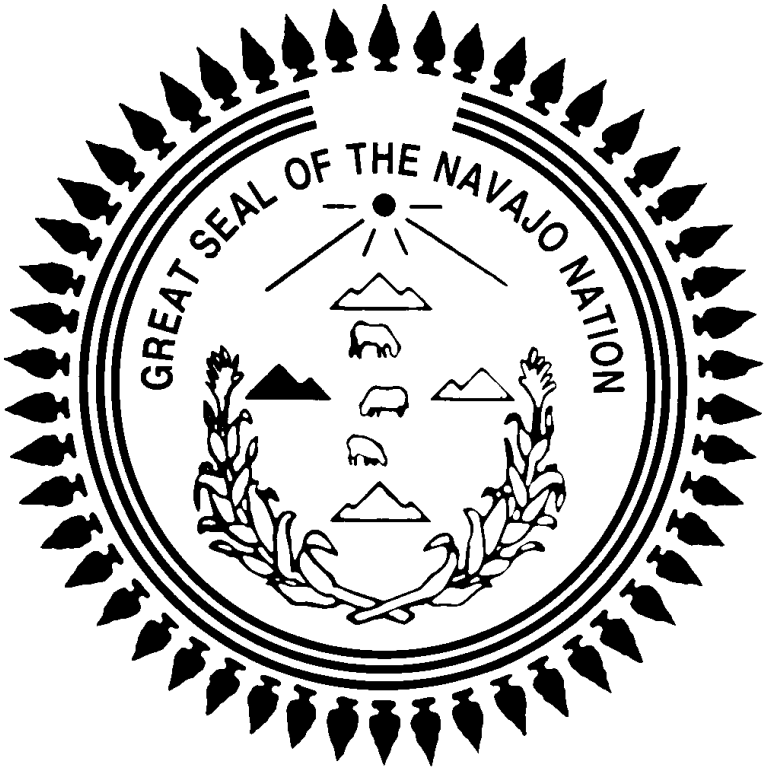
NAVAJO NATION
DROUGHT CONTINGENCY PLAN
2003



PREPARED BY:

NAVAJO NATION
DEPARTMENT OF WATER RESOURCES

IN COOPERATION WITH:
U.S. Bureau of Reclamation
U.S. Bureau of Indian Affairs
Navajo Nation Department of Emergency Management

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LIST OF ABBREVIATIONS

ADWR	Arizona Department of Water Resources
BIA	Bureau of Indian Affairs
CPC	Climate Prediction Center
DNR	Navajo Division of Natural Resources
EPA	U.S. Environmental Protection Agency
EMC	Emergency Management Commission
EQUIP	Environmental Quality Intensive Program
FSA	USDA Farm Service Agency
IGR	Intergovernmental Relations Committee
IHS	U.S. Indian Health Service
NEPA	Navajo Environmental Protection Agency
NDEM	Navajo Department of Emergency Management
NFD	Navajo Forestry Department
NDMC	National Drought Mitigation Center
NNDA	Navajo Nation Department of Agriculture
NDFW	Navajo Department of Fish & Wildlife
NDPR	Navajo Department of Parks and Recreation
NNSPI	Navajo Nation SPI
NDWR	Navajo Department of Water Resources
NIIP	Navajo Indian Irrigation Project
NOAA	National Oceanic and Atmospheric Administration
NRCS	USDA Natural Resources Conservation Service
NTUA	Navajo Tribal Utility Authority
PDSI	Palmer Drought Severity Index
SAS	Navajo Nation Council Signature Authority Sheet
SPI	Standardized Precipitation Index
SWE	Snow Water Equivalent
TCOB	Technical Construction and Operation Branch
USDA	U.S. Department of Agriculture
WMB	Navajo Water Management Branch
WRCC	Western Regional Climate Center

1 INTRODUCTION

Due to the arid climate, drought has always been a major concern to the Navajo people. Navajo Nation residents, ranchers, farmers, and businessmen are subjected to frequent water shortages. Since 1988 the Navajo Nation Department of Emergency Management (NDEM) has coordinated the Navajo Nation's response to drought. The most recent extreme Reservation-wide drought faced by the Navajo Nation was in 1996. As a result of that event, the NDEM drafted the *Drought Comprehensive Action Plan* (NDEM, 1996). That action plan is the template for the Navajo Nation's drought contingency plan.

To improve the understanding of future drought impacts, in 1996 the Navajo Nation Department of Water Resources (NDWR) and U.S. Bureau of Reclamation (Reclamation) completed the *Drought Contingency Planning Study Phase I Plan* (Phase I Study, NDWR, 1996). That report compiled much of the information which was later incorporated into the *Water Resources Development Strategy for the Navajo Nation (NDWR, 2000).* One of the recommendations from the *Phase I Study* was that, although the Navajo Nation had drafted several components for a drought plan, it still needed a more comprehensive and effective contingency plan. That recommendation has resulted in the *Navajo Nation Drought Report 2002* (Drought Report). The *Phase I Study* and the Drought Report were used to prepare this *Navajo Nation Response Contingency Plan 2002* (Contingency Plan).

This Drought Contingency Plan is a collaboration between Reclamation, the U.S. Bureau of Indian Affairs (BIA), the Navajo Division of Natural Resources (DNR), and the NDEM. To develop this plan the NDWR met with: 1) NDEM, 2) DNR Departments, 3) Division of Economic Development's Community Development Block Grant Program and Local Governance Support Center, 4) Navajo Tribal Utility Authority, and 5) Navajo Environmental Protection Administration.

The term "drought" is often inaccurately used to characterize all water shortage situations. Drought is commonly defined as a persistent and extended period of below normal precipitation causing abnormal moisture deficiency having adverse effects on people, animals and crops (Hawaii, 2000). The Navajo Nation is an arid region, where periods of little or no rainfall frequently occur and do not necessarily constitute a drought. The Navajo Nation response needs to distinguish between chronic water shortage and drought.

Droughts are a result of a number of interacting factors. The impacts of a drought vary depending on the water use sector. Droughts can be defined by meteorological, agricultural, hydrologic or socioeconomic variables. Any one of these variables can be quantified using different indices. Furthermore, the beginning and end of drought events are not distinct. The Contingency Plan is based on the six-month Standard Precipitation Index (SPI).

Mitigation and protection are more cost effective than response and recovery. One objective of drought mitigation is to reduce the expense of responding to drought emergencies. Emergency drought response is difficult to sustain over a long period of time. The Contingency Plan combines long term and short term mitigation strategies, and it will assist all of the Navajo stakeholders to be proactive before a drought begins.

This Contingency Plan provides guidance to the Chapters and the federal agencies to take appropriate action to minimize drought impacts. It will be updated annually. The Appendices A through provide an example of the monthly drought status report, draft correspondence, and contact information. The Navajo Nation's drought response is evolving, and will continue to incorporate input from tribal departments, federal agencies, Navajo Chapters, and individual water users on the Navajo Nation.

During severe droughts the Navajo Nation Council receives dozens of Chapter resolutions requesting assistance. Due to the lengthy and complicated tribal process, impacted Chapters wait for many months for Tribal funds to become available. And, they often miss the opportunity to benefit from federal drought relief programs. This Contingency Plan provides the Navajo Nation with a simpler, more streamlined tool to determine in a timely manner which Chapters should receive assistance.

1.1 GOALS AND OBJECTIVES

This Contingency Plan has several broad goals. On one level the Contingency Plan is a "how to" handbook for individuals and Chapters to address drought. It contains useful information for connecting specific categories of water users with specific resources. It describes which programs should be contacted and when. And, it describes the types of information needed to assist various sectors of water use. This plan encourages the Chapters to plan prior to, and respond during, droughts. For instance, Chapters may need assistance to get water hauled to stricken areas, or to help individuals qualify for supplemental feed programs. On another level this Contingency Plan is intended to help tribal and federal programs respond effectively. Using the NDMC methodology as a guide, the broad objectives of the *Navajo Nation Drought Contingency Plan 2002* are to:

- Provide an effective and systematic means of assessing drought conditions
- Develop mitigation actions and programs to reduce risk in advance of drought
- Develop response options that minimize hardships during drought

Specific objectives of the drought plan are to:

- Collect, analyze and disseminate drought related information in a timely manner

- Establish criteria for declaring drought and triggering mitigation and response activities
- Describe the organization structure and the responsibilities of programs with respect to drought
- Prepare and inventory of state and federal programs and provide action recommendations
- Identify drought prone areas and vulnerable sectors
- Identify mitigation actions
- Provide a mechanism to ensure a timely and accurate assessment of drought impacts

2 BACKGROUND

The Navajo Reservation was established in 1868, and has been expanded through a series of executive orders to become the largest Indian reservation in the United States. The on-reservation population is more than 183,000 (U.S. Census Bureau, 2001). Larger than the State of West Virginia, the Navajo Nation encompasses more than 27,000 square miles including portions of the States of Arizona, New Mexico, and Utah (See Figures 2.1, 2.2 and 2.3). The objective of this section is to provide the leadership structure of the Navajo Nation Government, the Tribal Codes in response to drought, and description of the climate

The Navajo Nation per capita income is less than half of the U.S. average, and a majority of its people live below the poverty level. Between 25 and 40 percent of the population does not have direct access to public drinking water systems, and must haul domestic water to their homes. For instance, many residents in the Navajo Mountain area need to travel forty miles each way to the Shonto Chapter to get water. It has been estimated that the typical cost of hauling water to Navajo households is $47 per 1000 gallons (Merchant, 2001). These domestic water haulers pay twenty times more for water than the water users in the surrounding non-Navajo communities. During drought the cost of hauling water can double. And, some residents resort to water from nearby non-potable sources. Even for residents with access to public drinking water systems, the per capita water use is far less than the per capita water use rates of the surrounding communities.

Under normal conditions livestock are a $20 million per year industry and traditional agriculture is worth $2 million (Eckert, 1986). However, during the 1996 drought these sectors essentially disappeared. Along with the cultural significance, livestock are one of the few economic ventures that the average Navajo can engage in on the Reservation. These Navajo residents cannot afford a drought. During severe drought they need to be offered relief.

Based on current trends cited in *1997 Chapter Images*, by 2012 more than half of the Navajo people will be living off of the Reservation (Division of Community Development, 1996). To reduce out-migration, the Navajo Nation needs to create a sustainable economy and infrastructure. However, a significant portion of the water users are susceptible to drought. On the Navajo Reservation drought impacts are more significant than just a few brown patches in lush bluegrass lawns.

The lack of water infrastructure, lack of economic development, and sustained poverty on the Navajo Nation are connected. The low per capita water use is part of a larger pattern reflecting a lower economic standard of living compared to the non-Indian communities in the region. The fact that the mean income of Navajo families is below the poverty line can be attributed, in large part, to the lack of water infrastructure within the Reservation. Drought response on the Navajo Nation is not a luxury, drought costs local residents their livelihoods.

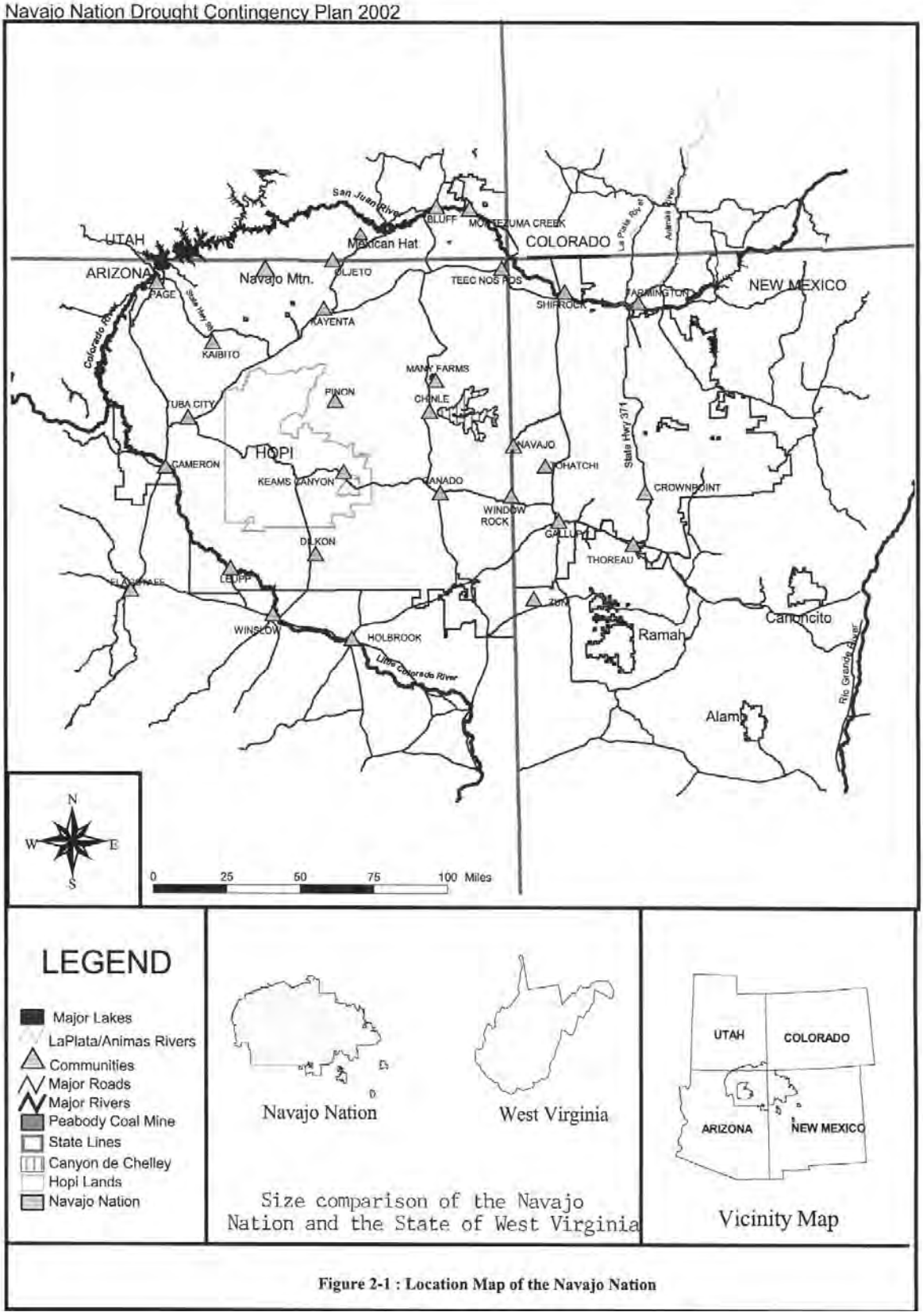

Figure 2-1 : Location Map of the Navajo Nation

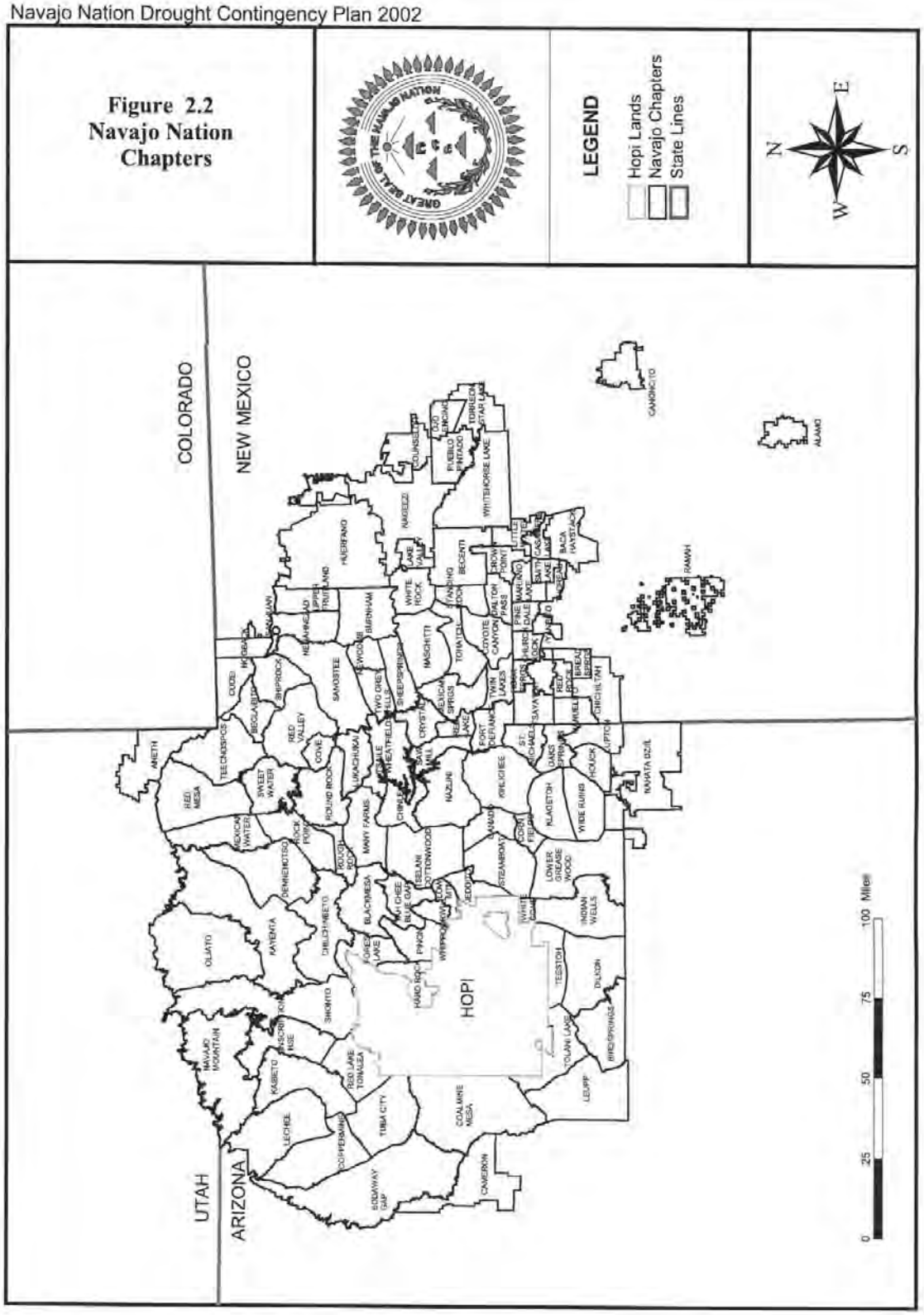
Figure 2.2
Navajo Nation
Chapters
LEGEND
Hopi Lands
Navajo Chapters
State Lines
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COLORADO
NEW MEXICO
UTAH
ARIZONA
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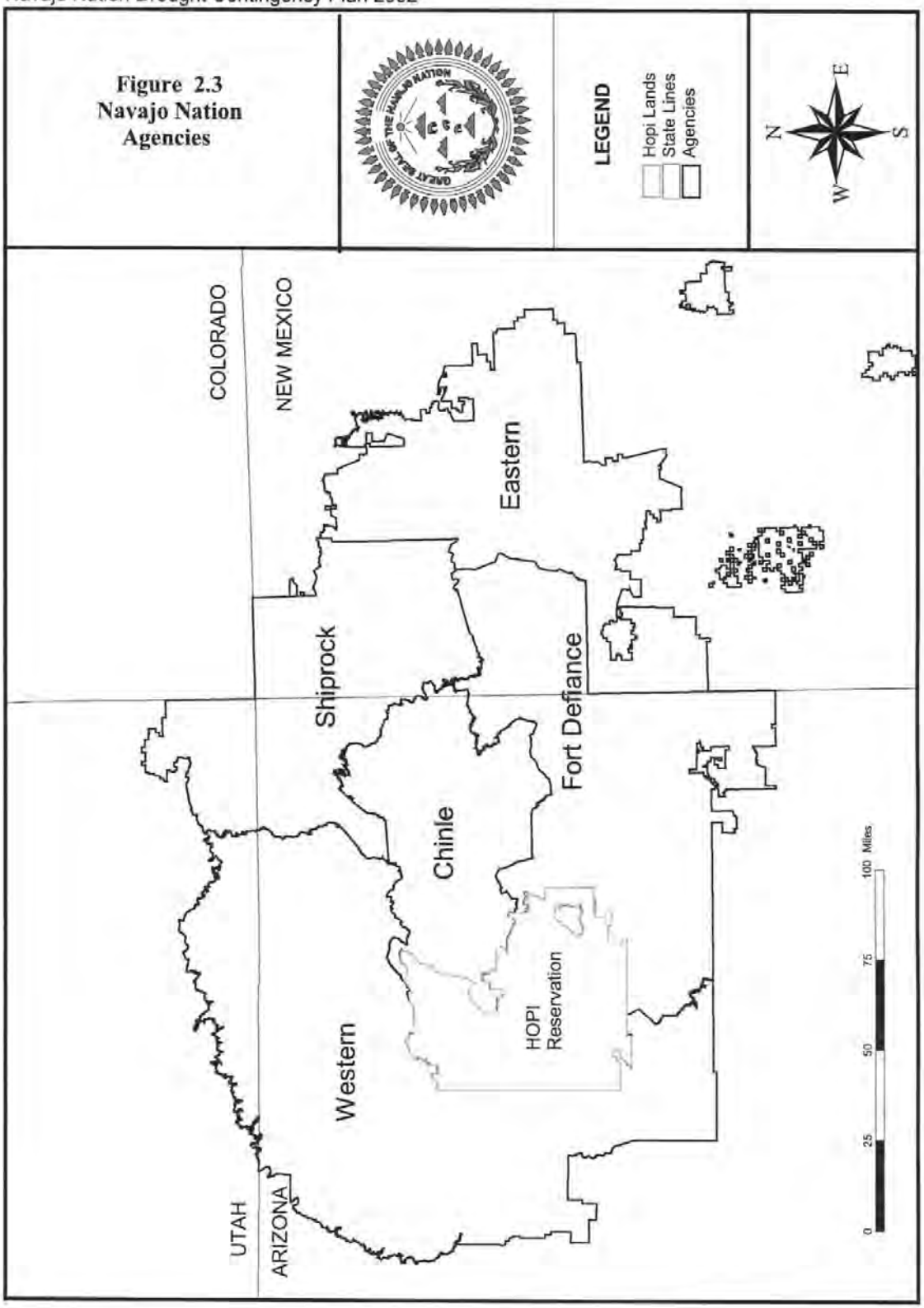


Figure 2.3
Navajo Nation
Agencies
LEGEND
Hopi Lands
State Lines
Agencies
N
E
S
W
COLORADO
NEW MEXICO
UTAH
ARIZONA
Eastern
Shiprock
Fort Defiance
Chinle
Western
HOPI
Reservation
0
25
50
75
100 Miles

Even under normal conditions, the Navajo Nation is confronted with frequent dry seasons. Water sources must be readily accessible and maintained throughout the year. The Navajo Nation needs to insure that windmills, stock ponds, earthen dams, canals, and public drinking water systems are operable. However, during a drought it is especially critical that water systems that still have water operate efficiently to serve increased water demands.

2.1 THE NAVAJO NATION GOVERNMENT STRUCTURE

The Navajo Nation operates under a three-branch governmental structure including the Legislative, Executive, and Judicial Branches. The Legislative Branch is composed of the 88-member Navajo Nation Council which was established in 1938. The Council represents 110 Chapters of the Navajo Nation. The Chapters are the smallest unit of local Navajo Government and they are shown in Figure 2.1. The Legislative Branch has 12 standing committees, including the Resources Committee which provides oversight to the Natural Resources Division and the Public Safety Committee which provides oversight to the Public Safety Division.

The Executive Branch operates under the direction of an elected president and vice-president. Within the Executive Branch, the Divisions of Public Safety and Natural Resources have key roles in drought response. The executive directors of these divisions are appointed by the President of the Navajo Nation. The Divisions are shown in Figures 2.4 and 2.5.

Since 1988 the primary responsibility for coordinating the Navajo Nation's drought response has been with the Division of Public Safety's Department of Emergency Management (NDEM). This department coordinates emergency response with the Navajo Nation divisions, departments, local communities, and with federal, state, and county organizations. The NDEM develops and implements emergency procedures, and supervises emergency management services during declared emergencies including droughts.

In 1990 the Navajo Nation Council established the Navajo Nation Emergency Management Commission (EMC). With the concurrence of the President of the Navajo Nation, the EMC is authorized to declare a state of emergency affecting the Navajo Nation (2 N.N.C. Section 884 (b)(1)). The EMC works in conjunction with the NDEM. The EMC is composed of six commissioners with expertise in civil defense, health, fire fighting, environment, and media, and an elected official. They are appointed by the Speaker of the Navajo Nation Council and confirmed by the Intergovernmental Relations (IGR) Committee. The EMC also has authority to seek and coordinate assistance. The Commissioners are on call for the purpose of obtaining timely action on emergency matters.

Figure 2.4 Organization Chart of the Navajo Nation

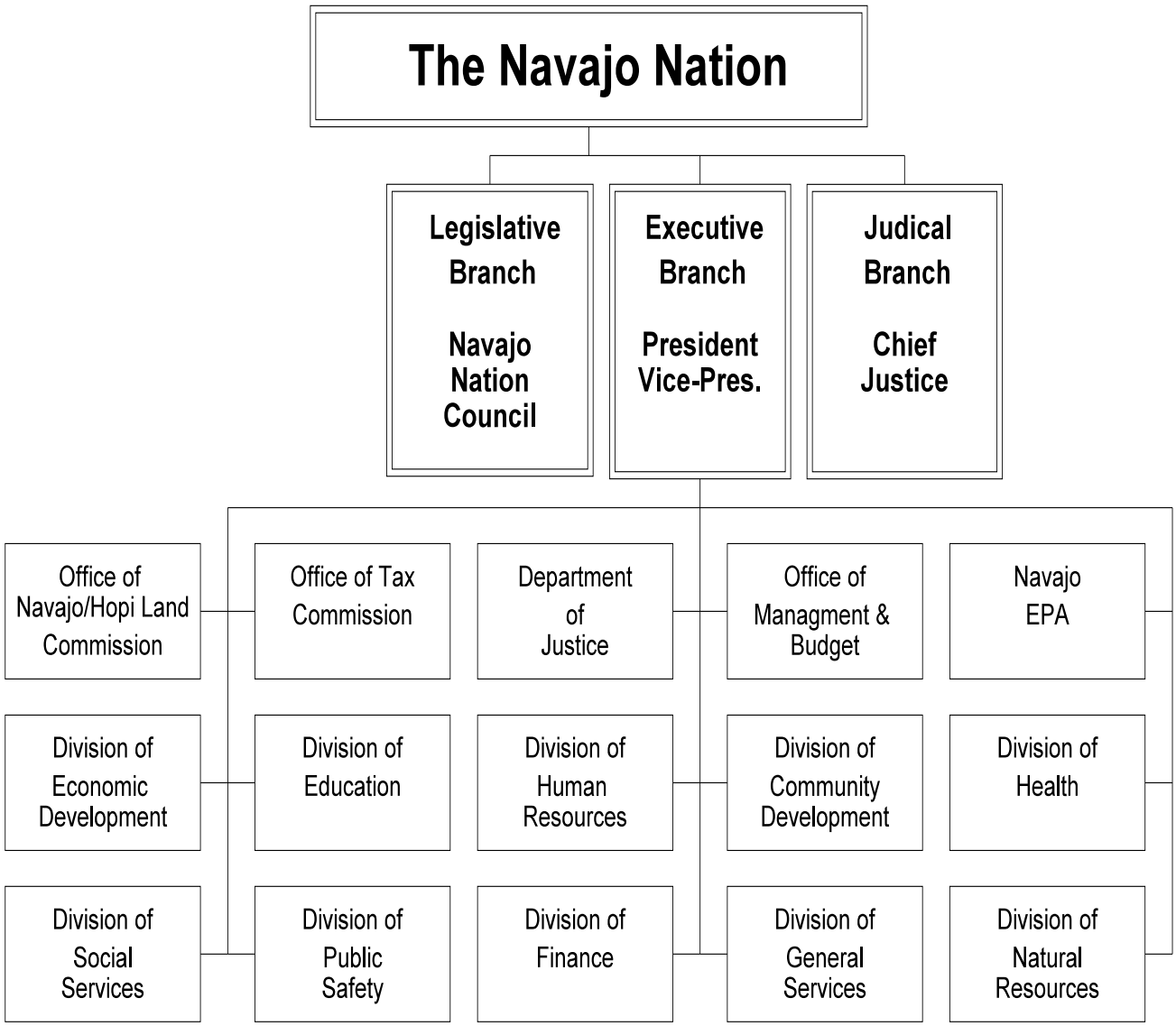
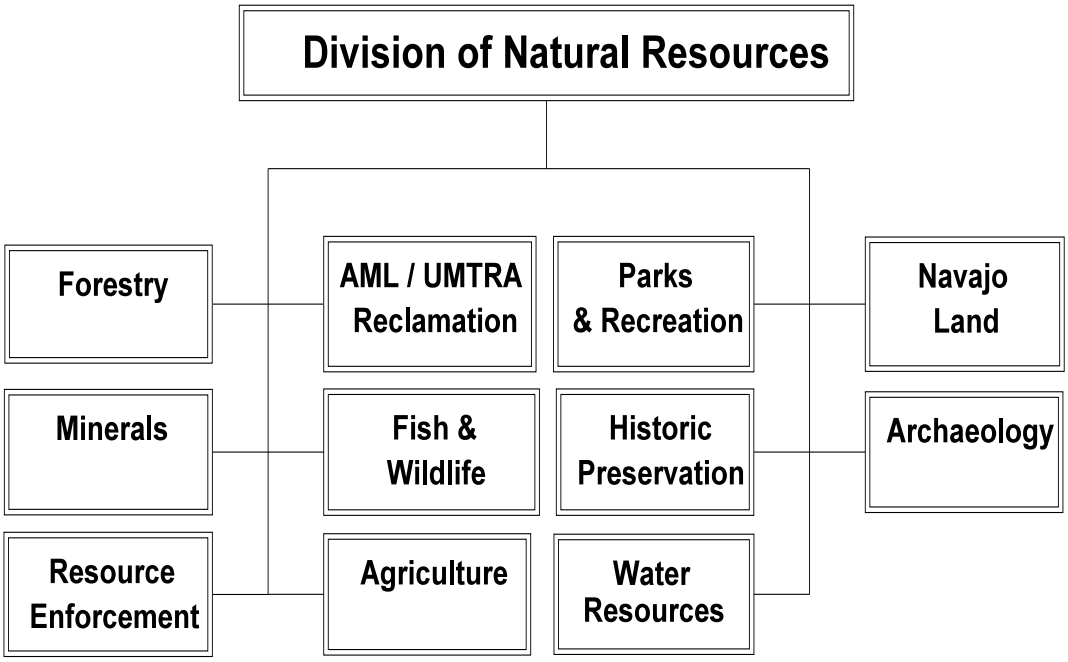


Figure 2.5 Organizational Chart of the Navajo Division of Natural Resources



The largest purveyor of drinking water on the Navajo Nation is the Navajo Tribal Utility Authority (NTUA). NTUA is an enterprise of the Navajo Nation. The mission of NTUA is to provide its customers with electricity, natural gas, water, wastewater treatment, and related services. NTUA was created in 1966 and is under the direction of a management board which operates as a tribal enterprise under the oversight of the Navajo Nation's Economic Development Committee. NTUA has five district offices. NTUA operates and maintains 93 public water systems including 1,300 miles of water lines, 24,000 water connections, and 12,000 wastewater connections, delivering more than 12,000 acre-feet of residential water and 3,300 acre-feet of commercial water annually to approximately 200 commercial users. NTUA serves approximately 55 percent of the on-Reservation population. The main concepts in NTUA's *Draft Drought Contingency Plan* (NTUA, 2001) have been incorporated into this Contingency Plan.

The Navajo Nation Department of Water Resources (NDWR) is the primary department within the Navajo Nation Division of Natural Resources responsible for water resources. These organizational charts are shown in Figures 2.5 and 2.6. The NDWR operates under the direction of the department director and is composed of:

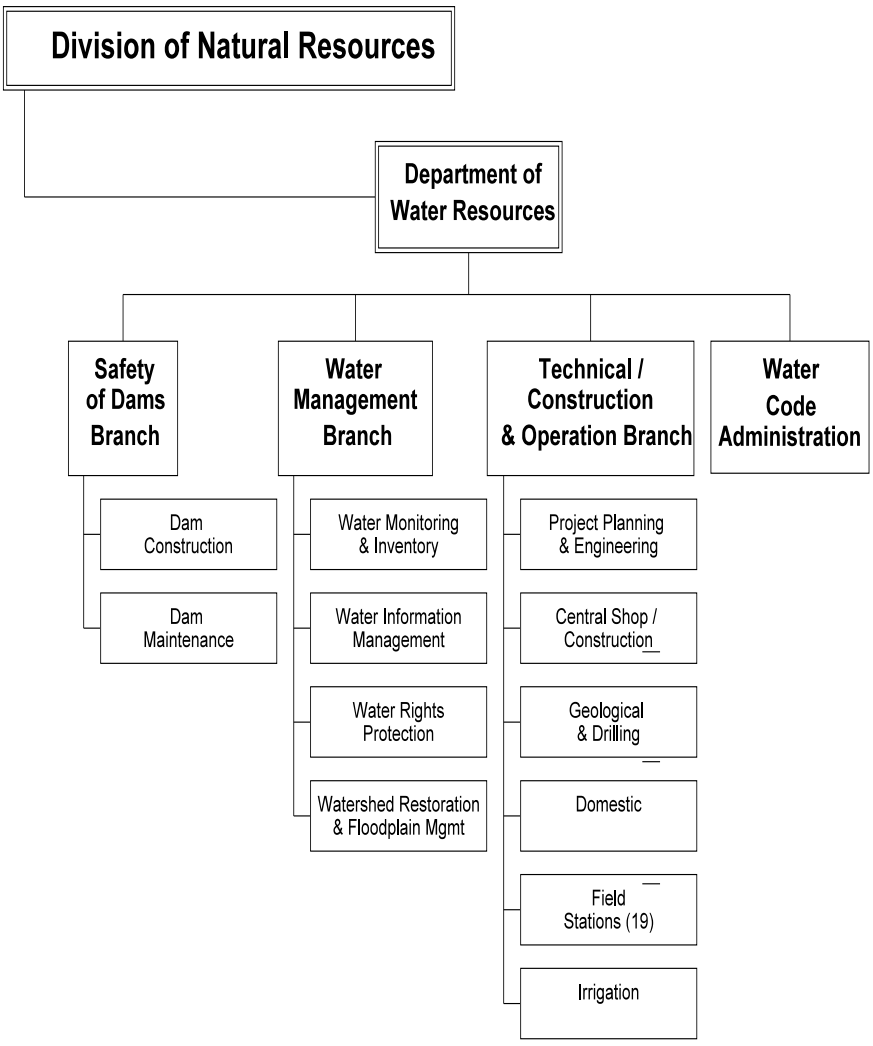
- Dam Safety Branch

  The Dam Safety Branch is responsible for overseeing construction repairs on unsafe dams, providing general maintenance and monitoring of existing dams, surveying and land withdrawal, and developing safety plans, emergency action plans, and early warning systems.

- Technical Construction and Operation Branch

  The Technical Construction and Operation Branch is responsible for operating 27 public water systems, eight irrigation projects, and more than 800 windmills. This Branch is also responsible for planning, designing, constructing, and rehabilitating water facilities for livestock, domestic, and irrigation including wells, pipelines, dams, erosion control structures, irrigation systems, diversions, water storage tanks, and stock ponds. This Branch provides well drilling and construction support for the NDWR facilities. This Branch maintains construction equipment to support construction, mechanical repair, and transportation services for the NDWR.

Figure 2.6 Navajo Department of Water Resources Organization Chart



- Water Code Administration

  The Navajo Nation Water Code was adopted by the Navajo Nation Council in 1984. Through water use permitting, the NDWR Water Code Administration quantifies and accounts for the beneficial consumption of water within the Navajo Nation. Permitting ensures that water is available for newly permitted water uses and that new water users do not conflict with existing and traditional water users. Through water well permitting the NDWR collects and analyzes data on the groundwater aquifers of the Navajo Nation. This information and its analysis are essential for monitoring the short term and long term aquifer trends. The NDWR also facilitates future groundwater development by providing hydro geologic information. The Water Code Administration is responsible for administering a water use fee structure that balances the need for protecting and managing the water resources with the needs of a robust business environment.

- Water Management Branch

  The Water Management Branch (WMB) is responsible for monitoring the Navajo Nation's water resources, protecting its water rights, restoring its watersheds, and managing its water resources. The WMB maintains water resource databases and provides hydrologic information needed to serve the interests of the Navajo people. The WMB maintains networks of monitoring wells, stream gages, weather stations, and snow survey courses.

