

## Section 3

# ENVIRONMENTAL SETTING



## ENVIRONMENTAL SETTING

Section 3 contains information about the environmental setting of the Navajo Nation. Maps and associated text and tables are presented that describe administrative boundaries and infrastructure features, climate, topography, physiography and geology, hydrology, soils, and land cover. All of the datasets were prepared using existing data sources, and no field verifications were conducted as part of this project.

The Navajo Nation (Dine'é) is the largest Indian reservation in the United States, covering an area of about 27,000 square miles. The Navajo Nation is comprised of 110 Chapters, including three (3) Navajo satellite reservations: Alamo, Ramah, and Tohajiilee. This area includes a large part of northeastern Arizona, northwestern New Mexico and a small part of southeastern Utah, and is contained within eleven (11) counties (Figure 1). Hopi Reservation tribal lands are located within the Navajo Nation boundaries. On November 4, 2006 the Navajo-Hopi Intergovernmental Compact was signed to lift the 40-year old Bennett Freeze restriction on development, making the area around Moenkopi part of the Hopi Reservation. The eastern portion of the Navajo reservation, located in New Mexico, is commonly referred to as the "Checkerboard" because tribal trust lands are mingled with fee lands (owned by both Navajo and non-Navajo) and federal and state lands under various jurisdictions. The Navajo Nation is generally sparsely populated. The 2000 Census reported a population of 180,462 on the Navajo Nation Reservation and off-reservation trust land.

The Navajo Nation is predominantly located in the Colorado Plateau physiographic province. There is significant topographic relief across the nation, including broad mesas, canyons, dry washes, and mountains. Elevations range from a low of 3,080 feet at the gauging station across from Lee's Ferry in Marble Canyon to over 10,346 feet at Navajo Mountain. Generally elevations across the Navajo Nation range from about 5,000 feet in the broad valleys to over 8,500 feet in the mountains.

The Colorado Plateau covers 130,000 square miles across northern Arizona, southwestern Utah, western Colorado, and northwestern New Mexico. The Navajo Nation is in the southern half of the Plateau, known as the Navajo Section. The landforms in the region are characterized and affected by alternating resistant and weak rock strata. Flat lying sedimentary rocks occur in an alternating sequence of resistant sandstones and limestones and less resistant shales and siltstones. Resistant beds form ledges, cliffs, mesas, and rock benches that are separated by slopes and valleys carved in the weaker beds. The Plateau was broadly and gently uplifted 10 million years ago generally placing the Navajo Nation over a mile high.

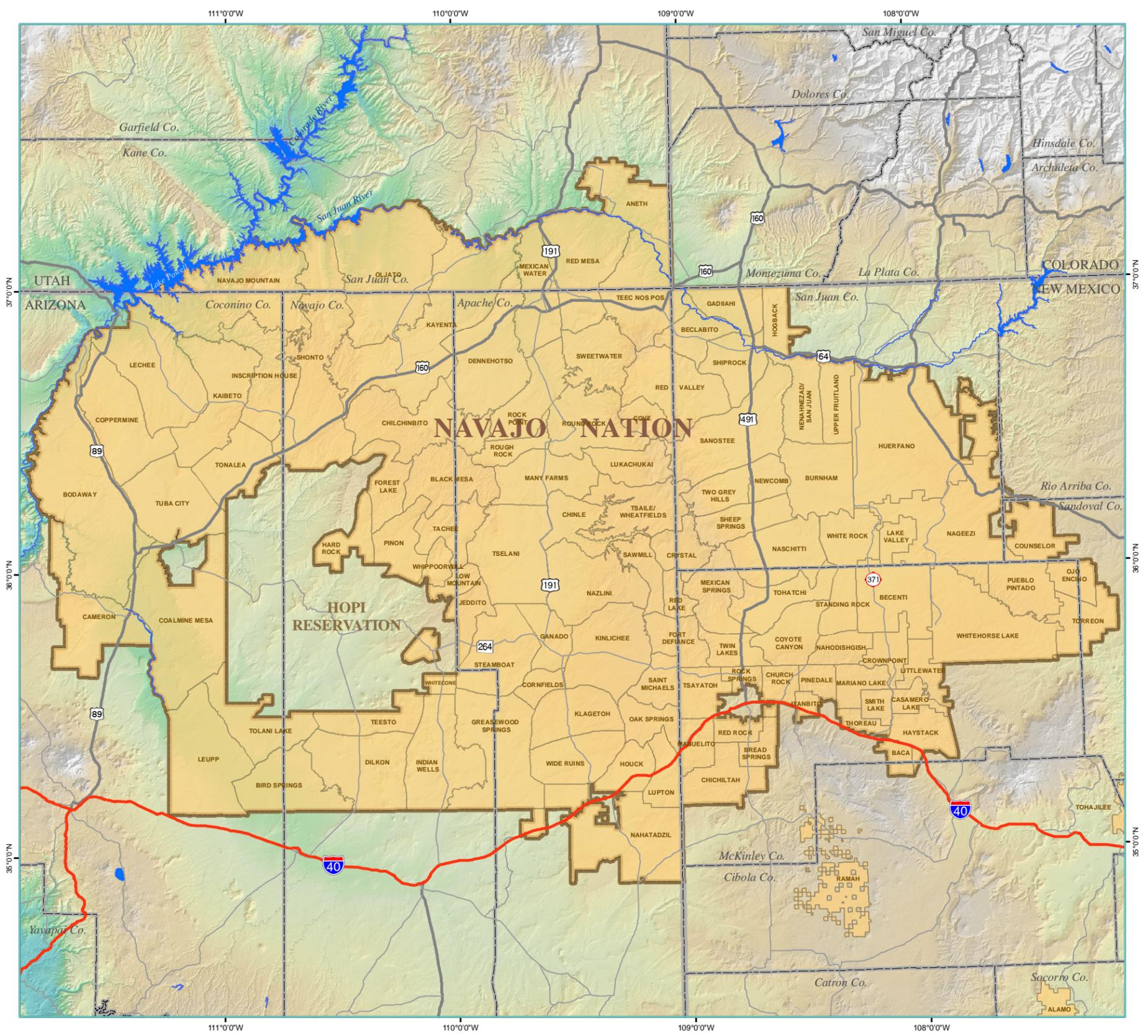
The perennial river valleys on the Navajo Nation include the Puerco, the Little Colorado, the Colorado, and the San Juan. All the other streams are intermittent or ephemeral, except for short reaches downstream from large springs and where the streambed intersects a water table. The underlying bedrock aquifers are composed of beds of sandstone between nearly impermeable layers of siltstone and mudstone. There are also near-surface alluvial aquifers.

