will review the summary of potential hazards and begin identifying ways to prevent or mitigate risks.

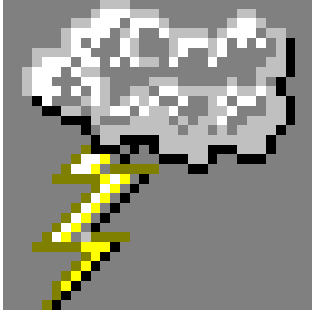
The purpose of the Plan is to increase the Northern Cheyenne Reservation's resistance to disasters, particularly focusing on natural disasters such as severe winter storms, floods, etc. Persons attending these meetings play an important role—identifying historic and potential hazards, clarifying issues related to responding to such disasters, and proposing projects to reduce risks and potential damage.

Pre-Disaster Mitigation Plans are being developed throughout the nation by states, counties, and Indian Reservations. In Montana, both the Fort Peck and Flathead Reservations have recently completed their plans. Completing the plan will make the Northern Cheyenne Reservation eligible for certain kinds of Federal Emergency Management Agency (FEMA) assistance to implement projects identified in the plan.

We strongly encourage your participation in the next meetings. Having a wide variety of interests actively involved is crucial to ensuring that plan addresses the needs of businesses, schools, tribal government, emergency services, and the young, old, ill, and those with special needs in the response to disasters.

If you have any questions about the plan or your role as a Steering Committee member, please call Ernestine Spang at 477-6878.

Sincerely,



NORTHERN CHEYENNE PRE-DISASTER PLANNING MEETING

TUESDAY, APRIL 18; 10:00 a.m. -
Noon

Location: _____

Open to the public. This is a planning project of the Northern Cheyenne Tribe.

Anyone with an interest is encouraged to attend and participate. The meeting will focus on goals and projects for reducing effects of future disasters.

For more information, contact:
Disaster Emergency Coordinator, Ernestine Spang, 477-6878



nvtech.com



nvtech.com

Meeting Summary
Northern Cheyenne Reservation Pre-Disaster Mitigation (PDM)
Steering Committee
Public Health Building Conference Room
April 18, 2006

Welcome

Anne Cossitt, contractor to the Northern Cheyenne to prepare the plan, briefly reviewed the agenda and indicated that this is the second of three meetings of the PDM Steering Committee. The purpose of this meeting is to set goals and identify projects to reduce risks.

The group introduced themselves.

Background-Recap of work to date

Cossitt briefly reviewed what a PDM plan is, incentives for developing such a plan, and roles of the steering committee, contractor, tribal council, public, etc. in developing the PDM plan. Summaries of the first meeting were distributed and Cossitt reviewed the hazards that were identified and prioritized at that meeting.

Risk Evaluation and Hazard Assessment

Cossitt distributed a draft summary of the risk evaluation and hazard assessment. Each of the hazards identified at the first meeting, as well as a few others, were included in the summary.

The group reviewed each hazard, identifying existing mitigation measures, issues, opportunities, needs, and potential future measures (and the notes from this discussion are attached to this meeting summary). For some hazards, no new items were identified to add to the risk evaluation and hazard assessment.

Develop Goal Statements and Preliminary List of Projects

Cossitt briefly reviewed the difference between goals, objectives, and action items or projects. Many action items/projects were identified in the hazard assessment discussion (see attached pages). Cossitt proposed to the group that she would organize these items and develop some draft goal statements for review by the PDM steering committee at the next meeting.

Wrap-Up

Cossitt thanked everyone for their participation and ideas.

The next meeting date is set for June 1, from 10 a.m. to noon. Location still needs to be determined. Ernestine Spang will work on finalizing a location for the upcoming meeting.

Purpose of the next meeting will be to finalize and prioritize goals and projects, and develop a work implementation process and schedule.