2.2 NAVAJO NATION CODES

The Navajo Nation has always been concerned with drought. Since the 1960's, and since the extreme drought in 1996, the Navajo Nation's response has been greatly enhanced. The objective of this section is to present the Navajo Nation Tribal Codes that address drought response.

The NDWR identified several parts of the Navajo Nation Tribal Code that pertain to drought and drought response. Since the early 1960's, the Navajo Nation Tribal Code has described the Nation's authority to act during a drought (Title 22, N.T.C. §121, 1977 Book 4, pp 151-153). In the Tribal Code the justification for drought response is "the lack of rainfall and snowfall." The specific quantified criteria for response, however, has been left to the discretion of the oversight committees, tribal programs, and President of the Navajo Nation. The Tribal Code provides for:

- Emergency Water Transportation Assistance Program - The Water Operation and Maintenance Department is authorized to haul water to stricken areas.

- Distribution to Drought-Distressed Areas - Chapters in drought stricken areas may apply for relief. After approval by the Division of Natural Resources, assistance may

include trucks to haul water and feed, the development of water sources, and equipment and labor costs. The Tribal Code also permits Tribal General Funds to be used for replacing windmills with other types of pumps which are to be operated by users at their own expense. It also permits assistance for "special water equipment."

The Navajo Nation Grazing Code was adopted in 1966 (Title 3, N.C.C., Chapter 5, §710-950). The purposes of this code is to: 1) preserve the forage, land and water, and restore those resources in places where they have deteriorated, and 2) encourage sound management of grazing lands through grazing regulations. Sound management includes drought response.

The Navajo Nation Water Code was adopted in 1984 (Title 22, N.C.C., Chapter 7, § 1101-2405). The Water Code includes basic water policy guidelines. When insufficient water is available, the Water Code presents the following priority of uses:

- Domestic and Municipal
- Stock water
- Agricultural
- In-stream needs
- Economic development uses including Industry and Power Generation
- Other uses

The Water Code includes guidelines for making the most effective use of the water resources that are available. Among the actions described are:

- Maintaining water levels or diversion and withdrawal systems
- Increasing efficiency of conveyance system
- Minimizing interference between competing users of water
- Planning long term water development

The Navajo Nation Emergency Management Commission (EMC) was established in 1990 (2 N.N.C. § 881-887). The EMC, in conjunction with the NDEM, coordinates emergency and disaster relief services by the Navajo Nation and non-tribal entities. It is authorized to seek and coordinate drought assistance. It is similar to state emergency response commissions. With the concurrence of the Navajo Nation President, the Commission is authorized to declare a state of emergency affecting the Navajo Nation.

The Navajo Nation Conservation Wildlife Code (Title 23, N.C.C., Chapter 9, §902 (B)) provides authority for the Forest Manager to develop, recommend and enforce forest regulations. This authority allows the Forest Manager, with the concurrence of the President of the Navajo Nation, to close or restrict the use of the forests when weather, lack of precipitation, or environmental conditions create extreme fire hazards.

2.3 OVERVIEW OF THE CLIMATE

The climate of the Navajo Nation is semi-arid. Periods of little or no rain, which would be considered droughts in most other regions of the United States, are normal on the Navajo Nation. The Navajo people have survived and made their livelihood in this climate for hundreds of years. But, when drought occurs and precipitation falls below the already low averages, the impacts are significant.

Rainfall in the region is seasonal with a summer peak during the month of August, and a much smaller peak in the late winter. April, May and June are the driest months. According to National Weather Service data, the average annual precipitation in Tuba City on the west, Mexican Hat on the north, Shiprock on the northeast, and Winslow on the south is approximately 7 inches. In Ganado and Window Rock the average annual precipitation is approximately 11 inches. In the Chuska Mountains the average precipitation exceeds 16 inches. The Western Regional Climate Center (WRCC) monthly climate statistics for selected climate stations are shown in Table 2.1 and isohytal maps showing the spatial distribution of average annual precipitation in the Four Corners Region and the Navajo Nation are shown in Figures 2.6 and 2.7.

The seasonal and spatial distribution of the rainfall is a function of latitude, elevation, and location with respect to atmospheric circulation and surrounding orographic barriers (Mathien, 1985). For instance, winter precipitation is significantly greater in the northern part of the Reservation (southeastern Utah and southwestern Colorado) than in the southern part of the Reservation (northwestern New Mexico and northeastern Arizona). Precipitation is greater on the Defiance Plateau and the Chuska Mountains, which are at a higher elevation than the rest of the Reservation. The Chuska Mountains create a rain shadow in the eastern part of the Navajo Nation. And, the San Francisco Peaks create a rain shadow that results in Flagstaff receiving 21 inches of annual precipitation while Window Rock, which is at a similar elevation, only receives half that amount. These features result in the Western Agency of the Reservation having relative greater deviations in annual precipitation. With greater deviations comes increased frequency of drought conditions.

The Navajo Nation's precipitation is derived from three components: 1) winter precipitation from the north Pacific, 2) winter precipitation from the tropical Pacific, and 3) summer monsoons primarily from the Gulf of Mexico. Due to its huge expanse and location in the Four Corners Region, the dominant sources of precipitation in the southeast portion of the Navajo Nation are different than those that effect the northwest.

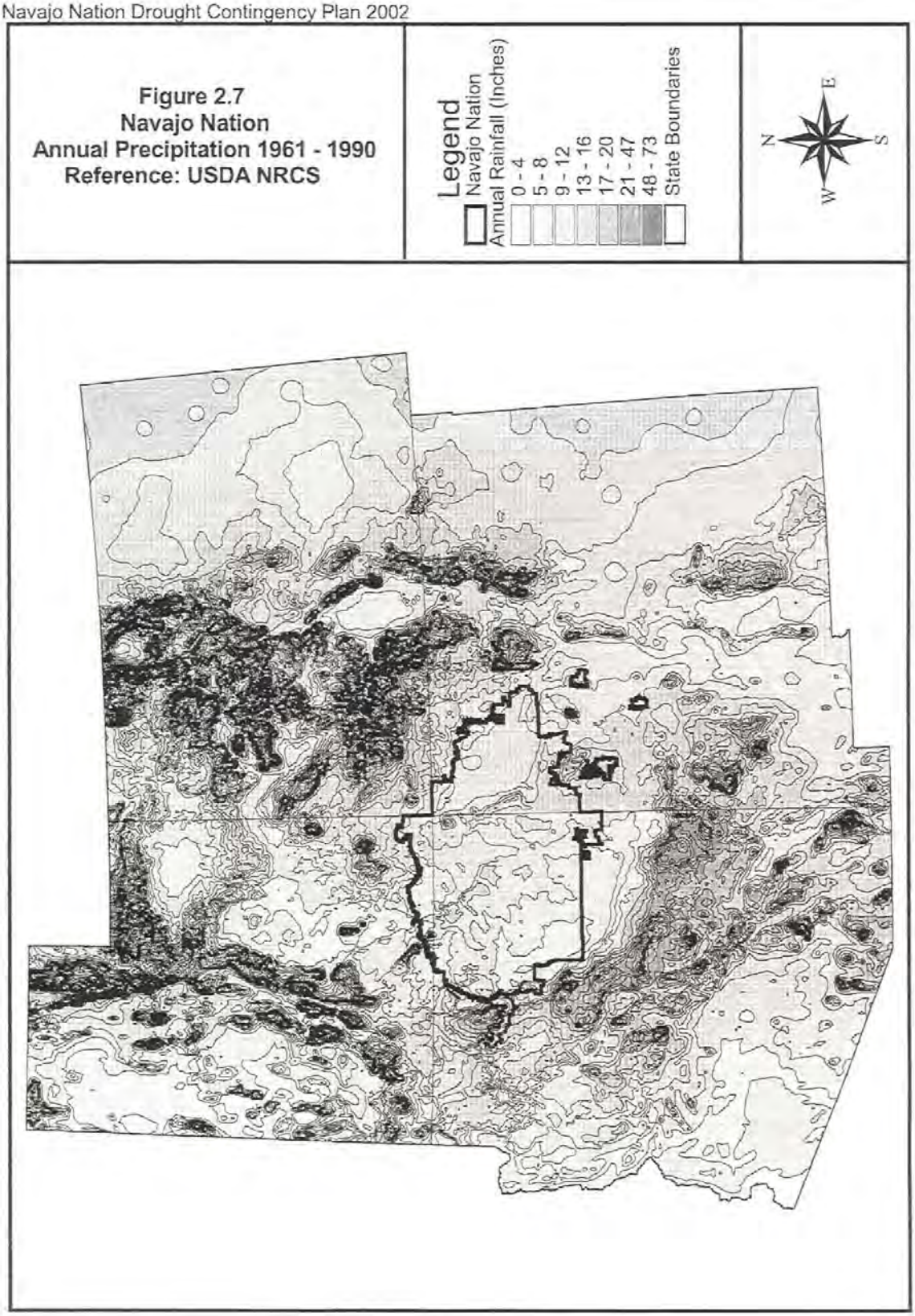
During the winter the primary wind flow is from the west or northwest. Consequently, winter precipitation is primarily from the northern Pacific. With seasonally cooler temperatures the prevailing mid latitude westerly winds shift northward. Occasionally during the winter the westerly wind shifts southward and storms originating near Alaska, cross the State of Washington, and pass through the Four Corners Region. At the higher elevations on the Reservation winter snowfall is a significant component of the annual precipitation.

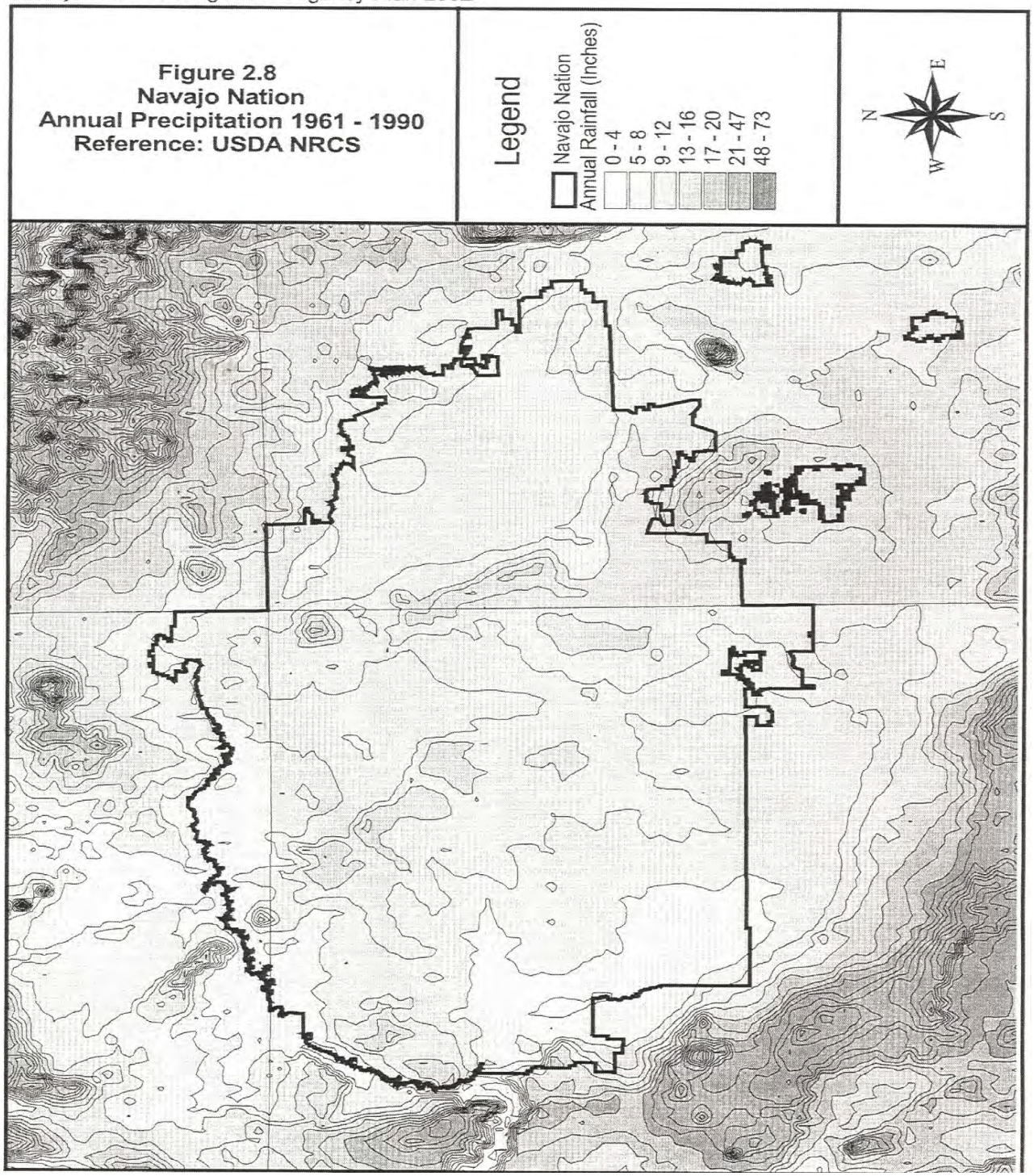
Table 2.1 Monthly Precipitation Summary
(Variable Periods of Record)

Location	Station Number	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Cameron	21169	0.40	0.33	0.46	0.29	0.36	0.12	0.58	0.91	0.72	0.59	0.39	0.50	5.50
Canyon De Chelly	21248	0.81	0.63	0.73	0.58	0.57	0.33	1.09	1.34	0.92	1.06	0.82	0.66	8.81
Crownpoint	292219	0.58	0.56	0.54	0.52	0.56	0.59	2.13	2.15	1.19	0.76	0.45	0.61	9.43
Flagstaff	23010	2.06	2.12	2.31	1.31	0.71	0.53	2.45	2.85	1.94	1.60	1.75	1.97	21.60
Gallup	293422	0.87	0.71	0.87	0.51	0.63	0.49	1.58	2.02	1.08	1.07	0.97	0.72	10.65
Ganado	23303	0.65	0.66	0.86	0.63	0.49	0.34	1.56	1.75	1.05	1.20	0.82	0.85	10.11
Mexican Hat	425582	0.53	0.46	0.46	0.37	0.42	0.20	0.67	0.68	0.62	0.85	0.49	0.50	6.08
Page	26180	0.52	0.47	0.66	0.45	0.43	0.16	0.50	0.69	0.67	0.89	0.53	0.51	6.48
Shiprock	298284	0.47	0.46	0.53	0.42	0.53	0.30	0.69	1.03	0.79	0.78	0.53	0.57	6.17
Tuba City	29792	0.51	0.49	0.49	0.42	0.31	0.26	0.75	0.87	0.77	0.71	0.45	0.50	5.98
Window Rock	29410	0.72	0.68	0.88	0.60	0.50	0.47	1.75	2.04	1.21	1.12	0.82	0.95	11.03
Winslow	29439	0.48	0.47	0.51	0.38	0.32	0.29	1.30	1.49	0.93	0.71	0.48	0.60	7.08

	1. Source: Western Regional Climate Center http;/www.wrcc.dri.educ/cgi-bin/clirectm.pl?

Figure 2.7
Navajo Nation
Annual Precipitation 1961 - 1990
Reference: USDA NRCS





Winter precipitation is also brought to the Four Corners Region from the tropical Pacific when low pressure moves eastward and enters the area. These tropical storms can bring very high precipitation and account for the wettest winters. These events are infrequent because the Mogollon Rim blocks much of the tropical moisture, with only the larger, more significant storms getting through. In Figure 2.6, the Mogollon Rim appears as the region of high precipitation south of the Navajo Reservation. September rainfall is often the result of these tropical Pacific storms. These September storms however, do not correlate with the summer monsoon rain during July and August.

During the summer monsoon season, the hemisphere heats up. The westerly winds move northward and the primary wind flow in the Four Corners Region is from the southeast. Unstable moist air moves in from the Gulf of Mexico and the tropical Pacific adjacent to Central America. As shown in Table 2.1, the

summer monsoon brings precipitation during July, August and September.

The closer to the Gulf of Mexico the greater the relative affect of the monsoon. In Winslow, Ganado and Window Rock, the monsoon season brings 40 to 50 percent of the annual precipitation, with approximately 20 percent during the month of August. In Mexican Hat the monsoon season only brings 30 percent of the annual precipitation, with approximately 10 percent during the month of August.

3 DROUGHT VULNERABILITY

The objective of this section is to assess the vulnerability to drought of different types of Navajo Nation water users. The recommended mitigation measures to these vulnerabilities are presented in Section 5. These water use categories include:

- Domestic water haulers
- Public drinking water systems
- Irrigators and dryland farmers
- Ranchers
- Recreation, wildlife and forestry

3.1 DOMESTIC WATER HAULERS

Many of the homes on the Navajo Reservation do not have direct access to a public water system. The households without direct access to water are assumed to be hauling water. During drought the population that hauls domestic water is at the greatest risk. During drought they travel greater distances to find public water systems that can provide water, or they utilize non-potable water sources. These water haulers also create additional demands on the public water systems that maintain public water taps. The Chapters with the greatest percentage of water haulers are at greater risk from drought.

In a 1981 water resource report by Morrison-Maierle Inc., the per capita water use for the 25 to 50 percent of homes without running water is estimated to be 10 gallons per day. This same rate of water use is cited in *Estimated Use of Water in the United States* (Murray, Richard C., USGS Circular 556, 1965). In 2001 Dornbush & Associates evaluated the cost of water hauling on the Navajo Reservation. Based on that study, families which haul water for domestic purposes spend the equivalent of $16,000 per acre-foot compared with $600 per acre-foot for a typical suburban water user in the region (Merchant, 2001).

The percent of Navajos that do not have direct access to public water systems can only be estimated. From the IHS Sanitation Deficiency System data, the NDWR tabulated the number of homes without water and total number of homes by Chapter. According to the IHS data out of approximately 45,000 homes, approximately 12,000, or 25 percent, do not have access to water. However, the 2000 census indicates that there are more than 71,000 housing units on the Navajo Reservation (U.S. Census Bureau, 2001). These values are shown by Chapter in Table 3.1. Public water system data from the NEPA indicate fewer than 30,000 residential and commercial water connections. Based on the total number of connections, more than 50 percent of the Navajo housing units may not have direct access to public water systems. The NDWR was unable to reconcile the difference between the IHS and Census Bureau statistics. However, for prioritizing mitigation measures, IHS statistics were used.

Table 3.1
Percent of Navajo Households without access to Public Water Systems

CHAPTER	No Water	IHS Total	Census Total	%	CHAPTER	No Water	IHS Total	Census Total	%
Alamo	23	300	561	8	Forest Lake	165	194	293	85
Aneth	112	246	716	46	Fort Defiance	46	1253	2012	4
Baca/Haystack	181	181	341	100	Ganado	27	580	1132	5
Becenti	102	185	236	55	Hardrock	73	305	592	24
Beclabito	28	208	337	13	Hogback	6	6	456	100
Birdsprings	68	210	294	32	Houck	394	674	663	58
Black Mesa	63	185	240	34	Huerfano	71	494	818	14
Bodaway/Gap	100	211	711	47	Indian Wells	170	294	435	58
Breadsprings	38	249	398	15	Inscription House	47	317	447	15
Burnham	100	113	114	88	Iyanbito	0	223	320	0
Cameron	98	215	498	46	Jeddito	277	339	604	82
Canoncito	140	371	507	38	Kaibeto	176	421	561	42
Casamero Lake	111	175	144	63	Kayenta	221	1168	2108	19
Chichiltah	491	541	691	91	Kinlichee	229	397	778	58
Chichinbeto	120	360	520	33	Klagetoh	73	167	530	44
Chinle	247	1119	2978	22	Lake Valley	70	134	165	52
Church Rock	74	450	937	16	Lechee	33	357	525	9
Coalmine	60	60	251	100	Leupp	100	302	583	33
Coppermine	110	141	243	78	Littlewater	131	248	209	53
Cornfields	67	243	382	28	Low Mountain	4	119	380	3
Counselor	64	537	405	12	Lower Greasewood	109	356	646	31
Cove	17	135	912	13	Lukachukai	26	400	915	7
Coyote Can	147	286	414	51	Lupton	60	274	433	22
Crownpoint	104	890	1072	12	Manuelito	236	236	153	100
Crystal	74	274	341	27	Many Farms	124	1552	1159	8
Cudeii	N/A	N/A	N/A	N/A	Mariano Lake	293	293	391	100
Dennehotso	231	496	670	47	Mexican Spring	47	500	528	9
Dilkon	166	403	806	41					

Table 3.1 (Continued)

Percent of Navajo Households without access to Public Water Systems

CHAPTER	No Water	IHS Total	Census Total	%	CHAPTER	No Water	IHS Total	Census Total	%
Mexican Water	176	222	378	79	Shiprock	39	2758	3050	1
Nageezi	45	258	483	17	Shonto	155	236	1084	66
Nahathdzil	0	381	498	0	Smith Lake	21	231	374	9
Nahodishgish/	8	165	155	5	St. Michaels	89	2678	1932	3
Naschitti	68	334	796	20	Standing Rock	88	265	282	33
Navajo Mtn	158	223	322	71	Steamboat	59	123	790	48
Nazlini	120	541	571	22	Sweetwater	66	429	640	15
Nenahnezad	0	334	551	0	Tachee/Blue Gap	0	352	722	0
Newcomb	34	239	843	14	Teec Nos Pos	44	312	660	14
Oaksprings	32	399	276	8	Teesto	145	247	429	59
Ojo Encino	6	108	232	6	Thoreau	0	288	454	0
Oljeto	220	482	953	46	Tohatchi	104	340	817	31
Pinedale	0	128	365	0	Tolani Lake	64	185	305	35
Pinon	139	890	1097	16	Tonalea	161	679	753	24
Pueblo Pintado	46	233	204	20	Torreon	187	385	569	49
Ramah	309	552	654	56	Tsaile/Wheatfields	177	553	1011	32
Red Lake #18	0	655	700	0	Tsayatoh	46	250	299	18
Red Mesa	79	367	454	22	Tselani/Cottonwood	129	245	710	53
Red Rock	255	359	773	71	Tuba City	73	1460	2644	5
Red Valley	40	418	912	10	Twin Lakes	31	425	838	7
Rock Point	156	238	525	66	Two Grey Hills	7	270	843	3
Rock Springs	0	441	368	0	Upper Fruitland	0	590	782	0
Rough Rock	132	242	357	55	Whippoorwill	4	250	492	2
Round Rock	76	282	591	27	Whitecone	132	332	589	40
San Juan	N/A	N/A	N/A	N/A	Whitehorse Lake	252	252	254	100
Sanostee	60	507	998	12	White Rock	85	85	45	100
Sawmill	120	264	471	45	Wide Ruins	305	419	636	73
Sheepsprings	23	221	407	10					
					Total	11,109	44,509	70,493	

For the public water systems the NDWR assigned five drought risk categories, low through high. According to IHS data, approximately 73 public water systems are in Chapters where more than 40 percent of the households haul water. One priority of the proposed mitigation is to ensure that the drought vulnerability of the public water system in those Chapters is reduced as much as possible. These statistics were combined with other public water system drought deficiencies to prioritize drought mitigation.

The Water Management Branch (WMB) conducted a telephone survey of the Chapters to determine the primary sources of drinking water for each Chapter. The Chapters' staff were asked if their primary drinking water sources are public water systems, livestock wells, or watering points. The public water systems only included systems operated by NTUA or the NDWR. Livestock wells include wells or springs. Watering points include public water taps at trading posts, Chapter houses, schools, or border towns. Livestock wells and watering points, which include some public water systems, may not meet the minimum EPA drinking water standards. The respondents in more than 20 Chapters indicated that livestock wells are primary or secondary water sources, and more than50 Chapters indicated that water points are primary or secondary water sources.

3.2 PUBLIC DRINKING WATER SYSTEMS

With respect to drought vulnerability, public drinking water systems are the most important health and human safety concern. In 1998 there were 237 public water supply systems on the Navajo Reservation with a total of 371 wells (NEPA, 1998). As shown in Table 3.2, these systems have approximately 30,000 connections. The majority of these systems rely on groundwater.

The largest supplier of domestic and municipal water on the Navajo Nation, NTUA, operates 93 public water systems with approximately 24,000 connections. Assuming four people per connection, NTUA serves approximately 100,000 people, most of whom are on the Reservation. The largest NTUA system, with 2,800 connections, is the Window Rock system which serves the communities of Fort Defiance and St. Michaels. In 1996 NTUA estimated that these water systems had an undepreciated value of $210 million, a large percentage of which are nearing the end of their design lives. NTUA charges residential and commercial customers approximately $3.00 per thousand gallons of water. The NTUA systems are shown in Figure 3.1.

Another 5,000 connections are provided by a variety of smaller operators. In 1998 the NDWR operated 27 public water systems that are largely subsidized by Tribal general funds and community block grants. These systems are typically smaller than the NTUA systems. They are largely non-metered with generally worse economies of scale. Consequently, it is more difficult to generate adequate revenue for proper administration and maintenance. In addition to these systems, the BIA operates 56 water systems, almost all of which are associated with BIA schools and school related housing. Approximately 50 smaller systems are operated by missions, trading posts, and private commercial operators. Assuming that half of these connections are primarily for residential users, these small operators serve approximately 10,000 people and convey 1,000 acre-feet of water.

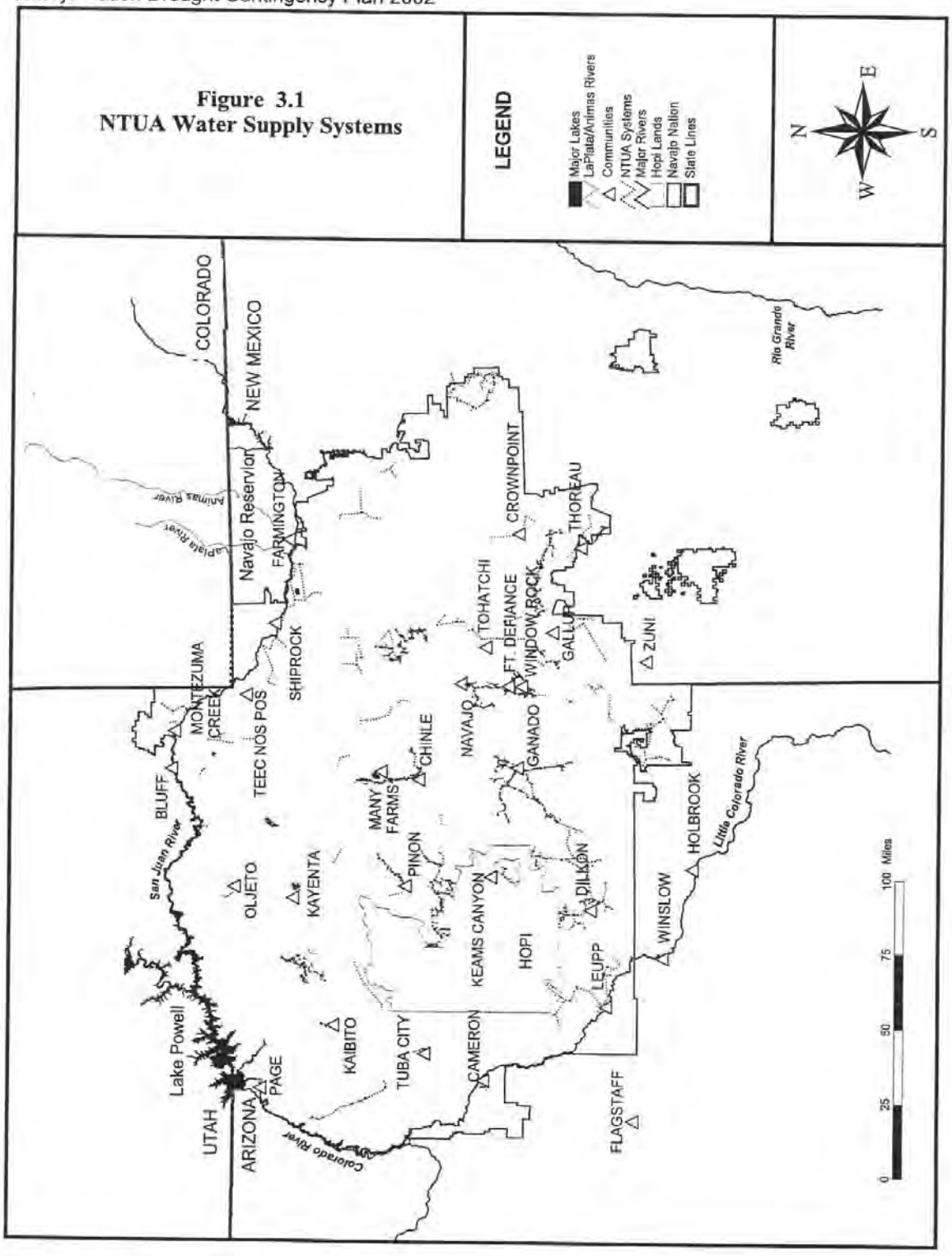


Figure 3.1
NTUA Water Supply Systems
LEGEND
Major Lakes
LaPlata/Animas Rivers
Communities
NTUA Systems
Major Rivers
Hopi Lands
Navajo Nation
State Lines
N
E
S
W
COLORADO
NEW MEXICO
UTAH
ARIZONA
Navajo Reservior
FARMINGTON
SHIPROCK
TEEC NOS POS
MONTEZUMA CREEK
BLUFF
San Juan River
Lake Powell
PAGE
Colorado River
OLJETO
KAYENTA
KAIBITO
TUBA CITY
MANY FARMS
CHINLE
PINON
KEAMS CANYON
HOPI
CAMERON
NAVAJO
TOHATCHI
FT. DEFIANCE
WINDOW ROCK
GANADO
GALLUP
CROWNPOINT
THOREAU
ZUNI
LEUPP
DILKON
FLAGSTAFF
WINSLOW
HOLBROOK
Little Colorado River
Rio Grande River
0
25
50
75
100 Miles

Table 3.2
Navajo Reservation Public Water Supply Systems (1998)

Operator	Number of Systems	Number of Connections
Navajo Tribal Utility Authority	93	23,700
U.S. Bureau of Indian Affairs	56	2,535
Navajo Department of Water Resources	27	767
Chapters	16	592
Miscellaneous & Commercial	15	212
School Districts	12	644
Trading Posts	11	146
Missions	7	193
Total	237	28,789

Source: Navajo Nation Environmental Protection Agency Inventory, 1998

Per capita water use on the Navajo Reservation varies depending on the accessibility of the water supply. Billing data from NTUA indicates that the average water use on the NTUA systems is approximately 100 gallons per person per day. According to the data for other metered systems from the IHS, water use on the non-NTUA systems ranges from 20 to 100 gallons per person per day. Given these low per capita water user rates and high water use fees, water conservation as a drought response may not produce dramatic reductions in water use.

In its *Draft Drought Contingency Plan*, NTUA identified "at-risk" water systems (NTUA, 2000). This Contingency Plan utilizes drought vulnerability criteria similar to the one used by NTUA and applies it to all 237 public drinking water systems on the Navajo Reservation. Many of the public drinking water drought mitigation requirements are also reflected in the IHS Sanitation Deficiency List. However, due to the IHS backlog it will be many years, or decades, before they are all addressed. For this Contingency Plan the public water systems are grouped into five categories of drought vulnerability based on three criteria which are described in this section. The number of public water systems in each drought risk category are shown in Table 3.3.

Table 3.3
Number of Navajo Public Water Systems that are Vulnerable to Drought

	Drought Risk	**Number of Public Water Systems**
Greater than 40% of Households in the Chapter Haul Water		
Greater than 50% of Water Supply from Alluvial Sources and Inadequate Storage	High	7
Greater than 50% of Water Supply from Alluvial Sources	Medium to High	4
Inadequate System Storage	Medium to High	31
Remaining Systems	Medium	24
Subtotal		73
Less than 40% of Households in the Chapter Haul Water		
Greater than 50% of Water Supply from Alluvial Sources and Inadequate Storage	Medium	12
Greater than 50% of Water Supply from Alluvial Sources	Medium to Low	14
Inadequate System Storage	Medium to Low	96
Remaining Systems	Low	42
Subtotal		164

- Percentage of the population in the Chapter that hauls water

During drought water haulers travel greater distances to find public water systems that can provide water, or they depend on non-potable water sources. A drought ranking criterion for public water systems is the number of water haulers in the Chapter that depend on these systems, but may not be reflected in the number of system connections. According to the IHS data 73 public water systems are located communities where more than 40 percent of the households haul water.

- Dependence on alluvial systems

For NTUA the most important drought vulnerability criterion for municipal water supplies is dependence on alluvial aquifers. Typically on the Navajo Reservation the alluvial aquifers have significantly less storage than the deeper aquifers. In many areas where alluvial water development has been possible, the water systems are already at their sustainable limits. These aquifers frequently depend on annual recharge from run off due to snow melt and infiltration along ephemeral washes. Several consecutive dry seasons can dramatically impact water availability from alluvial sources. Public drinking water systems that rely on the larger and deeper aquifers are less susceptible to dry cycles lasting only a few years. To assess drought vulnerability, the public water systems were ranked based on the number of alluvial wells. Systems that rely entirely on alluvial wells are at greater drought risk than systems relying on no alluvial wells. At least 13 public water systems depend 100 percent on alluvial water sources and an additional 24 systems depend on alluvial water sources for more than 50 percent of their water supply.

- Single verse multiple water sources and adequate storage

Public water systems that depend on a single source of water are at greater overall drought risk than systems with multiple sources. In addition, systems with inadequate storage are also at greater risk. During droughts systems with less storage are less able to keep up with peak water demands, and are more likely to require rationing. NTUA combined these two criteria into a single risk criterion. NTUA and the NDWR recommend that public water systems with single sources should have five days of storage capacity (based on 160 gallons per capita per day). Systems with multiple water sources should have storage capacity for 2.5 days. Approximately 146 public water systems fail to meet this criterion.

Many of the public water systems have a combination of problems the magnify the water users exposure to drought. The 73 systems that are in Chapters that have more than 40 percent of the households hauling water were grouped into three drought risk categories. The seven systems with more than 50 percent of the water supply from alluvial sources and that have inadequate storage are in the high drought risk category. The four systems with more than 50 percent of the water supply from alluvial sources, and the 31 systems with inadequate storage are in the medium to high drought risk category. Of the 73 systems that have more than 40 percent of the households hauling water, 24 would not be improved under the first two criterion and are in the medium risk category.

Many of the remaining 164 public water systems that are in Chapters where fewer than 40 percent of the households haul water also have deficiencies. The NDWR identified 12 public water systems that depend on alluvial sources for more than 50 percent of their water supply and have inadequate water storage tanks. These systems are in the medium drought risk category. The NDWR also identified 14 of these public water systems that depend on alluvial sources for more than 50 percent of their

water supply and 96 systems that have inadequate storage. These systems are in the medium to low drought risk category. Of the 164 systems that have less than 40 percent of the households hauling water, 42 would not be effected by any of the criterion, and are in the low drought risk category. The number of systems in each category are shown in Table 3.3. Proposed mitigation measures are presented in Section 5.

3.3 IRRIGATORS AND DRY LAND FARMERS

The Navajo people have a long history of successful management of irrigated lands. In 1989 Colorado State University estimated that the personal income from traditional agricultural crops was approximately $2 million per year (Eckert, 1989). Aside from the Navajo Indian Irrigation Project, irrigation on the Navajo Reservation is located on alluvial floodplains along the perennial and intermittent washes throughout the Reservation. In 1960, pursuant to Public Law 86-636 Navajo Tribe Transfer of Irrigation Project Works, Congress transferred title and operation and maintenance responsibilities for the Navajo irrigation systems from the BIA to the Navajo Nation.

In 1986 the NRCS conducted an inventory of irrigation projects across the Navajo Reservation. The NRCS investigated 83 irrigation projects to determine existing conditions, consolidate resource data, and prioritize projects for possible rehabilitation (USDA SCS, 1986). According to BIA records by 1950 these small projects irrigated 46,219 acres of land. These projects are shown in Figure 3.2. Since that time, due to inadequate management and inadequate funding for operation, maintenance and replacement, many of these systems have deteriorated. In a separate analysis, in 1994 the federal government identified more than 60,000 acres of historically or recently irrigated land just in the Little Colorado River Basin.