The climate of the Navajo Nation varies widely, ranging from semiarid below 4,500 feet to relatively humid above 7,500 feet. Precipitation has a strong and fairly uniform relationship to altitude and the orographic effects of the physiography. The largely semiarid Navajo Nation is shown by the dominance of the 4-12 inch precipitation range. This low precipitation is due to the rain shadow effect of the Sierra Nevada Mountains of California in winter and quasi-permanent subtropical high pressure ridge over the region (Sheppard and others, 1999 - S0728303). Thunderstorms during the summer months account for most of the annual rainfall.

Minimum and maximum annual average temperatures are also directly related to the orographic effect. The higher elevations of the Chuska and Carrizo Mountains, the Defiance Plateau and Black Mesa have summer maximum high temperatures of 66° F or less. The remainder of the Navajo Nation averages more than 66° F. In the lower elevations within the Marble and Little Colorado Canyons, temperatures can average as high as 80° F in the summer. In the winter these same topographically higher areas average below freezing, whereas most of the remainder of the Navajo Nation is above freezing, but in the 30's. The valleys of the Little Colorado, Colorado, Lake Powell, and the San Juan River up to about Comb Ridge in Utah average about 40° F in the winter (Sheppard and others, 1999 - S0728303).

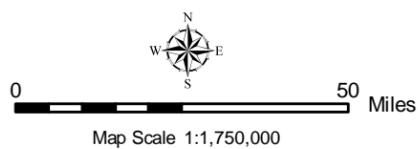
Except for the months of August and September, strong south winds, with abundant dust and sand, blow almost constantly (Harshbarger, 1946 - S04170306). The prevailing wind direction is from the southwest throughout the region, which is widely displayed in dunes and eroded surfaces (Cooley et al, 1969 - S10290201).

Elevation largely determines what type of biotic communities will exist in a given location, as temperatures generally decrease and precipitation increases as one moves upward (Grahame, 2002 - S06020701). Vegetation in the area ranges from sparse desert scrub/grassland in the valley to piñon-juniper woodlands at elevations from about 5,000 to 7,000 feet, with coniferous forests at elevations above 7,000 feet. Annual precipitation is typically from 10 to about 15 inches in piñon-juniper woodlands, and tree species in these communities have evolved both drought and cold resistance. Piñons dominate at higher elevations and juniper tends to grow at lower elevations and in more arid areas. Much of the Navajo Nation is sparsely vegetated with sagebrush, tamarisk, and other desert vegetation which is used by local residents for livestock grazing. Small-scale farming of row crops, such as corn and squash, is practiced. In open areas, residents are typically allotted one-acre home site leases. Grazing permits given to residents that own animals can range from 10 to 100 acres.



ABANDONED URANIUM MINES AND THE NAVAJO NATION

NAVAJO NATION



Legend

- Navajo Nation Chapter
- State
- County

Sources

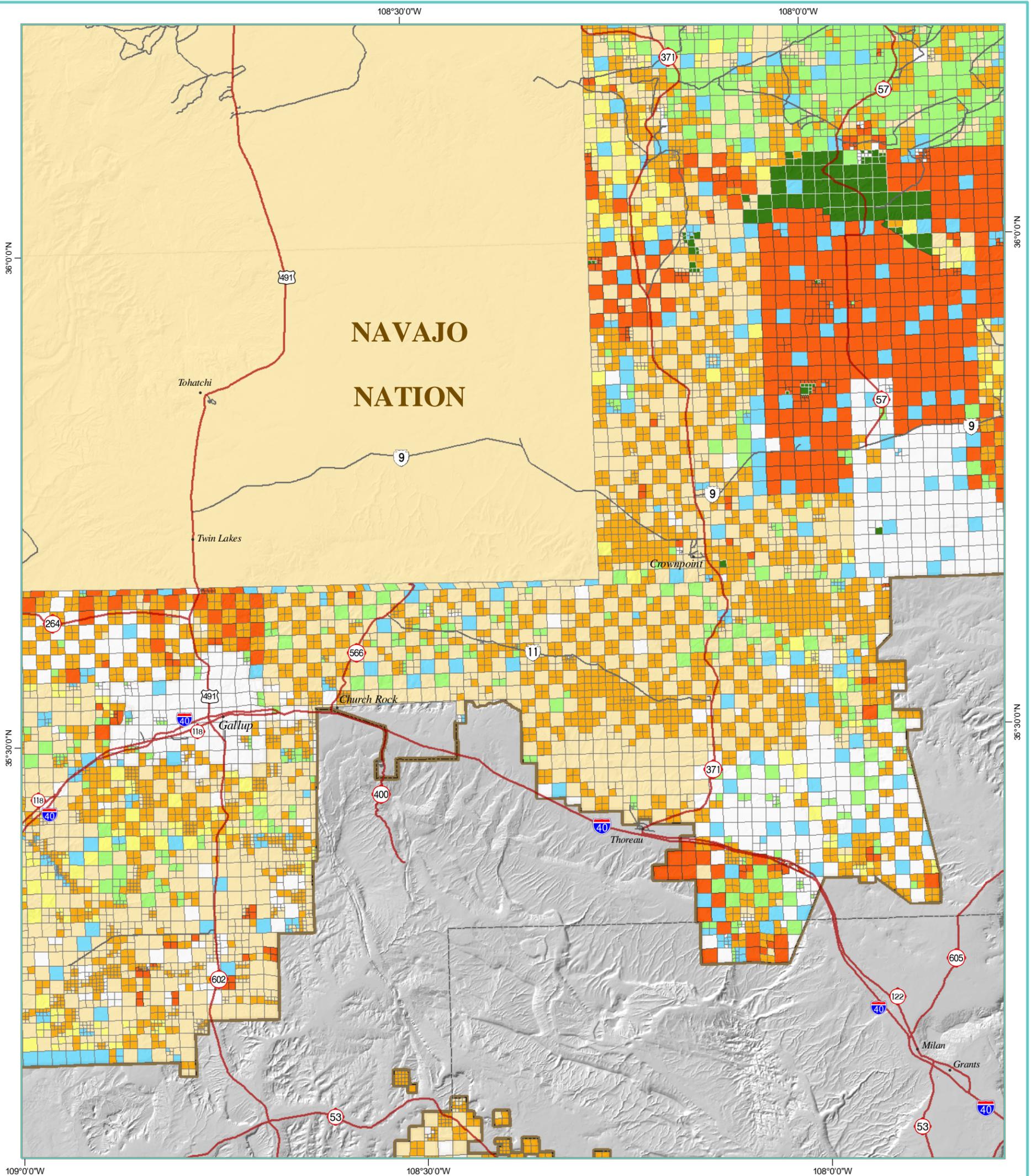
The Navajo Nation Chapter boundaries are from the Navajo Land Department.  
Filename: DB/Boundary/Navajo\_Nation.shp