PDM STEERING COMMITTEE 04/18/06 DISCUSSION OF MITIGATION MEASURES/ISSUES FOR SPECIFIC HAZARDS

Drought

Existing Mitigation

- Piped in water to cattle “Tongue River Dam Project”—stored in 20,000 gallon tanks—this project is now completed—it was done in 2-3 areas along the tongue River divide
- Water conservation education
- Guidelines for water use (for public water in Lame Deer/Busby)—restrictions on lawn watering, for example
- There are existing monitoring stations along the rivers

Impacts

- Reductions in irrigation water from the Tongue Rive Dam
- Impacts to water wells in terms of quality and quantity issues (contact Letha Whitewolf at Tribal Health and/or Sonja Messer about impacts and IHS redrilling some wells)
- Mormon Crickets along Highway 212 in the past

Potential Other Mitigation

- Awareness Building
- Utilize the USDA Disaster Determination process (which could make some loan funds available)—talk to Kirk Denny, USDA Extension in Lame Deer
- More accurate weather reporting for the area
- Possible issues with water storage/provision—capacity for livestock; Lame Deer and Busby capacity (esp. a potential issue with power outage).
- Developing a grasshopper/mormon cricket program—bait program like Big Horn County has; or spray for insects

Flooding

Existing Mitigation

- Floodplain guidelines and building permit systems—Land Committee reviews new development
- Floodplains of all creeks on the reservation are mapped (talk to Clifford Foote)

Issues

- No NOAA weather radio reception in Lame Deer

Potential Other Mitigation

- Develop enhanced 911 system (which provides for emergency calls to be made to all phones to facilitate evacuations)—this enhanced 911 system requires a rural addressing program (which N. Cheyenne do not have now?)

Power Outages

Existing Mitigation

- Special populations are identified already
- Shelters are identified

Potential Other Mitigation

- Need back-up plans for power outages (back-up power sources, etc.)—(Reginald Kills Knight had a plan for “Y2K” –with generators, etc.)

Lightning Strikes

Existing Mitigation

- KIKC radio station out of Forsyth does announce severe weather warnings that cover the Northern Cheyenne Reservation. This is the only radio station that is received in the Lame Deer area

Potential Other Mitigation

- Participate in the program that provides lightning strike information. This is a private sector program which requires an annual fee, but the information would be useful for firefighters.

Wildfire

Existing Mitigation

- Wildfire mitigation plans for Lame Deer and Muddy Cluster
- BIA has plan for entire reservation (check with Ladina Big Man)
- There are public fire suppression water supplies with hydrants in Rabbit Town, Birney, Muddy Cluster, Busby, and Lame Deer. However, many of the hydrants are not working.

OPPORTUNITIES-GENERAL

- Using Cadre Consulting for EOC (Emergency Operations Center) Activation. Some funds are available. (talk to Ed Auker for more details)
- Red Cross Shelter operations—involve them in simulations –particularly as it relates to shelters/evacuation centers

NEEDS-GENERAL

- Tribe needs a DES Coordinator and a separate DES program—one that is on the same level as county DES where the DES Coordinator is not “under” other departments, but has clear and direct access to the government decision-makers (e.g., the Tribal President and Council)
- TERC needs to be active
- Gaps in emergency response
 - No EOC
 - Shelters don’t have back-up generators
 - Need training for ICS positions

Pre-Disaster Mitigation Plan

NORTHERN CHEYENNE

STEERING COMMITTEE MEETING

APRIL 18 10:00 am -

NAME	Organization	Address	Email	Phone
LONNIE R. FLATNESS	BIA	P.O. Box 40		(406) 477-6211
Leon Sioux	- Transportation	P.O. Box 40		(406) 477-6211
Ernestine Spang	TERC	Box 67 Lame Deer	emslamedeer@range.web.net	477-67
A. Clifford Foote		P.O. Box 327 N.C.T. 174 Lame Deer, MT 59043		477-69
Ed Auker	B.H.C. DES		eaucker@co.bighorn.mt.us	665-17
Charlie Hanson	MT DES	1537 Ave. D suite 320	desdrst5@	245-96
Merlin Stelix		Billings MT 59102	msn.com	
Merlin Sioux	NEFD		nefreddepartment@range.web.net	477-8161
John J. Grinsell	BIA-OLES	P.O. Box 40 Lame Deer MT		477-6288
Ginger Roll	Rosebud Co. Public Health	Box 388 Forsyth, MT		346-7417
Quentin Means	NEWS	Box 67 Lame Deer MT, 59043		477-6775

**CONTACTS: Ernestine Spang, Northern Cheyenne Ambulance Services, 477-6878
Anne Cossitt, Cossitt Consulting, 633-2213**

Steering Committee Identifies Gaps in Disaster Protection

At the second meeting of the Northern Cheyenne Pre-Disaster Mitigation planning effort, participants identified a number of different actions to reduce the effects of approximately of 20 different disasters that could strike the Northern Cheyenne Reservation. Types of disasters included winter storms, drought, floods, wildfire, and severe summer storms and high winds.