Depending on the water source, irrigators and dry land farmers are exposed to a range of drought vulnerability. The NDWR categorized the irrigators and dry land farmers into four qualitative categories of drought risk. The lowest drought risk category are farmers with access to San Juan River water. The low to medium risk category are farmers with access to alluvial wells or springs. The medium to high drought risk category are farmers on irrigation projects that have access to storage reservoirs. And, the highest drought risk category are farmers on irrigation projects without storage and dry land farmers. These categories are described in greater detail in the following section. The number of projects and the total project acreage are presented in Table 3.4. The NRCS 1986 rehabilitation ranking is used to establish quantified mitigation priorities within each category. Mitigation measures are presented in Section 5.

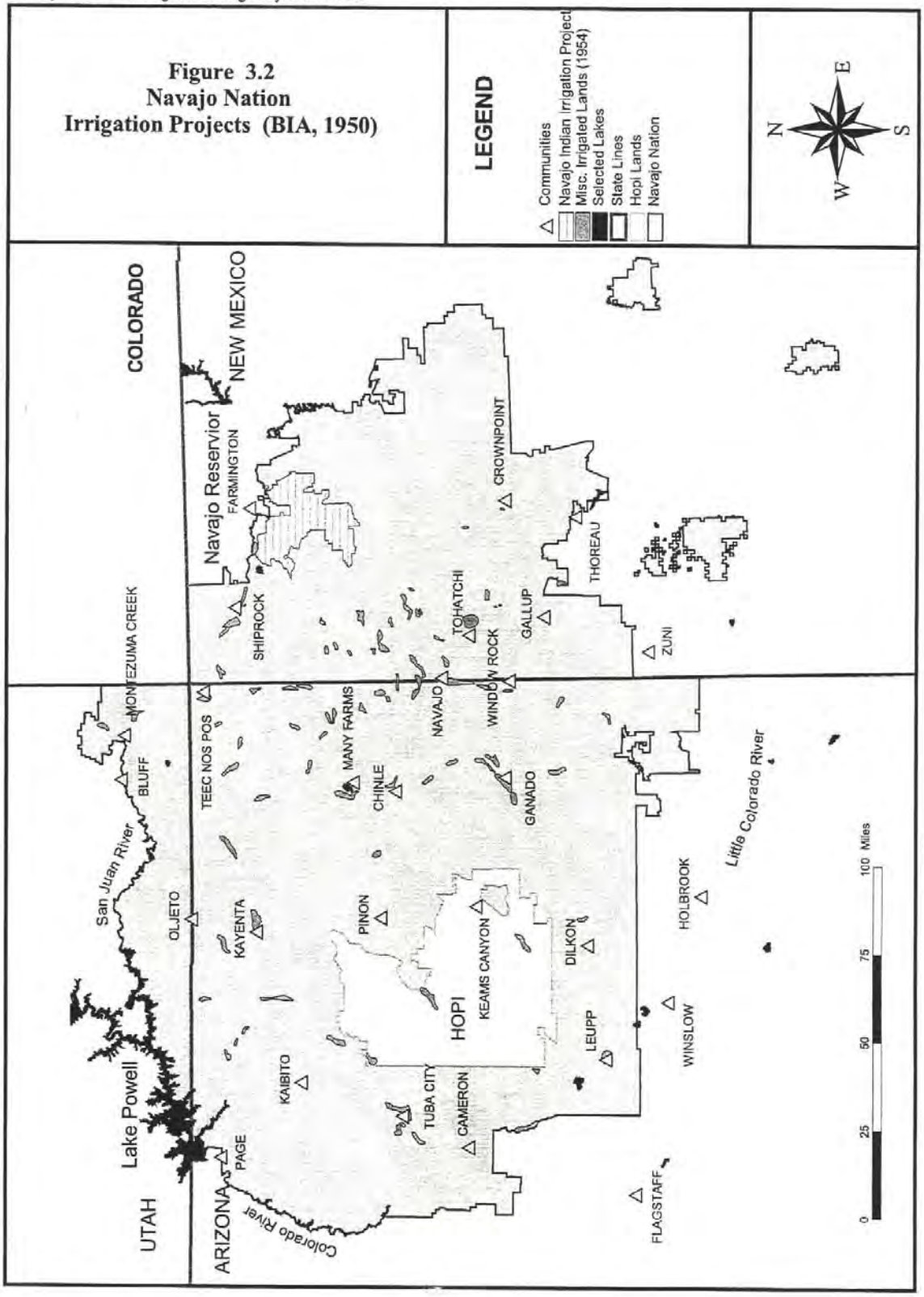


Figure 3.2
Navajo Nation
Irrigation Projects (BIA, 1950)
LEGEND
Communities
Navajo Indian Irrigation Project
Misc. Irrigated Lands (1954)
Selected Lakes
State Lines
Hopi Lands
Navajo Nation
N
E
S
W
COLORADO
NEW MEXICO
UTAH
ARIZONA
Navajo Reservior
Lake Powell
San Juan River
Colorado River
Little Colorado River
FARMINGTON
SHIPROCK
CROWNPOINT
THOREAU
GALLUP
TOHATCHI
WINDOW ROCK
NAVAJO
ZUNI
MONTEZUMA CREEK
BLUFF
TEEC NOS POS
MANY FARMS
CHINLE
GANADO
OLJETO
KAYENTA
PINON
KEAMS CANYON
HOPI
DILKON
HOLBROOK
WINSLOW
LEUPP
KAIBITO
TUBA CITY
CAMERON
PAGE
FLAGSTAFF
0
25
50
75
100 Miles

Table 3.4
Navajo Irrigation Projects Ranked by Drought Vulnerability

Drought Vulnerability Category	Total Number of Projects	Total Number of Acres	Total Number of Projects in the Top Half of the NRCS Rehabilitation Ranking	Total Number of Acres in the Top Half of the NRCS Rehabilitation Ranking
Low Risk				
San Juan River Projects	5	11,115	5	11,115
NIIP	1	110,630	NA	NA
Low to Medium Risk				
Springs	3	376	2	326
Wells	10	1,824	5	1,120
Medium to High Risk				
Reservoirs	38	23,300	17	15,542
High Risk				
Run of the River	30	13,143	11	4,128
Dry Land	NA		NA	NA
Total	87	160,388	40	32,231

- Lowest Drought Risk

Five irrigation projects, the Hogback, Fruitland, Cambridge, Cudei, and Aneth are located along the San Juan River. According to the NRCS these projects include 11,115 acres (USDA SCS, 1986). The median annual flow of the San Juan River at Bluff, Utah, is 1.62 million acre-feet (Holden, 1999). The Navajo Nation has the paramount water claim from the San Juan River, but these water rights are unquantified. The operative constraint to the irrigation water supply, and the limiting factor for water development in the San Juan River Basin, is protection of the endangered Colorado pike minnow and the razorback sucker. The San Juan River Recovery Implementation Program adopted flow recommendations that resulted in reduced water availability for the Navajo Nation and may restrict future development. These San Juan River irrigation projects have an adequate supply of water with a senior priority date, perhaps dating back to 1868, to meet the reasonable water demands of the historic command area. The Navajo irrigation projects that have access to the San Juan River are in the lowest drought risk category. No drought mitigation or response is proposed.

The Navajo Indian Irrigation Project (NIIP) was jointly authorized with the San Juan Chama Diversion in 1962 through Public Law 87- 483. This public law authorized the Secretary of the Interior to construct, operate, and maintain NIIP for the principal purpose of furnishing irrigation water to approximately 110,630 acres of land. NIIP is shown in Figure 3.3. NIIP has a 1956 State Water Use permit for 640,000 acre-feet, a 1974 contract with the Secretary of the Interior to divert 508,000 acre-feet of water, and an annual depletion amount of 270,000 acre-feet per year that has been consulted on by the U.S. Fish and Wildlife Service (Keller-Bliessner, 1999a). NIIP shares its 1956 water priority with the other Navajo Dam reservoir water users. With respect to drought impacts, NIIP is also in the lowest drought risk category. No drought mitigation or response is proposed.

- Low to Medium Drought Risk

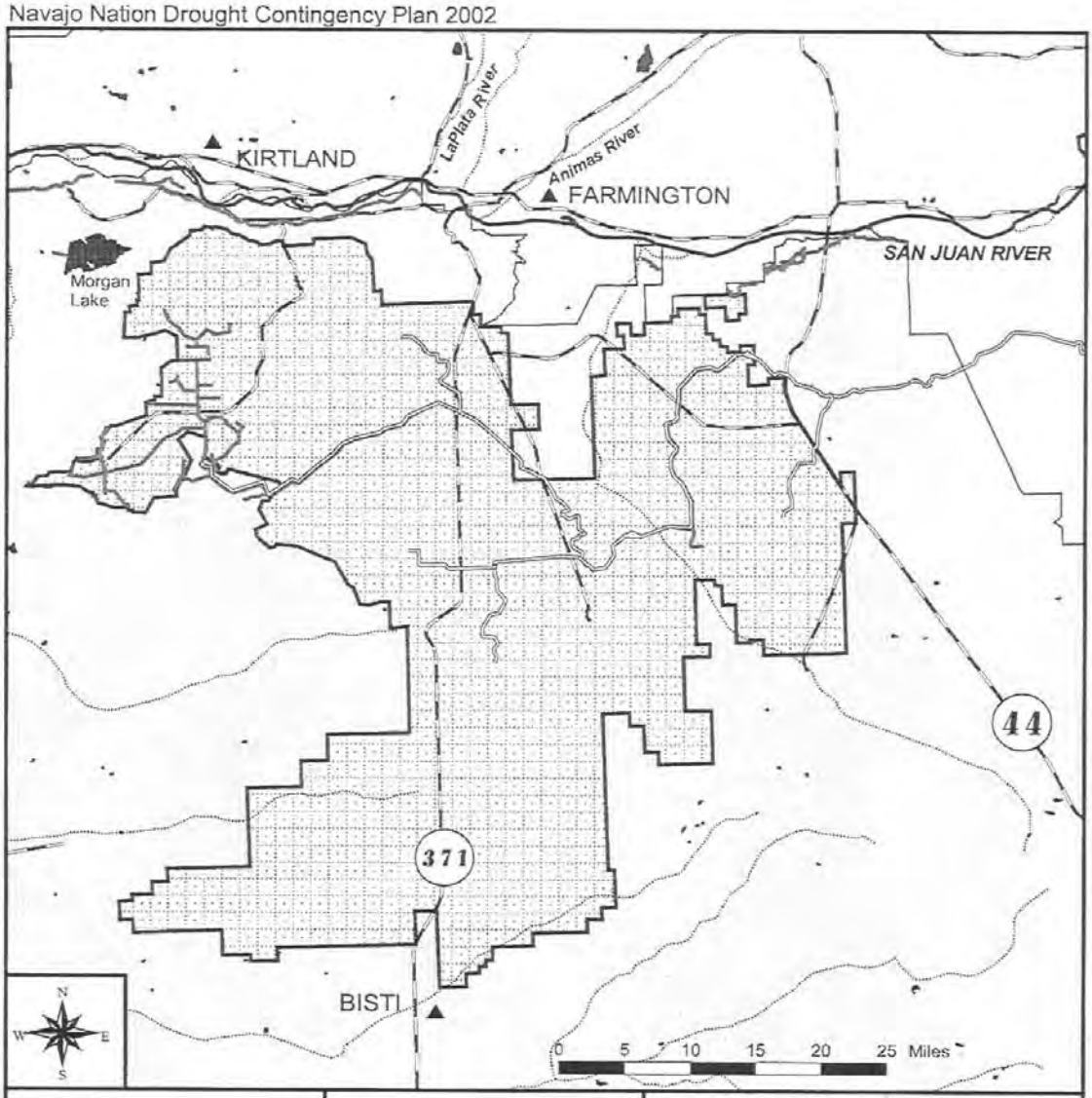
Irrigation projects with access to the Little Colorado River alluvium, wells, or springs are in the low to medium drought risk category. These water sources, although very limited, are relatively stable and can be relied on during short dry cycles. Thirteen irrigation projects with approximately 2,100 acres are in the low to medium drought risk category. The Beaver Farms and Vanzee Irrigation Projects are examples of irrigation projects in this category.

- Medium to High Drought Risk

Irrigation projects with storage reservoirs are in the medium to high drought risk category. Almost all of these projects were expanded to their hydrologic limits based on the farming practices at that time. Dry cycles that reduce the surface water supply impact these farms. These projects can especially benefit from water conservation programs. Thirty-eight irrigation projects with approximately 23,300 acres are in the medium to high drought risk category. The Ganado, Many Farms, and Red Lake irrigation systems are examples of irrigation projects in this category.

- High Drought Risk

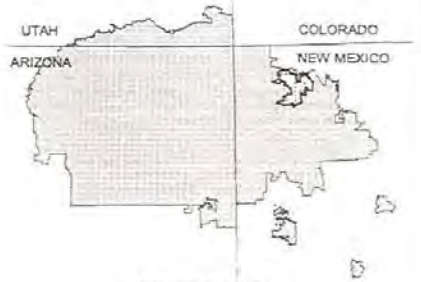
Irrigation projects without storage and dryland farms are in the highest drought risk category. These irrigation projects are “run of the river” systems. They use seasonal runoff when, and if, it comes. In many dry years these irrigators are essentially dryland farming. These farms are in the highest drought risk category. Thirty irrigation projects with approximately 13,000 acres are in the high drought risk category. The Upper Moenkopi-Tuba (Kerley Valley) Irrigation Project is an example of a system in this category.



LEGEND

- NIIP Main Canal
- Canals
- Major Roads
- Major Rivers
- LaPlata/Animas Rivers
- Streams/Washes
- NIIP Blocks 1-11
- Lakes
- State Lines
- Hopi Lands
- Navajo Nation

Figure 3.3
Navajo Indian Irrigation Project (NIIP)



Vicinity Map

Many Native American farmers use dryland farming or "Ak Chin" methods. Ak Chin describes farming systems which utilize water harvesting techniques to catch and control nearby runoff. The farmers plant opportunistically where water naturally collects without conveying water through irrigation project ditches. For the Hopi Drought Plan Daniel B. Stephens provided the following description (Hopi Tribe, 2000):

1. Alluvial fans at the mouth of small watersheds where water naturally spreads across the land

2. Low stream terraces adjacent to wide drainages

3. Sand dunes watered by rainfall, and

4. Artificial terraces constructed near springs

Traditional dryland farmers depend on the spring soil moisture to get the plants started. Late summer precipitation is needed to ensure a harvestable crop. Even with native plant varieties, the margin of safety is small and slight variations in precipitation may cause a complete crop failure. These dryland or "Ak Chin" farmers are also in the highest drought risk category.

3.4 RANCHERS

The importance of livestock to the Navajo Nation cannot be overstated. In spite of droughts, harsh winters and fluctuating prices, raising livestock has historically been one of the few economic enterprises which has been successfully managed in the Reservation environment. In 1989 the Navajo Division of Economic Development (NDED) estimated that the value of cattle on the Reservation was $16 million, the value of sheep was $3 million, the value of horses was $625,000, and the value of goats was $375,000. The total value of livestock exceeds $20 million (Eckert, 1989). In 1997 personal income from livestock was $15 million (NDED). However, the cultural importance of livestock to the Navajo Nation exceeds its monetary value. Livestock have been integrated into the Navajo lifestyle for many generations, and much of the Navajo culture is imparted through the raising of livestock. Navajo families are called upon to provide animals for cultural and social activities throughout the year. The objective of this section is to assess the drought vulnerability of livestock.

Estimates of the livestock population during the last 150 years are presented in Table 3.5. The most recent NNDA Livestock Inventory is from 2001. For the grazing districts that were included in the inventory, the 2001 inventory indicates a total of 403,138 reported sheep units, but only 285,346 permitted sheep unit. This inventory indicates more than 117,000 excess livestock units, or 40 percent overstocking. However, due to a significant number of grazing districts that were unreported, and the uncounted, penned, and feral animals, the actual overstocking is much greater that the voluntary livestock count indicates.

Table 3.5 Estimates of the Livestock Populations on the Navajo Nation

Year	Mature Sheep and Goats	Cattle	Horse, Mules and Burros	Total Estimated Number of Mature Sheep Units	Total Permitted Sheep Units
1846	500,000	30,000	10,000		
1855	200,000		10,000		
1880	1,500,000	500	61,500		
1899	125,000		100,000		
1913	1,781,900	43,000	96,235	2,328,000	
1928	1,375,000	37,500	67,500	1,862,500	
1930	761,589	27,000	50,000	1,111,589	500,000
1931	828,372	25,000	50,000	1,178,372	
1932	749,498	21,000	44,000	1,053,498	
1933	709,725	20,000	42,000	999,725	
1934	650,046	19,000	40,000	926,046	
1935	640,801	19,020	40,270	918,231	
1936	532,885	12,557	32,007	711,148	560,000
1937	448,922	18,053	39,835	720,309	
1940	413,904	13,045	31,100	621,584	
1941	505,751				
1942				583,569	
1943				552,267	
1950				460,526	
1951	273,633	9,205	27,439	449,808	512,922
1952	262,473	8,847	27,802	433,983	512,922
1953	278,305	9,997	27,309	454,838	512,922
1954	304,939	11,149	26,972	484,395	512,922
1955	312,987	12,583	26,890	497,769	512,922
1956	328,694	13,678	25,783	515,965	512,922
1957	346,645	14,594	23,920	524,621	512,922
1958	364,785	14,590	23,051	538,400	512,922
1959	372,361	14,987	22,067	539,323	512,922
1974	600,000	70,000			
1981	404,455	70,842	20,814	496,611	352,423
1993	160,081	232,139	116,785		342,360
1996	157,415	52,879	8,754	367,889	342,360
1997	123,929	40,824	8,858	331,515	342,460
2001	128,101	58,453	8,245	403,138	342,460

Sources: The Navajo Yearbook 1951 to 1961, A decade of Progress BIA; Kluckhorn, 1962; Locke, 1992; Parman, 1976; BIA, 1996; NNDA, 1981, 1993, 1997, 2001 (voluntary livestock count includes lambs in totals, 1993 is missing the Eastern Agency).Note: One horse equals 5 sheep units, one cow equals 4 sheep units.

Livestock overstocking adversely impacts water quality and supply, increases erosion, and leads to desertification of Navajo range lands. It destroys many of the wild plants which traditionally furnished the Navajo people with food and medicine. Overgrazing also makes livestock more susceptible to drought. The response to overgrazing and the increase in the drought vulnerability of livestock raises several complex issues.

Winter and spring precipitation is critical for the range to provide grass for livestock. During the 1996 drought Navajo officials warned ranchers that, if they did not sell their livestock, their economic losses would increase. For instance, 100 sheep may have a market value of $10,000. This flock will require approximately 400 gallons of water per day, or seven fifty-five gallon containers per day. Hauling this water may cost between one and twenty dollars per day. With no grass on the range, the ranchers also need to spend an additional fifty to 100 dollars per day on fodder. Drought related hay shortages increase hay prices and the cost of feeding animals even more. Ranchers who did not sell their livestock were gambling that they could wait out the drought. If they lost that gamble, they had to either spend additional money on their flock and take the financial loss, or let their animals die. In spite of these hardships, many ranchers ignored the advice from the Navajo range managers (Personnel Communication, Johnny Francis, Director NDWR, July 2001).

After the onset of drought, even if the ranchers do sell their livestock, because the animals are under weight, it may be too late to obtain a good price. In 1996 Naschitti had one of the few sale barns that remained in operation. However, due to the drought, many animals brought to the sale barn died in transit or in the chutes. Understanding why the advice from the range managers was ignored is critical to understanding some of the difficulties facing range management and drought response on the Navajo Reservation.

The traditional Navajo livestock system was radically changed in the 1930's due to: 1) the stock reduction program, 2) establishing grazing districts and BIA grazing permits, and 3) the dominance of wage income. The range management and drought response consequences of these changes are presented in the following sections.

- The Stock Reduction Program of the 1930's

  During the 1930's much of the United States was impacted by drought, dust bowl conditions and depression. As a result, the federal government began implementing soil conservation practices throughout the western United States. In 1930 the federal government estimated that the Navajos had 1.27 million sheep units while the grazing capacity of the Navajo range was only 560,000 sheep units. The government proposed reducing 944,910 sheep and goats to 361,000; 25,000 cattle to 9,000; and 45,000 horses, mules and burrows to 30,000 (Parman, Donald, 1976).

  In many respects, the traditional Navajo grazing system was sensitive to the carrying capacity of the range. Decades ago Navajos would frequently travel 120 miles, or more, during a season

with their herds. Seasonal movements were well planned and a key feature of Navajo culture. Navajos also traveled shorter distances, typically 30 miles, around their summer camps. Sheep herds were always kept moving and constantly attended. If the sheep stayed in one place too long they over grazed the land and packed down the ground so that little would grow. Animals penned at a homestead would still be herded daily over a radius of up to five miles to get to water. A limited amount of hoof action from these animals is beneficial to the soil and many wild grasses need to be grazed to thrive (Schoepfle,G. Mark, 1988, and Downs, James, 1972).

Regardless of the presumably honorable intentions of the federal agents, the implementation of the livestock reduction was a nightmare. A number of authors have explored the controversy and dramatic consequences that the federal livestock reduction program had on the Navajo people. Some authors indicate that, even without the imposition of the Stock Reduction Program, the Navajo livestock numbers were already decreasing, and that the traditional grazing system was already sensitive to the capacity of the range. The troubled history of livestock reduction greatly complicates the introduction of any grazing management or drought response policy.

- Establishing grazing districts and BIA grazing permits

In 1940, based on the 1937 livestock count, the BIA began issuing grazing permits. These permits establish the number of permitted animals and the boundary of land that can be grazed. Due to the controversy regarding BIA range management policy, these permits were not activated until the early 1950's. In 1955 there were 7,954 grazing permits, in 1959 there were 8,390, and by 1990's there were more than 12,000 permits. Among other features, these permits restrict moving stock across grazing districts and permitted boundaries for grazing. These changes reduce the Nationwide mobility that Navajo ranchers enjoyed in the past as a response to droughts. Often livestock are in the same fields year round which does not allow for new forage reproduction, and increases the impacts of overgrazing.

Based in part on the recommendations of the local District Grazing Committees, the BIA administers grazing permits on the Navajo Nation, and provides oversight for dividing permits into smaller numbers of sheep units. These grazing permits are divided among greater numbers of family members. In 1915 the size of the average sheep herd was more than 50 sheep and one third of Navajo families had herds larger than 100 sheep. The federal agents reported that 110 Navajo families had herds in excess of 500 sheep. Today the average grazing permit is for approximately 25 sheep units.

The NNDA recommends that the minimum limit should be 50 sheep units per permit, although the BIA regulations allow a minimum of 10 sheep units per permit. The smaller permit holders are more inclined to exceed their permit allocations, and in aggregate, contribute more to the excess livestock problem. No matter how worthy the objectives of the permitting system, this policy was a departure from the customary grazing use patterns established over generations.

- The dominance of wage income

Throughout the 20th Century the percent of Navajo income from wage labor increased and the percent of Navajo income from livestock and traditional agriculture decreased. In 1879 livestock contributed 85 percent of the average Navajo income. By 1940 livestock and traditional agricultural contributed 58 percent. By 1958 livestock and traditional agricultural contributed 10 percent. By 1974 livestock and traditional agricultural contributed 2 percent (Kluckhorn, Clyde, 1962). And, by 1997 livestock and traditional agricultural contributed less than 2 percent (Navajo Division of Economic Development, 1997). These changes are mirrored throughout the United States. In 1930 10.7 percent of the gross domestic product was agricultural output. However, by 1997 only 2.8 percent of the gross domestic product was agricultural output.

Decades ago most ranchers maintained their livestock on a daily basis. Today, most ranchers do not have time to tend herds of sheep and goats on a daily basis. Many ranchers are only able to tend to their animals on weekends. Another consequence of wage income is a smaller overall percent of sheep and a greater percent of cattle because cattle, unlike sheep, do not require constant attention.

In part as a response to these changes, ranchers have described two different approaches to ranching on the Navajo Nation: 1) Ranchers with strong cultural attachments to their animals and who may refuse to sell their livestock, even during hard times, and 2) Ranchers who depend on market prices to get the best value for their stock and who are more inclined to sell their livestock for economic reasons.

- Ranchers who may refuse to sell their livestock

For generations many Navajos have believed that family wealth was based on the number of livestock. To many ranchers livestock are essential for preserving the family's hold on their grazing areas. As a result, many ranchers would rather maintain the cultural attachment to their animals than sell their livestock at a market price. The poorly administered livestock reduction programs of the past only reinforced these sentiments. These ranchers may not respond to livestock sell barns or purchasing programs intended to create incentives to reduce the number of animals. They may also be suspicious of NNDA attempts to respond to drought.

- Ranchers who are more inclined to sell their livestock

To supplement their income many ranchers link traditional values with financial gain. These ranchers realize that the livestock depend on the rancher to produce healthy, marketable animals, and are more likely to rotate grazing areas. Often during drought, these ranchers either haul hay and water to their animals, or sell their livestock as soon as possible. These ranchers may be more inclined to respond to livestock sell barns, purchasing programs intended to create incentives to reduce the number of animals, or information regarding climate

and range conditions. Interviews with ranchers in this category indicate that during recent droughts, in spite of the efforts of the NNDA, they did not have access to timely information regarding climate conditions and markets.

The NNDA estimates that Navajo livestock require approximately 1 to 2 million gallons per day or 1,000 to 2,000 acre-feet of water per year. The water for livestock comes from surface water impoundments, livestock wells and, during droughts, potable water systems. The NDWR estimates approximately 7,500 stock ponds on the Navajo Reservation. Due to high evaporation rates and lack of rainfall, many stock ponds go dry during normal events. During droughts the stock ponds are the first water sources impacted. In 1989 the NNDA estimated that during drought sixty five percent of ranchers may have hauled water for livestock (NNDA, 1989).

The NDWR Technical Construction and Operation Branch maintains approximately 900 livestock wells throughout the Navajo Nation. Sixteen of these are either inactive or abandoned. In 1999 the NDWR estimated that at any time five percent of the windmills are not functioning. Table 3.6 is a summary of the NDWR livestock wells sorted by water sources (alluvium or deep aquifers) and power source (wind or solar). Forty-three of the NDWR livestock wells are in alluvial aquifers and 32 utilize solar power.

In 1993 the NDWR estimated that the average water supply for livestock from the windmill powered wells was 865 acre-feet per year. Windmills only operate effectively at wind speeds between 20 and 35 mile per hour. At these speeds the pumping rates are typically between three and five gallons per minute. However, the average wind speed on the Navajo Reservation is less than ten miles per hour. Effective wind speeds may only occur less than 25 percent of the time. The Navajo Nation's highest average monthly wind speeds are during April and May, whereas the lowest average monthly wind speeds are in June, July and August. As a result water from windmills may not be adequate during the summer months when the demand is the highest. This problem is intensified if the summer monsoon arrives or not at all. Solar power increases the reliability, but vandalism makes many solar installations prohibitively expensive for the NDWR to maintain.

It has been suggested that during droughts when fewer storm fronts pass through the region, windmills may be less effective than during wet periods. However, the 1996 and 2000 droughts demonstrate that the primary factor affecting the effectiveness of the windmills is vandalism and normal wear and tear. During droughts most of the surrounding surface water storage ponds go dry. This situation places increased demand on the few remaining functional water sources. The actual performance of the windmills is only modestly affected by drought conditions. However, livestock congregate around the operating windmills concentrating their impacts on the surrounding dry range.

Table 3.6 NDWR Livestock wells

NDWR Stations	Total Number of Livestock Wells	Number of Alluvial Wells	Number of Solar Powered Wells
Canoncito	30	0	1
Chinle	139	15	2
Crownpoint	105	0	4
Dilcon	54	3	3
Fort Defiance	72	4	5
Ganado	74	15	2
Leupp	55	3	4
Pueblo Pintado	67	0	6
Shiprock	72	0	0
Teec Nos Pos	85	2	1
Tuba City	104	1	2
Vanderwagon	64	0	2
Total	921	43	32

With respect to drought vulnerability, the primary conclusion is that animals in areas that are overstocked are much more vulnerable to drought than animals in areas that are not over grazed. This finding has been repeated in numerous studies and it was the justification for the BIA denying supplemental feed grain during the 1989 drought and limiting support in 2002. The Navajo Nation does not have control over the number of excess livestock or feral animals. The NNDA needs additional resources to improve enforcement of the existing grazing restrictions. Attempts to improve livestock water supplies should place a high priority on: 1) local participation and 2) the limits of the range to sustain livestock. If no efforts are being made to balance the livestock numbers with the range capacity, then it may be counterproductive to provide drought relief to livestock in areas that are over grazed.

3.5 RECREATION, WILDLIFE AND FORESTRY

The Navajo Division of Natural Resources is responsible for the stewardship of the Navajo Nation's

natural resources. Recreation, wildlife and the forests are natural resources that can be gravely impacted during droughts. The protection and management of these resources is the responsibility of the Navajo Department of Parks and Recreation (NDPR), the Navajo Department of Fish and Wildlife (NDFW), and the Navajo Department of Forestry (NFD). The objective of this section is to describe the drought vulnerability of these resources.

3.5.1 Recreation

The Navajo Nation is home to several national parks and monuments including Canyon De Chelly, Chaco Canyon, Hubbell Trading Post, Navajo National Monument and Rainbow Bridge. The NDPR manages seven Tribal Parks, including Monument Valley and Asaayi Recreation Area. Other nearby attractions include the Glen Canyon Recreation Area and Grand Canyon National Park which share boundaries with the Navajo Nation. Many of these sites are shown in Figure 3.4. The annual tourism revenue in the Four Corners Area exceeds $660 million.

Many of the parks have reservoirs within their boundaries. The NDPR operates and maintains the campgrounds near the lakes. The NDPR reports that campgrounds and recreational facilities near reservoirs like Asaayi are booked solid from March through October. The Navajo Nation charges of $5 per person per day for the use of these facilities. Drought related closures or declines in visitation impact this income. The Monument Valley Park is the only park that requires hauling potable water. During the 1996 drought, the NFD restricted open fires to designated campground areas (Personnel Communication, Martin Begay, Planner, July 2001).

3.5.2 Fish and Wildlife

Drought is part of a natural cycle. The local floral and fauna are well equipped to endure drought. However, when drought is combined with over grazing, the impacts to fish and wildlife are magnified and a large number of game animals starve. Streams and riparian areas are impacted by wildlife and livestock. As the drought intensifies, the lack of water drives livestock and wildlife to the few areas that still have water, further impacting the water supply and water quality. The wild and domestic animals congregate in these areas destroying the native flora. The Navajo Nation needs a pro-active approach to lessen these livestock impacts.

The NDFW monitors game, non-game, threatened and endangered species. These species are surveyed every September. Based on the game survey hunting permits are allocated for the season. In 1996, due to the smaller numbers of game animals, approximately 15 percent fewer hunting permits were issued (Personal Communication, Jeffrey Cole, Wildlife Manager, NDFW, July 2001).

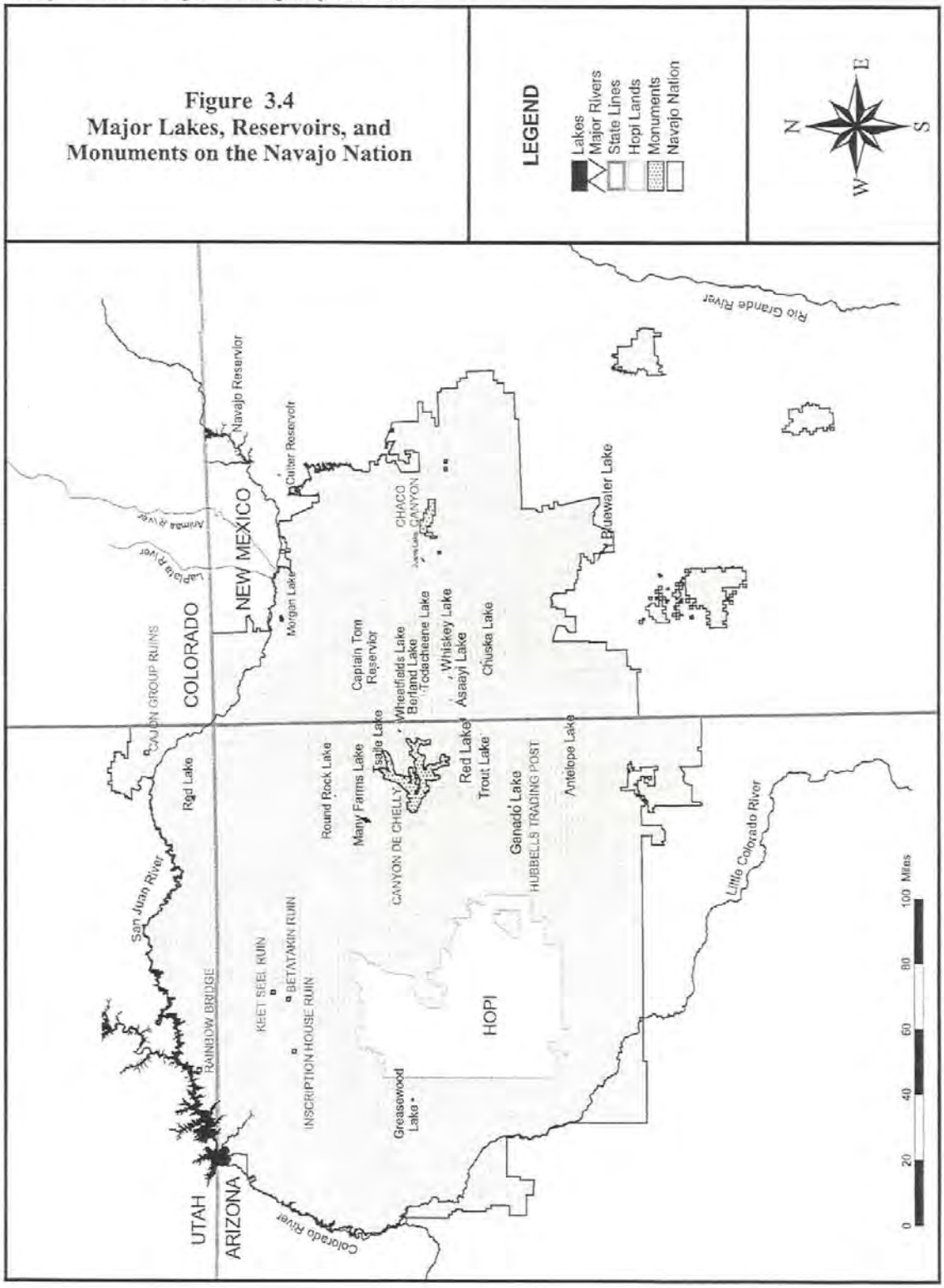


Figure 3.4
Major Lakes, Reservoirs, and
Monuments on the Navajo Nation
LEGEND
Lakes
Major Rivers
State Lines
Hopi Lands
Monuments
Navajo Nation
N
S
E
W
Rio Grande River
Navajo Reservoir
Cutter Reservoir
Morgan Lake
Captain Tom Reservoir
Wheatfields Lake
Berland Lake
Todacheene Lake
Whiskey Lake
Asaayi Lake
Chuska Lake
Dinnebito Wash
Dilwater Lake
CHACO CANYON
Animas River
La Plata River
COLORADO
NEW MEXICO
CAJON GROUP RUINS
Rigd Lake
Round Rock Lake
Mary Farms Lake
Isaile Lake
CANYON DE CHELLY
Red Lake
Trout Lake
Ganado Lake
HUBBELL'S TRADING POST
Antelope Lake
San Juan River
RAINBOW BRIDGE
KET SEEL RUIN
BETATAKIN RUIN
INSCRIPTION HOUSE RUIN
Greasewood Lake
HOPI
Little Colorado River
Colorado River
UTAH
ARIZONA
0
20
40
60
80
100 Miles

In addition to irrigation and domestic water supply, the Navajo Nation's reservoirs provide important wildlife habitat and recreation. The NDFW stocks trout in Wheatfields, Tsaile, Asaayi, Whiskey, Chuska, Trout, Berland, Aspen, Antelope, and Round Rock Reservoirs; catfish in Tsaile, Ganado, Red Lake, Many Farms, Morgan, and Round Rock Reservoirs; and bass in Ganado, Red Lake, Many Farms, and Morgan Reservoirs. These lakes and reservoirs are shown in Figure 3.4. Often during drought minimum pools in lakes and reservoirs are not maintained. The fish are at increased risk when irrigators release water from the already low reservoirs. (Personal Communication, Gloria Tom, NDFW Director, 2001).