The state boundaries are from the National Transportation Atlas Databases (NTAD) 2002. The dataset has been clipped to the "four corner" states: Arizona, Colorado, New Mexico, and Utah.  
Filename: DB/Boundary/NN\_State.shp

The county boundaries are from the National Transportation Atlas Databases (NTAD) 2002. The dataset has been clipped to the "four corner" states: Arizona, Colorado, New Mexico, and Utah.  
Filename: DB/Boundary/NN\_County.shp

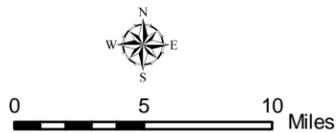
Figure 1. Location of the Navajo Nation.





ABANDONED URANIUM MINES AND THE NAVAJO NATION

LAND STATUS



Sources

These data were collected by the U.S. Bureau of Land Management (BLM) in New Mexico at both the New Mexico State Office and at the various field offices. The Navajo Land Department further processed and attributed the Indian Lands polygons into Navajo Tribal Trust, Indian Allotment, Navajo Tribal Fee, and Public Land Order (PLO) by PLO Number.

Filename: DB/Boundary/NN\_Land\_Status.shp

Legend

NAVAJO NATION SURFACE LAND STATUS

- Navajo Tribal Trust
- Navajo Tribal Fee
- Indian Allotment
- Public Land Order Land
- Bureau of Land Management
- National Park Service
- State
- Private

Figure 4. Land Status in the Eastern Navajo Nation.

## NAVAJO NATION ADMINISTRATIVE BOUNDARIES

The Navajo Reservation was established with the Treaty of 1868. Congress ended treaty-making with Indian tribes in 1871 (Bureau of Indian Affairs, 2001 - S05050301). Since then, several Executive Orders and administrative acts have added lands to the original boundaries of the Treaty of 1868 (see Figure 2, page 3-4). The Navajo Reservation is the largest Indian reservation in the United States, and stretches across northwest New Mexico, northeast Arizona, and southeast Utah.

Three Navajo satellite communities are located in New Mexico. These are the Alamo Band of Navajo, located about 30 miles west of Magdalena, the Canoncito Band of Navajo, located in the Tohajiilee Chapter about 25 miles west of Albuquerque, and the Ramah Band of Navajo, which is located about 40 miles south of Gallup. The Navajo Nation also owns four (4) ranches that are outside the boundaries of the Navajo Nation: Big Boquillas Ranch, Crow Mesa Ranch, Espil Ranch, and the Largo Ranch. Neither these satellite communities nor the ranches have been included in the abandoned uranium mine screening assessments.

The sovereign relationship between the governments of the Navajo Nation and the United States was established in the Treaty of 1868. The Navajo Nation is recognized by the United States as a distinct, independent, political community able to exercise powers of self-government (Bayless, 2000 - S05050303). The capital of the Navajo Nation is located in Window Rock, Arizona. The Navajo Nation conducts a government-to-government relationship with the U.S. Government wherein no decisions about their lands and people are made without their consent (BIA, 2001 - S05050301). In 1921, oil was discovered in northwest New Mexico and the first form of the Navajo Tribal Council, a six-member business council, was created for the sole purpose of giving consent to mineral leases. The Navajo Nation did not adopt the Indian Reorganization Act of 1934 and does not operate under a constitution (SW Strategy, 2003 - S05050302). In 1936, the "Rules of the Navajo Tribal Council," were issued, which formed the basis for the Navajo Nation's government. The Navajo Nation Code sets forth the laws of the Navajo Nation.

The Navajo Nation government is a representative form of government with a President, Vice-President, and Council Delegates elected by the Navajo people. It acts by resolution and is separated into three branches: Executive, Legislative, and Judicial. The 88 members of the Council are elected, based on the population of the 110 chapters. The Council is the governing body of the Navajo Nation and its meetings are presided over by the Speaker who is elected by the membership of the Council. The Navajo Nation Council meets four times a year to enact legislation and discuss other issues of importance to the Navajo people. The Executive Branch is headed by a President and Vice-President, who are elected every four years by the Navajo people (SW Strategy, 2003 - S05050302).

### NAVAJO CHAPTERS

The Tribal government structure consists of 110 chapters, representing all reservation areas and Navajo communities. The 110 chapters are the local form of government. "Although it would be misleading to consider a chapter as a county, they are more significant than a township or municipality, and are most comparable to counties within a state" (McKenzie, 1999 - S01280302). Each chapter elects a President, Vice-President, Secretary-Treasurer, and Grazing Committee, Farm Board, and/or Land Board member to run the affairs of the local chapter community. Community meetings are held in the chapter houses and the members vote on issues such as home site leases and land use plans. Chapters exercise authority which is delegated by the Navajo Nation government over tribal members, and land/assets within their boundaries (SW Strategy, 2003 - S05050302).