The group identified a number of ongoing and existing efforts, such as the Tribal Emergency Response Commission. The group also recognized ongoing efforts to reduce wildfire fuel build-up around Lame Deer and elsewhere on the reservation. Also mentioned were water conservation measures to address drought such as lawn and yard watering guidelines that have been enacted in Lame Deer during drought years.

But the group also acknowledged some serious gaps for emergency response. Although processes are established for disaster response, there is no identified place, or emergency operations center (EOC), from which to direct emergency response efforts. In a major disaster, an EOC is critical for coordinating efforts of law enforcement, emergency services, etc. Equally important, there is no single Disaster and Emergency Services program and no single point of contact to coordinate such a program for the Northern Cheyenne. Many other reservations and county governments have these programs in place throughout the nation. Federal funds are available to fund half the costs of such a position but must be matched by non-federal dollars.

Other among other issues the group discussed the widespread number of poorly functioning or non-functioning fire hydrants, lack of reception on the Northern Cheyenne reservation for national weather service broadcasts and warnings, and need for back-up power plans for power outages.

Participants at the meeting included representatives of Northern Cheyenne ambulance services, fire protection, law enforcement, public health, and transportation, as well as other representatives from BIA, Rosebud County Public Health, and Disaster and Emergency Services coordinators from the state of Montana and Big Horn County.

Pre-Disaster Mitigation Plans are being developed throughout the nation by states, counties, and Indian Reservations. In Montana, both the Fort Peck and Flathead Reservations have recently completed their plans. Completing the plan will make the Northern Cheyenne Reservation eligible for certain kinds of Federal Emergency Management Agency (FEMA) assistance to implement projects identified in the plan.

The public is invited to attend these meetings. The next meeting will be held June 1 from 10:00 a.m. to noon at _____ ERNESTINE, PLEASE FILL IN LOCATION HERE _____

Anyone with information to share about past or potential natural disasters or questions about the project is encouraged to contact Ernestine Spang, Northern Cheyenne Ambulance Services at 477-6878 or Anne Cossitt at cossitt@usadig.com.

XXXXXXXXXXXXXXXXXXXX

Northern Cheyenne PDM PLAN
Steering Committee/Public Meeting Agenda
June 1, 2006

Welcome/introductions

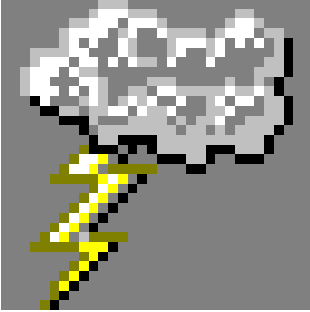
Quick Review

Purpose of PDM Plan
Where we are in the planning process
Today's tasks

Goals and Objectives

Background and Priority Approach
Got it Right?
Project Cost-Benefit, Prioritization, Scheduling

Wrap-up
Schedule for finalizing the plan
Where to find copies
How to comment
Thank you for your participation!



NORTHERN CHEYENNE PRE-DISASTER PLANNING MEETING

Steering Committee Members:

Please note the date of the
next meeting:

Thursday, June 1

10:00 a.m.

Location: _____

Purpose of this meeting is to
finalize and prioritize goals,
projects, and develop the
implementation process and
schedule.

**NORTHERN CHEYENNE PDM PLAN
Steering Committee/Public Meeting
June 1, 2006**

Welcome

Anne Cossitt welcomed participants and explained that this was the third and final planning meeting for the PDM plan for the Northern Cheyenne Reservation. Cossitt introduced herself and participants did the same.

Quick Review

Cossitt reviewed the purpose of PDM Plan and schedule for completion. Primary objective of this meeting is to review and finalize goals, objectives and projects, and also to prioritize the projects.

Goals, Objectives, and Project Prioritization

A preliminary draft of goals, objectives, and projects was handed out. The draft included columns for the “benefits,” estimated costs, rank (priority ranking) and potential resources that could be used to accomplish the project.

Participants used this handout as the template for discussion as they reviewed the goals, objectives, and projects.