The Arizona Department of Water Resources (ADWR) estimates that one angler day has a value of $50 and that one acre of surface water has a potential recreation value of $20,000 per year. If the reservoirs on the Navajo Reservation were able to maintain minimum pools of 30 percent of the total surface area, the annual economic return could exceed $20 million. The NDFW issues more than 13,000 fishing, hunting, and boating permits which generate more than $500,000 per year, in addition to the incidental business revenues. The 1996 and 2000 droughts impacted many Navajo Reservoirs. However, it did not impact the number of fishing permits because fishermen could still travel to the unaffected lakes and reservoirs.

3.5.3 Forests

The Navajo Nation forest includes approximately 5.4 million acres of ponderosa pine, aspen, oak, spruce and fir at the higher elevations, and pinon and juniper at the lower elevations. Drought impacts fire suppression, fire restrictions and forest restoration projects. The Navajo Department of Forestry (NFD) manages the Navajo Nation forests and woodlands. As a trust asset, the BIA also has a major role in forest management. The BIA Navajo Region Office Branch of Fire and Aviation Management prepared the *Programmatic Wildland Fire Plan for the Navajo Nation* (BIA, 2001). The fire management program reduces fuels loads, creates fire breaks, and prescribes burns. The BIA also issues fire permits and advises the NFD on fire restrictions and warnings.

- Fire Suppression

  Although fire is a natural part of forest management, during drought, if forests are not properly managed, the fire danger increases. The history of fire suppression in the southwest has resulted in increased fuel loads in many forests. During drought these forests are vulnerable to conflagrations.

  Fire suppression is still essential to prevent forest fires from destroying human life, and impacting property and resources values. During the 1996 drought, the NFD had trouble obtaining water for fire suppression. NTUA limits the use of water from NTUA fire hydrants to structural fires, not wildfires. In a memorandum from the NDWR to NDEM dated July 17, 1996, the NDWR stated that, due to the extreme emergency, the NFD did not have to apply for a water use permit. However, the NFD was requested to, after the emergency, document the

amount of water used, the point of diversion and the location of fire. The NFD tries to minimize its water use impacts on Navajo reservoirs and ponds during water shortages. At times during 1996 water was transported in trucks from the Fort Defiance Area office to fires.

- Fire Restrictions

The Navajo Region Office monitors the following indicators to predict the severity of the fire season: 1) NFDRS index values (Energy Release Component, Burning Index, and FIL), 2) temperature, 3) precipitation, 4) humidity, 5) Palmer Drought Index or Standard Precipitation Index, 6) 1000-hour fuel moisture, 7) vegetation moisture levels, 8) episodic wind events, 9) unusual weather events, and 10) fires to date. Based on these indices, the Forest Manager recommends to the President of the Navajo Nation to issue restrictions and closures for the forested areas. This information is updated daily.

The five categories of "Fire Danger Level" include: 1) low, 2) moderate, 3) high, 4) very high, and 5) extreme. These categories provide consistency in rating fire danger levels. During periods of low danger the NFD engages in fire prevention. During moderate fire danger periods the NFD posts signs in Fort Defiance, Window Rock and recreation areas. During high danger periods the NFD posts signs along main forest roads. And, during very high and extreme danger periods fire use restrictions are recommended and public service announcements made (BIA, 2000).

Since 1990 fire permits have been required throughout the year even when the fire danger level is low. During high through extreme fire danger levels, fire permits are still issued. For example, fire permits for traditional ceremonies are not denied. However, the fire towers are notified of the location of the permitted fire, and extra people are assigned in case the fire gets out of control. The fires that create the most problems are camp fires that are not properly extinguished. Because many fires in wilderness areas are caused by camp fires, the NFD prefers that all fires be kept within developed campgrounds. The NFD is collecting geographic fire information to improve forest management.

The NFD is concerned that public information regarding fire restrictions and fire permits is lacking. Consequently, the Navajo Nation departments and the people are not aware of the specific restrictions described in the Presidential order. Due to the lack of communication, the Navajo rangers and police are not prepared to enforce the fire restrictions or issue fines, and many people continue to have fires in the forests even after the President declares fire restrictions. Communication among Navajo programs and the public needs to improve. The NFD also provides public education on fire prevention (Personnel Communication, Alex Becenti, Forest Manager, Navajo Forestry Department, July 2001).

4 DROUGHT MONITORING

The Water Management Branch (WMB) of the NDWR proposes three components for drought monitoring. The first component is to highlight and disseminate the six-month SPI for the three climate divisions that encompass the Navajo Nation. The six-month SPI will be used to justify the Navajo Nation drought alerts, warnings and declarations, and to trigger drought responses. The second component is to convey the relevant information from the NDMC Drought Monitor to the appropriate Navajo Nation contacts. And, the third component is to provide Navajo Nation climate data and develop a Navajo Nation SPI for each Navajo Agency.

The NDWR tabulated the six-month SPI from 1996 though 2000 as reported by the NDMC. During this period, the SPI ranged from normal to extremely dry. The climate trends do not skip over drought conditions categories. This recent historic record implies that the time frame from normal conditions to the on set of a drought emergency is at least three months. However, recovery from the extreme condition can occur much more quickly. The six-month SPI data and the Drought Monitor is available on the 10th of the month. The WMB proposes to complete the monthly drought status report by the 15st of the month, distribute the report, and post the results on the Navajo Nation web site. The information in the report and its distribution is described in the following section.

4.1 THE SIX-MONTH SPI

The Western Regional Climate Center (WRCC) publishes the SPI for the climate divisions before the tenth of each month. In a monthly drought status report the NDWR will highlight the six-month SPI for the three climate divisions that encompass the Navajo Nation: 1) North East Arizona, 2) North West New Mexico, and 3) South East Utah. The SPI will be used to trigger the Navajo Nation's drought response. These responses are patterned after the State of New Mexico's response.

- Normal Conditions

  During normal conditions the six-month SPI is greater than 0.0. The WMB will distribute the monthly drought status report to the Executive Director of the Division of Natural Resources and the Director of the Department of Emergency Management.

- Drought Alert

  The next level of response is a drought alert, which will be triggered when the SPI is between 0.0 and -0.99. This event is a mild drought. The WMB will distribute the monthly drought status report to the Executive Director of Natural Resources, the Director of Emergency Management, the Drought Task Force (which is composed of the division executive directors), and the Emergency Management Commission. The various tribal programs will be able to utilize programmatic resources to prepare for drought conditions.

- Drought Warning

The next level of response is a drought warning, which will be triggered when the SPI is between -1.0 and -1.49. This event is a moderate drought. The WMB will distribute the monthly drought status report to the Executive Director of Natural Resources, the Director of Emergency Management, the Drought Task Force (which is composed of the divisions directors), the Emergency Management Commission, the IGR and Resources Committees, and the affected grazing district, soil and water conservation districts, farm boards and Chapters. The various tribal programs will be able to utilize programmatic resources to address limited drought conditions. And, applications that need SAS review can be preemptively submitted to the SAS review process.

- Drought Emergency

The next level of response is a drought emergency, which will be triggered when the six-month SPI is less than -1.5. This event is a severe or extreme drought. The WMB will distribute drought status report will be distributed to the Executive Director of Natural Resources, the Director of Emergency Management, the Drought Task Force (which is composed of the division directors), the Emergency Management Commission, the IGR and Resources Committee, and the affected grazing district, soil and water conservation districts, farm boards and Chapters. The various tribal programs will utilize programmatic resources to address worsening drought conditions. The information in the drought status reports can be used by the Emergency Management Commission and the President of the Navajo Nation as justification for declaring a drought emergency in the effected Chapters.

4.2 RELEVANT INFORMATION FROM THE NDMC DROUGHT MONITOR

According to the NDMC Drought Monitor, drought monitoring requires a combination of science and art. And, no single definition or index works for all circumstances. Every month the USDA, the NOAA - Climatic Prediction Center (CPC), and the NDMC produce a comprehensive drought monitoring effort called the Drought Monitor. The drought monitor synthesizes indices, outlooks and news, and issues a consolidated depiction of National drought conditions based on a combination of drought indicators and filed reports. As part of the Drought Monitor the CPC issues weekly drought assessments and monthly seasonal assessments. The NDWR will collect the relevant information from the Drought Monitor and include that information in the Navajo monthly drought status report. Which specific information will be included will depend on input from various tribal programs.

4.3 NAVAJO DROUGHT MONITORING AND THE NAVAJO NATION SPI

The 344 NOAA climate divisions cover the entire United States. These divisions are for general climate analyses on a nationwide scale. However, in the western United States the area of each division is larger than most of the eastern states. These climate divisions provide a general description of drought conditions in the region, but they lack the spatial resolution to distinguish between reservation lands and off-reservation lands, or among the different physiographic regions within the 27,000 square mile Navajo Nation.

Due to its size, droughts do not necessarily create uniform impacts across the Navajo Nation. For instance, between 1895 and 2000 the PDSI indicated that 32 years could be classified as moderate, severe or extreme drought years. For half of those drought years the entire Reservation had a similar drought classification. However, for eight of those 32 drought years, the western side of the Reservation experienced a more severe drought, and for nine of those drought years the eastern side of the Reservation experienced a more severe drought. The correlation coefficient (R squared) between the PDSI in the western portion of the Reservation and the eastern portion is 0.70. (NDWR, 1996). This statistic indicates that only 70 percent of the drought variation in the western portion of the Navajo Nation can be predicted by the conditions in the eastern portion. An SPI based on the Navajo Agencies can address this spatial variation.

Several National Weather Service precipitation stations with records dating more than thirty years are located in and around the Navajo Nation. Some of these stations are listed in Table 2.1. These historical data are available from the Western Regional Climate Center, and the National Climatic Data Center. The historic data can be used to establish the long term precipitation statistics such as the SPI. However, the National Weather Services has few active stations on the Navajo Nation, and very limited historic data. And, for drought response the lag time in distributing recent data is unacceptably long.

The WMB has collected hydrologic and climatic data for the Navajo Nation since 1984. Monthly precipitation has been measured throughout the Navajo Nation with recording rain gages, precipitation storage gages, and weather stations. These sites are shown in Figure 4.3. At of the start of water year 2001, a subset of the much larger precipitation storage gage network has been visited on a monthly basis in support of the Navajo Nation SPI. This network of gages has the best spatial coverage of the Reservation and is lower in cost than the automated equipment. Given the high risk of vandalism to the equipment, the lower cost is an important consideration.

Most climate analyses, including the calculation of the SPI, require 30 years of record to establish long term trends. The NDMC software for calculating the SPI is designed for 30 years of record. The major limitation in using the Navajo Nation automated stations for determining the SPI is that the Navajo stations only extend over a 17-year period of record. This short period of record presents a challenge for calculating NNSPI values. However, each year the WMB is adding to the period of record for these stations. The WMB may statistically extend these records by deriving regression equations with other long term precipitation records in the area.

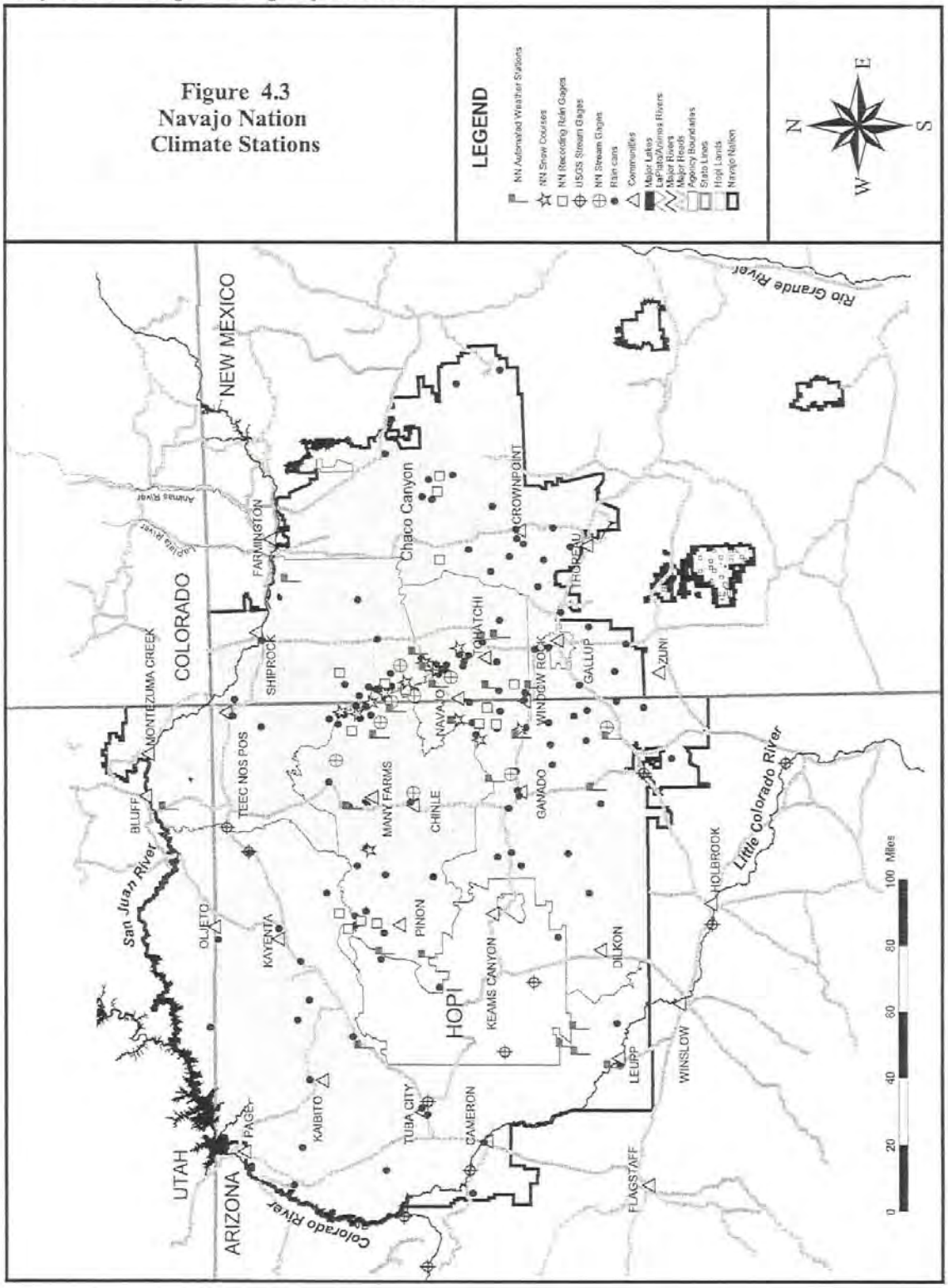


Figure 4.3
Navajo Nation
Climate Stations
LEGEND
NN Automated Weather Stations
NN Snow Courses
NN Recording Rain Gages
USGS Stream Gages
NN Stream Gages
Rain cans
Communities
Major Lakes
Major Rivers
Major Roads
Agency Boundaries
State Lines
Hopi Lands
Navajo Nation
N
E
S
W
NEW MEXICO
COLORADO
UTAH
ARIZONA
Rio Grande River
Animas River
San Juan River
Colorado River
Little Colorado River
Chaco Canyon
FARMINGTON
CROWNPOINT
THOREAU
SHIPROCK
NAVAJO
LUKACHUKAI
WINDOW ROCK
GALLUP
ZUNI
MONTEZUMA CREEK
BLUFF
TEEC NOS POS
MANY FARMS
CHINLE
GANADO
HOLBROOK
OLJETO
KAYENTA
PINON
HOPI
KEAMS CANYON
DILKON
LEUPP
WINSLOW
PAGE
KAIBITO
TUBA CITY
CAMERON
FLAGSTAFF
0
20
40
60
80
100 Miles

The WMB proposes calculating SPI values for each of the five Navajo Agencies using data that specifically apply to the Navajo Nation. With improved data collection and reduction, in the future the WMB will produce monthly NNSPI maps following the same format and time scales as the nationwide NDMC maps. Theoretically, the NNSPI could have greater spatial resolution and be calculated on the basis of watersheds, grazing districts, or Chapters. However, this resolution is not practical given the current level of funding for staff and equipment.

Although the SPI was selected as the primary drought index, additional drought indices may be used to trigger specific response measures. The 160 WMB precipitation stations can be used to compute the Percent of Normal Rainfall. These stations provide better spatial coverage of the Navajo Nation than the longer term stations. Long term monthly average precipitation data for the percent of normal calculations, is available from the NRCS and Oregon State University. These maps, combined with the data from the precipitation stations, can be used to calculate the percent of normal with a higher level of spatial resolution for the Navajo Nation than what is available from the national maps.

Another drought indicator is the Navajo Nation snow survey. The snow survey began in 1984. Using federal snow samplers, the Navajo Nation Snow Survey is conducted bimonthly from January 1st to April 1st at eight snow courses in the Chuska Mountains and Defiance Plateau. The survey measures the snow water equivalent (SWE), which is the water content of the snow pack. These data are used to forecast spring runoff into streams and reservoirs. Snow accumulation typically reaches the maximum during March. A large deficit in the snow water equivalent of the snow pack during March is a good indicator of a lack of runoff for the growing season. Irrigators and reservoir operators benefit from the early warning provided by the snow survey.

4.2 DROUGHT FORECASTING

The NOAA Climate Prediction Center Drought Monitor provides several forecasting tools including: 1) the 12-month forecast of national and regional precipitation and temperature, 2) the12-month forecast for the drought outlook, 3) the stream flow outlook based on snow pack information, and 4) the PDSI and soil moisture outlook. These forecasts can be included in the Navajo monthly drought status report.

5 DROUGHT MITIGATION

Drought mitigation includes short and long term actions, programs, or policies implemented in advance of drought that reduce the degree of risk to people, property, and productive capacity (Wilhite, 1997). The objective of this section is to recommend mitigation measures to be implemented before the next drought occurs. This section also presents appraisal level costs of drought mitigation for the following:

- Drought monitoring
- Domestic water haulers
- Public drinking water systems
- Irrigators and dryland farmers
- Ranchers
- Recreation, wildlife and forestry
- Reuse of treated effluent

5.1 DROUGHT MONITORING

Climate monitoring is the basis for defining drought and triggering response. The Navajo Nation drought plan is based on the six-month SPI supplemented by local climate data from the NDWR WMB. The NDWR proposes the following mitigation measures to enhance the collection, reduction and dissemination of data.

- Reliable Internet Access and a Navajo Nation drought information web site

  Access to the Internet is difficult to maintain on the Reservation. This situation makes it difficult to reliably access the Western Regional Climate Center SPI maps and the NOAA Drought Monitor forecasts. A critical drought mitigation measure is to establish reliable Internet connections to the WMB server, and to the other Tribal programs that have drought response responsibilities. In addition to the server connection, a backup dial-in connection will ensure reliable access to drought information. The cost of an Internet connection is $5,670 and developing a Navajo Drought web page is $7,200. Updating the Web page annually is $4,080, hosting the web page is $840 per year, and operation and replacement of hardware is $4,300 per year. The initial start up cost is approximately $13,000 and the annual cost is approximately $10,000 per year.

- Improve the Navajo Nation climate network

Another high priority is to sustain and expand the efforts of the Water Monitoring and Inventory program of the WMB. This program operates the climate network on the Navajo Nation. The WMB collects monthly precipitation data from 160 rain cans, 15 weather stations, six stream gages and eight snow sites across the Reservation. These data provide a better description of the spatial variability in the climate than any other network. Additional funding will expand the climate data coverage, train staff, install telemetry, improve data reduction, and it will result in more accurate and useful climate information. The WMB estimates that the cost for these improvements is $100,000.

5.2 DOMESTIC WATER HAULERS

During drought domestic water haulers are the most vulnerable water use sector. Significant reductions in water use by these households through water conservation are unlikely. For the public drinking water systems the NDWR established five drought risk categories. The number of public water systems in each drought risk category andthe cost of mitigation is presented in Table 5.1. Using IHS data, the NDWR identified 73 public water systems that are located in Chapters where more than 40 percent of the households haul water. The public water systems with multiple deficiencies are at higher risk and have higher priority for drought mitigation. Of these 73 systems, the NDWR identified four public water systems that depend on more than 50 percent of their water supply from alluvial sources, and thirty-one of these 73 systems have inadequate storage. These 35 systems are in the medium to high drought risk category. The cost of addressing the alluvial source deficiencies of the four systems is $4.5 million. And, the cost of addressing the storage deficiencies of the 35 systems is $33.2 million.

Of the 73 systems in Chapters where more than 40 percent of the households haul water, seven systems have inadequate storage and depend on more than 50 percent of their water supply from alluvial sources. These systems are in the high drought risk category. The cost of addressing the deficiencies of just these systems is $13.4 million.

Of these 73 public water systems located in Chapters with more than 40 percent of the households hauling water, 24 systems will not be improved based on the other two criteria. These systems are in the medium drought risk category. The cost of adding a deep aquifer well for a watering point to these systems is $ 17.75 million.

The IHS and NEPA are investigating approaches to assist the water haulers. For instance, cisterns can store rain water for domestic use. In remote areas cisterns may effectively augment water supplies. Cisterns, however, may not help much during drought. The NEPA is also investigating small household filters and other treatment systems.

Table 5.1
Cost of Improving Navajo Public Water Systems that are Vulnerable to Drought

	Drought Risk	**Number of Public Water Systems**	**Drought Mitigation Cost**
Greater than 40% of Households in the Chapter Haul Water			
Greater than 50% of Water Supply from Alluvial Sources and Inadequate Storage	High	7	$13,400,000
Greater than 50% of Water Supply from Alluvial Sources	Medium to High	4	$4,500,000
Inadequate System Storage	Medium to High	31	$33,200,000
Remaining Systems	Medium	24	$17,750,000
Sub-total		73	$68,850,000
Less than 40% of Households in the Chapter Haul Water			
Greater than 50% of Water Supply from Alluvial Sources and Inadequate Storage	Medium	12	$9,008,000
Greater than 50% of Water Supply from Alluvial Sources	Low to Medium	14	$9,750,000
Inadequate System Storage	Low to Medium	96	$72,650,000
Remaining Systems	Low	42	$0
Subtotal		164	$91,403,000

Another mitigation measure is to set up "pay per fill" watering stations at existing public water systems. Several Chapters are planning to install water stations. Several off-Reservation water purveyors, including the City of Williams in Arizona and the City of Gallup in New Mexico have stations in place. These stations are completely automated and comply with U.S. EPA safe drinking water standards. By enabling the operators to generate income, they are better able to keep the public water systems functioning during droughts. Some trading posts, missions and schools may be ideally located for water stations. By improving access to potable water, these watering stations will reduce the risk of people obtaining water from unregulated, non potable water sources. A few pilot projects should be established. The Chapters of Navajo Mountain, Ramah and Canoncito are excellent candidates for pilot projects. These stations may cost $30,000 each.

Another mitigation measure is a drought gasoline voucher program similar to the livestock assistance program. Water haulers would either save their gasoline receipts, or be issued coupons for purchasing gasoline. During a drought the Chapters would convey funds based on the increased distance these water haulers must travel to get to a potable watering station.

5.3 PUBLIC DRINKING WATER SYSTEMS

The lack of municipal water is the greatest water resources problem facing the Navajo Nation. Historic data demonstrate that water use for non-Indian communities have generally increased over time and is more than 206 gallons per capita per day in Arizona. This rate compares to a current average per capita use on the Reservation between 10 and 100 gallons per day. This disparity in per capita water use can be directly correlated to the lack of community development and the difference in the economic standard of living on the Navajo Reservation. The low per capita water use and the already high water use fees make significant reductions in water use through water conservation unlikely.

Approximately 164 public water systems are located in Chapters were less than 40 percent of the households haul water. Many of these systems still have deficiencies. For the systems that rely on alluvial wells for more than 50 percent of their water supply the mitigation measure is to diversify the source of water by adding additional non-alluvial wells. The NDWR estimated the cost to provide additional non-alluvial wells to reduce the number of alluvial wells production capacity to no more than 50 percent of the total number of system wells. The Fort Defiance system, which depends on alluvial wells for 40 percent of its water supply, was also included. These systems are in the low to medium drought risk category. The NDWR estimates that bringing these 14 public water systems into compliance with this criterion will cost $9.75 million.

Approximately 96 of these public water systems have inadequate storage. The second mitigation measure is to add additional storage tanks to these public water systems. The NDWR recommends that systems with a single source of water should have storage capacity for five days of demand and systems with multiple water sources should have storage capacity for 2.5 days of demand. These systems are in the low to medium drought risk category. The NDWR estimates that bringing these 96 public water systems into compliance with this criterion will cost $72.6 million.

A substantial number of public water systems have multiple deficiencies. For instance, 12 of the 164 public water systems depend on more than 50 percent of their water supply from alluvial sources and do not have adequate storage. These systems are in the medium drought risk category. The cost of addressing the deficiencies of just these systems is $9.0 million. These public water systems are in the medium risk category. This information is presented in Table 5.1.

Operation and maintenance of the public water systems is especially critical during droughts. NTUA operates approximately 90 public water systems. NTUA has a regular operation and maintenance program funded by water use fees. The remaining 140 public water systems suffer from irregular operation and maintenance. These remaining systems would benefit from a rural water users circuit rider program. The circuit riders can help the system water users and operators establish fee schedules, prepare proposals for rural water assistance, and provide onsite technical assistance and training. The circuit rider program will improve the reliability of these systems and assist in getting them qualified for rural water programs.

In many cases the alluvial aquifers and the deep aquifer have reached their sustainable limits. For these communities, the NDWR has proposed regional water systems which will meet the water demands over a forty year planning horizon. Although implementing these regional projects may require additional programmatic authorization, this Contingency Plan 2002 complements the *Navajo Nation Water Development Strategy* (NDWR, 2000).

5.4 IRRIGATORS AND DRYLAND FARMERS

The NDWR established four drought risk categories for the irrigators and dry land farmers. These categories are described in Section 3.3. To prioritize mitigation measures within each drought risk category, the irrigation projects were ranked using the same ranking criteria developed for the *Inventory of Navajo Indian Irrigation Projects* (NRCS, 1986). That criteria is ninety points for resources, sixty points for sponsorship, and fifty points for rehabilitation cost. For each drought risk category mitigation is only recommended for the irrigation projects that are in the top half of the NRCS ranking. Many of the mitigation measures will also provide collateral benefits to the dry land farmers in the vicinity of the irrigation project.

Mitigation assessments include preparing water conservation and management plans at a cost of $25,000 per project and improving reservoir operation at a cost of $20,000 per reservoir. The cost of mitigation implementation is based on rehabilitating the entire project at a unit cost of $1,000 per acre. The project acreages and mitigation costs are presented in Table 5.2.

- Low Risk

  The five irrigation projects along the San Juan River with more than 11,000 acres of land are in the low risk category. No mitigation or response measures are proposed for the projects in this category.

Table 5.2
Cost of Improving Navajo Irrigation Projects that are Vulnerable to Drought

Drought Vulnerability Category	Total Number of Projects	Total Number of Acres	Total Number of Projects in the Top Half of the NRCS Rehabilitation Ranking	Total Number of Acres in the Top Half of the NRCS Rehabilitation Ranking	Mitigation Assessment (Dollars)	Mitigation Implementation (Dollars)
High Risk						
Run of River	30	13,143	11	4,128	$275,000	$4,128,000
Dry land Farming	NA		NA			
Medium to High Risk						
Reservoirs	38	23,300	16	15,542	$765,000	$15,542,000
Low to Medium Risk						
Springs	3	376	2	326	$50,000	$326,000
Wells	10	1,824	5	1,120	$125,000	$1,120,000
Low Risk						
San Juan River Projects	5	11,115	4	11,115	$0	$0
NIIP	1	110,630				
Total	87	160,388	40	32,231	$1,165,000	$21,116,000

Note: Mitigation Assessment is based on the cost of a Water conservation and Management Plan at $25,000 per system and $20,000 for the irrigation projects that have reservoirs. The estimated cost of implementing the water conservation drought mitigation measures

is $1,000 per acre.

- Low to Medium Risk

The irrigation projects with access to the Little Colorado River Alluvium, wells or springs are in the low to medium risk category. Of the 13 irrigation projects in this category seven projects with approximately 1,400 acres are in the top half of the NRCS rehabilitation ranking. For these irrigation projects the NDWR proposes Water Conservation and Management Plans. These plans will address: increasing irrigation efficiency, incorporating water users associations, improving operation and maintenance, establishing ditch riders, repairing and improving the hydraulic structures, pre-irrigating, increasing the water holding capacity of the soil, improving the prediction of the timing and duration of the peak runoff, drilling shallow alluvial wells, and other measures. The cost of the Water Conservation and Management Plans and drought mitigation assessment is $175,000. The cost of full mitigation implementation is $1.4 million.

- Medium to High Risk

The irrigation projects with surface water storage reservoirs are in the medium to high risk category. Of the 38 irrigation projects in this category 16 projects with approximately 15,000 acres are in the top half of the NRCS rehabilitation ranking. For these irrigation projects the NDWR proposes Water Conservation and Management Plans and improving the reservoir operations. The cost of the Water Conservation and Management Plans and drought mitigation assessment is $765,000. The cost of full mitigation implementation is $15.4 million.

- High Risk

The irrigation projects without storage, Little Colorado River alluvium wells, or springs are in the highest drought risk category. The dry land farmers are also in the highest drought risk category. Of the 30 irrigation projects in this category 11 projects with approximately 4,000 acres are in the top half of the NRCS rehabilitation ranking. For these irrigation projects the NDWR proposes Water Conservation and Management Plans. These farmers benefit the most from the Drought Monitor forecasts, pre-irrigating, increasing the water holding capacity of the soil, and improving the prediction of the timing and duration of peak runoff. The cost of the Water Conservation and Management Plans and drought mitigation assessment is $275,000 and the cost of mitigation implementation is $4.1 million.

5.5 RANCHERS

The drought mitigation measures for ranchers include four broad components: 1) Establish an effective Navajo Nation Grazing Policy, 2) Improve range management, 3) Provide assistance to ranchers, and 4) Improve the reliability of livestock water. These components are described in the following sections.

5.5.1 Establish an effective Navajo Nation Grazing Policy

Numerous studies have established the link between overgrazing and drought vulnerability. However, the Navajo Nation does not have control over the excess number of livestock on the range. One key step toward establishing an effective Navajo Nation Grazing Policy is adopting a Navajo Nation Uniform Grazing Act. This act would delegate the local administration of grazing permits and enforcement away from locally elected officials to salaried administrators. It would also establish grazing fees comparable to the ones charged on federal land. These fees would be dedicated to the stewardship of the range. This act, if approved by the Navajo Nation Council, would respond to many of the range management conditions required by the BIA during the 1989 drought. Passage of this act is by no means certain. Consequently, other range management measures must be concurrently addressed.

5.5.2 Improve Range Management

Separate from adopting the Navajo Nation Uniform Grazing Act, there are numerous actions that the Navajo Nation can take to improve range management. The NNDA estimates that the Navajo range is overstocked by more than 40 percent. Overgrazing is directly connected with poor range management practices, deteriorating range conditions and drought vulnerability. Under these conditions, livestock assistance that fails to protect the range from overgrazing, especially during droughts, is counterproductive. Instead of providing supplemental feed and water during severe droughts, it is more constructive to initiate mitigation programs to will reduce the number of animals and improve range management. This section describes a couple of mitigation measures that should be initiated immediately.

- Conduct a comprehensive, accurate and independent livestock tally

  The NNDA receives livestock tallies from elected grazing district officials who are themselves responsible for administrating the grazing regulations. This approach is not accurate, and it may result in a biased livestock count. Because the NNDA does not have the staff to reduce and tabulate livestock tally, the data is sent to the Arizona Department of Agriculture state statistician. The Navajo Nation needs better control of this information.

  The NNDA livestock tally is public information. It could be used as a tool to decrease the

number of unauthorized animals. An accurate tally can be used to cross check with supplemental feed and water hauling programs to ensure that the feed is only provided to permittees who are within their permit allocation. The tally could also be used to target drought assistance only to areas where the permittees are not exceeding the number of permitted animal units. A full-time person over a two-year period working with the grazing officials and rangers should be able to create a new, more accurate, tally. The cost for this improved livestock tally is $84,500.

- Remove feral animals

The problems of overstocking are compounded by the feral animals on the range. Each Chapter has oversight for reducing the number of feral animals. However, the effort to roundup feral animals has been inadequate. Often after a roundup the animals are sold back into the community which defeats the purpose of the roundup. After the roundup the feral animals should be removed from the Reservation. The NNDA estimates the cost of rounding up feral animals is $50,000 per Navajo agency, or $250,000 for all five agencies. (Ray Castillo, Personnel communication)

5.5.3 Provide additional assistance to ranchers

If ranchers are to become more responsive to drought conditions, they will need help. The Navajo Nation needs to find ways to provide that help. This section describes several steps that can be undertaken.

- Distribute climate and market information for ranchers more widely

Especially during drought, climate and market information needs to be more widely distributed to Navajo ranchers. Better distribution of this information is relatively inexpensive, and during the onset of drought, it can have tremendous benefits for ranchers. Better distribution of climate and market information for grazing district officials and ranchers will enable ranchers to receive higher prices for livestock, and will encourage ranchers to voluntarily reduce their livestock before “extreme drought” conditions emerge.

Public announcements and the Navajo Monthly Drought Status Report will inform ranchers of drought alerts, warnings, and emergencies. Agriculture market reports should also be disseminated. The cost for public announcements on the three major radio stations in the area is $13,700 per year. The mitigation measure is to design the information packages that will be distributed during drought.

- Encourage livestock sale barns or cattle auctions

Increasing the number of sale barns or cattle auctions across the Navajo Nation will reduce the drought damage and improve the condition of the range. The Naschitti Chapter has held annual cattle auctions for the last 57 years. During the 1996 drought they held more than one auction. Throughout a drought numerous cattle auctions should be held across the Navajo Nation. To encourage the voluntary reduction of livestock the Navajo Nation should assist sale barns to get established. Subsidizing the sale barns during mild and moderate drought conditions further encourages ranchers to sell their livestock before severe and extreme drought conditions occur. The sale barns need to be outfitted with fencing and weigh stations. During mild drought the livestock buyers need to be encouraged to attend. During severe and extreme droughts they should be provided incentives to attend. The cost of establishing a sale barn is $10,000. The total cost for two sale barns for all five Navajo Agencies is $100,000.

- Construct storage for USDA grain

Because of the lack of adequate storage near a railroad, the Navajo Nation has been unable to take full advantage of USDA grain distributions. The BIA has warehouse sites north of the City of Gallup that may be suitable. The Navajo Agricultural Products Industry anticipates the construction a $750,000 combination grain storage and rail loading facility. Based on the recent emergency grain applications, during a drought the Navajo Nation may need to process seven or eight rail cars, or 25 percent of the anticipated grain storage capacity. This share of the facility may cost $187,500.

- Increase the number of range managers to assist the Chapters

The range managers assist the Chapters with improved management practices. The range managers also assist with reclamation projects, reseed and restore topsoil, identify alternative pastures, and introduce rotational grazing. The range managers conduct workshops on improving the quality of the cattle, vaccinations, increasing body weight, and decreasing diseases. The range managers also improve communication between the livestock producers and buyers. With this information the ranchers will be better prepared to respond to drought and, if need be, reduce the number of livestock.

5.5.4 Improve the reliability of livestock supplies

Livestock water development should be part of an overall livestock plan. The following components include: 1) developing the livestock water development plan, 2) repairing and improving the existing livestock watering facilities, and 3) establishing circuit riders to improve the reliability of the water supplies.

- Developing the livestock water plan

During drought, if the range has no grass, and if the ranchers cannot afford fodder, providing additional livestock water can result in even greater long term damage to the range. Livestock water development must be part of a comprehensive range plan. For instance, grazing rotation can be encouraged by moving and spreading out the drinkers. Livestock water supplies should not be expanded beyond the capacity of the range to sustain them. And, additional livestock water development in areas that are chronically over grazed may be counter productive. Based on $60,000 per Navajo Agencies, a Reservation wide livestock water plan may cost $300,000. This plan may be a candidate for funding through the Environmental Quality Intensive Program (EQIP).

- Repair and overhaul livestock wells

The NDWR estimates that there are more than 7,500 stock ponds. Stock ponds are often dry during the summer months and during droughts. Because new stock ponds impact the stock ponds immediately downstream, the total number of stock ponds that can be effectively constructed is self limiting. Above ground storage tanks loose less water to evaporation and seepage than stock ponds. In selected areas, stock tanks can be installed. Assuming that each stock pond costs approximately $10,000 to rehabilitate, these ponds may cost $7.5 million.