Each of the Navajo Nation Chapters has developed a website, with useful information in their Chapter Profiles and chapter demographics (NNDES, 2006 - S02060604). A Navajo Nation Chapters Directory website is under development at [www.navajochapters.org](http://www.navajochapters.org) with links to each Chapter's website.

### BUREAU OF INDIAN AFFAIRS (BIA) AGENCIES

There are five (5) BIA agencies within the Navajo Nation: Chinle, Eastern Navajo, Fort Defiance, Shiprock and Western Navajo. The top map in Figure 5 shows the boundaries of the BIA agencies. These agencies are administrative designations created by the BIA primarily for management of reservation land bases. The administrative hierarchy within the BIA divides the United States into different "Area Offices," which are in turn divided into agencies. In recent years, the agency boundaries have become important to the Navajo Nation for its governmental activities, particularly in planning and service delivery. The agency has become incorporated into the Navajo Nation political system. Each of the agencies have a council which considers issues common to the chapters within that agency. Further, the agency geographical subdivision is used in making reports to the U.S. Department of Interior and the Congress (McKenzie, 1999 - S01280302).

### BIA LAND MANAGEMENT DISTRICTS

In 1936, the Commissioner of Indian Affairs established land management districts within the Navajo Indian Reservation. There are 22 BIA Land Management Districts on the Navajo Nation. The bottom map in Figure 5 shows the boundaries of the BIA Districts. District 6 is the Hopi Reservation. District 22 (Alamo) is not shown on the map

### STATES AND COUNTIES

The Navajo Nation is the largest Indian reservation. It spans eleven (11) counties within Arizona, New Mexico, and Utah:

#### Arizona Counties

Apache, Navajo, and Coconino

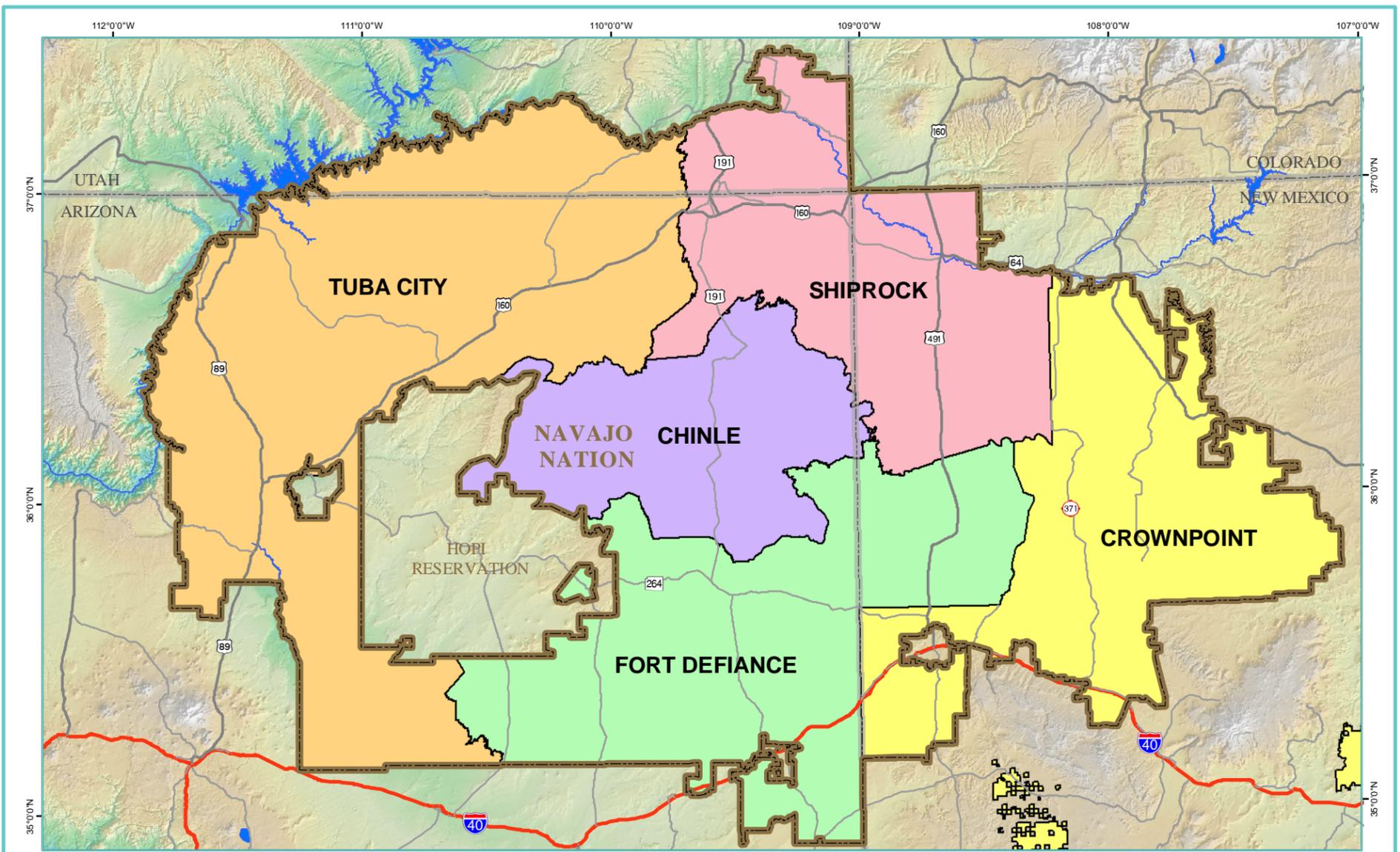
#### New Mexico Counties

Bernalillo, Cibola, McKinley, Rio Arriba, San Juan, Sandoval, and Socorro

#### Utah County

San Juan

States and counties have limited jurisdiction over the Navajo Nation, and only as provided by Federal law. On the Navajo Nation, only Federal and tribal laws apply to members of the Tribe (BIA, 2001 - S05050301).