Before starting on the goals, Cossitt reviewed the hazards that were rated the highest by participants at the first steering committee meeting. These were:

Hazard	Rank
Winter Storms	1
Wildland Fire	2
Hazardous Materials	3
Floods	4
Water Quality	5

Cossitt explained that she had referred to all the potential disasters brought up at previous meetings in the development of the draft goals and objectives. She asked the group to consider if any hazard had been left un-addressed by the draft goals.

Participants discussed the relationship between the priority hazards and the prioritization of goals and objectives before they began detailed discussion of goals and objectives. It was agreed that goal prioritization did not have to be a mirror image of the priority hazards. For example, it might be that goals and objectives for communication, which relates to all hazard types, might end up as a top priority among all goals and objectives, even though “Communication” was not identified on the top list of hazards above.

Cossitt reviewed the following criteria for comparison of cost-benefits among goals, objectives, and projects:

- Number of lives at risk
- Value of property at risk
- Infrastructure at risk
- Risk of business interruption or loss

The group went through all of the goals, objectives, and projects/strategies on the list, making changes where needed. Because of time constraints, benefits and costs were generally discussed but not always specifically for each goal. Cossitt suggested that she would work more on the cost-benefit detail and include as part of the draft that would be relea

At the beginning of the meeting, Cossitt had suggested the following criteria for prioritizing projects:

- Cost/benefit of the project
- Need (urgency)
- Feasibility/Difficulty
- Public acceptance (or not)

At the end of the meeting, also because of time constraints, Cossitt asked participants to identify the highest priority goals. This was done intuitively, relying on the participants' long-term experiences on the Reservation, knowing what the needs and constraints are. Participants quickly and clearly identified top priorities.

Cossitt also indicated that she would complete the schedule column on the draft goals based on the information from the meeting today. The schedule would reflect the priority of the project (higher priority projects would start sooner in the schedule) and difficulty or complexity of the project (the more complex or difficult, the longer it could take to accomplish the task). Participants concurred that approach made sense.

Wrap-up

Cossitt explained that a draft of the entire document would be available for a 30-day public review period once the complete document was compiled. The review period will begin later in the summer. Once the review period has ended, the plan will be finalized and submitted for approval by Tribal President. Following that it will go through state and federal review. Participants were thanked for their involvement in the planning process.

Attendance Sheet

Activity Northern Cheyenne PDM Plan Meeting
 Location Lame Deer Date(s) June 1
 Duration _____

Name & Title	Affiliation	E-Mail Address & Phone#	Agency Use Only		
			H	M	T
Name: <u>Ginger Roll, RN</u> Title: <u>PHEP Lead</u>	<u>Rosebud Co. Health Dept.</u>	<u>groll@mt.gov</u> <u>(406) 671-0438</u>			
Name: <u>Quentin Means</u> Title: <u>EMT - P Supervisor</u>	<u>NCAS</u>	<u>477-6795</u>			
Name: <u>Carrie Braine</u> Title: <u>NC utility general Manager</u>	<u>NCUC</u>	<u>ncuc@rangeweb.net</u> <u>(406) 477-6318</u>			
Name: <u>Mike Descoms</u> Title: <u>Fuels Specialist</u>	<u>NC Fire Dispatch BIA</u>	<u>477-8267</u>			
Name: <u>Merlin Sioux</u> Title: <u>NC FIRE DEPT</u>	<u>NC FIRE DEPT</u>	<u>ncfiredept@rangeweb.net</u>			
Name: <u>A. Clifford Foote</u> Title: _____	<u>NETHA</u>	<u>477 6419</u>			
Name: <u>Ernestine Spang</u> Title: <u>EMS / TERC</u>	<u>EMS/TERC</u>	<u>emslamedeert@rangeweb.net</u> <u>477-6878</u>			
Name: <u>Jason Whiteman Sr.</u> Title: <u>Water Resource Administrator</u>	<u>MT Natural Resources Department</u>	<u>nc.naturalresources@rangeweb.net</u> <u>477-6503</u>			
Name: <u>KENT ATWOOD</u> Title: <u>State Hazard Mitigation Office</u>	<u>STATE of MT</u>	<u>katwood@mt.gov</u> <u>(406) 841-3960</u>			
Name: _____					
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Rev. 4/23/03