Stock ponds dry up they are prone to wind and water erosion. Wind breaks around the stock ponds may reduce wind damage and loss of water. The cost of establishing a wind break around a stock pond is $2,700. Assuming 15 sites per Chapter the total cost is $440,000.

During drought the NDWR windmills are not able to supply adequate water. Also many of these livestock wells need repair or overhaul. In its 2002 five year water development plan, the NDWR estimated the cost to repair and overhaul the livestock wells is $12.4 million. If the Uniform Grazing Act is adopted, the grazing fees may be available to supplement this effort.

- Establishing Circuit Riders

The circuit riders will assist the Chapters with drought plans, and establishing water user groups. Livestock water fees could be based on the number of animal units per permit and will enable water users to improve the operation and maintenance of the livestock wells. A water user group at the local level will also reduce vandalism. Three full-time circuit riders on the Reservation for a four year period will cost $480,000.

5.6 RECREATION, WILDLIFE AND FORESTRY

The Navajo Departments of Fish and Wildlife, Parks and Recreation and Forestry identified mitigation measures to support their stewardship of the Navajo Nation's natural resources. A few of the mitigation measures are described in this section.

5.6.1 Recreation and Wildlife

With respect to drought mitigation, the NFDW has made recommendations to reduce catastrophic fish kills. In a letter dated June 30, 2000 from Jeffrey Cole, Wildlife Manager, to Gloria Tom, Director, the NFDW recommends establishing minimum pool levels in many of the Navajo Nations reservoirs. These recommendations are based on maintaining at least five feet of water depth at the reservoirs with warm water fish (bass and catfish) and at least ten feet of water depth in the reservoirs with cold water fish (trout). The NFDW recommends that irrigation should be discontinued if the reservoirs fall below these levels. The NFDW recommends the following Water Surface Levels:

- Ganado Reservoir

  The Water Surface Level is at 6,425 feet. The depth is 10 feet deep, or 850 acre-feet out of a total capacity of 2,900 acre-feet.

- Many Farm Reservoir

  The Water Surface Level is at 5,299 feet. The depth is 10 feet deep, or 1,253 acre-feet out of a total capacity of 14,500 acre-feet.

- Red Lake

  The Water Surface Level is at 7,069 feet. The depth is 5 feet deep, or 2,000 acre-feet out of a total capacity of 10,650.

- Round Rock Lake

  The Water Surface Level is at 5,500 feet. The depth is 16 feet deep, or 100 acre-feet out of a total capacity of 1,070 acre-feet.

Minimum recommended water surface elevations have not been established for Tsaile, Wheatfields, and Chuska Reservoirs. For Asaayi Lake the NDWF recommends that the minimum pool should not be lowered any more than necessary for safety of dam purposes, approximately 30 feet in depth.

Whiskey, Berland and Antelope Lakes are not used for irrigation. However, all three have experienced occasional fish kills during the summer.

To ensure that the water supply is adequate during drought, the NFDW should apply for water use permits from the Water Code Administration. Through the permitting process the Water Code Administration will determine water availability so that minium pool levels can be protected under Navajo law. Water Use Permits can be issued with special conditions that address drought concerns. The permit could also protect in stream flows based on the NFDW recommendations.

The Toadlena Fish Hatchery depends on spring-fed runoff from the Chuska Mountains for its water. In 1996, due to a lack of spring-fed runoff, the fish hatchery did not have enough water to adequately support fish production. Consequently, the hatchery was unable to completely restock the lakes and reservoirs on Navajo Nation. Poor surface water quality during droughts also impacts the success of fish stocking. A well could provide supplemental water when the spring-fed runoff is inadequate. The estimate cost for a well is $60,000.

5.6.2 Forestry

Three drought mitigation measures are recommended: 1) Fire Prevention, 2) Fire Detection and Suppression, and 3) Forest Restoration.

- Fire Prevention

  The NFD and BIA have a fire prevention strategy that includes removing vegetation near homes and other buildings, providing road access for emergency evacuation, proving road access for fire equipment, providing public information on prevention measures, and providing adequate sources of water for use by fire fighters.

  The Navajo Nation Forest Management Plan recommends thinning out the forest and initiating prescribed burns. These measures reduce the risk of conflagrations during droughts and maintain better forest health. Prescribed burns are only conducted when favorable conditions such as high soil moisture content, vegetation, low wind speed, and low topographic gradients exist. The BIA provides technical assistance to the NFD and hires fire crews to prepare and control fires.

  The NFD and BIA have procedures for assessing the fire danger level and issuing fire restrictions. Because the fire danger level depends on climate related parameters, including the SPI, the NFD and BIA could correlate the fire danger level with specific SPI values. The Navajo Nation President could then combine drought and fire restriction declarations. The combined declarations may reach a broader audience than separate efforts. However, it would be counterproductive to delay the drought declaration due to low fire hazard, or to delay fire restrictions due to a high SPI value.

Each fire restriction order should explain why the restriction is imposed and it needs to be announced publicly. The fire prevention teams at the federal, state and tribal levels should assist each other in publicizing restrictions using the radio, newspaper, and Chapter meetings (Personal Communication, Bill Watchman, BIA Forester, July 2001).

- Fire Detection and Suppression

A fire weather watch is used to alert firefighters to hazardous fire conditions. Fire lookouts are used on the Navajo Nation. Aerial patrols are also provided in conditions warrant. The NFD needs to identify fire suppression water sources that need to be protected during drought. It also needs to increase the number of water sources and to improve access points for fire equipment including trucks and helicopters. No specific costs were provided.

5.7 REUSE OF TREATED WASTE WATER

Even during droughts, the supply of effluent is relatively constant. The NDWR estimates that the NTUA lagoons treat approximately 6,000 acre-feet of effluent every year. Another drought mitigation measure is to use this treated effluent. Construction contractors on the Navajo Nation already use effluent when other water sources are not available. Water reuse programs have already been initiated in Pinon for wetlands and in Ganado to re-establish a riparian area. Developing these, and other, water conservation opportunities will enable the Navajo Nation to better withstand drought impacts.

The NDWR and Reclamation have proposed a water reuse investigation to identify water reuse opportunities for recreation, athletic fields, agriculture, wildlife, and other uses. Many of the NTUA sewage lagoons on the Reservation are close to capacity. The IHS sanitation deficiency list includes $73 million for sanitation upgrades. A reuse program may extend the effective capacity of many of these lagoons. The cost of a reconnaissance study to evaluate the use of effluent is $100,000.

5.8 CONCLUSIONS

The NDWR proposes drought mitigation measures with an estimated cost of $204.6 million. These measures include: 1) $113,000 for drought monitoring, 2) $160 million for public water systems, 3) $22.2 million for irrigators and dryland farmers, 5) $21.7 million for ranchers, and 6) $160,000 for a well at the Toadlena Fish Hatchery and a treated effluent reuse investigation. The NDWR has ranked these mitigation measures in terms of high, medium and low drought risk. The high priority measures have an estimated cost of $18,7 million, the medium priority measures have an estimated cost of $101.9 million, and the low priority measures have an estimated cost of $84.0 million. Approximately 78 percent of these measures address public water system deficiencies, 10 percent address irrigation vulnerability, and 10 percent address ranching. The values are summarized in Table 5.3.

Table 5.3 Drought Mitigation Summary

Priority	Water Use Sector	Dollars
High		
	Drought Monitoring	$113,000
	High Risk Public Water Systems	$13,400,000
	High Risk Irrigation Projects	
	Mitigation Assessments and Water Conservation Plans	$275,000
	Mitigation Measures	$4,128,000
	Ranching	
	Range management reform	n/a
	Accurate livestock count and establish Sale Barns	$184,500
	Remove feral animals	$250,000
	Livestock water development plan	$300,000
Subtotal		$18,650,500
Medium		
	Medium Risk Public Water Systems	$64,458,000
	Medium Risk Irrigation Projects	
	Mitigation Assessments and Water Conservation Plans	$765,000
	Mitigation Measures	$15,542,000
	Ranching	
	Overhaul and repair windmills	$12,400,000
	Rehabilitate stock ponds	$7,500,000
	Windbreaks	$440,000
	Circuit Riders	$480,000
	Grain Storage	$187,500
	Toadlena Fish Hatchery well and Navajo effluent re-use study	$160,000
Subtotal		$101,932,500
Low		
	Low to medium risk Public Water Systems	$82,400,000
	Low to Medium Risk Irrigation Projects	
	Mitigation Assessments and Water Conservation Plans	$175,000
	Mitigation Measures	$1,446,000
Subtotal		$84,021,000
Total		$204,604,000

6 DROUGHT RESPONSE

One objective of this Contingency Plan is to streamline the Navajo Nation's drought response. To prepare this drought response strategy the NDWR reviewed several state drought responses and conducted meetings with the Navajo Tribal programs. This section describes the responses of: 1) the four Navajo departments that have explicit drought response responsibilities, 2) the Navajo Nation's Office of the President and Vice President, 3) the Emergency Management Commission and Legislative oversight committees, 4) the Chapters, 5) NTUA, and 6) the grazing districts, farmboards, and soil and water conservation districts. This Drought Report and the resulting Contingency Plan will be presented to the Resources and Intergovernmental Relations Committees of the Navajo Nation Council for adoption.

6.1 NAVAJO DEPARTMENT OF WATER RESOURCES

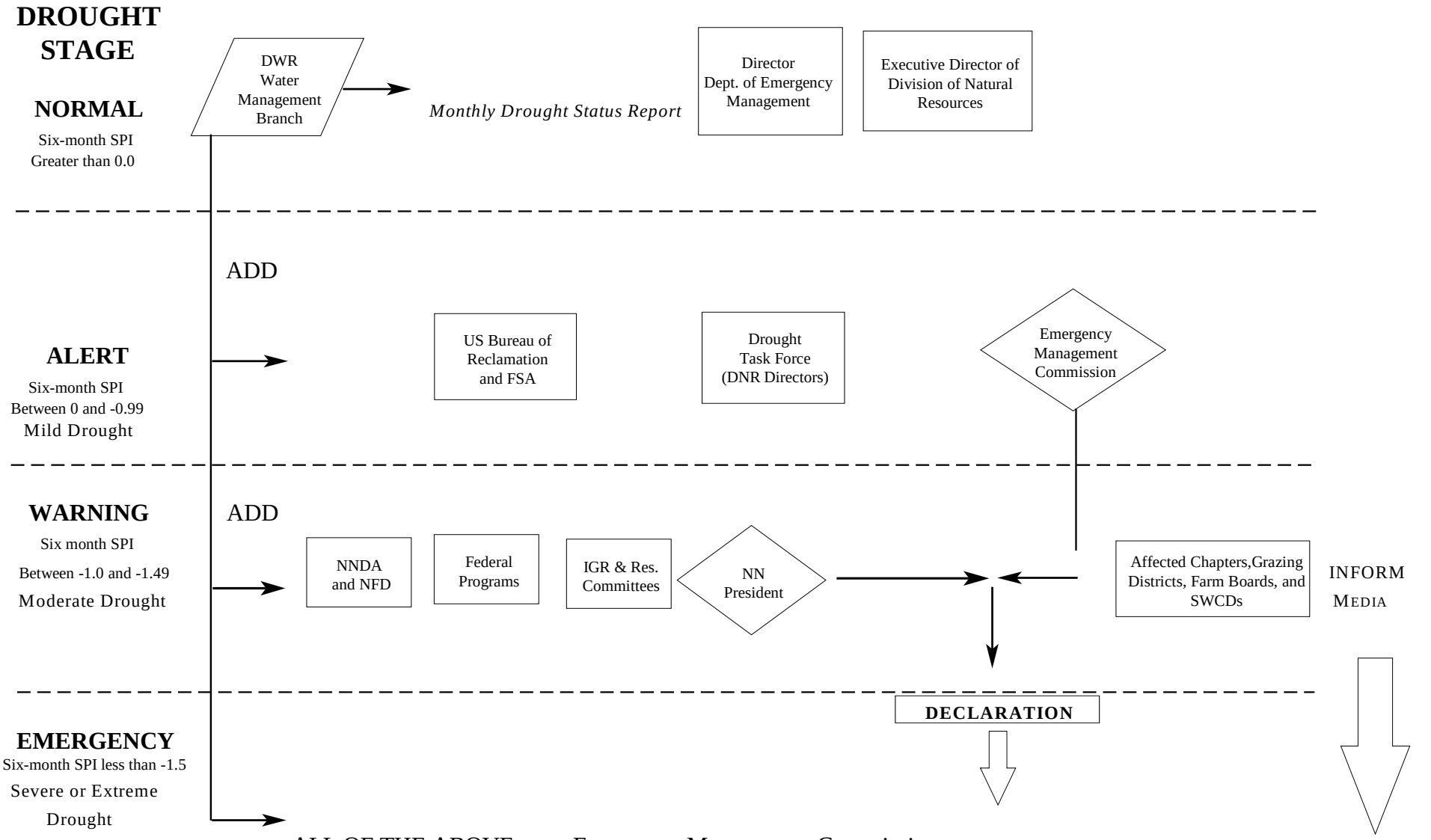
The NDWR has three branches that have specific drought response responsibilities: 1) the Water Management Branch, 2) the Technical Construction and Operation Branch, and 3) the Water Code Administration. The response of these programs is described in this section. Because drought monitoring results in the information used by all of the other respondents, the NDWR response is presented first.

6.1.1 Water Management Branch

The primary drought responsibility of the WMB is to prepare and distribute the Navajo monthly drought status report. The WMB will also provide annually updated information for the Drought Contingency Plan. This drought status report will include: 1) the six-month SPI for the climate divisions that encompass the Navajo Nation, 2) relevant information from the NOAA Drought Monitor, and 3) additional climate data from the Navajo Nation climate network. The six-month SPI data and the Drought Monitor are available on the 10th of the month. The WMB proposes to complete the monthly drought status report and distribute it by the 15st of the month. The drought status report is described in greater detail in Section 4.4. The drought status report will also be posted on the Navajo Nation web site. To ensure the timely flow of information, as drought conditions worsen, the monthly status report will be distributed more widely.

Tribal programs will be able to utilize programmatic resources to address worsening drought conditions. The information in the monthly drought status reports can be used by the Emergency Management Commission and the President of the Navajo Nation to justify a drought emergency in the affected Chapters. Once the drought emergency declaration has been made, the Chapters are eligible to apply for, and receive, supplemental assistance from the Navajo Nation and from specific federal authorities. This distribution is presented in the following section and the drought status notification is shown in Figure 6.1.

Figure 6.1
Navajo Nation Drought Notification Chart



- Normal Conditions (Six-month SPI greater than 0.0)

During normal conditions when the six-month SPI is greater than 0.0, the Navajo monthly drought status report will be distributed to:

Director of the Department of Emergency Management
Executive Director of the Division of Natural Resources

- Drought Alert (Six-month SPI between 0.0 and -0.99)

The next level of response is a drought alert, which will be triggered when the SPI is between 0.0 and -0.99. This event is a mild drought which may occur 34 percent of the time. The Navajo monthly drought status report will be distributed to:

Director of the Department of Emergency Management
Executive Director of the Division of Natural Resources
Emergency Management Commission
Drought Task Force (Executive Directors of the Divisions)
U.S. Bureau of Reclamation and Farm Service Agency

During the Drought Alert, the Executive Directors of Tribal Divisions may utilize programmatic resources to prepare for drought impacts.

- Drought Warning (Six-month SPI between -1.0 and -1.49)

The next level of response is a drought warning, which will be triggered when the SPI is between -1.0 and -1.49. This event is a moderate drought which may occur about 10 percent of the time. The monthly drought status report will be distributed to:

Director of the Department of Emergency Management
Executive Director of the Division of Natural Resources
Emergency Management Commission
Drought Task Force (Executive Directors of the Divisions)
The Office of the President and the Vice President
Affected Chapters
IGR and Resources Committees
Federal Programs
Affected grazing district officials, Soil and Water Conservation Districts, and farm boards
Directors of the Departments of Agriculture and Forestry

During the Drought Warning, the Executive Directors of the Tribal Divisions may utilize programmatic resources to prepare for drought conditions. To minimize drought impacts the Chapters should begin to prioritize needs and prepare for drought.

- Drought Emergency (Six-month SPI less than -1.5)

The next level of response is a drought emergency, will be triggered when the six-month SPI is less than -1.5. This event is a severe or extreme drought which may occur about 6 percent of the time. The monthly drought status report will be distributed to:

Director of the Department of Emergency Management
Executive Director of the Division of Natural Resources
Emergency Management Commission
Drought Task Force (Executive Directors of the Divisions)
The Office of the President and the Vice President
Affected Chapters
IGR and Resources Committees
Federal Programs
Affected grazing district officials, Soil and Water Conservation Districts, and farm boards
Directors of the Departments of Agriculture and Forestry

6.1.2 Technical Construction and Operation Branch

The Technical Construction and Operation Branch is responsible for operating irrigation projects, several public water systems, and more than 900 livestock wells on the Reservation. It also provides support for more than 7,500 stock ponds.

- Normal Conditions and Drought Alert (SPI greater than -0.99)

During normal and alert conditions the TCOB will have no special drought programmatic responsibilities.

- Drought Warning (Six-month SPI between -1.0 and -1.49)

During a drought warning the TCOB will prioritize well maintenance and major repairs based on drought impacts. The TCOB will prepare a needs budget for additional Tribal appropriations. This needs budget for supplemental funds will require SAS review. The TCOB field offices will report field observations of water systems and drought impacts. They will also distribute, collect and tabulate drought evaluation forms submitted by the Chapters

and provide these forms to the NDEM. These forms will identify water supply problems and potential watering points for water haulers. If programmatic or supplemental funds are available, the TCOB will provide drought assistance to water users.

- Drought Emergency (Six-month SPI less than -1.5)

The next level of response is a drought emergency. The TCOB will submit a needs budget for additional Tribal appropriations. This budget will require SAS review. The TCOB field offices will report field observations of water systems and drought impacts. They will also distribute, collect and tabulate drought evaluation forms submitted by the Chapters and provide these forms to the NDEM. These forms will identify water supply problems and potential watering points for water haulers. If programmatic or supplemental funds are available, the TCOB will respond to the drought impacts described in the drought forms. The Safe Drinking Water Act requires public system operators to prepare emergency action plans. As these plans are prepared for the NDWR public water systems, they will describe drought emergency measures.

6.1.3 Water Code Administration

During normal, alert and warning drought conditions, the Water Code Administration may review and issue Water Use Permits with special conditions that address drought impacts. For instance, the Water Code Administration could, on behalf of the U.S. Forest Service or NFD, submit an emergency Water Use Permit for fire suppression to the Resources Committee. That permit could describe specific water sources that the Navajo Nation will reserve during drought for fire suppression. In addition, based on water availability, the Water Code Administration may decline new water use permits for any surface water diversions.

During severe and extreme drought emergencies, whether or not a drought is formally declared, the Water Code prescribes the priority of water use on the Navajo Reservation. When insufficient water is available, the Water Code Administration may enforce priority uses which include: 1) domestic and municipal, 2) stock, 3) agricultural, 4) in stream, 5) economic development including industry and power generation, and 6) other uses. The Water Code may also restrict unpermitted water uses.

6.2 NAVAJO DEPARTMENT OF EMERGENCY MANAGEMENT

Since 1988 the Navajo Nation Department of Emergency Management (NDEM) has coordinated the Navajo Nation's emergency response to drought. The NDEM has the primary responsibility for disseminating drought information, and is the designated point of contact for press releases. The NDEM may use the six-month SPI information provided in the monthly drought status report to advise

the Emergency Management Commission and the Navajo Nation President. The NDEM responses are described in the following section.

- Normal Conditions (Six-month SPI greater than 0.0)

During normal conditions the NDEM will receive the monthly drought status report. The NDEM may convene a drought status meeting with the Emergency Management Commission and Drought Task Force twice a year, or as needed, to review work, evaluate monitoring, and assess drought triggers. The NDEM will assist with, and review, the Chapter drought plans. The NDEM will monitor vacancies on the EMC and seek IGR approval of nominees. The NDEM will conduct an annual drought response drill.

- Drought Alert (Six-month SPI between 0.0 and -0.99)

During drought alerts the NDEM will receive the monthly drought status report. The NDEM may convene a drought status meeting with the Emergency Management Commission and Drought Task Force every other month, or as needed, to review work, evaluate monitoring, and assess drought triggers. The NDEM will assist with, and review, the Chapter drought plans. The NDEM will monitor vacancies on the EMC and seek IGR approval of nominees. The NDEM will also identify federal, state, and local assistance programs.

- Drought Warning (Six-month SPI between -1.0 and -1.49)

The next level of response is a drought warning. The NDEM will receive the monthly drought status report. During a drought warning the NDEM may convene the Emergency Management Commission monthly, or as needed, to review work and evaluate monitoring. The NDEM will monitor vacancies on the EMC and seek IGR approval of nominees.

The NDEM will assist with, and review, the Chapter drought plans. The NDEM will receive the NNDA and NDWR drought forms, and evaluate the drought impacts. The NDEM will evaluate the Chapter drought assistance resolutions. The resolutions will include the NDEM Initial Incident Assessment Forms. The NDEM will review the NDR drought Contingency Plans and requests for supplemental funds. The NDEM will contact federal, state, and local drought programs and coordinate assistance. The NDEM will communicate to the public through the media using press releases. And, the NDEM will advise the President and the EMC on preparing drought emergency declarations.

- Drought Emergency (Six-month SPI less than -1.5)

The next level of response is a drought emergency. During a drought emergency, the NDEM will convene the Emergency Management Commission and the Drought Task Force every other week, or as needed, to review work and drought monitoring. The NDEM may use the monthly drought status report to make recommendations to the President of the Navajo Nation and to the Emergency Management Commission that the conditions in affected Chapters warrant a drought emergency. The NDEM will evaluate the DNR request for supplemental funds.

The NDEM is the first point of contact for the Chapters to receive drought assistance. The NDEM will review the Chapter drought plans. The NDEM will also evaluate NNDA and NDWR drought forms and summaries. The NDEM will evaluate the Chapter resolutions requesting drought assistance. The NDEM Initial Incident Assessment Forms must accompany the resolutions.

The NDEM will contact federal, state and local programs and coordinate assistance. The NDEM will communicate to the public through the media using press releases. The Federal programs provide assistance when the emergency impacts exceed the local capacity to respond. Based on the emergency conditions, the DNR and NDEM will initiate government to government requests for assistance. These request will need to proceed through the SAS 164 review process, and many requests for outside assistance may require approval by the IGR Committee and possible other oversight committees.

6.3 Navajo Nation Department of Agriculture

The NNDA provides and coordinates assistance to ranchers and farmers. The NNDA has oversight over agricultural and supplement feed programs. The NNDA responses are described in the following section.

- Normal Conditions (Six-month SPI greater than 0.0)

During normal conditions the NNDA will have no special programmatic drought responsibilities.

- Drought Alert (Six-month SPI between 0.0 and -0.99)

The next level of response is a drought alert. The NNDA will encourage voluntary reduction in livestock, encourage sale barns, and provide market information to the affected grazing districts.

- Drought Warning (Six-month SPI between -1.0 and -1.49)

The next level of response is a drought warning. During the drought warning the NNDA will receive the monthly drought status report. The NNDA will distribute drought impact forms to ranchers and farmers, tabulate results, and evaluate the range conditions. It may utilize programmatic resources to prepare for drought impacts, and may prepare a needs budget for additional Tribal appropriations. This budget for supplemental Tribal funds will require SAS review. The NNDA will assist the ranchers with volunteer livestock reduction and will assist and subsidize sale barns. The NNDA will provide market information to the affected grazing districts. The NNDA will initiate the preliminary steps for the USDA drought assistance applications, and disseminate information on USDA programs. The NNDA will provide a monthly drought update.

- Drought Emergency (Six-month SPI less than -1.5)

The next level of response is a drought emergency. During the Emergency the NNDA will receive the monthly drought status report. The NNDA will assist the ranchers with livestock reduction. The NNDA will assist and subsidize livestock sale barns. The NNDA will receive reports on range conditions from the grazing districts, farmboards, and soil and water conservation districts. The NNDA will distribute and tabulate drought impact forms to ranchers and farmers. If available, NNDA may utilize programmatic resources to prepare for drought impacts, and may submit a needs budget for additional Tribal appropriations. This budget for supplemental Tribal funds will require SAS review. The NNDA will provide market information to the affected grazing districts. The NNDA will round up and remove feral animals. The NNDA will coordinate planning with the Navajo Nation, states, counties and federal government. The NNDA will prepare and submit the USDA drought assistance applications. The NNDA will distribute information on USDA drought programs. The NNDA will prepare a monthly drought update.

6.4 NAVAJO FORESTRY DEPARTMENT

Because drought corresponds with periods of high fire hazard, the NFD drought response parallels the fire hazard response. The same measures that apply to critical fire conditions, also apply to drought conditions. During normal and alert drought conditions, the NFD is engaged in fire prevention. During warnings and emergencies the NFD may be engaged in fire detection and suppression.

6.5 THE NAVAJO NATION

The Executive and Legislative Branches of the Navajo Nation Government have complementary drought response authorities. The Executive Branch discharges its responsibilities through the Office of the President and Vice President, the Executive Directors of the Divisions which comprise the standing Drought Task Force, and the Tribal Departments. The Legislative Branch, which includes the 88 elected council delegates, discharges its authority through its oversight committees and the Emergency Management Commission. The Public Safety Committee provides oversight to the NDEM, and the Resources Committee provides oversight to the DNR. Through the SAS 164 review process both Branches provide input and review for requests for Tribal funds, and requests for outside assistance.

6.5.1 The Office of the President and the Vice President

The President and the Vice President of the Navajo Nation are elected by the Navajo people to serve a four-year term. The response of the President is described in the following section.

- Normal Conditions (SPI greater than 0.0)

  During normal conditions the Office of the President and the Vice President will have no special programmatic drought responsibilities.

- Drought Alert (SPI between 0.0 and -0.99)

  During alert conditions the Office of the President and the Vice President make appointments to vacancies on the Emergency Management Commission and direct the Division Directors to utilize programmatic resources to address drought impacts.

- Drought Warning (Six-month SPI between -1.0 and -1.49)

  The next level of response is a drought warning. During a drought warning the Office of the President and the Vice President will receive copies of the monthly drought status report from the WMB, and additional drought information from the NDEM. The staff may also monitor the activities of the Drought Task Force. This standing Drought Task Forces, which comprises the presidentially appointed Executive Directors of the Divisions, may be able to address drought impacts using limited programmatic funds. The President may prepare the drought emergency declaration and prepare letters requesting drought determinations.

- Drought Emergency (Six-month SPI less than -1.5)

The next level of response is a drought emergency. The President of the Navajo Nation may, with the concurrence of the Emergency Management Commission, declare a drought emergency. The President of the Navajo Nation will send letters to the Secretary of the Interior, the Secretary of Agriculture, the Chief Engineer of the Army Corps, and the State Agencies requesting determinations of drought and drought assistance. And, the President may support a resolution requesting supplemental tribal funding to address drought impacts in the affected Chapters. The standing Drought Task Forces consists of presidentially appointed Executive Division Directors. The President may direct them to address drought impacts using limited programmatic or supplemental Tribal funds.

6.5.2 The Emergency Management Commission

The EMC is composed of six commissioners with expertise in civil defense, health, fire fighting, environment, and media, and an elected official. They are appointed by the Speaker of the Navajo Nation Council and confirmed by the Intergovernmental Relations (IGR) Committee. The EMC also has authority to seek and coordinate assistance. The Commissioners are on call for the purpose of obtaining timely action on emergency matters.

- Normal Conditions (Six-month SPI greater than 0.0)

During normal conditions the Emergency Management Commission and Legislative Oversight Committees will have no special programmatic drought responsibilities. The EMC may meet with the NDEM twice a year, or as needed, to review recently completed and planned work, evaluate current monitoring data, and assess drought triggers. The EMC may also participate in an annual drought response drill.

- Drought Alert (Six-month SPI between 0.0 and -0.99)

The next level of response is a drought alert. The EMC will receive the monthly drought status report. During the drought alert the Emergency Management Commission the may meet with the NDEM every other monthly or as needed to review recently completed and planned work and evaluate current monitoring data.

- Drought Warning (Six-month SPI between -1.0 and -1.49)

The next level of response is a drought warning. The EMC will receive the monthly drought status report. During the drought alert the Emergency Management Commission the may meet with the NDEM monthly or as needed. The EMC may advise the President on preparing a drought emergency declaration, and seek and coordinate assistance.

- Drought Emergency (Six-month SPI less than -1.5)

The next level of response is a drought emergency. The EMC will receive the monthly drought status report. During the drought alert the Emergency Management Commission the may meet with the NDEM every other week or as needed. The Emergency Management Commission, with the concurrence of the President of the Navajo Nation, may declare a drought emergency in the affected Chapters. The Emergency Management Commission is authorized to seek and coordinate drought assistance.

6.6 THE CHAPTERS

The Navajo Nation assists the Chapters when emergency impacts exceed their local capacities. And, based on their existing plans of operation, the Tribal programs have limited discretion to act using existing programmatic resources. However, supplemental Tribal resources require action by the Navajo Nation Council, must go through the SAS review process which includes action by the appropriate oversight committee. If Tribal General Funds are required, then Council may recognize the six-month SPI as a justification of drought relief to the affected Chapters. The broader the consensus on the drought trigger, the shorter the period of time it will take to provide assistance to the affected Chapters.

This Contingency Plan is a "how to" handbook for the Chapters. The Chapter drought Contingency Plan is patterned after the Safety Drinking Water Act Emergency Action Plan. It includes information regarding whom the Chapter should contact and when. It also includes descriptions of the type of information the chapters need to effectively approach the Navajo government for funding. The Chapter Drought Contingency Plans may include:

- Name of the Chapter
- Public water system and livestock well identification numbers
- Telephone numbers of Chapter, Grazing District and Farmboard officials
- Location of the public water systems and livestock wells
- Possible sources of water for emergency public supplies
- Water conservation ordinances and plans
- Especially vulnerable water users (water haulers, elderly, etc.)
- Stockpiled supplies

- Provisions for alternate water supplies

- Normal Conditions (Six-month SPI greater than 0.0)

During normal conditions Chapters will complete and update their drought Contingency Plans. Few if any Chapters have emergency drought plans. This lack of planning makes it difficult for the Chapters to respond in a timely manner. The NDEM recommends that the Chapters: 1) prepare drought Contingency Plans, 2) Chapters designated a drought coordinator, and 3) conduct a drought hazard analysis (NDEM, July 1999). The Chapter Drought Contingency Plans may include:

- Drought Alert (Six-month SPI between 0.0 and -0.99)

The next level of response is a drought alert. During the Drought Alert the Chapters may prepare and update their drought Contingency Plans and appoint a drought coordinator.

- Drought Warning (Six-month SPI between -1.0 and -1.49)

The next level of response is a drought warning. The affected Chapters will receive the monthly drought status report. During the drought warning the Chapters will implement their drought Contingency Plans and assess their water supply. They will complete the NNDA, NDWR and NDEM drought impact forms. The Chapters will prepare drought response resolutions, and administer local assistance.

- Drought Emergency (Six-month SPI less than -1.5)

The next level of response is a drought emergency. The affected Chapters will receive the monthly drought status report. During the drought warning the Chapters will implement their drought Contingency Plans. They will update the NNDA, NDWR and NDEM drought impact forms. During the drought emergency the Chapters will amend or resubmit drought response resolutions requesting assistance. These resolutions include the NDEM incident forms for the NDEM to evaluate the need for assistance. This assistance may consist of funding to the Chapter officials who then administer the responses. Or, the assistance may be in the form of funding to Navajo programs that provide services. In that case the Tribal programs working with the Chapters administer the response. Since the Chapters are closer to the local problems, they should be actively involved. The Chapter officials may know which wells and springs are dry, which windmills are broken, and which families need help. Other responses include recruiting volunteers for local action, assisting with public service announcements, and assisting with feed and water distribution, and working with the national guard.

6.7 NAVAJO TRIBAL UTILITY AUTHORITY

In a July 12, 1999, Press Release, NTUA's General Manager, Randall Medicine Bear, states that during drought conditions NTUA is primarily concerned with the continuous provision of domestic water to its customers. In a follow up letter to the Department of Emergency Management Mr. Randall Medicine Bear states that the water supplied by NTUA is only available for human consumption, safety and sanitary needs. The safety issues include fire suppression, but not stock watering or irrigation.

- Normal Conditions and Drought Alert (Six-month SPI greater than -0.99)

During normal conditions NTUA will have no special programmatic drought responsibilities. The NTUA will continue preparing emergency action plans for their Public water systems.

- Drought Warning (Six-month SPI between -0.99 and -1.49)

The next level of response is a drought warning. During the warning NTUA will encourage voluntary conservation.

- Drought Emergency (Six-month SPI less than -1.5)

The next level of response is a drought emergency. The Navajo Nation Safe Drinking Water Act (sub chapter 4, Section 405) requires that each public water system owner or operator will develop an emergency water plan. NTUA has developed for approximately 20 their 90 public water systems. NTUA will implement emergency action plans which may include rationing.

6.8 GRAZING DISTRICTS, FARMBOARDS AND SWCD'S

In a July 12, 1999, Press Release, NTUA's General Manager, Randall Medicine Bear, states that during drought conditions NTUA is primarily concerned with the continuous provision of domestic water to its customers. In a follow up letter to the Department of Emergency Management Mr. Randall Medicine Bear states that the water supplied by NTUA is only available for human consumption, safety and sanitary needs. The safety issues include fire suppression, but not stock watering or irrigation.

- Normal Conditions and Drought Alert (Six-month SPI greater than -0.99)

During normal and alerts the grazing districts, farmboards, and SWCD's will have no special programmatic drought responsibilities.

- Drought Warning (Six-month SPI between -0.99 and -1.49)

The next level of response is a drought warning. The affected districts will receive the monthly drought status report. They will evaluate and report the range and water supply conditions to the NNDA. And, they will assist the NNDA with the USDA drought assistance applications and distribution of assistance.

- Drought Emergency (Six-month SPI less than -1.5)

The next level of response is a drought emergency. The affected districts will receive the monthly drought status report. They will evaluate and report the range and water supply conditions to NNDA. And, they will assist the NNDA with the USDA drought assistance applications and distribute of assistance. The grazing district will assist with livestock reduction.