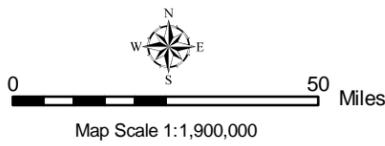


### NAVAJO NATION AGENCIES

**Source**

Navajo Nation Agency boundaries are from the Navajo Land Department.

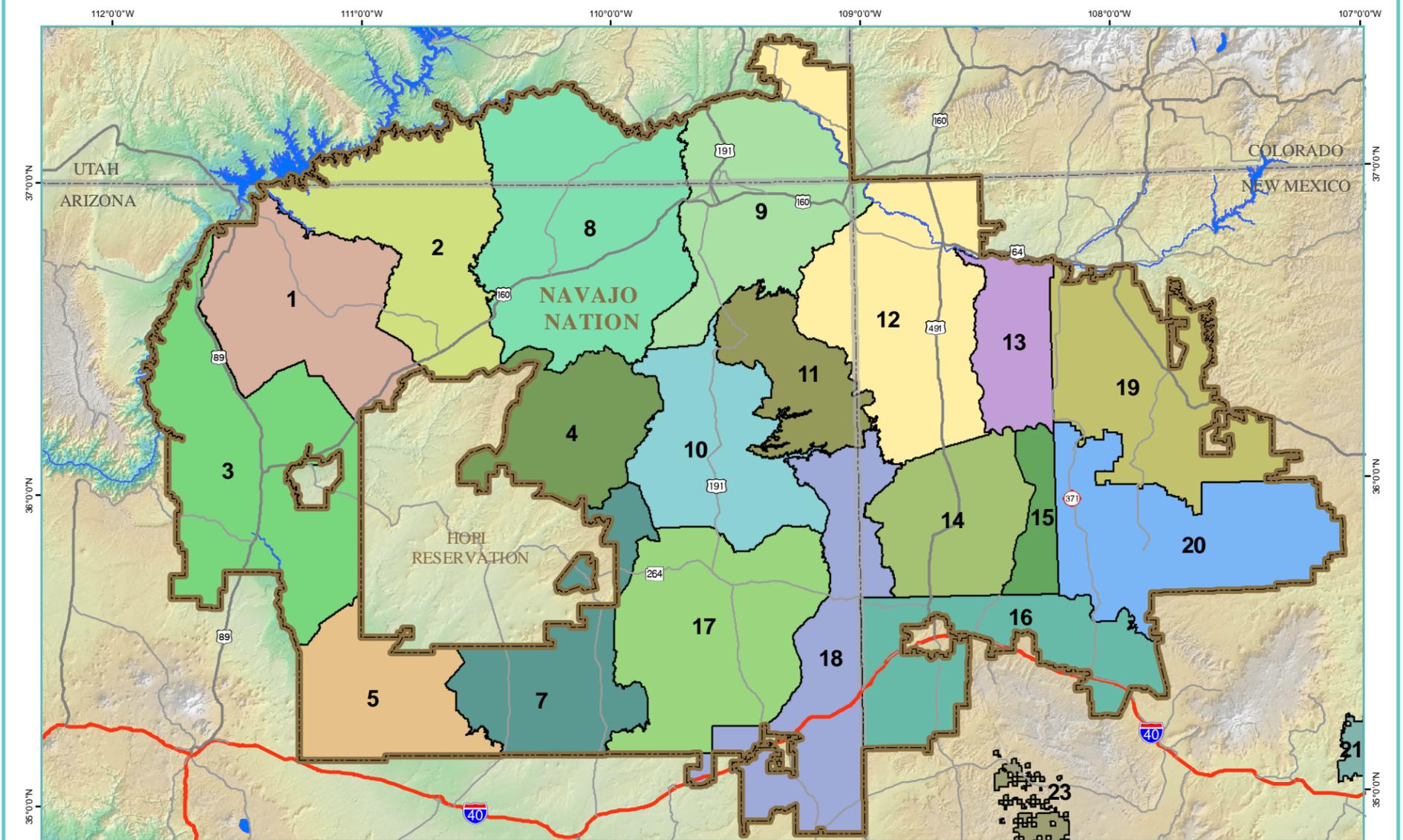
Filename: DB/Boundary/Navajo\_Nation.shp



**Legend**

**AGENCY**

- Chinle
- Crownpoint
- Fort Defiance
- Shiprock
- Tuba City

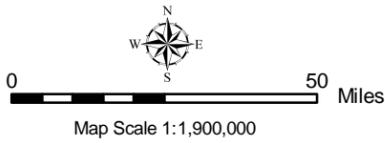


### NAVAJO NATION DISTRICTS

**Source**

Navajo Nation District boundaries are from the Navajo Land Department.

Filename: DB/Boundary/Navajo\_Nation.shp



**Legend**

- 16 District

**Figure 5. Navajo Nation Agencies and Districts.**

## NAVAJO NATION DEMOGRAPHICS

Since the first census in 1790, the Federal Government has conducted a census of the U.S. population and its housing units every ten years. However, it was not until 1860 that American Indians were counted in the census as a separate population category. In 1960, the U.S. Census Bureau made many changes in its methods of enumeration in an effort to acquire a more accurate and complete count for American Indians and Alaska Natives (AIANA) (U.S. Census Bureau, 1999 - S05070302). The Census Bureau began to report data systematically for American Indian reservations in conjunction with the 1970 census. The Census Bureau used the reservation boundaries shown on its enumeration maps, which proved in many cases to be inaccurate and incomplete. For the 1980 census, the Census Bureau attempted to improve reservation boundary information and worked with the Bureau of Indian Affairs (BIA) to obtain more accurate maps. In an effort to further improve enumeration for the 1990 census, the Census Bureau increased its collaboration throughout the 1980's with the American Indian and Alaska Native population by creating the Tribal Governments Liaison Program. The Census Bureau and the BIA signed a memorandum of understanding to achieve a more inclusive exchange of boundary information between the two agencies and the tribal authorities. This agreement provided the framework for the Tribal Review Program. The Census Bureau obtained boundary maps from the BIA, which were then provided to the tribal governments for review. A process of reviews and boundary certifications continued until mid-1989. The Census Bureau developed Tribal Review Maps, which were sent to the tribes for approval and final certification by the BIA. The Tribal Review Program improved the accuracy of the reservation and trust land information used for the 1990 census (U.S. Census Bureau, 1994—S05070301). For Census 2000, the Census Bureau relied entirely on Navajo Nation officials to review the legal boundaries already in the Census Bureau's records. The BIA was asked to participate only if the Census Bureau needed additional information (U.S. Census Bureau, 2002 - S05070303).