APPENDIX B

Selected portion of the Big Horn County Community Wildfire Protection Plan: Goals, Objectives, Strategies

**(Northern Cheyenne Fire Departments cooperated in
development of the plan)**

**Excerpt from the
BIG HORN COUNTY COMMUNITY WILDFIRE PROTECTION PLAN**

The following includes the Goals and Objectives for the Big Horn County Community Wildfire Protection Plan. Because a portion of the Northern Cheyenne Reservation overlaps with a portion of Big Horn County, members of the Northern Cheyenne BIA wildland fire department, Northern Cheyenne Tribal Fire Department, and Northern Cheyenne Tribal Schools (Busby) Fire Department participated in the development of the following goals and objectives.

The Northern Cheyenne may wish to implement those actions relevant to the Northern Cheyenne Reservation. Participants in the Big Horn County CWPP planning process encouraged cooperation among jurisdictions on fire suppression-related activities. It was understood by Big Horn County that they do not have jurisdiction on lands under the jurisdiction of the Northern Cheyenne Tribe.

Strategic Plan/Desired Condition

There is one overarching desired condition for Big Horn County:

Reduce the number and extent of wildfires in the County.

The desired condition is an acknowledgement that Big Horn County has an inordinately high number of human-caused fires; and terrain, fuel build-up, wind, and weather conditions that can quickly cause fires to grow out of control and endanger lives and property.

Wildfire and/or other significant disturbances are necessary in overall long-term ecosystem health. Managing wildfire to achieve ecosystem health can be achieved where it does not endanger lives or property. The fire management plans for the Crow and Northern Cheyenne recognize the importance of fire disturbance.

Goals, Objectives, Projects/Actions

GOAL 1: Ensure an effective, coordinated response to wildland fire.

Objective 1.1. Continue to improve coordination and communication among the various fire response entities.

- 1.1.1 Involve all fire response teams (public, private—e.g., for coal mines, oil and gas, etc.) in stakeholder groups and planning for fire response.
- 1.1.2 Hold an annual workshop to review past fire season and prepare for upcoming season. Include representatives of tribes, state and federal lands, private companies (BNSF, coal-bed methane companies, coal companies, etc.), and private landowners. Identify measures to reduce fuel loads, ensure fire fighting capabilities to protect industry infrastructure in the wildland areas (coal, oil, and gas facilities), coordinate efforts, etc.

Objective 1.2. Increase the numbers of trained volunteers throughout the county.

- 1.2.1 Build recognition for firefighters. Hold an annual firefighter appreciation day. Celebrate one or more outstanding firefighters.
- 1.2.2 Submit articles to the media about the importance of firefighters, recognizing outstanding individuals, and information on how to participate and who to contact.
- 1.2.3 Develop an outreach program for high school students to become members of volunteer fire departments. (e.g., presentations, coordinate with schools for credit for volunteer hours/training, etc.)

Objective 1.3. Provide for adequate water for fire fighting purposes.

- 1.3.1 In communities with public water supplies, secure adequate water supplies for firefighting purposes and annually assess the capabilities of each system, identifying needed maintenance or other issues, and identifying who will be responsible for repairs, maintenance, and upgrades as necessary. Specific short term needs include:
 - Fort Smith
 - Immediate need: put fire hydrants at each end of the trailer park and ensure adequate flow
 - Ensure that all existing hydrants are in working condition
 - Lodge Grass
 - Ensure that all hydrants are in working condition
 - Build additional water storage (current tank insufficient)
 - Busby, Muddy Cluster, Rosebud, Eagle Feather, Wyola, Pryor, St. Xavier, and Crow Agency
 - Ensure that all hydrants are in working condition; upgrade existing hydrants as necessary, and add new hydrants (existing insufficient to serve needs)
 - Build additional water storage as necessary
- 1.3.2 Work with Fidelity and other coal-bed methane exploration and development companies to identify available water supply sources as they become developed through the extraction process. Coordinate adequate access into the facilities.
- 1.3.3 Equip underground water supplies (e.g., cisterns) in gas fields and other locations (such as fire suppression water supplies in new subdivisions) with standardized connections so that firefighters can withdraw water.

Objective 1.4 Improve access for firefighting equipment.