Table 6.1
Recommended Responses Normal Conditions(SPI greater than 0.0)

Agency	Recommended Responses
Department of Water Resources (NDWR)	Water Management Branch will: - Prepare the Monthly Drought Status Report - Distribute the Monthly Drought Status Report to: 1. the Director of the Dept. of Emergency Management 2. the Executive Director of Division of Natural Resources - Post the Monthly Drought Status Report on the Navajo Nation web site
Department of Emergency Management (NDEM)	Convene drought status meetings with the Emergency Management Commission twice a year, or as needed, to review recently completed and planned work, evaluate current monitoring data and assess drought triggers Assist and review Chapter drought Contingency Plans Monitor vacancies on the Emergency Management Commissioners, and seek IGR approval of nominees Conduct a Navajo Nation Drought Response annual drill (table top exercise)
Emergency Management Commission (EMC)	Meet twice annually, or as needed, on drought issues to review recently completed and planned work, evaluate current monitoring data, and assess existing “drought triggers” Conduct a Navajo Nation Drought Response annual drill (table top exercise)
Chapters	Prepare or update drought Contingency Plans

Table 6.2
Recommended Responses During Drought Alert
(Mild Drought Conditions, SPI between 0.0 and -0.99)

Agency	Recommended Responses
Department of Water Resources (NDWR)	Water Management Branch will: - Prepare the Monthly Drought Status Report - Distribute the Monthly Drought Status Report to: 1. the Director of Dept. of Emergency Management 2. the Executive Director of Natural Resources Division 3. the Emergency Management Commissioners 4. Drought Task Force (Navajo Nation Division Directors) 5. Reclamation and FSA - Post the Monthly Drought Status Report on the Navajo Nation web site
Department of Emergency Management (NDEM)	Convene drought status meetings with the Emergency Management Commission and Drought Task Force every other month, or as needed, to review recently completed and planned work, evaluate current monitoring data and assess drought triggers Assist and review Chapter drought Contingency Plans, and evaluate drought impacts Monitor vacancies on the Emergency Management Commissioners, and seek IGR approval for nominees Identify federal, state and county assistance
Department of Agriculture (NNDA)	Encourage voluntary livestock reduction Encourage sale barns Proved market information to affected districts
Navajo Nation President	Makes appointments to the Navajo Nation Drought Task Force. Direct each Tribal Division will designate a drought coordinator
Drought Task Force (Division Directors)	Divisions Executive Directors may use programmatic funds if available to mitigate drought impacts

Table 6.2 (Continued)
Recommended Responses During Drought Alert
(Mild Drought Conditions, SPI between 0.0 and -0.99)

Agency	Recommended Responses
Emergency Management Commission (EMC)	Meets every other month on drought issues to review recently completed and/or planned work, and to evaluate current monitoring data.
Chapters	Prepare or update drought Contingency Plans Appoint Drought Coordinator
Drought Task Force (Division Directors)	Divisions Executive Directors may use programmatic funds if available to mitigate drought impacts

Table 6.3
Recommended Responses During Drought Warning
(Moderate Drought Conditions, SPI between -1.00 and -1.49)

Agency	Recommended Responses
Department of Water Resources (DWR)	Water Management Branch will: - Prepare the Monthly Drought Status Report - Distribute the Monthly Drought Status Report to: 1. the Director of Dept. of Emergency Management 2. the Executive Director of Natural Resources Division 3. the Emergency Management Commissioners 4. Drought Task Force (Navajo Nation Division Directors) 5. Office of the President and Vice President 6. Affected Chapters 7. Inter-Governmental Relations and Resources Committees 8. Federal Programs 9. Affected Grazing Districts, Farm Boards, and Soil Water Conservation Districts 10. Directors of the Departments of Agriculture and Forestry - Post the Monthly drought Status Report on the Navajo Nation Web site Technical Construction and Operation Branch will: - Prioritize well maintenance and major repairs based on drought impacts - Prepare a needs budget for additional Tribal appropriations - Field Offices will report field observations of water systems - Distribute, collect and tabulate drought evaluation forms submitted by Chapters and provide them to NDEM - identify potential watering points for water haulers - provide technical assistance to local water users

Table 6.3 (Continued)
Recommended Responses During Drought Warning
(Moderate Drought Conditions, SPI between -1.00 and -1.49)

Agency	Recommended Responses
Department of Emergency Management (NDEM)	Convene drought status meetings with the Emergency Management Commission and Drought Task Force monthly, or as needed, to review recently completed and/or planned work, and evaluate monitoring data Assist and review Chapter drought Contingency Plans Monitor vacancies on the Emergency Management Commissioners, and seek IGR approval of nominees Contact federal, state and county drought programs and coordinate assistance Distribute drought information to the Chapters and general public Receive drought forms from NNDA and NDWR and evaluate impacts Evaluate Chapter resolutions requesting assistance and drought initial incident forms submitted by the Chapters Evaluate DNR Departments drought plans and supplemental funding requests Disseminate drought information to the public through the media Advise the Navajo Nation President and EMC on preparing a Drought Emergency Declaration for the affected Chapters
Department of Agriculture (NNDA)	Encourage voluntary livestock reduction Assist and subsidize sale barns Evaluate range conditions Prepare a needs budget for additional Tribal appropriations Distribute, collect and summarize drought evaluation forms submitted by Chapters and ranchers and provide these forms to NDEM Initiate the USDA applications Proved market information to affected districts Provide a monthly drought update

Table 6.3 (Continued)
Recommended Responses During Drought Warning

(Moderate Drought Conditions, SPI between -1.00 and -1.49)

Agency	Recommended Responses
Navajo Nation President	Prepares Drought Emergency Declaration Prepare letters to U. S. Secretaries for drought determination.
Drought Task Force (Division Directors)	Divisions may use programmatic funds if available to mitigate drought impacts
Emergency Management Commission (EMC)	Meet monthly or as needed on drought issues to review recently completed and planned work, evaluate current monitoring data, and assess drought triggers Advise the Navajo Nation President on preparing a Drought Emergency Declaration Seek and coordinate federal, state, and county assistance
Chapters	Implement drought plans Assess the water supplies Complete NNDA, NDWR, and NDEM forms Prepare resolutions and administer local assistance
Navajo Tribal Utility Authority	Encourage voluntary water conservation
Grazing Districts	Affected Grazing Districts evaluate their rangeland Assist NNDA and FSA with USDA applications
Farm Boards	Affected Farm Boards evaluate their soil moisture and water supply Assist NNDA and FSA with USDA applications
Soil and Water Conservation Districts	Affected SWCDs coordinate response with the Grazing District and Farm Boards

Table 6.4
Recommended Responses During Drought Emergency
(Severe or Extreme Drought, SPI less than -1.50)

Agency	Recommended Responses
Department of Water Resources (DWR)	Water Management Branch will: - Prepare the Monthly Drought Status Report - Distribute the Monthly Drought Status Report to: 1. the Director of Dept. of Emergency Management 2. the Executive Director of Natural Resources Division 3. the Emergency Management Commissioners 4. Drought Task Force (Navajo Nation Division Directors) 5. Office of the President and Vice President 6. Affected Chapters 7. Inter-Governmental Relations and Resources Committees members, 8. Federal Programs 9. Affected Grazing Districts, Farm Boards, and Soil Water Conservation Districts 10. The Directors of the Departments of Agriculture and Forestry - Post the Monthly Drought Status Report on the Navajo Nation web site Technical Construction and Operation Branch will: - Submit a needs budget for additional Tribal appropriations. - Field Offices will report field observations of water systems. - Distribute, collect and tabulate drought evaluation forms submitted by Chapter, and provide the forms to NDEM - Identify potential watering points for water haulers - Respond to NDWR impact forms if resources are available - Implement Safe Drinking Water Act emergency action plans Water Code Administration will enforce water use priorities and restrict unpermitted water uses

Table 6.4 (Continued)
Recommended Responses During Drought Emergency
(Severe or Extreme Drought, SPI less than -1.50)

Agency	Recommended Responses
Department of Emergency Management (NDEM)	Convene drought status meetings with the Emergency Management Commission and Drought Task Force every other week, or as needed, to review recently completed and planned work, and evaluate current monitoring Evaluate completed Chapter drought Contingency Plans Receive drought impact forms from NNDA and NDWR and evaluate impacts Evaluate DNR Departments drought plans and supplemental funding requests Disseminate drought information to the public through the media Advise the Navajo Nation President on declaring a Drought Emergency Declaration in the affected Chapters. Evaluate Chapter resolutions and drought initial incident assessment forms submitted by the Chapters Coordinate federal, state and county assistance and distribute information to the Chapters and general public
Department of Agriculture (NNDA)	Assist with livestock reduction, and assist and subsidize sale barns Distribute, collect and summarize drought evaluation forms submitted by Chapters and ranchers and provide these forms to NDEM Receive reports on range conditions from grazing districts, Farmboards, and SWCD and evaluate range conditions Submit a needs budget for additional Tribal appropriations. Distribute information on USDA programs Prepare and submit USDA applications for farm and ranch relief Proved market information to affected districts Round up and remove feral animals Coordinate planning with federal, state, and local government Respond to NDWR impact forms if resources are available Prepare a monthly drought update

Table 6.4 (Continued)
Recommended Responses During Drought Emergency

(Severe or Extreme Drought, SPI less than -1.50)

Agency	Recommended Responses
Navajo Nation President	Based on recommendation of NDEM and EMC, declare a drought emergency Send letters to Secretaries for drought determination and assistance Support resolutions for supplemental drought assistance funding Direct the Drought Task Force to address impacts with programmatic funds
Drought Task Force (Division Directors)	Divisions may use programmatic funds if available to mitigate drought impacts
Emergency Management Commission (EMC)	Meet every other week or as need to review recently completed and planned work, and evaluate current monitoring data Recommend to, and concur with, the President on a Drought Emergency Declaration Seek and Coordinate assistance
Chapters	Implement Emergency Drought Contingency Plans Affected Chapters submit drought assistance resolutions to NDEM or amend previous resolutions recognizing emergency conditions Affected Chapters update NDWR, NNDA, and NDEM initial incident assessment drought forms and submit to appropriate departments Coordinate and administer local drought assistance (hauling, feed etc.) Respond to specific local needs if resources are available Assist with public service announcements
Navajo Tribal Utility Authority	Initiate Emergency Water Plans and possible rationing on affected systems
Grazing Districts	Affected Grazing Districts evaluate their rangeland Assist with livestock reduction Assist NNDA and FSA with USDA applications and assistance
Farm Boards	Affected Farm Boards evaluate their soil moisture and water supply Assist NNDA and FSA with USDA applications and assistance
Soil and Water Conservation Districts	Affected SWCDs coordinate with the Grazing District and Farm Boards

REFERENCES

Alley, W. M., *The Palmer Drought Severity Index: Limitations and Assumptions*. Journal of Climate and Applied Meteorology, 23:1100-1109. 1984.

Becker, Robert J., PhD. *Provisional Drought Assessment for the Navajo Nation 1996.* Navajo Nation Department of Water Resources. 1996.

Bureau of Reclamation. *San Carlos Reservoir Drought Impact Finding Report.* Phoenix, Arizona: Phoenix Area Office, May 1998.

Bureau of Reclamation. *Achieving Efficient Water Management, A Guidebook for Preparing Agricultural Water Conservation Plans*. Prepared by Hydrosphere Resource Consultants, Prepared for the Bureau of Reclamation. December 1999.

Bureau of Indian Affairs. *The Navajo yearbook 1951 - 1961, A decade of Progress.* Compiled by Robert W. Young, Assistant th the General Superintendent, Navajo Agency, Window Rock , Arizona 1961.

Bureau of Indian Affairs. *Programmatic Wildland Fire Plan for the Navajo Nation*. Fort Defiance, Arizona. May 2000.

Downs, James F., *The Navajos*, Holt, Rinehart and Winston, Incorporated, New York, New York, 1972.

Eddy, Richard E, and Hurley, Patrick H. *Southwest Drought Research Program.* University of Nebraska-Lincoln, 1991.

Eckert, Jerry. *Employment and Incomes in the Navajo Nation: 1987 - 88 Estimates and Historical Trends*, January 1989.

Gatewood, J.S.; Wilson, Alfonso; Thomas, H.E.; and Kister, L. R. *General Effects of Drought on Water Resources of the Southwest.* Geological Survey Professional Paper 372-B. U.S. Department of the Interior. United States Government Printing Office, Washington: 1964.

Hawaii Drought Council. *Hawaii Drought Plan, Phase 1*, August 25, 2000.

Hopi Tribe, 2000 *Hopi Drought Plan*, The Hopi Tribe, Kykotsmovi, Arizona and D.B. Stephens and Associates, Inc. Albuquerque, New Mexico, August 8, 2000.

Karl, T. R. and R. W. Knight, *Atlas of Monthly Palmer Hydrological Drought Indices (1931-1983) for the Contiguous United States*. Historical Climatology Series 3-7, National Climatic Data Center, Asheville, North Carolina. 1985.

Kluckhorn, Clyde and Leighton, Dorothea, *The Navajo*, Double Day and Company Incorporated, Garden City, New York, 1962.

Leverson, Verne. *Part I of the Drought Index Study*, Bureau of Reclamation, Technical Services Center, Denver, Colorado, July 2, 1998.

Leverson, Verne. *SPI Drought Work*, Bureau of Reclamation, Technical Services Center, Denver, Colorado, July 19, 1998.

Locke, Raymond Friday, *The Book of the Navajo*, Mankind Publishing Company, Los Angeles, California, 1992.

Mathien, Frances Joan., *Environmental and Subsistence of Chaco Canyon New Mexico*, National Park Service, Albuquerque, New Mexico, 1985.

McKee, T. B., N. J. Doesken, and J. Kleist. *The relationship of drought frequency and duration to time scales*. Preprints, 8th Conference on Applied Climatology, 17-22 January, Anaheim CA, PP. 179-184. 1993.

Merchant, Jim. *Three Canyon Water Supply Project, Project Description, Appendix D*, May 8, 2000.

Molzen-Corbin & Associates. *Navajo Tribal Utility Authority: Shiprock Water Supply Study*. Prepared by Molzen-Corbin & Associates. Prepared for NTUA. 1993.

National Drought Mitigation Center, *A Methodology for Drought Planning* Prepared for the Bureau of Reclamation, Prepared by the National Drought Mitigation Center, University of Nebraska- Lincoln. 1997.

National Drought Policy Commission, *Preparing for Drought in the 21st Century*, May 2000.

National Oceanic Atmosphere Administration. *Atlas of monthly Palmer Hydrological Drought Indices (1895-1930) for the contiguous United States.* National Oceanic Atmosphere Administration.

National Oceanic Atmosphere Administration. *Atlas of monthly Palmer Hydrological Drought Indices (1931-1983) for the contiguous United States.* National Oceanic Atmosphere Administration.

Navajo Nation, Executive Branch. *The Navajo Nation Drought Reports and Comprehensive Action Plan.* Executive Branch of the Navajo Nation, Window Rock, Arizona, June 4, 1996.

Navajo Nation, Department of Emergency Management. *Drought Comprehensive Action Plan* NDEM, April 20, 1999.

Navajo Nation, Department of Emergency Management. *1999 Navajo Nation Drought Update*, July 22, 1999.

Navajo Nation, Department of Emergency Management. *Emergency Operations Plan, The Navajo Nation Drought Contingency Plan* December, 2000.

Navajo Nation, Division of Community Development. *Chapter Images, 1997,* 1997.

Navajo Nation, Division of Natural Resources. *Drought Emergency Comprehensive Action Plan*, August 25, 2000.

Navajo Nation. *Navajo Nation Drought Assessment prepared for Safety Council of the Navajo Nation.* Navajo Nation, 1996.

Navajo Nation, Division of Natural Resources, Department of Water Management. *Navajo Nation Drought Contingency Planning Study Phase I ,Arizona.* U.S. Bureau of Reclamation: Lower Colorado Region, Grand Canyon Area Office: November 16, 1996.

Navajo Nation Division of Community Development. *1981 Drought Impact Evaluation for the Navajo Nation.* April, 1981.

Navajo Nation Department of Water Resources. *Water Resource Development Strategy for the Navajo Nation.* July 17, 2000.

Navajo Nation Department of Water Resources. *Kerley Valley and Lower Kerley Valley Irrigation Projects Water Management and Conservation Plan.* 2000.

Navajo Tribal Utility Authority. *Draft Drought Contingency Plan* Fort Defiance, Arizona, April 2001.

Palmer, W. C. *Meteorological Drought. Research Paper No. 45,* U.S. Department of Commerce Weather Bureau, Washington, D.C. 1965.

Parman, Donald, *The Navajos and The New Deal*, Yale University Press, New Haven, 1976.

San Juan Drought Committee, Utah Interagency Technical Team. *San Juan County : Drought Hazard Mitigation Plan.* San Juan County Commission, Utah Division of Comprehensive Emergency Management, January 2000.

Schoepfle, G. Mark, *The effects of the great stock reduction on the Navajos*, NCC-Shiprock, Dine Be iina, 1988.

Steila, Donald. *Drought in Arizona.* Division of Economics and Business.

Thomas, H. E.; and others *Effects of Drought in Basins of Interior Drainage.* Geological Survey Professional Paper 372-E. United States Department of the Interior. United States Government Printing Office, Washington.1963.

Thomas, H. E.; and others *Effects of Drought in the Colorado River Basin*. Geological Survey Professional Paper 372-F. United States Department of the Interior. United States Government Printing Office, Washington. 1963.

Thomas, H. E. *General Summary of Effects of the Drought in the Southwest*. Geological Survey Professional Paper 372-H. United States Department of the Interior. United States Government Printing Office, Washington. 1963.

Thomas, H. E. *The Meteorologic Phenomenon of Drought in the Southwest.* Geological Survey Professional Paper 372-A. United States Department of the Interior. United States Government Printing Office, Washington. 1962 .

U.S. Census Bureau, *2000 Census,* 2000.

U.S. Department of Agriculture Soil Conservation Service. *Inventory of Navajo Indian Irrigation Projects*. 1986.

U.S. Department of Interior, Geological Survey. *National Summary 1988-1989 Hydrologic events and floods and droughts.* Water-Supply Paper 2375 USGS, 1988.

Western Water Policy Review Advisory Commission. "*Improving drought management in the west, the role of mitigation and preparedness.* American Water Resources.

Wilhite, D. A., and M. H. Glantz, *Understanding the Drought Phenomenon: The Role of Definitions*, Water International 10:111-120. 1985.

Wilhite, Donald. *Improving Drought Management in the West, the role of Mitigation and Preparedness*, National Drought Mitigation Center, University of Nebraska, report to the Western Water Policy Review Advisory Commission. June, 1997.

APPENDIX A:

Example of Monthly Status Report

THE NAVAJO NATION
DEPARTMENT OF WATER RESOURCES
WATER MANAGEMENT BRANCH
P. O. Box 678 • Fort Defiance, Arizona 86504 • (520) 729-4004 • FAX (520) 729-4126

Kelsey A. Begaye
PRESIDENT

Taylor McKenzie, M.D.
VICE PRESIDENT

March 12, 2002

MEMORANDUM

To: Eugene Guerito, Director, Department of Emergency Management
Office of the President and Vice-President
Richard Begay, Acting Executive Director, Division of Natural Resources
Emergency Management Commission
Navajo Nation Inter-Governmental Relations Committee
Navajo Nation Resources Committee
Farm Service Agency
Soil and Water Conservation Districts
Natural Resource Conservation Service

From: John Leeper for
Alex DiNatale, Hydrologist II
Water Management Branch
Department of Water Resources

Subject: **Monthly Drought Status Report – March 2002**

This monthly drought status report conveys the most recent Western Regional Climate Center (WRCC) drought information to the programs that are responsible for drought response. The six month Standard Precipitation Index (SPI) for the climate divisions that encompass the Navajo Nation are:

Climate Division	6 month SPI	Moisture Conditions	Possible Drought Stage
North East Arizona	-2.43	Extreme	Emergency
North West New Mexico	-1.94	Severe	Emergency
South East Utah	-1.42	Moderate	Warning

Severe or extreme moisture conditions may warrant a drought emergency. Moderate conditions, warrant a drought warning. A map of the six month Standard Precipitation Index (SPI) for March 2002, is attached. Drought has expanded throughout the Southwest, with a forecast of above-normal temperatures and below-normal precipitation for the region over the next three months. The U S Department of Agriculture reports that the Chuska Mountain snowpack is 51% of average (as of February 15, 2002), and below average streamflow levels forecasted.

For the appropriate response, please refer to the Navajo Nation Drought Response Plan which can be obtained from the Department of Emergency Management (928) 871 - 6892/94. If you have any questions, please contact me at (928) 729-4004.

Attachment: Six Month Standard Precipitation Index for the Navajo Nation March 2002

Navajo Nation
Monthly Drought Status Report
March 2002
N
E
S
W
Northwest
New Mexico
Southwest
Colorado
Southeast
Utah
Northeast
Arizona
0
25
50
75
100 Miles
Normal Conditions > 0
Mild Conditions 0.00 to -0.99
Moderate Conditions -1.00 to -1.49 UT
Severe Conditions -1.50 to -1.99 NM
Extreme Conditions > -2.00 AZ

Appendix B:

Sample of Drought Declaration
and
Letters Requesting Drought Determination

THE NAVAJO NATION
OFFICE OF THE PRESIDENT
Post Office Box 9000, Window Rock, AZ 86515
PHONE (928) 871-6352 * FAX (928) 871-4025

KELSEY A. BEGAYE
PRESIDENT

TAYLOR MCKENZIE, M.D.
VICE PRESIDENT

EXECUTIVE PROCLAMATION

DECLARING A STATE OF EMERGENCY ON THE NAVAJO NATION

WHEREAS, the Navajo Nation is currently experiencing severe drought resulting from dry weather conditions, below normal precipitation which has significantly reduced surface and ground water supplies; and

WHEREAS, the President of the Navajo Nation has recognized the National Standardized Precipitation Index results provided by the Navajo Nation Department of Water Resources. The Standardized Precipitation Index indicates values equal to and less than -1.00 from several Navajo Agencies. The adverse impacts the drought has caused to the land and the suffering by ranchers, farmer, livestock owners, and wildlife; and

WHEREAS, The San Juan County Commission, The State of Arizona, the Navajo County Board of Supervisors, and certain portions within the State of New Mexico have been declared states of emergency; and

WHEREAS, the Emergency Management Commission responsible for declaring a state of emergency with the concurrence of the President of the Navajo Nation has not been funded in this current Fiscal Year and the duties and responsibilities for the formulation of disaster relief measure has heretofore been carried out and implemented by the Navajo Nation Department of Emergency Management in consultation with the Navajo Department of Water Resources, the Navajo Department of Agriculture and Grazing Management Office.

I, THEREFORE, as the President of the Navajo Nation, in accordance with Title 2 Navajo Nation Code Section 1005 (B) and (C)(9) hereby declare a state of emergency to exist within the Navajo Nation resulting from severe drought conditions. The Navajo Department of Emergency Management is hereby directed to immediately coordinate with the Department of Water Resources, the Department of Agriculture and with appropriate state and county governments for disaster and emergency relief measures and implement an appropriate plan of action to address the drought conditions through community education and assistance to livestock owners, ranchers, and farmers.

DATED this _____ day of _____ 2002

KELSEY A. BEGAY, *President*
Navajo Nation

THE NAVAJO NATION
OFFICE OF THE PRESIDENT
Post Office Box 9000, Window Rock, AZ 86515
PHONE (928) 871-6352 * FAX (928) 871-4025

KELSEY A. BEGAYE
PRESIDENT

TAYLOR MCKENZIE, M.D.
VICE PRESIDENT

DECLARATION

NAVAJO NATION
STATE OF EMERGENCY

WHEREAS:

1. The Navajo Nation has suffered severe damage brought on by t he continuing drought conditions from below normal precipitation which has significantly reduced surface and ground water supplies upon which citizens and commerce are dependent; and

2. Weather forecasts for the coming months predict above normal temperatures; and

3. Conditions now exist that have created a critical shortage of water and range feed for livestock, resulting in disease and generally poor physical condition of the livestock; and

4. The drought is endangering other natural resources within the Navajo Nation ; and

5. The Navajo Nation Commission on Emergency Management has the authority, pursuant to 2 N.T.C., Article 4, Section 864, Paragraph B (1), with the concurrence of the President of the Navajo Nation, to declare that a state of emergency exist due to drought conditions; and

6. The declaration of a state of emergency will enable to Navajo Nation to provide, request and receive mutual aid from any affected area, from other political entities, including county, state and federal agencies.

NOW, THEREFORE IT BE RESOLVED:

1. That the Navajo Nation Commission on Emergency Management declares a drought state of emergency, pursuant to 2 N.T.C., Article 4, Section 884, Paragraph B (1), to exist on all lands within the jurisdiction of the Navajo Nation.

2. This declaration is in association and support of the Presidential Executive order on Fire Restriction within Navajo Nation Forests & Woodlands, signed and effective Month, day, 200X.

3. That this declaration is in association and support o f the declaration issued by the Navajo Nation Council on Month, day, 200X.

CERTIFICATION

We hereby certify that the foregoing declaration was duly considered by the Navajo Nation Commission on Emergency Management at duly called meeting in Window Rock, Navajo Nation, Arizona) at which a quorum was present that the same was passed by a vote of _____in favor and _____opposed and _____abstained , this day of _____2006.

_____
NAME, Chairman
Commission on Emergency Management

_____
NAME, Vice-Chairman
Commission on Emergency Management

CONCURRENCE:

_____
KELSEY A. BEGAY, *President*
The Navajo Nation

THE NAVAJO NATION
OFFICE OF THE PRESIDENT
Post Office Box 9000, Window Rock, AZ 86515
PHONE (520) 871-6352 * FAX (520) 871-4025

KELSEY A. BEGAYE
PRESIDENT

TAYLOR MCKENZIE, M.D.
VICE
PRESIDENT

December 4, 2001

The Honorable Dan Glickman
Secretary of Agriculture
United States Department
of Agriculture
1400 Independence Avenue, S.W., Room 200A
Washington, D.C.20250

Dear Secretary Glickman:

I have declared a state of emergency drought on the Navajo Nation based on the results of the Standardize & Precipitation Index where drought conditions exist in the following Agencies: Western, Fort Defiance, and Eastern. The lack of precipitation has significant reduced surface and ground water supplies and stream flows. The drought endangers the crops, livestock, wildlife and citizens of the Navajo Nation.

The Navajo Nation's situation exceeds available tribal resources; therefore, I respectfully request Secretarial Determination for drought and request damage assessment reports be initiated by the affected Navajo Nation agencies. Additionally, I request all disaster programs available be implemented, particularly the Livestock Assistance Program.

Mr. Arvin S. Trujillo, Executive Director, of the Navajo Nation Division of Natural Resources will be the designated contact and can be reached at 928.871.6592

Thank you for your assistance and time,

Sincerely,

KELSEY A. BEGAY
Navajo Nation President

Appendix C:

Names. Addresses & Phone Numbers of the Executive Director of the Division of Natural Resources and Departments, the Director of Departments of Emergency Management, and Navajo Nation Emergency Management Commission

Division of Natural Resources

	Address	Phone #	Fax #	Email Address/Web Site
Executive Director - Arvin Trujillo	P.O. Box 9000 Window Rock, AZ 86515	(928)871-6592/3	(928) 871-7040	Dirdnr@email.com
Deputy Director - Richard M. Begay				Begayric@hotmail.com
DNR Attorney - Robert O. Allen				Robert O Allan@hotmail.com
Resources Committee Advisor - Peggy Nakai		(928) 871-6020	(928) 871-7255	www.navajo.org
Department/ Director	Address	Phone #	Fax #	Email Address
AML RECLAMATION				
Madeline Roanhorse, Director	P.O. Box 1875 Window Rock, AZ 86515	(928) 871-6982	(928) 871-7190	www.navajo.org
				Madelineroanhorse@navajo.org
ARCHAEOLOGY				
Anthony Klesert, Director	P.O. Box 0689 Window Rock, AZ 86515	(928) 871-6540	(928) 871-6511	www.navajo.org
				archealogy/index.html
AGRICULTURE				
John Blueyes, Director	P.O. Box 4889 Window Rock, AZ 86515	(928) 871-6605	(928)871-6679	Johnb87421@yahoo.com
FISH & WILDLIFE				
Gloria Tom, Director	P.O. Box 1480 Window Rock, AZ 86515	(928) 871-6451	(928)871-7069	www.navajofishandwildlife.org
				Gtom@navajofishandwildlife.org
FORESTRY				
Alexious Becenti, Director	P.O. Box 230 Ft. Defiance, AZ 86504	(928) 729-4007	(928) 729-4225	Acbecenti_nfd@citlink.net
HISTORIC PRESERVATION				
Alan S. Downer, Director	P.O. Box 4950 Window Rock, AZ 86515	(928) 871-7198	(928) 871-7886	www.navajo.org/hpd/index.html
				Downer@cnetco.com
NAVAJO LAND				

Alfred Dehiya, Director	**P.O. Box 9000 Window Rock, AZ 86515**	**(928) 871-6402**	**(928) 871-7039**	**Website:www.nizhoni.navajo.org**
MINERALS				
Akhtar Zaman, Director	**P.O. Box 1910 Window Rock, AZ 86515**	**(928) 871-6587**	**(928) 871-7095**	**Akhtar.zaman@mms.gov**
PARKS & RECREATION				
Ray Russell, Director	**P.O. Box 9000 Window Rock, AZ 86515**	**(928) 871-6645**	**(928) 871-6637**	**Website:www.navajonation.parks.org**
				Rrussell@navajonationparks.org
RESOURCES ENFORCEMENT				
Leonard Butler, Director	**P.O. Box 9000 Window Rock, AZ 86515**	**(928) 871-6701**	**(928) 871-7899**	**Cop_igb@yahoo.com**
WATER RESOURCES				
Johnnie D. Francis, Director	**P.O. Box 678 Window Rock, AZ 86515**	**(928) 729-4003**	**(928) 729-4029**	

Department of Emergency Management and the Emergency Management Commission

DEPARTMENT DIRECTOR
Jimson Joe
P.O. Box 2908
Window Rock, AZ 86515
Phone Number:
(928) 871-6892/94
Fax Number:
(928) 871-7261

COMMISSION ON EMERGENCY MANAGEMENT

NAME	POSITION	DEPARTMENT	ADDRESS	PHONE #	FAX #
Herman Shorty	Chairman	Environmental Health	P.O. BOX 1390, Window Rock, AZ 86515	(928) 871-6349	(928) 871-6255
Eugenia Quintana	Member	Navajo EPA	P.O. Box 2946, Window Rock, AZ 86515	(928) 871-7800	none
Selena Manychildren	Member		P.O. Box 2404, Window Rock, AZ 86515	(928) 871-6380	(928) 722-9236
Sgt. Wally Whitegoat	Member	Public Safety	P.O. Box 250, Window Rock, AZ 86515	(928) 871-6112	none
Capt. Dicky Bain	Member	Fire & Rescue Services	P.O. Box 3360, Window Rock, AZ 86515	(928) 871-6915	(928) 871-6917
Larry Anderson	Council Delegate	Ft. Defiance Chapter	P.O. Box 366, Fort Defiance, AZ 86504	(928) 729-4352	(928) 729-4353

Appendix D:

Names, Addresses & Phone Numbers of the Navajo Nation Drought Task Force (Division Directors)

Navajo Nation Division Directors & Deputy Directors

NAMES	ADDRESSES	PHONE #	FAX
EXECUTIVE BRANCH			
President - Joe Shirley, Jr	P.O. Box 9000 Window Rock, AZ 86515	(928) 871-6352/6355	(928) 871-4025
Vice-president - Frank Dayish	P.O. Box 9000 Window Rock, AZ 86515	(928) 871-6352/6355	(928) 871-4025
Chief of Staff - Patrick Sandoval			
LEGISLATIVE BRANCH			
Speaker - Lawrence Gorman	P.O. Box 3390 Window Rock, AZ 86515	(928) 871-7160	(928) 871-7255
DIVISION OF COMMUNITY DEVELOPMENT			
Division Director (Acting) - Stanley Yazzie	P.O. Box 1896 Window Rock, AZ 86515	(928) 871-6442/6810	(928) 871-7090
DIVISION OF ECONOMIC DEVELOPMENT			
Division Director - Allen Begay	P.O. Box 663 Window Rock, AZ 86515	(928) 871-6544/6547/7377	(928) 871-7381
Deputy Director - Vacant	P.O. Box 663 Window Rock, AZ 86515	(928) 871-6544/6547/7377	(928) 871-7381
DIVISION OF EDUCATION			
Division Director - Derrick Watchman	P.O. Box 670 Window Rock, AZ 86515	(928) 871-7475	(928) 871-7474
Deputy Director - Jennie Rogers	P.O. Box 670 Window Rock, AZ 86515	(928) 871-7475	(928) 871-7474
DIVISION OF FINANCE			
Controller (Acting) - Mark Grant	P.O. Box 3150 Window Rock, AZ 86515	(928) 871-6310	(928) 871-6026
Assistant Controller - Martin Ashley	P.O. Box 3150 Window Rock, AZ 86515	(928) 871-6310	(928) 871-6026
DIVISION OF GENERAL SERVICES			

Division Director - Kenneth Petersen	P.O. Box 9000 Window Rock, AZ 86515	(928) 871-6514/6311	(928) 871-7620
Deputy Director (Acting)- Delford Smith, ASO	P.O. Box 9000 Window Rock, AZ 86515	(928) 871-6514/6311	(928) 871-7620
DIVISION OF HEALTH	**Addresses**	**Phone#**	**Fax #**
Division Director - Cora Phillips	P.O. Box 1390 Window Rock, AZ 86515	(928) 871-6350/6351	(928) 871-6255
Deputy Director - Robert Nakai	P.O. Box 1390 Window Rock, AZ 86515	(928) 871-6350/6351	(928) 871-6255
DIVISION OF HUMAN RESOURCES			
Division Director - Vacant	P.O. Box 9000 Window Rock, AZ 86515	(928) 871-6375	(928) 871-6377
Deputy Director - Andre Cordero	P.O. Box 9000 Window Rock, AZ 86515	(928) 871-6375	(928) 871-6377
DIVISION OF NATURAL RESOURCES			
Division Director - Arvin Trujillo	P.O. Box 9000 Window Rock, AZ 86515	(928) 871-6592/6593	(928) 871-7040
Deputy Director - Richard M. Begay	P.O. Box 9000 Window Rock, AZ 86515	(928) 871-6592/6593	(928) 871-7040
ENVIRONMENTAL PROTECTION AGENCY			
Division Director - Arlene Luthar	P.O. Box 339 Window Rock, AZ 86515	(928) 729-4005/7751	(928) 729-7996
DIVISION OF PUBLIC SAFETY			
Division Director - Leonard Butler	P.O. Box 3360 Window Rock, AZ 86515	(928) 871-6581	(928) 729-7087
Chief of Police - Dorothy Fulton	P.O. Box 3360 Window Rock, AZ 86515	(928) 871-6581	(928) 729-7087
DIVISION OF SOCIAL SERVICES			
Division Director (Acting) - Virgil Pablo	P.O. Box 4590 Window Rock, AZ 86515	(928) 871-6566/6837	(928) 729-6278
Deputy Director - James Tom	P.O. Box 4590 Window Rock, AZ 86515	(928) 871-6566/6837	(928) 729-6278

Appendix E:

Names, Addresses & Phone Numbers of the Navajo Nation Inter-Governmental Relations and NN Resources Committee

NAVAJO NATION STANDING COMMITTEES

Resources Committee		
Name	**Agency**	**Address**
George Arthur, Chairperson	Shiprock	P.O. Box 382, Fruitland, NM 87416
LaVern Wagner, Vice-Chairperson	Eastern	P.O. Box 960, Cuba NM 87313
Nelson S. Begay	Chinle	P.O. Box 1230, Chinle, AZ 86503
Harry J. Goldtooth	Western	P.O. Box 801, Tuba City, AZ 86045
Herman Daniels	Western	P.O. Box 360126, Monument Valley, UT 86535
Amos F. Johnson	Chinle	P.O. Box 750, Window Rock, AZ 86515
Norman John, II	Ft. Defiance	P.O. Box 3768, Ft. Defiance, AZ 86504
Larry Noble	Ft. Defiance	P.O. Box 1283, Ganado, AZ 86505
Peggy Nakai, Legislative Advisor	None given	P.O. Box 3390, Window Rock, AZ 86515
Nada Ralphaelito, Legislative Secretary I	None given	P.O. Box 3390, Window Rock, AZ 86515
Eva Smiley, Legislative Reporter	None given	P.O. Box 3390, Window Rock, AZ 86515
Intergovernmental Committee		
Name	**Agency**	**Address**
Lawrence T. Gorman, Chairperson	Chinle	P.O. Box 3390, Window Rock, AZ 86515
Raymond Maxx	Western	P.O. Box 3905, Tuba City, AZ 86045
Lawrence R. Platero	Eastern	P.O. Box 2273, Albuquerque, NM 87103
Leonard Chee	Western	HC 61 Box 93, Winslow, AZ 86047
Duane Tsinigine	Western	P.O. Box 2167, Tuba City, AZ 86045
Ervin M. Keeswood, Sr.	Northern	P.O. Box 682, Waterflow, NM 87421
Jerry Freddie	Ft. Defiance	HCR 63 Box 6070, Winslow, AZ 86047
Larry Anderson, Sr.	Ft. Defiance	P.O. Box 948, Ft. Defiance, AZ 86504
Willie Greyeyes	Western	P.O. Box 10053, Tonalea, AZ 86044
Hope MacDonald-Lonetree	Western	P.O. Box 727, Tuba City, AZ 86045
Mark Maryboy	Northern	P.O. Box 190, Montezuma Creek, UT 84534

Appendix F:

Addresses & Phone Numbers of the Chapters, Grazing Districts, and Farm Boards by Climate Divisions