### CENSUS GEOGRAPHIC AREAS FOR AMERICAN INDIAN AND ALASKA NATIVE AREAS (AIANA)

The Census Bureau tabulates and publishes population and housing census data for several geographic areas that cover AIANA areas. The two primary types of AIANA geographic areas on the Navajo Nation are reservation lands and trust lands. In addition, the 1990 Census included programs to allow tabulating AIANA census data by smaller geographic areas. These included: tribal subreservations, census tracts, and block groups.

#### Reservations and Trust Lands

American Indian reservations are areas with boundaries established by treaty, statute, and/or executive or court order. The Navajo Nation also has trust lands, which are real property held in trust by the Federal Government. Trust lands may be located within a reservation or outside of a reservation. However, the Census Bureau recognizes and tabulates data separately only for the inhabited off-reservation trust lands; on-reservation trust lands are included as part of the Navajo Nation reservation. As with reservations, tribal trust lands may cross state boundaries. The Census Bureau first reported data for tribal trust lands in conjunction with the 1980 census. For the 2000 Census, tribal subreservations were changed to American Indian Tribal Subdivisions, which allow the tabulation and presentation of census data that are more useful to the Navajo Nation.

#### Tribal Census Tract

Tribal census tracts are small, relatively permanent statistical subdivisions of the Navajo Nation and its off-reservation trust land. The optimum size for a tribal census tract is considered to be about 2,500 people; it must contain a minimum of 1,000 people.

#### Tribal Block Group

A tribal block group (BG) is a cluster of census blocks that are within a single tribal census tract. The optimum size for a tribal BG is 1,000 people; it must contain a minimum of 300 people.

#### Census Designated Places (CDP)

Census Designated Places, or CDPs, are population concentrations that function as a community, are locally recognized as such, but are not legally incorporated. To recognize the significance of unincorporated communities located on American Indian reservations, the Census Bureau lowered the minimum population size for such CDPs to 250 people for the 1990 census.

#### Tribal Subdivisions

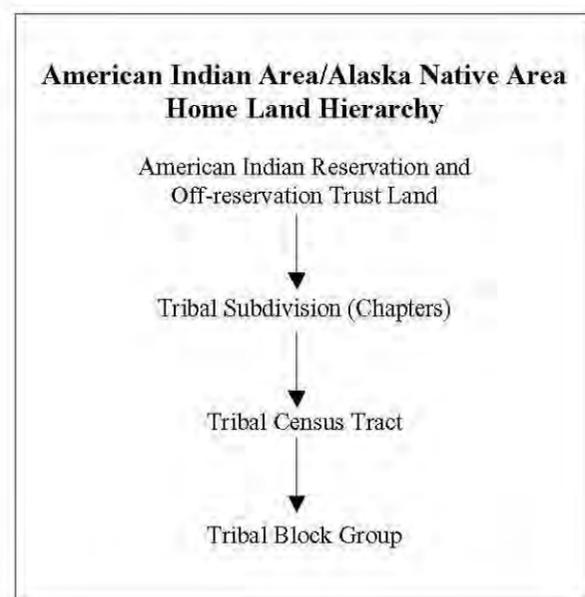
On May 4, 1999 Taylor McKenzie, the Navajo Nation Vice-President, testified before the U.S. Senate Committee on Indian Affairs in Washington, D.C. regarding the views of the Navajo Nation on the 2000 Census. He stressed the importance that the mapping used by the Census Bureau needed to reflect the political units used by the Navajo Nation - namely, Chapters and Agencies (McKenzie, 1999 - S01280302). Tribal subdivisions were implemented in the 2000 Census. Chapters make up the tribal subdivisions for the Navajo Nation. Users of these data should note that the Tribal Subdivision boundaries used in the 2000 Census are not the same as the Chapter boundaries provided by the Navajo Land Department .