- 1.4.1 Provide information on the access requirements for firefighting equipment to homeowners throughout the county.
- 1.4.2 Encourage homeowners to work with the fire depts. and other homeowners to provide adequate access (e.g., methods to address security systems and/or poor roads that may impede access).
- 1.4.3 Identify and address problems with access on existing county roads (e.g., such as some county roads in the Pine Ridge area).

Objective 1.5 Ensure that equipment is adequate for fire suppression needs.

- 1.5.1 Annually review equipment and identify gaps and needs.

- 1.5.2 Continue to work to identify funding sources, such as grants, to acquire needed equipment.

Objective 1.6 Protect firefighters from loss of life and injury due to wildland fire.

- 1.6.1 Continue to provide training and extend training for staff and volunteers.
- 1.6.2 Continue to assure that there is adequate personal protective gear and communications upgrades as necessary.

Objective 1.7 Develop and maintain detailed resource information.

- 1.7.1 Develop a detailed map of critical infrastructure (e.g., power lines, roads, etc.), locations of fire fighting equipment and infrastructure, water sources, etc., and review and update annually.
- 1.7.2 Develop, review, and update annually a roster of contact information for fire fighting resources (both in-county and those available out-of-county), with names of contacts, lists of equipment, and other information useful for firefighting.
- 1.7.3 Identify a GIS technician and other technical assistance in the county (or work with other counties for such resources) to develop, coordinate and update GIS maps (such as the detailed map above) and the detailed roster information on a regular basis

GOAL 2: Protect the public from loss of life or injury from wildland fire.

Objective 2.1. Ensure that residents know how to respond to wildfire situations.

- 2.1.1 Provide information about personal safety in a wildfire situation and distribute via the media and presentations at schools, etc.
- 2.1.2 Make sure that steps to reporting a fire are clear to residents. Review the telephone books annually to ensure that information is correct.
- 2.1.3 Annually provide a workshop or training session for individuals who may find themselves as first responders to fire. Session would include safety training, etc.

Objective 2.2. Ensure efficient 911 dispatch.

- 2.2.1 Annually review existing 911 system and identify any issues, need for drills/exercises, or staff training.

Objective 2.3. Reduce post-fire impacts to public health and safety.

- 2.3.1 Provide public education about how to reduce post-fire impacts, such as potential impacts to water supply sources after a fire, potential for mudslides, increased for potential for noxious weeds, etc.
- 2.3.2 Public agencies to develop and follow post-fire procedures to reduce impacts.

Objective 2.4 Develop fire evacuation plans.

- 2.4.1 Identify “safe areas” and evacuation plans for each community in the county.

GOAL 3: Reduce fuel loads and create defensible space in high and moderate risk areas.

Objective 3.1 Continue and expand programs to create and maintain fire breaks.

- 3.1.1 Continue to mow and/or plow fire breaks around communities at risk. Crow and Northern Cheyenne have been doing this for many of the identified at-risk communities on the reservations. Identify any at-risk communities that do not have fire breaks, evaluate need, and implement as necessary.
- 3.1.2 Continue to mow along roads in the county and to do this early in the fire season.
- 3.1.3 Assess need and implement as necessary fire breaks around communication facilities, including radio repeater stations.

Objective 3.2 Reduce fuel loads and create defensible space in and around identified communities at risk.

- 3.2.1 Continue to implement the actions identified for Muddy Cluster in the Wildfire Hazard Assessment and Mitigation Plan (Northern Cheyenne Reservation).
- 3.2.2 Continue to implement actions identified in the Crow Fire Management Plan.
- 3.2.3 Complete the Hazard Assessment and Mitigation Plan for the Crow Reservation and implement recommendations.
- 3.2.4 Work with residents and landowners in the Pine Ridge and Sarpy-Tullock areas as individuals or in small groups to identify areas of fuel build-up (especially in areas with structures), options to address, and means to implement (including resources for assistance). Options can include thinning and pruning the understory, overstory treatment, prescribed fire, and other means to create defensible space.
- 3.2.5 For Lodge Grass--address fuel build-up and unmanaged fuels:
 - a) Remove vacant structures (including abandoned vehicles)
 - b) Clean up vacant lots; maintain and reduce weed growth.
 - c) Trim dead and dying limbs from trees and shrubs on a regular basis.
 - d) Maintain alleyways clear of debris and fuels.
 - e) Prohibit trash burning and fireworks in town.
 - f) Remove abandoned ignitable storage tanks (such as at old gas station).
- 3.2.6 For areas along the Big Horn River from Fort Smith to Treasure County (starting with those in the Fort Smith and St. Xavier areas):
 - a) Work with landowners to identify particular hazard areas, including areas with dead-end roads or other transportation issues (e.g., gated and locked entries) that make it difficult or impossible for fire responders to access their properties
 - b) Work with seasonal residents to identify best practice measures to protect their properties year-round.