NAVAJO NATION CHAPTERS - NE ARIZONA

Coordinators, Grazing Officials, and Farm Board Presidents

Chapter	Address	Phone #	Fax #
Beclabito Chapter	Beclabito Trading Post Shiprock, NM 87420	(928) 656-3265	(928) 656-3813
Birdsprings Chapter	HC 61 Box K Winslow, AZ 86047	(928) 686-6220	(928) 686-6338
Black Mesa Chapter	P.O. Box 97 Pinon, AZ 88510	(928) 674-1733	None
Blue Gap/Tachee Chapter	P.O. Box 4427 Blue Gap, AZ 86520	(928) 674-1087	None
Bodaway/Gap Chapter	P.O. Box 1548 Gap, AZ 86020	(928) 283-8843	(928) 283-8843
Cameron Chapter	P.O. Box 85 Cameron, AZ 86020	(928) 679-2323	(928) 679-2297
Chilchinbeto Chapter	P.O. Box 1681 Kayenta, AZ 86033	(928) 697-3136	(928) 697-8559
Chinle Chapter	P.O. Box 1809 Chinle, AZ 86503	(928) 674-2052	(928) 674-2054
Coalmine Mesa Chapter	P.O. Box 1464 Tuba City, AZ 86045	(928) 283-3383	(928) 283-3385
Coppermine Chapter	P.O. Box 1323 Page, AZ 86040	(928) 691-1109	None
Cornfields Chapter	P.O. Box 478 Ganado, AZ 86505	(928) 755-5911/5921	(928) 755-5917
Crystal Chapter	P.O. Box 775 Navajo, NM 87328	(505) 777-2800/2801	(505) 777-2806
Dennehotso Chapter	P.O. Box 301 Dennehotso, AZ 86535	(928) 658-3300	(928) 658-3304
Dilkon Chapter	HCR 63 Box E Winslow, AZ 86047	(928) 657-3233/3376	(928) 657-3324
Forest Lake Chapter	P.O. Box 441 Pinon, AZ 88510	(928) 677-3252	(928) 677-3320
Fort Defiance Chapter	P.O. Box 366 Fort Defiance, AZ 86504	(928) 729-4352/4362	(928) 729-4353
Ganado Chapter	P.O. Box 188 Ganado, AZ 86505	(928) 755-5920/5921	(928) 755-5927
Greasewood Springs Chapter	P.O. Box 1260 Ganado, AZ 86505	(928) 654-3239	(928) 654-3232
Hardrock Chapter	P.O. Box 20 Kykotsmovi, AZ 88039	(928) 725-3460	(928) 725-3460
Houck Chapter	P.O. Box 127 Houck, AZ 86506	(928) 688-2734	(928) 688-3068
Indian Wells Chapter	P.O. Box 3049 Indian Wells, AZ 86031	(928) 654-3289	(928) 654-3282
Inscription House Chapter	P.O. Box 5205 Tonalea, AZ 86044	(928) 672-2337	(928) 673-2337
Jeddito Chapter	P.O. Box 798 Keams Canyon, AZ 86034	(928) 738-2276	(928) 738-5455
Kaibeto Chapter	P.O. Box 1761 Kaibeto, AZ 86053	(928) 673-5860	(928) 673-5853
Kayenta Chapter	P.O. Box 1088 Kayenta, AZ 86033	(928) 697-5520	(928) 697-5524
Kinlichee Chapter	P.O. Box 880 St. Michaels, AZ 86511	(928) 755-3821	(928) 755-6364
Klagetoh Chapter	P.O. Box 1019 Ganado, AZ 86505	(928) 652-2700/2704	(928) 652-2701
Lechee Chapter	P.O. Box 4720 Page, AZ 86040	(928) 698-2800	(928) 698-2803
Leupp Chapter	CPO Box 5085 Leupp, AZ 86035	(928) 686-3227/3228	(928) 686-3232
Low Mountain Chapter	P.O. Box 4416 Blue Gap, AZ 86520	(928) 725-3700	None
Lukachukai Chapter	P.O. Box 248 Lukachukai, AZ 86507	(928) 725-3460	(928) 787-2332
Lupton Chapter	P.O. Box 403 Lupton, AZ 86508	'(928) 688-3150	(928) 688-3150
Many Farms Chapter	P.O. Box 185 Many Farms, AZ 86538	(928) 781-3610	(928) 781-3608

Mexican Water Chapter	HC 61 Box 38 Teeecnospos, AZ 86514	(928) 674-3641	None
Nahata Dzil Chapter	P.O. Box 400 Sanders, AZ 86512	(928) 688-2150	(928) 68-2235
Navajo Mountain Chapter	P.O. Box 10070 Tonalea, AZ 86044	(928) 672-2867	(928) 672-2857
Nazlini Chapter	P.O. Box 7387 Nazlini, AZ 86540	(928) 755-6900	(928) 755-5903
Oak Springs Chapter	P.O. Box 486 Window Rock, AZ 86515	(928) 871-6182/6179	(928) 871-6182
Oljato Chapter	P.O. Box 360456 Monument Valley, UT 84531	(435) 727-5850/5851	(435) 727-5852
Pinon Chapter	P.O. Box 127 Pinon, AZ 88510	(928) 725-3710/3711	(928) 725-3712
Red Lake Chapter	P.O. Box 130 Navajo, NM 87328	(505) 777-2810	(505) 777-2311
Red Mesa Chapter	P.O. Box 423 Montezuma Creek, UT 84534	(425) 656-3658	(435) 656-3428
Red Rock Chapter	P.O. Box 2648 Gallup, NM 87305	(505) 726-8071	(505) 726-8135
Red Valley Chapter	P.O. Box 304 Red Valley, AZ 86544	(928) 653-5800	(505) 653-5803
Rock Point Chapter	P.O. Box 190 Rock Point, AZ 86545	(928) 659-4350/4351	(928) 659-4356
Rough Rock Chapter	P.O. Box 633-RRDS Chinle, AZ 86503	(928) 728-3361	(928) 728-3362
Round Rock Chapter	P.O. Box 10 Round Rock, AZ 86547	(928) 787-2370	None
Sawmill Chapter	P.O. Box 171 Sawmill, AZ 86549	(928) 729-4433/4432	(928) 729-4435
Shonto Chapter	P.O. Box 7800 Shonto, AZ 86054	(928) 672-2460	(928) 672-2862
St. Michaels Chapter	P.O. Box 829 St. Michaels, AZ 86511	(928) 871-7842/7844	(928) 871-3023
Steamboat Chapter	P.O. Box 117 Ganado, AZ 86505	(928) 736-2600/2602	(928) 736-2634
Sweetwater Chapter	P.O. Box 105 Teecnospos, NM 86514	No Phone/ No Fax	No Phone/ No Fax
Teenospos Chapter	P.O. Box 106 Teecnospos, NM 86514	(928) 656-3682	(928) 656-3661
Teesto Chapter	P.O. Box 7166 Winslow, AZ 86047	(928) 657-3354	(928) 657-3358
Tolani Lake Chapter	HC 61 Box 3001 Winslow, AZ 86047	(928) 686-6286/6212	(928) 686-6339
Tonalea Chapter	P.O. Box 207 Tonalea, AZ 86044	(928) 283-5921	(928) 283-5921
Tsaile/Wheatfields Chapter	P.O. Box 667 Tsaile, AZ 86556	(928) 724-3326	(928) 724-3388
Tsalani/Cottonwood Chapter	P.O. Box 1139 Chinle, AZ 86503	(928) 725-3349	(928) 725-3349
Tuba City Chapter	P.O. Box 727 Tuba City, AZ 86046	(928) 283-3284/3285	(928) 283-3288
Whippoorwill Chapter	P.O. Box 279 Pinon, AZ 88510	(928) 725-3378	(928) 725-3373
Whitecone Chapter	P.O. Box 3338 Indian Wells, AZ 86031	(928) 654-3319	(928) 654-3319
Wide Ruins Chapter	P.O. Box 208 Chambers, AZ 86502	(928) 652-3223	(928) 652-3253

NAVAJO NATION CHAPTERS - NW NEW MEXICO

Coordinators, Grazing Officials, and Farm Board

Chapter	Address	Phone #	Fax #
Alamo Chapter	P.O. Box 827 Magdalena, NM	(505) 854-2686/2693	(505) 854-2685
Baca/Prewitt Chapter	P.O. Box 563 Prewitt, NM 87045	(505) 876-9917	(505) 285-4421
Becenti Chapter	P.O. Box 708 Crownpoint, NM	(505) 786-2283/2284	(505) 786-2285
Beclabito Chapter	Beclabito Trading Post Shiprock,	(928) 656-3265	(928) 656-3813
Breadsprings Chapter	P.O. Box 3008 Gallup, NM 87305	(505) 778-5796	(505) 778-5915
Burnham Chapter	P.O. Box 7359 Newcomb , NM	(505) 696-3323	(505) 696-3323

Casamero Lake Chapter	P.O. Box 549 Prewitt, NM 87045	(505) 786-5237	(505) 786-7078
Chichiltah Chapter	P.O. Box 1336 Gallup, NM 87305	(505) 778-5754	(505) 778-6758
Churchrock Chapter	P.O. Box 549 Churchrock, NM	(505) 488-5949	(505) 488-6561
Counselor Chapter	P.O. Box 209 Counselor, NM 87018	(505) 568-4311/4424	(505) 568-4311
Cove Chapter	P.O. Box 276 Red Valley, NM	(505) 653-5808	(505) 653-5808
Coyote Canyon Chapter	P.O. Box 257 Brimhall, NM 87310	(505) 735-2204/2205	(505) 735-2207
Crownpoint Chapter	P.O. Box 336 Crownpoint, NM	(505) 786-2130	(505) 786-2136
Crystal Chapter	P.O. Box 775 Navajo, NM 87328	(505) 777-2800/2801	(505) 777-2806
Cudeii Chapter	P.O. Box 2990 Shiprock, NM 87420	(505) 368-1071	(505) 368-1072
Hogback Chapter	P.O. Box 1268 Shiprock, NM 87420	(505) 368-5500	(505) 368-4812
Huerfano Chapter	P.O. Box 968 Bloomfield, NM	(505) 325-1400	(505)326-3044
Iyanbito Chapter	P.O. Box 498 Fort Wingate, NM	(505) 488-5650	(505) 488-6155
Lake Valley Chapter	P.O. Box 190 Crownpoint, NM	(505) 786-2190/2191	(505) 786-2192
Little Water Chapter	P.O. Box 1896 Crownpoint, NM	(505) 786-2120	(505) 786-2125
Manuelito Chapter	HCR 57-9069 Gallup, NM 87301	(505) 722-3073	(505) 722-3073
Mariano Lake Chapter	P.O. Box 1770 Gallup, NM 87301	(505) 786-2180/2182	(505) 786-2181
Mexican Springs Chapter	P.O. Box 93 Mexican Springs, NM	(505) 733-2345	(505) 733-2108
Nageezi Chapter	P.O. Box 100 Nageezi, NM 87037	(505) 632-7200	(505) 632-7201
Nahodishgish Chapter	P.O. Box 369 Crownpoint, NM	(505) 786-2028	(505) 786-5286
Naschitti Chapter	Drawer D Sheepsprings, NM 87364	(505) 732-5400/5401	(505) 732-5406
Nenahnezad Chapter	P.O. Box 438 Fruitland, NM 87416	(505) 698-9702	(928) 698-9702
Newcomb Chapter	P.O. Box 7982 Newcomb, NM	(505) 696-3436	(928) 696-3436
Ojo Encino Chapter	HCR 79 Box 7 Cuba, NM 87013	(505) 731-2263	(505) 731-2263
Pinedale Chapter	P.O. Box 3 Churchrock, NM 87311	(505) 786-2208	(505) 786-2211
Pueblo Pintado Chapter	HCR 79 Box 9026 Cuba, NM 87013	(505) 655-3221	(505) 655-3221
Ramah Chapter	Rt 2 Box 13 Ramah, NM 87321	(505) 775-7140	(505) 775-7137
Red Lake Chapter	P.O. Box 130 Navajo, NM 87328	(505) 777-2810	(505) 777-2311
Red Rock Chapter	P.O. Box 2648 Gallup, NM 87305	(505) 726-8071	(505) 726-8135
Red Valley Chapter	P.O. Box 423 Red Valley, AZ	(928) 653-5800	(505) 653-5803
Rock Springs Chapter	P.O. Box 4608 Yatahey, NM 87375	(505) 371-5407	(505) 371-5531
San Juan Chapter	P.O. Box 1636 Fruitland, NM	(505) 598-6916	(505) 598-0021
Sanostee Chapter	P.O. Box 219 Sanostee, NM 87461	(505) 723-2704	(505) 723-2705
Sheepsprings Chapter	P.O. Box Drawer 1 Sheepsprings,	(505) 7732-5408	(505) 732-5409
Shiprock Chapter	P.O. Box 3810 Shiprock, NM	(505) 732-5408	(505) 732-5409
Smith Lake Chapter	P.O. Box 80 Smith Lake, NM 87365	(505) 786-2138	(505) 786-2143
Standing Rock Chapter	P.O. Box 247 Crownpoint, NM	(505) 786-2248/2247	(505) 786-2249
Teenospos Chapter	P.O. Box 106 Teecnospos, NM	(928) 656-3682	(928) 656-3661
Thoreau Chapter	P.O. Box 899 Thoreau, NM 87323	(505) 862-0139	(505) 862-7957
Tohajillee Chapter	P.O. Box 3398 Canoncito, NM	(505) 836-4221	(505) 833-0741
Tohatchi Chapter	P.O. Box 1236 Tohatchi, NM 87325	(505) 733-2660	(505)733-2321
Torreon Chapter	P.O. Box 1024 Cuba, NM 87013	(505) 731-2336	(505) 731-2252

Tsaile/Wheatfields	P.O. Box 667 Tsaile, AZ 86556	(928) 724-3326	(928) 724-3388
Tseyatoh Chapter	P.O. Box 86 Mentmore, NM 87319	(505) 722-2649	(505) 722-0537
Twin Lakes Chapter	P.O. Box 4424 Yatahey, NM 87375	(505) 735-2600/2602	(505) 735-2605
Two Grey Hills Chapter	P.O. Box 7950 Newcomb, NM,	(928) 789-3100	(928) 789-3101
Upper Fruitland Chapter	P.O. Box 1257 Fruitland, NM 84718	(505) 598-5032	(505) 598-0614
Whitehorse Lake Chapter	HCR 79 Box 4069 Cuba, NM 87013	(505) 655-5430/5431	(505) 655-5432

SE UTAH

Coordinators, Grazing Officials and Farm Board

Chapter	Address	Phone #	Fax #
Aneth Chapter	P.O. Box 430 Montezuma Creek, Ut 84534	(435) 651-3494	(435) 651-3413
Dennehotso Chapter	P.O. Box 301 Dennehotso, AZ 86535	(928) 658-3300	(928) 658-3304
Inscription House	P.O. Box 5205 Tonalea, AZ 86044	(928) 672-2337	(928) 673-2337
Mexican Water	HC 61 Box 38 Teeecnospos, AZ 86514	(928) 674-3641	None
Navajo Mountain	P.O. Box 10070 Tonalea, AZ 86044	(928) 672-2867	(928) 672-2857
Oljato Chapter	P.O. Box 360456 Monument Valley, UT 84531	(435) 727-5850/5851	(435) 727-5852
Red Mesa Chapter	P.O. Box 423 Montezuma Creek, UT 84534	(425) 656-3658	(435) 656-3428
Teecnospos Chapter	P.O. Box 106 Teecnospos, NM 86514	(928) 656-3682	(928) 656-3661

Appendix G:

Names, Addresses & Phone Numbers of the Soil Water Conservation Districts by Climate Divisions

SOIL WATER CONSERVATION DISTRICTS

Chinle Office			
Name	**Address**	**Phone**	**Chapter**
Eugene Tso, President	P.O. Box 1809, Chinle, AZ 86503	(928) 309-2007 (Work)	Chinle
			(928) 674-2054
Anslen Joe, Vice-President	P.O. Box 86, Lukachukai, AZ 86507	(928) 787-2332 (Work)	Lukachukai
		(928) 787-2324 (Home)	(928) 787-2332
Judy A. Yazzie, Secretary/Treasurer	P.O. Box 1164, Chinle, AZ 86503	(928) 902-3992 (Work)	Tselani/Cottenwood
		(928) 781-6612 (Message)	(928) 725-3349
Board Members			
Name	**Address**	**Phone**	**Chapter**
Marty Benallie	P.O. Box 902, Chinle, AZ 86503	(928) 781-6845 (Home)	Black Mesa
			(928) 674-1733
Danny Clah	P.O. Box 2388, Chinle, AZ 86503	(928) 674-1733	Blue Gap
			(928) 674-1087
Lorena Eldridge	P.O. Box 715, Tsaile, AZ 86556	(928) 871-6411 (Work)	Tsaile/Wheatfields
			(928) 724-3326
Jones Begay	P.O. Box 311, Chinle, AZ 86503	(928) 871-6380 (Work)	Forest Lake
Roland Tso	P.O. Box 185, Many Farms, AZ 86538		Many Farms
Irvin R. Shirley	P.O. Box 711, Ganado, AZ 86505		(928) 781-3607
			Nazlini
			(928) 755-5900/5901
Tony T. Yazzie	P.O. Box 593, Chinle, AZ 86503	(928) 674-5481 (Messsage)	Rough Rock
			(928) 728-3377/3361
Shirly Sorrell	P.O. Box 97, Round Rock, AZ 86547		Round Rock

Little Colorado River SWCD	**HC P.O. Box 6087, Winslow, AZ 86047**	**(928) 657-3251 Fax - (928) 657-**	
SWCD Officials			
Name	**Address**	**Phone**	**Chapter**
Thomas Begay, President	CPO Box 5146, Leupp, AZ 86035	(928) 686-6184 (home)	Birdsprings
		(928) 380-5947 (cell)	(928) 686-6220
Joe H. Yazzie, Vice-President	P.O. Box 5306, Leupp, AZ 86035	(928) 686-6286 (Chapter)	Tolani Lake
			(928) 686-6286
John David, Secretary	P.O. Box 3832, Tuba City, AZ 86045	(928) 283-2315 (work)	Leupp
			(928) 686-3227/3228
Willie Foster	HC 63 Box E Winslow, AZ 86047		Dilkon
			(928) 657-3233/3376
Board Members			
Name	**Address**	**Phone**	**Chapter**
Vacant			Cameron
			(928) 679-2323
Louise Nakaidine	P.O. Box 1322, Tuba City, AZ 86045	(928) 283-8843 (Chapter)	Bodeway/Gap
			(928) 283-8843
Freddie Scott	P.O. Box 3145, Indian Wells, AZ 86031		Indian Wells
			(928) 654-3289
Bahe Jackson	P.O. Box 271, Keams Canyon, AZ 86034		Jeddito/lLow
			(928) 738-2276
Whitecone Chapter	P.O. Box 3338, Indian Wells, AZ 86031	(928) 654-3352	Whitecone
			(928) 654-3319
Tuba City Chapter	P.O. Box727, Tuba City, AZ 86045	(928) 283-8843 (Chapter)	Tuba City
			(928) 283-8843
Coalmine Chapter	P.O. Box 1464, Tuba City, AZ 86045		Coalmine
			(928) 283-3383
Fort Defiance Office	**P.O. Box 499, St. Michaels, AZ**	**(928) 871-4528/Fax 871-4530**	
SWCD Officials			

Name	Address	Phone	Chapter
Martin Begay, President	P.O. Box 57, Ganado, AZ 86505	(928) 755-3457 (Home)	Ganado
			(928) 755-5920
Herman Morris, Vice-President	P.O. Box 1236, Tohatchi, NM 87325	(505) 733-2660 (Work)	Tohatchi
		(505) 733-2321 (Work Fax)	(505) 733-2660
R.C. Kinsel, Treasurer	P.O. Box 206, Mexican Springs, NM 87320	(505) 722-9771 (Home)	Mexican Springs
			(505) 733-2345
Board Members			
Name	**Address**	**Phone**	**Chapter**
Phyllis Begay	P.O. Box 458, Navajo, NM 87328	(928) 871-6693/6691 (Work)	Crystal
			(928) 871-6749
Spencer Yazzie	HC 58 Box 70, Ganado, AZ 86505		Greasewood
			(928) 654-3239
Tommy K. Shirley	P.O. Box 296, Houck, AZ 86506	(928) 688-2734 (Work)	Houck
		(928) 688-3068 (Fax)	(928) 688-2734
			(928) 688-3068
Woodie Tsosie	P.O. 354 Chambers, AZ 86502	(928) 652-2682 (Daughter's)	Wide Ruins
			(928)652-3223
Dorothy Bitsilly	P.O. Box 45, Tohatchi, NM 87325	(505) 733-2411 (Home)	Tohatchi
			(505) 733-2660
Shiprock Office			
SWCD Officials			
Name	**Address**	**Phone**	**Chapter**
Marjorie Irwin, President	P.O. Box 7839, Newcomb, NM 87455	(505) 696-3441	Newcomb
			(505) 696-3436
Benjamin Begay, Vice-President	None	None	Burnham
			(505) 696-3323
Alonzo Cohoe, Secretary	None		Sanostee

			(505) 696-3323
Douglas Diswood, Treasurer	P.O. Box 83, Fruitland, NM 87416	(928) 656-3265	Beclabito
			(928) 656-3265
BOARD MEMBERS			
NAME			**Chapter**
Grace J. Chavez	P.O. Box 752, Kirtland, NM	(505) 598-6916	San Juan
		(505) 368-1062	(505) 598-6916
		(505) 598-6916 NZD	
Ramie Nelson	P.O. Box 752, Kirtland, NM	(505) 368-1062	Nenahnezad
		(505) 598-6916	(505) 698-9702
		(505) 598-9702 NZD	
Joe Ray Harvey	P.O. Box 104, Red Valley, AZ 86544	(928) 653-5806	Cove
			(928) 653-5808
Harry Descheene	P.O. Box 1179, Farmington, NM 87499		Mexican Water
Johnson Mason, Sr.	P.O. Box 1523, Fruitland, NM 87416	(505) 598-4032	(928) 674-3641
Albert Willie	P.O. Box 2540, Shiprock, NM 87420	(505) 860-0090	Sweetwater
			No phone/No Fax
Robert E. Ahkeah	P.O. Box 2990, Shiprock, NM 87420		Cudei
			(505) 368-1071
Betty Becenti-John	P.O. Box 1268, Shiprock, NM 87420		Hogback
			(505) 368-5500
Louis Tapaha	P.O. Box 423, Montezuma Creek, UT		Red Mesa
			(425) 656-3658
Lawrence Marshall	P.O. Box 423, Red Valley, AZ 86544		Red Valley
			(928) 653-5800
James W. Begay	P.O. Box 190, Rock Point, AZ 86545		Rock Point
			(928) 659-4350/4351
Lula Sandoval	P.O. Box 3810, Shiprock, NM 87420		Shiprock
			(505) 732-5408

Lenny C. Nez	P.O. Box 106, Teecnospos, AZ 86514		Teecnospos
			(928) 656-3661
James Hunt, Jr.	P.O. Box 7940, Newcomb, NM 87455		Two Grey Hills
			(928) 789-3100
Kayenta Office			
Navajo Mountain SWCD	**P.O. Box 429, Kayenta, AZ 86033**	**(928) 697-8482 (Fax) 697-8486**	
SWCD Officials			
Name	**Address**	**Phone**	**Chapter**
Keith Bennett, President	P.O. Box 1751, Winslow, AZ 86047	(928) 673-3276 (Home)	Kaibeto
			(928) 697-5850
			(928) 697-3277
Kenneth Johnson, Vice-President	P.O. Box 2357, Dennehotso, AZ 86535		Dennehotso
			(928) 658-3300
			(928) 658-3304
Barbara Greyeyes,	P.O. Box 460, Kayenta, AZ 86033	(928) 697-8466 (Home)	Kayenta
			(928) 697-5520
			(928) 697-5524
Board Members			
Name	**Address**	**Phone**	**Chapter**
Thomas Bradley	P.O. Box 2222, Kayenta, AZ 86033		Chilchinbeto
			(928) 697-3436
			(928) 697-8340
Betty Dodson	P.O. Box 7394, Shonto, AZ 86054		Shonto
			(928) 672-2460
			(928) 672-2862
			Oljato
Herman Daniels, Jr.	P.O. Box 360455, Monument Valley, UT		(435) 727-3259

			(435) 727-5850
			Inscription House
Kee Y. Begay	P.O. Box 5040, Tonalea, AZ 86044	(928) 727-5850	(928) 672-2337
			(928) 672-2337
Ada Lister	P.O. Box 165, Page, AZ 86040	(928) 698-2337	Lechee
			(928) 698-2800
			(928) 698-2803
Calvin Begay	P.O. Box 167, Page, AZ 86040		Coppermine
			(928) 691-1109
Jerry Whiterock	P.O. Box 207, Tonalea, AZ 86044	(928) 283-8820 (Home)	Tonalea
			(928) 283-5921
			(928) 283-5921
Kent Graymountain	P.O. Box 10070, Tonalea, AZ 86044	(928) 283-4655 (Home)	Navajo Mountain
			(928) 672-2857
			(928) 672-2448

Appendix H:

Names, Addresses & Phone Numbers of Federal Agencies

BIA NAVAJO REGIONAL OFFICE AND AGENCIES DIRECTORY

BIA CHINLE AGENCY	EXTENSION/NAME	TITLE
P.O. BOX 7H	5100 - Begay, Darlene	Secretary
CHINLE, AZ 86503	**5101 - Chee Emery**	**Natural Resource Manager**
PHONE (928) 674-EXT #	5103 - Jones, Herb	Rangeland Mgt. Spec.
	5107 - Gray, Dewayne	Computer Specialist
	5162 - Yazzie, Olsen	Civil Engineering Tech
	5157 - Smith Jackie	Range Tech.
	5163 - Begay, Benjamin	Range Tech.
	5160 - Yazzie, Harry D.	Soil Conservation Tech.
	5113 - Fax	
BIA EASTERN AGENCY	**EXTENSION/NAME**	**TITLE**
P.O. BOX 328	**6101- Delmar, Effie**	**Natural Resource Manager**
CROWNPOINT, NM 87313	6100 - Murphy, Helen	Secretary
PHONE -(505) 786-EXT #	6128 - Gurule, J. Melvin	
	6129 - Silago, Bessie /Willie, Anna	
	6130 - Vandever, Rose	
	6131 - Haver, Sherri	
	6133 - Gore, Gilbert	
	6107 - Fax	
BIA FORT DEFIANCE AGENCY	**EXTENSION/NAME**	**TITLE**
P.O. BOX 619	**223 - Roanhorse, Nelson**	**Natural Resource Manager**
FORT DEFIANCE, AZ 86504	218 - Brown, Cindy	
PHONE - (928) 729-7EXT#	358 - Arviso, Juan	
	216 - Begay, Leonard O.	
	359 - Larsen, Herbert	
	357 - Nixon, Charles	
	278 - Roan, Charlotte	
	356 - Yellowhair, Leroy	
	217 - Willie, Jerome	
	213 - Fax	

BIA NAVAJO REGIONAL OFFICE	**EXTENSION/NAME**	**Title**
P.O. BOX 1060	**8350 - Russell, Harold**	**Natural Resource Manager**
GALLUP, NM 87305	8397 - Mitchell, Keith	GIS Coordinator
PHONE - (505) 863-EXT#	8487 - Bullock, Ed	Soil Scientist
BIA WESTERN AGENCY	**EXTENSION/NAME**	**Title**
EAST HWY 160 & WARRIOR DR	2252 - Tsosie, Marie	Secretary
P.O. BOX 127	**2203 -Robbins, Tony**	**Natural Resource Manager (Acting)**
TUBA CITY, AZ 86045	2201 - Fransisco, Casey	Rangeland Management Spec.
PHONE (928) 283-EXT#	2272 - Yazzie, Lawrence	Biological Tech.
	2215 - Fax	
BIA SHIPROCK AGENCY	**EXTENSION/NAME**	**Title**
P.O. BOX 3538	**3300 - Thomas, Jerry W.**	**Natural Resource Manager**
SHIPROCK, NM 87420	3307 - Benallyson, Nelson Jr.	
PHONE - (505) 368-EXT#	3303 - Billy, Bahe	
	3308 - John, Gloria M.	Secretary
	3305 - Owens, Roxanne K.	
	3306 - Raymond, Tracy D.	
	3307 - Yazzie, Willard	
	3312 - Fax	

BUREAU OF RECLAMATION OFFICES

UPPER COLORADO REGION	Name	Address	Phone #'s
Native American Affairs	Brian Parry, Manager	125 S. State St. Rm 7220	(801) 524-3674
125 S. State Rm 7220		Salt Lake City, UT 84138	
Salt Lake City, UT 84138			
PHONE - (801) 524-3674			
FAX: (801) 524-3858			
LOWER COLORADO REGION			
Native American Affairs	Rich Dent, Manager	P.O. Box 81169	(602) 216-3809
Bureau of Reclamation		Phoenix, AZ 85069-1169	
Phoenix Area Office			
P.O. Box 81169			
Phoenix, AZ 85069-1169	Steve Jones	P.O. Box 61470	(702) 293-8186
Phone: (602) 216-3809	Regional Drought Coordinator	Boulder City, NV 89006	
FAX: (602) 216-4000	Leslie Meyers	2222 W. Dunlap Ave.	
	Water Conservation Manager	Phoenix, AZ 85301	
NAVAJO LIASON			
US Bureau of Reclamation	Larry Walden, Liason	2200 Bloomfield Hwy.	(505) 325-1794
2200 Bloomfield Hwy.		Farmington, NM 87401	ext. 136
Farmington, NM 87401			
PHONE:(505) 325-1794			
FAX: (505) 325-3599			

ARMY CORPS OF ENGINEERS

PHOENIX OFFICE

3636 N. CENTRAL AVE.

PHOENIX, AZ.85012-1936

PHONE: (602) 640-2003/2015

Arizona & Utah Region		
Los Angeles		
Name	**Address**	**Phone**
John McMaster, CESPL-IM	Mail: webmaster	(213) 452-3192
Phoenix		
Name	**Address**	**Phone**
Joe Dixon	3636 N. Central Ave., Phoenix, AZ 85012-1936	(602) 640-2003/2015 ext-245
		Fax: (602) 640-5383
Sacramento		
Name	**Address**	**Phone**
Jim Taylor, CESPK-PA	pao@spk.usace.army.mil	None given
New Mexico Region		
Name	**Address**	**Phone**
James Chavez	james.e.chavez@spaoz.usace.army.mil	(505) 342-3109

USDA- NRCS DISTRICT OFFICES

Michael Somerville		
Arizona State Conservationist		
3003 N. Central Ave. Suite 800		
Phoenix, AZ 86012		
(602) 280-8801		
Chinle Field Office		
District Conservationist	**Mailing Address**	**Phone #**
Daniel Tafoya	P.O. Box 490	(928) 674-3612
Soil Conservation Technician	Chinle, AZ 86503	(928) 674-3613 (Fax)
Wilson Halwood, Jr.		(928) 6743613 (Cellular)
Email		
daniel.tafoya@az.usda.gov		
wilson.halwood@az.usda.gov		
Dilkon Field Office		
District Conservationist	**Mailing Address**	**Phone #**
Felix Nez	HCR 63 Box 6087	(928) 657-3251
Email	Winslow, AZ 869047	(928) 657-3288 (Fax)
felix.nez@az.usda.gov		(928) 699-6009 (Cellular)
Kayenta Field Office		
Liason District Conservationist	**Mailing Address**	**Phone #**
Jerry Gilmore	P.O. Box 768 Highway 163	(928) 697-8482
Email	Kayenta, AZ 86033	(928) 697-8486 (Fax)

jerry.gilmore@az.usda.gov		(928) 660-0102 (Cellular)
Shiprock Field Office		
District Conservationist	**Mailing Address**	**Phone #**
Frank Archuleta	P.O. Box 3561, Shiprock, NM 87420-3561	(505) 368-5723
Rangeland Management Specialist		(505) 368-5733 (fax)
Steve Deeter		(505) 860-5201 (Cellular)
Email		
steve.deeter@usda.gov		
Soil Conservation Technician		
Katherine R. King		
Email		
Kathy.king@az.usda.gov		
Window Rock Office		
District Conservationist	**Mailing Address**	**Phone #**
Daniel Bloedel	P.O. Box 499	(928) 871-4528
Email	St. Michaels, AZ 86511-0499	(928) 871-4530 (Fax)
dan.bloedel@ az.usda.gov		(928) 870-0122 (Cellular)

USDA		
Farm Service Agencies		
ARIZONA		
APACHE COUNTY		
EXECUTIVE DIRECTOR	**ADDRESS**	**PHONE**
Greg Norton	140 W. Cleveland/P.O. Box 70	(928) 337-4411
gregg.norton@az.usda.gov	St. Johns, AZ 85936	**Fax:** (928) 337-2441
St. Michaels Service Center	Highway 264	(928) 871-5038 ext 2
	St. Michaels, AZ 86511	**Fax:**(928) 871-4530
NAVAJO COUNTY		
EXECUTIVE DIRECTOR	**ADDRESS**	**PHONE**
Greg Norton	51 W. Vista Dr. #2	(928) 524-3214 ext 2
gregg.norton@as.usda.gov	Holbrook, AZ 86025-1897	**Fax:**(928) 524-6619
COCONINO COUNTY		
EXECUTIVE DIRECTOR	**ADDRESS**	**PHONE**
Steve Drye	1585 S. Plaza Way Ste. 120	(928) 774-2401
steve.drye@az.usda.gov	Flagstaff, AZ 86001-7156	**Fax:** (928) 774-2780
NEW MEXICO		
McKINLEY COUNTY		
EXECUTIVE DIRECTOR	**ADDRESS**	**PHONE**
John Sakasitz	Cedar Hills Plaza	(505) 722-4357
john.sakasitz@nm.usda.gov	Gallup, NM 87301	**Fax:** (505) 722- 3923
SAN JUAN COUNTY		
EXECUTIVE DIRECTOR	**ADDRESS**	**PHONE**
Lloyd Wilhelm	1427 W Aztec St. 1	(505) 334-3090 ext 2
lloyd.wilhelm@nm.usda.gov	Aztec, NM 87410-1814	**Fax:**(505) 334-8659
UTAH		
EXECUTIVE DIRECTOR	**ADDRESS**	**PHONE**
Doug Christiansen	P.O. Box 639, 32 S. 1st E	(435) 587-2473 ext 3
	Monticello, UT 84535	**Fax:** (435) 587-2104

Appendix I:

Names, Addresses & Phone Numbers of State Agencies

Arizona

Chuck McHugh, Assistant Director of Operations
Response, Recovery and Mitigation Section
Division of Emergency Management
Department of Emergency Military Affairs
Arizona Division of Emergency Management
5636 E. McDowell Road Bldg. 103
Phoenix, Arizona 85008
Phone # (602) 231-6242
Fax # (602) 392-7528

Apache County

District I: Jim Claw, County Supervisor
P.O. Box 1952, Chinle, Arizona, 86503
Phone # (928) 674-5664/3447
Fax # (928) 674-5944

District II: Tom White, Jr., County Supervisor
P.O. Box 994, Ganado, Arizona, 86505
Phone # (928) 755-3881/82
Fax # (928) 755-3226

District III: David Brown, County Supervisor
P.O. Box 1360, Eager, Arizona, 85925
Phone # (928) 337-4364 (St. Johns)
Fax # (928) 333-4709

Coconino County Board of Supervisors

Louise Yellowman, County Manager
219 E. Cherry Ave.
Flagstaff, AZ 86001
Phone # (928) 283-4518 Fax # (928) 283-6366

Navajo County

District 1: Percy Deal, County Supervisor
Cell Phone # (928) 521-2421
Phone # (928) 524-4053 Fax # (928) 524-4239

District 2: Jessie Thompson, County Supervisor
Cell Phone# (928) 587-2569
P.O. Box 668
Holbrook, AZ 86025
Phone # (928) 524-4053 Fax # (928) 524-4239

New Mexico

Ernesto Rodriquez, Director
Emergency Management Bureau

NM Department of Public Safety
13 Bataan Blvd.
Santa Fe, New Mexico 87504
Phone # (505) 476-9600
Fax # (505) 476-9650

McKinley County

Doug Decker, County Manager
P.O. Box 70
Gallup, NM 87305
Phone # (505) 722-3868 Fax # (505) 863-6362

San Juan County

Don Cooper, Emergency Preparation Coordinator
209 S. Oliver Dr.
Aztec, NM 87410
Phone # (505) 334-1180 Fax # (505) 334-3239

Utah

Scott Behunis, Director
Comprehensive Emergency Management
1110 State Office Building
Salt Lake City, UT 84114
Phone # (801) 538-3639 Fax # (801) 538-377

Appendix J:

Media Resources

RADIO STATIONS	ADDRESS	PHONE	FAX
KTNN -660AM (Window Rock)	P.O. Box 2529 Window Rock, AZ86515	(928) 871-2582	(928) 871-3479
KNDN-960 Navajo Radio	P.O. Box 1515 W. Main Farmington, NM 87499	(505) 325-1996	(505) 327-2019
KGAK-1450 AM (Gallup)	401 E. Coal Ave. Gallup, NM 87301	(505) 863-4444	(505) 722-7381
KAFF-93 FM	P.O. Box 1930, Flagstaff, AZ 86002	(928) 774-5231	(928) 779-2988
KPGE-KXAZ	P.O. Box 1030 Page, AZ 86040	(928) 645-8181	(928) 645-3347
TELEVISION STATIONS			
KOBF-TV 12	206 W. Hill Ave., Gallup NM 87301	(505) 863-2413	
	825 W. Broadway, Farmington, NM 87499	(505) 326-4883	
KRQU-TV CBS 13	13 Broadcast Place Sw, Albuquerque, NM 87511	(505) 243-2285	
KOAT-TV Farmington (Newsroom)	708 E. 20 St. Suite D, Farmington, NM 88034	(505) 326-4883	
		1-800-734-1285	(505) 884-6354
NEWSPAPERS			
Gallup Independent	500 N. 9th St, Gallup, NM 87317	(505) 863-6811	(505) 722-5750
Navajo Times	P.O. Box 310, Window Rock, AZ 86515	(928) 871-6641	(928) 871-6409
Navajo-Hopi Observer	417 W. Santa Fe Ave. Flagstaff, AZ 86001	(928) 226-9696	(928) 226-1115
	Email - Editorial @Flagstaffaz.news.com @@@@		

Appendix K:

Federal Assistance Programs

U.S. DEPARTMENT OF AGRICULTURE

Agricultural Conservation Program(ACP)
Farm Service Agency (FSA) United States Department of Agriculture

Contact Person
Robert Stevenson, Director, Conservation and Environmental Protection Division, 202.760.6221 (Fax) 202.720.4619.