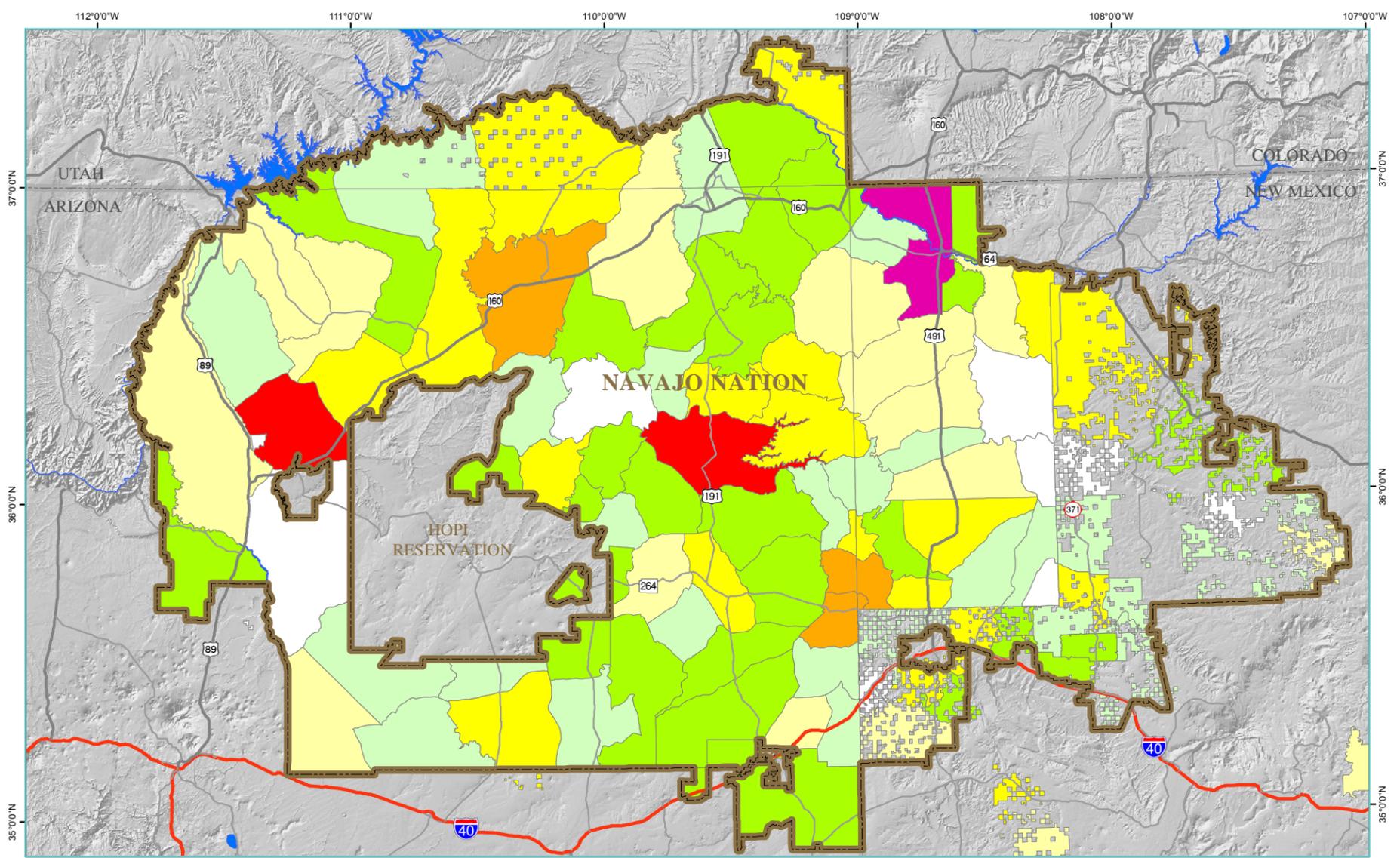
### 2000 CENSUS DEMOGRAPHICS

The 2000 Census reports the total population on the Navajo Nation Reservation and Off-Reservation Trust Land as 180,462 (U.S. Census Bureau, 2000 - S05070304). Figure 6 shows the total population for the Navajo Nation by Tribal Subdivision from the 2000 Census. There are differences between some of the chapter boundaries and the tribal subdivisions used by the Census Bureau. The tribal subdivisions with the highest populations are Shiprock, Kayenta, Chinle, Tuba City, and Fort Defiance.

#### Navajo Nation Demographics

Figure 6 provides "DP-1 Profile of General Population and Household Characteristics: 2000 Census" for the Navajo Nation Reservation and Off-Reservation Trust Land, AZ-NM-UT (U.S. Census Bureau, 2000—S05070304). According to the 2000 Census, the total population for the Navajo Nation was 180,462. The median age was 24 years. There were 47,603 occupied households, 21,141 vacant housing units and 11,126 seasonal, recreational, or occasional use on the Navajo Nation. The average size of a household was approximately 3.8 people.



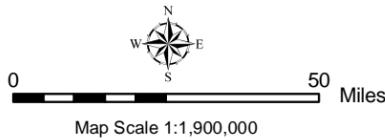


**2000 CENSUS - NAVAJO NATION  
TOTAL POPULATION BY TRIBAL SUBDIVISION**

**Source**

Population by tribal subdivision data is from the U.S. Census Bureau - 2000 Census.

Filename: DB/Cultural/nn\_tribal\_sub\_w\_pop.shp.



**Legend**

**TOTAL POPULATION**

0 - 500	2001 - 4000
501 - 1000	4001 - 7500
1001 - 1500	7501 - 9000
1501 - 2000	9001 - 10000

SUBJECT	NUMBER	PERCENT	SUBJECT	NUMBER	PERCENT
<b>TOTAL POPULATION</b>	<b>180,462</b>	<b>100</b>	<b>HOUSEHOLDS BY TYPE</b>		
<b>SEX AND AGE</b>			<b>Total households</b>	<b>47,603</b>	<b>100</b>
Male	88,469	49	Family households (families)	37,903	79.6
Female	91,993	51	With own children under 18 years	22,989	48.3
Under 5 years	17,364	9.6	Married-couple family	22,708	47.7
5 to 9 years	21,373	11.8	With own children under 18 years	14,614	30.7
10 to 14 years	22,967	12.7	Female householder, no husband present	11,759	24.7
15 to 19 years	18,742	10.4	With own children under 18 years	6,441	13.5
20 to 24 years	11,912	6.6	Nonfamily households	9,700	20.4
25 to 34 years	22,202	12.3	Householder living alone	8,841	18.6
35 to 44 years	24,470	13.6	Householder 65 years and over	2,697	5.7
45 to 54 years	17,316	9.6	Households with individuals under 18 years	28,087	59
55 to 59 years	6,182	3.4	Households with individuals 65 years and over	9,924	20.8
60 to 64 years	5,402	3	Average household size	3.77	(X)
65 to 74 years	7,691	4.3	Average family size	4.36	(X)
75 to 84 years	3,515	1.9	<b>HOUSING OCCUPANCY</b>		
85 years and over	1,326	0.7	<b>Total housing units</b>	<b>68,744</b>	<b>100</b>
<b>Median age (years)</b>	<b>24</b>	<b>(X)</b>	Occupied housing units	47,603	69.2
18 years and over	106,432	59	Vacant housing units	21,141	30.8
Male	50,897	28.2	For seasonal, recreational, or occasional use	11,126	16.2
Female	55,535	30.8	<b>HOUSING TENURE</b>		
21 years and over	97,395	54	<b>Occupied housing units</b>	<b>47,603</b>	<b>100</b>
62 years and over	15,707	8.7	Owner-occupied housing units	36,092	75.8
65 years and over	12,532	6.9	Renter-occupied housing units	11,511	24.2
Male	5,401	3	Average household size of owner-occupied unit	3.78	(X)
Female	7,131	4	Average household size of renter-occupied unit	3.75	(X)

(X) Not applicable

Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrices P1, P3, P4, P8, P9, P12, P13, P17, P18, P19, P20, P23, P27, P28, P33, PCT5, PCT8, PCT11, PCT15, H1, H3, H4, H5, H11, and H12.