- 3.2.7 For all other areas in the county: Work with local residents and landowners to identify areas of fuel build-up and means to address.
- 3.2.8 Work with Burlington Northern Santa Fe (BNSF) to participate in mowing or prescribed burns along the rail corridor to reduce fuel build-up.
- 3.2.9 Annually review the status of fuel build-up and identify fuel reduction program status for various agencies---state (DNRC), federal (BLM, National Park Service, Bureau of Reclamation), local (county and towns), and tribal (Crow, Northern Cheyenne, BIA).

GOAL 4: Raise public awareness geared to reduce the number of human-caused fires and improve wildland and structural defensibility.

Objective 4.1. Develop a public education campaign on wildfire awareness, need to create defensible space, and role of fire in the ecosystem.

- 4.1.1 Identify and fund a staff person to provide public education on fire preparedness (and preparedness for other disasters), and to provide the staffing for the numerous other education and outreach projects in this CWPP.
- 4.1.2 Develop programs geared to school-age children about fire safety and utilizing techniques to prevent experimentation with fire and arson.
- 4.1.3 Provide education on ways to make properties less susceptible to wildfire, understanding wildfire, and role of fire (and/or other disturbance) in long-term land health/productivity. Tailor programs/information for the general public as well as owners and managers of cropland, grazing land, harvestable timber, and recreation resources (such as fishing/hunting lodges, fishing/hunting guides, marinas, etc.) Mechanisms can include presentations for existing groups, e.g., Conservation District meetings, grazing associations or other groups, meetings in various communities, notices in mail, articles and inserts in the local papers, working with insurance companies, power companies and others to distribute information via bills and public announcements, etc.
- 4.1.4 Sponsor community Fire clean-up day and/or other special events in communities throughout the county. Work with schools, church groups, and others to participate.

GOAL 5: Ensure new developments are designed for adequate fire protection.

Objective 5.1. Review proposed subdivisions for fire safety.

- 1.1.1 Review and revise as necessary the subdivision regulations to address fire safety needs.
- 1.1.2 Review subdivision applications to make sure they meet fire safety requirements.
- 1.1.3 Develop a building code for fire safety purposes (using the NFPA codes as a starting point).

Objective 5.2. Provide education about wildfire issues to persons who are planning to build in areas not subject to subdivision review.

- 5.2.1 Update the “Way of the West” publication that was prepared by the county (or prepare another different publication) to inform new and existing residents about what to expect in rural Big Horn County. Include information on wildfire issues and response times.
- 5.2.2 Work with tribal governments and housing authorities in order that new housing and other developments are built in defensible areas.

GOAL 6: Reduce effects of wildfire on cultural and historic sites.

- 6.1 Work with owners and managers of recorded sites (including National Park Service battlefield sites, Rosebud Battlefield, Chief Plenty Coups State Park) to share fire suppression plans with local fire entities to familiarize responders with issues specific to the site.
- 6.2 Expand public awareness about the need to protect these sites.
- 6.3 Continue to work with landowners and other trustees of sites on an incident basis to identify sites and secure sites that are within reach of a fire.
- 6.4 Develop and incorporate policies and methods for dealing with historic and cultural sites into fire agency standard operating procedures. Consider using outside assistance as part of an annual workshop/training to develop these procedures.

APPENDIX C
RECORD OF REVIEW
EXHIBITS 4A AND 4B

From FEMA "How-to-Guide" - #8, Exhibits 4A and 4B

Exhibit 4A: Record of Review

Record of the review and incorporation of existing programs, policies, and technical documents for a single local jurisdiction.