Statute
Public Law 100-387 and Agricultural Credit Act of 1978. Assistance Cost-sharing of various practices including livestock water wells, livestock watering Available facilities, and pasture reseeding in drought-affected counties. Form of Assistance Cost-sharing. Beneficiaries Livestock producers. Qualifying The only requirement to participate in this program is that the recipient be an Requirements "Agricultural Producer". The definition, however, is county distinct, and as a result, program criteria will differ from county to county. Limitations Maximum annual benefit for FSA program is $100,000 per person. Availability this program is available for drought aid but is not limited to drought or other emergencies. It does not require a major disaster determination by the President or Secretary of Agriculture to provide local assistance. Comments Contact local FSA office for further information.

Updated 03-03-03

U.S. Department of Agriculture

Agricultural Marketing Transition Act (AMTA) Program
Farm Service Agency (FSA) - United States Department of Agriculture.

Contact Person
Diane Sharp, Director, Compliance and Production Adjustment Division, 202.720.7641 (Fax) 202.690.2130.

Statute
Public Law 104-127.

Assistance
The purpose of AMTA is to transition producers who have been earning deficiency. Available payments from government driven planting decisions to market driven planting decisions.

Form of Assistance
Direct payments to eligible producers.

Beneficiaries
Producers of a program crop who comply with AMTA program requirements.

Qualifying Requirements
Participation in AMTA, compliance with fruit and vegetable planting restrictions on contract acreage and agreement to protect idle contract acreage from erosion and weeds.

Limitations
A $40,000 per person per fiscal year limitation on the payments made to a person under one or more production flexibility contracts.

Availability
Availability to all producers on farms with 1996 crop acreage bases if they enrolled in the AMTA program by August 1, 1996, and to producers with Conservation Reserve Contracts which will expire or terminate before September 20, 2002.

Comments
Under AMTA eligible producers may earn payments whether or not a crop is planted on the contract acreage.

Updated 03-03-03

U.S. Department of Agriculture

Conservation Reserve Program (CRP)
Farm Service Agency (FSA) - United States Department of Agriculture

Contact Person
George Denley, Director Conservation and Environmental Protection Division, 202.720.6221 (Fax) 202.720.4619.

Statute
Public Law 100-387 and Food Security Act of 1985.

Assistance Available
Sharing of up to 50 percent of costs of specific new conservation practices on existing Conservation Reserve Program land. (The ASCS recommends that farmers plant grass on this highly erodible land and receive annual payments on the land from FSA for ten years.)

Form of Assistance
Cost-sharing.

Beneficiaries
Owners and operators on Conservation Reserve Program land.

Qualifying Requirements
Producers must have their annual rental payments reduced for emergency use of Conservation Reserve Program land. Program participants, who agreed to a reduction in the 1989 annual rental payment as a result of benefits derived from authorized haying or grazing, are eligible to receive 50 percent cost-sharing. Land must be highly erodible, normally devoted to agricultural production, and operated for three years. Fifty dollars per acre has been the maximum payment by FSA.

Limitations

Availability
This program is available for drought aid but is not limited to drought or other emergencies. It does not require a major disaster determination by the President or Secretary of Agriculture to provide local assistance.

Comments
Contact local FSA office for further information.

Updated 03-03-03

U.S. Department of Agriculture

Emergency Conservation Program (ECP)
Farm Service Agency (FSA) - United States Department of Agriculture

Contact Person
Robert Stevenson, Director, Conservation and Environmental Protection Division, .202.720.6221 (Fax) 202.720.4619.

Statute
Public Law 100-387 and Agricultural Credit Act of 1978.

Assistance Available
Sharing of costs of restoring to productive use farmland seriously damaged by natural disaster, or for emergency water conservation measures during droughts. Costs cover providing water for livestock, restoring structures, and water conservation measures.

Form of Assistance
Cost-sharing.

Beneficiaries
Farmers and ranchers.

Qualifying Requirements
Conservation problems which existed prior to disaster are not eligible for assistance
Limitations
Assistance limited to solving conservation problems caused by natural disaster that impair land or productive capability. Damage must be unusual and not likely to occur frequently in the same area.

Availability
This program is available for drought aid but is not limited to drought or other emergencies. It does not require a major disaster determination by the President or Secretary of Agriculture to provide local assistance.

Comments
Contact local FSA office for further information.

Updated 03-03-03

U.S. Department of Agriculture

Emergency Feed Program
Farm Service Agency (FSA) - United States Department of Agriculture

Contact Person
Sean O'Neill, Branch Chief, Non-insured Assistance Branch, (202) 720-9003.

Statute
Public Law 100-387 and Agricultural Act of 1949, as amended by the Disaster Assistance Act of 1988.

Assistance
The Emergency Feed Program,(feed cost-sharing program) pays eligible livestock. Available owners a portion of the cost of feed purchased to replace that which is normally produced on the farm. The dollar amount of assistance is 50 percent of the cost of feed purchased to exceed total benefits available. Livestock owners are allowed to request an advance payment, not to exceed 75 percent of their total benefits available, without providing proof of feed purchases until the end of the feeding period.

Form of Assistance
Cost-sharing.

Beneficiaries
Livestock producers with annual gross revenues less than $2.5 million. Qualifying Owner must have minimum 40 percent feed loss which requires buying abnormal amounts of feed for eligible livestock.

Requirements
Livestock must be owned at least six months, be offspring of eligible livestock, or be purchased as part of normal farm operation. Beneficiaries must be actively engaged in farming with at least ten percent of gross annual income derived from the production of grain or livestock.

Limitations
Producer must have suffered at least 40 percent loss of feed production due to natural disaster which requires purchasing abnormal amount of livestock feed.

Availability
Automatically available to livestock producers in counties designated by the Secretary of Agriculture as eligible for FSA emergency loans and for Emergency Feed Assistance Program. Once the program has been approved for a county, all producers in the county and all producers in contiguous counties are eligible to apply for assistance.

Comments
Maximum annual benefit for all FSA disaster programs is limited to 5100,000 per person. Contact the local FSA office for further information.

Updated 03-03-03

U.S. Department of Agriculture

Emergency Haying and Grazing of Acreage Conservation Reserve (ACR) and Conservation Use (CU) Acreage
Farm Service Agency (FSA) - United States Department of Agriculture

Contact Person
Lynn Tjeersdma, Chief, Emergency Preparedness Branch, 202.720.7998 (Fax) 202.696.3610.

Statute
Omnibus Budget Reconciliation Act of 1987.

Assistance Available
Secretary of Agriculture will permit qualifying farmers to use designated acreage for haying and grazing during the five designated summer months when the crop land normally is idle.

Form of Assistance
No financial assistance, but additional use of designated cropland for haying and grazing.

Beneficiaries
Qualified producers who participate in U.S. Department of Agriculture wheat and feed grain programs.

Qualifying Requirements
Qualified producers who participate in the USDA wheat and feed grain programs with eligible designated ACR and CU acreage removed from production.

Limitations
Producer must have designated ACR and CU acreage.

Availability
This program is available and is approved as needed on a county-by-county basis. It does not need a major disaster declaration by the President or the Secretary of Agriculture.

Comments
Once approved by the Secretary, qualified producers are authorized to use the designated acreage to an extent not to enhance erosion. The five-month summer period varies from county to county. Contact local FSA office for further information.

Updated 03-03-03

U.S. Department of Agriculture

Farm Labor Housing Loans and Grants
Farm Service Agency (FSA) - United States Department of Agriculture

Contact Person
Sue Harris, Branch Chief, Loan Making Division, 202.720-1604 (Fax) 202.690.3444.

Statute
Housing Act of 1949, as amended, Section 514 and 516, Public Laws 89-117 and U.S.C. 1484 and 1489.

Assistance Available
Project grants and direct loans to provide decent, safe and sanitary low-rent housing and related facilities for domestic farm laborers.

Forms of Assistance
Loans and grants

Beneficiaries
Family partnerships, family farm corporations, or an association of farmers.

Qualifying Requirements
Grants are available to eligible applicants only when it is doubtful that such facilities could be provided unless grant assistance is available. The applicant must furnish factual evidence of the following: (a) the number of domestic farm laborers currently being used in the area; (b) the kind of labor performed; (c) the future need for domestic farm labor in the area; (d) the kind, condition, and adequacy of housing presently used for such labor; (e) ownership of presently occupied housing; (f) ability of workers to pay necessary rent; and (g) with the exception of state and local public agencies, be unable to provide housing from its own resources or credit on terms and conditions that would enable to applicant to provide labor housing.

Limitations
The housing must be of practical type and must be constructed in an economical manner and not of elaborate material or extravagant design; loan and grant funds and any funds furnished by the applicant may be placed in a supervised bank account.

Availability
No deadlines.

Comments
The loans and grants may be used for construction, repair, or purchase of housing that is for year around occupancy or seasonal occupancy by migrant farm workers.

Updated 03-03-03

U.S. Department of Agriculture

Indian Acute Distress Donation Program (IADDP)
Farm Service Agency (FSA) - United States Department of Agriculture

Contact Person
Sean O'Neill, Branch Chief, Non-insured Assistance Branch, (202) 720-9003.

Statute section 216, Public Law 85-516; Section 403, Title 4, Agricultural Credit Act of 1978;
Public Law 95-334, 7 CFR 624.

Assistance Available
Commodity Credit Corporation owned feed grain may be donated to Indian tribes for livestock feeding due to severe droughts and other natural disasters following authorization by the FSA Administrator.

Form of Assistance
Direct donation of grain.

Beneficiaries
Indian tribes.

Qualifying Requirements
There must be a determination by the FSA Administrator that the chronic acute distress for the needy members of an Indian tribe has been materially increased due to severe drought, flood, hurricane, blizzard, or other catastrophe.

Availability
An initial request for implementation of the program must come from Tribal council and be concurred on by the Bureau of Indian Affairs. If the FSA Administrator assents with the determination, the program is authorized.

Comments
Distribution of feed to the tribe is arranged by the Bureau of Indian Affairs, Department of the Interior. Contact local FSA office for further information.

Updated 03-03-03

U.S. Department of Agriculture

Non-insured Crop Disaster Assistance Program (NAP)
Farm Service Agency (FSA) - United States Department of Agriculture

Contact Person
Sean O'Neill, Chief, Non-insured Assistance Branch, (202)720-9003.

Statute
Public Laws 103-354 and 104-127

Assistance Available
The Non-insured Crop Disaster Assistance Program (NAP) provides assistance to reduce financial losses that occur when natural disasters cause a catastrophic loss of production or prevented planting of an eligible crop.

Form of Assistance
Direct payments

Beneficiaries
Eligible persons sharing in the proceeds of an eligible crop at the time of loss with annual qualifying gross revenues less than S2 million.

Qualifying Requirements
Each commercial crop or other agriculture commodity (except livestock) for which catastrophic risk protection under section 508 (b) of the Federal Crop Insurance Act is not available that is produced for food or fiber. Effective with P.L. 103-354 eligible crops also include floricultural, ornamental nursery, and Christmas tree crops, turf grass sod, and industrial crops. Effective with P.L. 104 127 eligible crops also include seed crops and aquiculture (including ornamental fish) loss of yield or be prevented from planting more than 35 percent of intended acreage due to natural disaster reasonably related to the basis for the area designation. Once the area loss requirement for a crop is met, direct payments calculated based on the loss of yield in excess of 50 percent of a producer's approved yield, or acreage prevented from being planted in excess of 35 percent of intended times the producer's approved yield, as applicable, times 60 percent (55 percent for 1999 and subsequent years) of the average market price determined by Commodity Credit Corporation, or any comparable coverage determined by the Secretary, times a payment factor for decreasing cost incurred in the production cycle of a crop that is harvested, planted but not harvested, and prevented from being planted.

Limitations
Producer must report acreage and production by specified deadlines and furnish a timely notice of loss within 15 days of the disaster occurrence. Additionally, applications for NAP payments must be filed with the local office no later that the first acreage reporting date for the crop in the crop year immediately following the crop year in which the loss occurred.

Availability
Assistance will be made available for each approved crop in an area approved by CCC for a natural disaster.

Comments
No person shall receive payments for a crop year in excess of $100,000. If a producer is eligible to receive NAP assistance and benefits under any other program administered by the secretary for the same crop loss, the producer must choose whether to receive the other program benefits or NAP assistance. The producer is not eligible for both.

Updated 03-03-03

U.S. Department of Agriculture

Emergency Food Assistance
Food and Nutrition Service (FNS) - United States Department of Agriculture

Contact Person
Grace Sheffey, Food Programs Specialist, (703) 305-2035.

Statute
For the Food Stamp Program, Section 5(h) of the Food Stamp Act (7 U.S.C. 2014 (h)); Section 412 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Act) (42 U.S.C. 5179). For the Food Distribution Program, Section 416 of the Agricultural Act of 1949 (7 U.S.C. 1531); Section 32 of the Act of August 24, 1935 (7 U.S.C. 612c); Section 4(a) of the Agriculture and Consumer Protection Act of 1973 (7U.S.C. 612c note); Section 412 and 413 of the Act (42 U.S.C. 5179, 5180)

Assistance Available
The Secretary of Agriculture is authorized to establish temporary emergency standards of eligibility for the Food Stamp Program for qualified households to replace food destroyed in a disaster. In situations of distress in which the needs for food assistance cannot be met by other food distribution programs, food assistance may be provided in the form of congregate feedings and household distribution.

Forms of Assistance
Emergency Food Stamps and the donation of surplus commodities, congregate feeding and household distribution.

Beneficiaries
Emergency food stamps are available to low-income households who are unable to purchase adequate amounts of nutritious food. Food commodities may be donated to disaster victims deemed "needy persons" or "low income persons".

Qualifying Requirements
For Emergency Food Stamps to be provided, (1) the FNS Administrator must determine that because of a major disaster or other disaster, households are unable to purchase adequate amounts of food, (2) commercial channels of trade must be available or if disrupted, have been resumed, (3) the ongoing Food Stamp Program must be unable to expeditiously handle the number of potential eligible households affected by the disaster which are in need of emergency food assistance, (4) household eligibility requirements are met, (5) States must request authorization to conduct Emergency Food Stamp operations, including an estimate of the length of time necessary to accept and process application from the affected households and a recommendation on how long the period should be (either a half month or a full month). The initial request may be informal followed by a written application. For commodities to be authorized in a Presidentially-declared major disaster, State distribution agencies may release USDA donated foods from State inventories, schools, or other recipient agencies, to public or private disaster relief agencies for group feeding. State distributing agencies may request FNS Regional Office to approve the release of USDA-donated foods for household distribution. The FNS Administrator may authorize the State distribution agency to release donated foods to certain organizations for up to 30 days of special group feeding. FNS will replace donated food from State and local stocks, and when the stocks are low provide supplemental commodities.

Limitations

Availability
Both the Emergency Food Stamp and Food Distribution programs can be authorized by the President, through a major disaster declaration, by the Secretary of Agriculture, and by the FNS Administrator (upon recommendation of the applicable FNS Regional Administrator).

Updated 03-03-03

U.S. Department of Agriculture

Federal Crop Insurance
Risk Management Agency - United States Department of Agriculture

Contact Person
Ross Davidson, Jr., Administrator, 202.690.2803. (Fax) 202.690.2818
Statute
Federal Crop Insurance Act, as amended, 7 U.S.C. 1501-1502.

Assistance Available
The objective of the Federal Crop Insurance Corporation is to improve economic stability of agriculture through a sound system of crop insurance by providing multi-peril insurance for individual producers of commercially grown commodities against unavoidable causes of loss such as adverse weather conditions, fire, insects or other natural disasters beyond the producer's control.

Form of Assistance
Insurance.

Beneficiaries
Insured producers.

Qualifying Requirements
Any owner or operator of farmland, who has an insurable interest in a crop in a county where insurance is offered on that crop is eligible.

Limitations
The insured producer must have suffered a loss below the guarantee level for the particular crop insured. Producers are not indemnified for losses resulting from negligence or failure to observe good fanning practices.

Availability
Multiple peril crop insurance is available through private agents selling for private companies reinsured by FCIC and through most local offce of the Farm Service Agency. Premiums for the catastrophic level of crop insurance are fully subsidized and available to producers for $50 administrative fee per crop, not to exceed $200 per county or $600 for all crops and all counties. A portion of premiums are subsidized for higher levels of crop insurance.

Comments

Updated 03-03-03

U.S. Department of Agriculture

Emergency Community Water Assistance Grants
Rural Utilities Service - United States Department of Agriculture

Contact Person
Hilda Legg, Assistant Administrator, Water and Waste, 202.690.2670 (Fax) 202.720.0718
or USDA State Rural Development Office.

Statute
Title V of the Disaster Assistance Act of 1989.

Assistance Available
The objective of the Emergency Community Water Assistance Grant Program is to assist the residents of rural areas that have experienced a significant decline in quantity or quality of water to obtain adequate quantities of water that meet the standards set by the Safe Drinking Water Act (42 U.S.C. 300f et seq.) (SDWA).

Form of Assistance
(a) Grants made to alleviate a significant decline in quantity or quality of water available from the water supplies in rural areas that occurred within two years of filing an application for assistance. Grants cannot exceed $500,000. (b) Grants for repairs, partial replacement, or significant maintenance on an established water system. Grants cannot exceed $75,000.

Beneficiaries
Public bodies and private nonprofit corporations serving rural areas.

Qualifying Requirements
In the case of grants made to alleviate a significant decline in quantity or quality of water available from the water supplies of rural residents, the applicant must demonstrate that the decline occurred within two years of the date the application was filed with Rural Utilities Service. This would not apply to grants made for repairs, partial replacement, or significant maintenance on an established water system.

Limitations
Grant funds may not be used to: (1) Assist any city or town with a population in excess of 10,000 inhabitants according to the most recent decennial census of the United States. (2) Assist a rural area that has a median household income in excess of the statewide non-metropolitan median household income according to the most recent decennial. census of the United States. (3) Finance facilities which are not modest in size, design, and cost.

Availability
Authorization for this program comes at the State level by the Rural Development State Office. 1996 supplemental appropriation of $5,000,000 for natural disasters.

Comments
Must compete nationwide for funding.

Updated 03-03-03

U.S. Department of Agriculture

Emergency Watershed Protection Program (EWP)
Natural Resources Conservation Service (NRCS) - United States Department of Agriculture

Contact Person
Stu Simpson, National Operations Coordinator, Watershed and Wetlands, 202.720.8770. (Fax)

Statute
Section 216, Public Law 85-516; Section 403, Title 4, Agricultural Credit Act of 1978, Public Law 95-334, 7 CFR 624.

Assistance Available
Assistance in relieving an imminent threat to life and property as a result of a sudden impairment of a watershed caused by a natural occurrence including drought. The threat must significantly exceed that which existed before the impairment.

Form of Assistance
Technical and financial assistance (cost-share) to local organizations for planning and implementing watershed projects.

Beneficiaries
Public and private landowners, but they must be represented by a project sponsor.

Qualifying Requirements
Project sponsor must be a public agency of the State, county, city, or special district that has authority to acquire needed land rights, water rights, and permits.

Limitations

Availability
The State NRCS Conservationist has the authority to implement this program.

Comments
Program is much more applicable to emergency actions required due to sudden natural disaster, such as earthquakes and floods, than due to droughts. However, droughts result in blowing soils, and loss of visibility is a threat to the driving public and able to cost share emergency tillage and treatment of other critical areas.

Updated 03-03-03

U.S. Department of Agriculture

Resource Conservation and Development (RC&D)
National Resources Conservation Service (NRCS) - United States Department of Agriculture

Contact Person
Barbara Osgood, National RC&D Program Coordinator, (202) 690-4205.

Statute
Subtitle H of Public Law 97-98, Food and Agriculture Act of 1981, Section 1528-1538.

Assistance Available
Necessary technical assistance and loans to finance local costs of projects that were developed under the Resource Conservation and Development Program. Projects may include land or water conservation, water resource improvements, public recreational developments, and waste disposal projects.

Forms of Assistance
Loans and technical assistance.

Beneficiaries
Public agencies or nonprofit corporations in approved Resource Conservation District areas.

Qualifying Requirements

Limitations

Availability
Ibis program is not strictly a drought program, but it is available for drought aid. It is an ongoing program and does not need a major disaster declaration by the President or Secretary of Agriculture.

Comments
This program is not a drought financial assistance program, and typically it takes several years to develop and implement a project. However, as an example of possible drought-related use, the program could ,be used to fund a water supply reservoir to supplement or replace a drought-impacted water supply. NRCS typically provides the needed technical expertise.

Updated 03-03-03

U.S. Department of Agriculture

River Basin Surveys and Investigations (River Basin Program)
Natural Resources Conservation Service (NRCS) - United States Department of Agriculture

Contact Person
Harry Slawter, Director, Watershed and Wetlands Division, 202.690.4614 (Fax) 202.720.2143.

Statute
Watershed Protection and Flood Prevention Act, P.L. 83 566, as amended, Section 6.

Assistance Available
Data, planning and development services. The objective of this program is to assist Federal, State and local agencies plan and develop coordinated water and elated land resources programs. Under this program USDA has cooperated with local, State and Federal agencies in the preparation and updating of State water resources plans and other water, land and related studies. The USDA helps States coordinate upstream and downstream elements of water, land and related resource planning activities.

Forms of Assistance
Technical assistance is provided in planning activities to help solve water and related land resources problems. Assistance is provided in the following areas: engineering, economics, social sciences, agronomy, range management, forestry, biology, hydrology, archaeology, landscape architecture, waste management, etc.

Beneficiaries
Local or State water resource agencies or other Federal agencies concerned with water and related land resource development.

Qualifying Requirements
NRCS participation is based on a cooperative effort with another agency, agencies or Indian tribes.

Limitations
States and local agencies are expected to participate in the studies and to fund their own activities.

Availability
Letters of request must be submitted to the appropriate State Conservationist of the Natural Resources Conservation Service. The National office is: Depla Chief for Natural Resources Conservation Program. Natural Resources Conservation Service. USDA. P.O. Box 2890. Washington, D.C. 20013.

Updated 03-03-03

U.S. Department of Agriculture

Water and Waste Disposal Loans and Grants
Rural Utilities Service - United States Department of Agriculture

Contact Person
Hilda Legg, Administrator, Water and Waste, 202.690.2670 (Fax) 202.720.0718 or USDA State Rural Development Office.

Statute
Consolidated Farm and Rural Development Act, as amended, 7 U.S.C.1926 (a).

Assistance Available
Funds are to provide financial assistance for water and waste disposal facilities. Available in rural areas and incorporated communities up to 10,000 people. Priority is given to areas with no more than 5,000 people to restore deteriorating water supplies to improve or enlarge water facilities or inadequate waste facilities.

Forms of Assistance
Loans and grants.

Beneficiaries
Public entities such as counties, municipalities, special districts, Indian tribes, and nonprofit corporations for water and waste disposal facilities in rural areas and incorporated communities up to 10,000 people.

Qualifying Requirements
Applicant must be unable to obtain needed funds from other sources on reasonable terms. Commercial interim financing is normally used for construction, with program funds available when project is completed.

Limitations
Applicant must have legal authority and capability to repay funds (based on taxes, assessments, or revenues) and operate and maintain facilities.

Availability
This program is available for drought aid but it is not limited to drought or other emergencies. It does not require a major disaster declaration by the President or Secretary or Agriculture to be triggered

Comments
Priority is also given to small facilities serving low-income communities. Funds may be used to (1) construct, repair, improve, expand, or modify rural water supply facilities (reservoirs, wells, pipelines, pumping stations), (2) acquire a water supply or water right, (3) fund waste water and storm drainage facilities, and (4) pay legal, engineering, and right-of-way costs of these facilities. Grants are made for facilities in the most financially needy communities.

Updated 03-03-03

U.S. DEPARTMENT OF COMMERCE

Economic Adjustment (Title IX) Program
Economic Development Administration (EDA) - United States Department of Commerce

Contact Person
David Whitsohi, Director, Economic Adjustment Division, 202.482.2659 (Fax) 202.482.3742.

Statute
PL 89-136, Public Works and Economic Development Act of 1965 (Title IX).

Assistance Available
Grants to a designated redevelopment area, a nonprofit organization, an economic development district, or a State or political subdivision thereof to prevent serious economic dislocations or to reestablish employment opportunities after a sudden and significant dislocation occurs. Grants can fund public infrastructure business loans, in the form of revolving loan fund grants, construction grants and planning/technical assistance.

Form of Assistance
Grants.

Beneficiaries
Communities which could or have experienced sudden major permanent job losses.

Qualifying Requirements
Key factors are severity of dislocation and responsiveness of proposed project to needs of dislocated workers. Eligibility requirements are waived if there is a Presidentially declared disaster.

Limitations
Grants usually provide up to 75 percent of project cost.

Availability
The Assistant Secretary, Department of Commerce, has the authority to authorize this program. A Presidential disaster declaration is not required.

Comments
Communities can apply for strategy grants or implementation grants for drought-caused job losses, but must meet permanent job loss threshold level. Emphasis is on rural areas.

Updated 03-03-03

U.S. ARMY CORPS OF ENGINEERS

Emergency Water Supply/drought Assistance Programs
U.S. Army Corps of Engineers (USACE)

Contact Person
Ed Hecker, Acting Chief, Readiness Branch, HQUSACE, 202.761.0251.

Statute
Public Law 84-99 as amended.

Assistance Available
USACE is authorized to transport emergency supplies of clean drinking water for human consumption to any designated as a drought distressed area, and to construct wells in such drought distressed areas. Assistance will be to meet minimum public health and welfare requirements

Forms of Assistance
Emergency supply of clean drinking water for human consumption, and construction of wells if not commercially possible. Water normally provided by tank trucks or small diameter pipelines.

Beneficiaries
Any locality faced with a threat to public health and welfare from a drought situation affecting the water system.

Qualifying Requirements
Water distribution system may be publicly or privately owned. State and local agencies must make full use of their own resources, including the National Guard. Requests for assistance to the Corps must be initiated by the Governor or his/her authorized representative.

Limitations
Assistance is limited to work which is the most economical means of furnishing a temporary drinking water supply. Water will not be furnished to a business firm except as incidental to the use of the existing water distribution system, but drinking water can be provided for employees and on-site customers. Water is provided only for human consumption, not for livestock.

Availability
Application for program assistance will be made to USACE District, but assistance is subject to approval at higher level. The impacted area must be designated as a "drought distressed" area by Assistant Secretary of the Army for Civil Works.

Comments
USACE assistance is supplemental to State and local efforts. Permanent restoration of water supply is a local responsibility. Applicants must furnish land, easements, and right-of-way; make necessary relocation; and hold the U.S. free from damages. Purchase and storage costs are not eligible for USACE assistance.

Updated 03-03-03

FEDERAL EMERGENCY MANAGEMENT AGENCY - FEMA

Disaster Relief and Emergency Assistance Program
Federal Emergency Management Agency (FEMA)

Contact Person
Dennis Kwiatkowski, Deputy Associate Director, Response and Recovery 202.646-3162

Statute
The Robert T. Stafford Disaster Relief and Emergency Assistance Act, P.L. 93-288, as amended.

Assistance Available
Cost-shared grants to State and local agencies to meet threats to life and property from major disasters and to save lives, protect property, public health and safety, and to reduce threats from catastrophes. Assistance includes repairing and restoring public and private nonprofit facilities and providing community services (including water and fire suppression). Assistance to individuals includes disaster housing (including mortgage and rental assistance), unemployment assistance, crisis counseling, and grants for unmet needs. Federal agencies may be directed to provide technical assistance and advisory personnel to assist State and local agencies.

Forms of Assistance
Grants and technical assistance.

Beneficiaries
Local and State governments, private nonprofit facilities, Indian tribes, families, and individuals.

Qualifying Requirements
Requires declaration by Governor that an emergency or a major disaster exists which is beyond the capability of the State and local agencies and a Presidential declaration of a major disaster. A major disaster is normally one which requires Federal assistance beyond the normal assistance available under other Federal agency authorities, e.g., Secretary of Agriculture, Secretary of the Army, United States Army Corps of Engineers.

Limitations
The President may make an emergency declaration unilaterally in areas of primary Federal responsibility. Grants to individuals and families are limited to $13,100 (FY97) each in the Individual and Family Grant (IFG) program. IFG and Public Assistance cost share is normally at 75 percent Federal share/25% State share.

Availability
Drought is specifically included in the Act as a type of event which may cause a major disaster. The Act is very broad, but droughts may not produce emergency conditions and physical damage which the Stafford Act is primarily intended to address.

Updated 03-03-03

U.S. BUREAU OF RECLAMATION

Reclamation States Emergency Drought Relief Act of 1991
Bureau of Reclamation United States Department of the Interior

Contact Person
Tom Phillips, Senior Water Resources Specialist, 202.208-7587.

Statute
Reclamation States Emergency Drought Relief Act of 1991, P.L. 102-250, 106 Stat. 53. This act authorizes activities and measures that will minimize, or can be expected to have an effect minimizing and mitigating, losses and damages resulting from ongoing drought conditions.

Assistance Available
Construction, management and conservation activities; Loans and grants; Purchase of water for resale or for fish and wildlife purposes; Use of project facilities to store and convey water; Non-financial assistance to willing buyers and sellers.

Forms of Assistance
Temporary drought assistance could include construction, management and conservation activities undertaken by Reclamation on a non-reimbursable basis. Specific activities might include: (1) drilling of wells, (2) diking and dredging to improve river channel flow efficiency, (3) lining of canals with temporary equipment to maintain proper water temperature installation of temporary materials, (4) installation of temporary fish screens (5) installation of temporary equipment to maintain proper water temperature levels, (6) temporary installation of pumps in reservoirs and canals in order to lift water to outlets, (7) improved measurements, and reporting of conditions and diversions, (8) participation in State established water banks, and (9) changes in diversion schedules. Short term (in no cases more than 15 years) loans to water users for permanent construction, management, conservation activities, and the acquisition and transportation of water. The loans are for the same type of construction, operation and conservation measures listed above, but are of a more long term nature.

Beneficiaries
Indian Reservation governing bodies, States and Federal agencies, and nonprofit entities, e.g. irrigation districts, municipal water utilities, private or public fish and wildlife facilities.

Qualifying Requirements

Limitations
The geographical area can be parts of a State, or Indian reservation, and are not limited to Reclamation project areas, or to water provided by Reclamation projects.

Availability
After the Governor, or the governing body of a tribe, has made a request (to Reclamation) for temporary drought assistance, under provisions of P.L. 102 250, and the Commissioner of Reclamation has determined that such request is merited, Reclamation's Regional Offices will solicit specific proposals for funding

Updated 03-03-03

NATIONAL RESERVE ACCOUNT - NRA

Job Training Partnership Act
Economic Dislocated Worker Adjustment Assistance Act (EDWAA) - National Reserve Account (NRA)

Administering Agency
Employment and Training Administration Department of Labor

Contact Person
Bill Janes, EDWA Specialist 214.767.2154 (Fax) 214.767.4952.

Statute
Job Training Partnership Act of 1982, as amended, Title 111.

Assistance Available
The State may submit an application for assistance in response to disaster events either Presidentially declared natural disasters or other situations in which the Secretary of Labor determines that an occurrence has caused massive deviation and economical dislocation to a community, under Section 499A of EDWAA.

Form of Assistance
Funds to be used by States to provide temporary jobs (cleanup, rescue, repair, renovation and rebuilding activities) associated with such a major disaster.

Beneficiaries
Workers affected by the disaster.

Qualifying Requirements
To qualify individuals must have become unemployed as a consequence of the disaster.

Availability
Projects are funded from the Secretary's National Reserve Account which is equal to 20 percent of the total funds allocated for the EDWAA Program.

Comments
Temporary jobs created under this type of grant must be in public or private nonprofit agencies for up to six months duration. An individual worker may not receive more than 512,000 in temporary job wages paid with NRA grant funds.

Updated 03-03-03

U.S. DEPARTMENT OF LABOR

Disaster Unemployment Assistance (DUA)
Employment and Training Administration Department of Labor

Contact Person
Robert Gilham, Chief, Federal Programs, 202-219-5626; Darryl Bauman, 202-219-5616;Margie Shahin, DUA and Drought Representative, Dallas Regional Office (214) 767-2088 (Fax) 214.767.5122.

Statute
Section 410 of the Stafford Act, 42 U.S.C. 5177, 5189a; DOL Regulations at 20 CFR 625.

Assistance Available
Under section 410, weekly cash benefits for unemployed workers and unemployed self employed workers and re-employment assistance.

Form of Assistance
Grants from FEMA via DOL for administration and weekly payments to State Employment Security Agencies acting as agents for the Department of Labor for administrative costs and weekly payments.

Beneficiaries
Unemployed workers and unemployed self-employed workers.

Qualifying Requirements
Individuals not eligible for regular State unemployment compensation who are unemployed as a result of a major disaster

Availability
The program is implemented only upon a Presidential declaration of a major disaster designated for Individual Assistance.

Comments
DUA weekly payment amounts do not exceed the maximum weekly amount paid under the state unemployment compensation law. Payments may be made for up to 26 weeks after declaration. Payments are not based on need nor designed to replace all income loss due to unemployment or damage to property.

Updated 03-03-03

U.S. Department of Labor

Migrant and Seasonal Farm Workers
Employment and Training Administration Department of Labor

Contact Person
Robin Fritz, Monitor Advocate, Region VI, 214.767.2154 (Fax) 303.844.1579.

Statute
Job Training Partnership Act of 1982, as amended, Title IV, Part A, Section 402, Public Law 97-300, 96 Stat. 1369, 29 U.S.C. 1672.

Assistance Available
Under Section 402, farm workers and their dependents may be offered services such as classroom training, on-the-job training, work experience, job development, job placement, and relocation assistance, education assistance, health services, and other supportive services.

Forms of Assistance
Formula and project grants. Grant assistance is made available to (1) Public agencies and units of government. (2) Private nonprofit organizations authorized by their charters or articles of incorporation to operate employment and training programs.

Beneficiaries
Ultimate beneficiaries are farm workers who suffer chronic seasonal underemployment in the agricultural industry, and their dependents.

Qualifying Requirements
Limited to those individuals and their dependents who have, during any consecutive 12 months in the 24 month period preceding their application for enrollment, been a seasonal farm worker or migrant farm worker, and (a) received at least 50 percent of their total earned income or (b) been employed at least 50 percent of their total time in farmwork, and (c) been identified as member of a family which receives public assistance or whose annual family income does not exceed the higher of either the poverty level or 70 percent of the lower-living standard income level.

Limitations

Availability
This is an ongoing program and no one event triggers its implementation. Grantees are ultimately approved by the Chief, Division of Seasonal Farm worker Programs, Office of Special Targeted Programs, Employment and Training Administration, Department of Labor, Washington D.C.,(202)535-0502.

Comments
Section 402-no less than 94 percent allocated among the States on a formula basis using the best data available as to the farm worker population as determined by the Secretary. Up to 6 percent may be set aside for a National Account to be used for technical assistance and for special projects funded at the discretion of the Department. Awards of no less than 94 percent allocated among the States are made for 1 year, with a I year renewal subject to satisfactory performance. The grants range from S 120,000 to 54,794,000.

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