(Name of Jurisdiction) Northern Cheyenne Indian Reservation

Existing Program/Policy/ Technical Documents	Does the jurisdiction have this program/ policy/ technical document? (Yes/No)	Reviewed by Plan Authors? (Yes/No)	Method of incorporation into the hazard mitigation plan
PLANS			
Comprehensive Plan	no	NA	1
Capital Improvements Plan	no	NA	1
Redevelopment Plan	no	NA	1
Area Plan	no	NA	1
Watershed Management Plan	no	NA	1
Post Disaster Recovery Plan	no	NA	1
Comprehensive Emergency Management Plan	yes ²	yes	1
Regional Development Plan	no	NA	1
Special Function Plans	no	NA	1
<ul style="list-style-type: none"> • Downtown redevelopment 	no	NA	1
<ul style="list-style-type: none"> • Airport 	no	NA	1
<ul style="list-style-type: none"> • Land buyout program 	no	NA	1
<ul style="list-style-type: none"> • Long-range recreation facilities plan 	no	NA	1
<ul style="list-style-type: none"> • School siting plan 	no	NA	1
<ul style="list-style-type: none"> • Open space plan 	no	NA	1
<ul style="list-style-type: none"> • Transportation improvement-retrofit programs 	no	NA	1
<ul style="list-style-type: none"> • Water and sewer construction/retrofit programs 	no	NA	1

Existing Program/Policy/ Technical Documents	Does the jurisdiction have this program/ policy/ technical document? (Yes/No)	Reviewed by Plan Authors? (Yes/No)	Method of incorporation into the hazard mitigation plan
CODES, ORDINANCES, REGULATIONS AND GUIDELINES			In Chapter 1, pages 1-8 through 1-10 ³
Building codes	no	NA	3
Land development codes	no	NA	3
Zoning Ordinance	no	NA	3
Historic Preservation Ordinance	no	NA	3
Floodplain Ordinance	no	NA	3
Tree Protection Ordinance	no	NA	3
Landscape Ordinance	no	NA	3
Subdivision Regulations	no	NA	3
Development guidelines	no	NA	3
PROGRAMS			
Beach conservation and restoration program	no	NA	NA
Local and/or regional emergency evacuation program ⁴	no	NA	1
Historic preservation district program	no	NA	1

¹ Although the jurisdiction does not have many current policies, plans, etc. there is a possibility that could change in the future. The PDM plan states that projects in the CWPP/PDM Plan can be incorporated as appropriate into existing plans, annual budgets, and any relevant future plans that may be developed or updated for the Northern Cheyenne (page 5-2).

² As part of the Northern Cheyenne's Emergency Operations Plan. There is no plan specifically called Comprehensive Emergency Management Plan.

³ Plan Author conferred with Tribal Housing Authority regarding land use codes, ordinances, and regulations. The information is included in Chapter 1, pages 1-8 through 1-10.

⁴ Evacuations are addressed in the emergency operations plan. There is no separate "program."

Exhibit 4B: Record of Review (Summary)

Record of the review of existing programs, policies, and technical documents for all participating jurisdictions

Existing Program/Policy Technical Document	Northern Cheyenne Reservation
Comprehensive Plan	NA
Capital Improvements Plan	NA
Redevelopment Plan	NA
Area Plan	NA
Watershed Management Plan	NA
Post Disaster Recovery Plan	NA
Comprehensive Emergency Management Plan	√
Regional Development Plan	NA
Special Function Plans	
• Downtown redevelopment	NA
• Airport	NA
• Land buyout program	NA
• Long-range recreation facilities plan	NA
• School siting plan	NA
• Open space plan	NA
• Transportation improvement-retrofit programs	NA
• Water and sewer construction/retrofit programs	NA
CODES, ORDINANCES, REGULATIONS AND GUIDELINES	
Building codes	NA
Land development codes	NA
Zoning Ordinance	NA
Historic Preservation Ordinance	NA
Floodplain Ordinance	√
Tree Protection Ordinance	NA
Landscape Ordinance	NA
Subdivision Regulations	√
Development guidelines	NA
PROGRAMS	
Beach conservation and restoration program	NA
Local and/or regional emergency evacuation program ⁴	NA
Historic preservation district program	NA

NA = the jurisdiction does not have this program/policy/technical document

0 = the jurisdiction has the program/policy/technical document, but did not review/incorporate into the multi-hazard mitigation plan

√ = the jurisdiction reviewed the program/policy/technical document