**DP-1 PROFILE OF GENERAL POPULATION AND HOUSEHOLD CHARACTERISTICS: 2000 CENSUS  
Navajo Nation Reservation and Off-Reservation Trust Land, AZ-NM-UT**

Data from Census 2000 Summary File 1 (SF1) 100-Percent Data  
Filename: DB/Demog/NN\_2000Census\_pop.xls

**Figure 6. Navajo Nation Census 2000 Population and Households.**

## STRUCTURES

For the purposes of this NAUM Project, structures within one (1) mile of an AUM were mapped as an indicator of the target population locations. The target population consists of those people who use target wells or surface water for drinking water, eat food taken from impacted livestock or fisheries, or are regularly present on an AUM site or live within target distance limits.

For the purposes of assessing the potential target population, it is important to know where people live, work, go to school, and routinely gather. The locations of current residences were not readily available for the Navajo Nation. Existing USGS topographic maps include many buildings and other structures of interest. However, a majority of these maps are over 20 years old and require conversion into a suitable GIS format for analysis. More recent USGS Digital Orthophoto Quarter Quadrangles (DOQQs) were available and were used as a basis to map buildings and other structures by photointerpretation. The DOQQs were generated from aerial photography acquired in 1997 and 1998. For a small number of features, the older topographic maps were used as an interpretation aid. The interpretation of structures was limited due to the dates of the DRGs and DOQQs, which ranged in age from 8 to 20 years. Structures that were constructed after the date of the DRG or DOQQ were not present. In some cases, structures that were present at the time the DRGs or DOQQs were generated do not exist today.

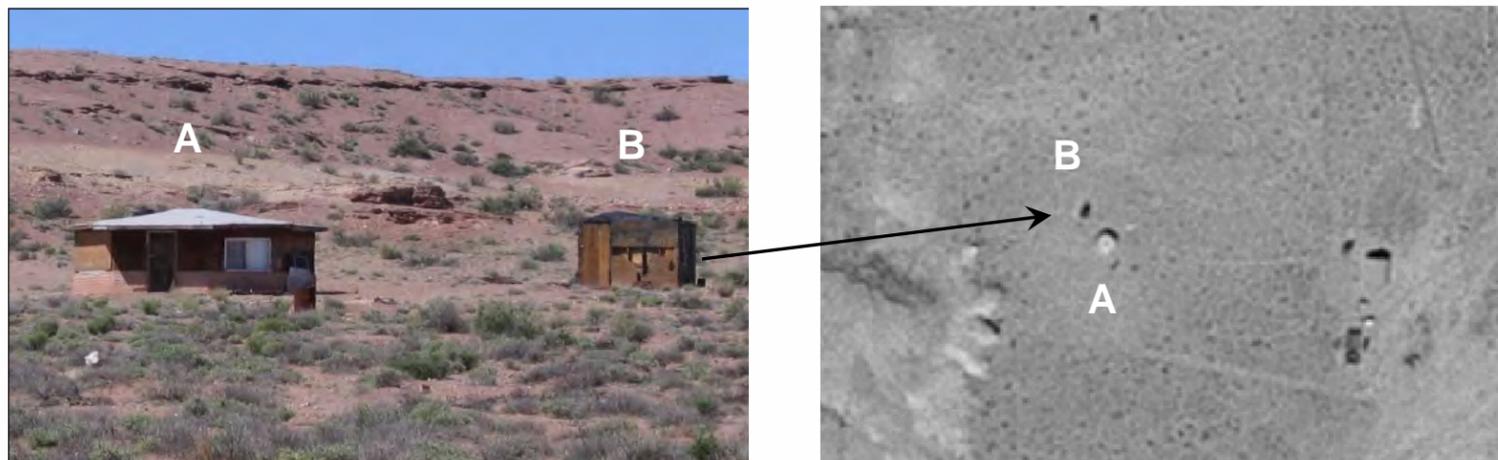


Figure 7. Photo Key Showing Ground Photo and Corresponding DOQQ Image of Structures.

The Navajo Tribal Utility Authority (NTUA) provided point locations for utility meters for the NTUA service areas within five (5) miles of a mapped AUM. The meter locations were collected by NTUA using Global Positioning System (GPS) equipment. It was assumed that where there were water, gas, or electric meters there was probably some type of structure present. The NTUA meter data was very useful in verifying the location of structures that were mapped from the DOQQs. The meter data were also used to include an “assumed structure” category, which designates the locations of structures that may have been constructed after 1997. Use of the NTUA meter location data was limited to this structures mapping effort, and distribution of the data was not permitted. Color DOQQs flown in 2005 were available for New Mexico and were used for structure mapping in the Eastern AUM Region.

More recent aerial photography (2005) was flown by the U.S. Bureau of Indian Affairs (BIA), and DOQQs were generated. These DOQQs were not available for distribution by the BIA for use in this project. However, when they are made available, these color DOQQs should provide a useful source for updating and photo-verifying the structures dataset.

Photo keys were developed to assist with the interpretation of structures and related features (Figures 7 and 8). However, it was not possible to accurately distinguish residences from other types of structures by photointerpreting the DOQQ imagery. Some structures that were mapped may be large sheds or other non-residential structures, and some may be seasonal residences and not occupied full-time. All of these structures, however, are indicative of locations where people might be present. These structures were used as an indicator for the probable location of the target population for the soil pathway and air pathway assessments. A map of structures within one (1) mile of an AUM site is shown on Figure 9. This dataset is provided on the GIS Data DVD (DB/Cultural/NN\_Structures\_1mi.shp). Also shown on Figure 9 are the locations of Chapter Houses, which was provided by the Navajo Land Department (NLD), and is included on the GIS Data DVD (DB/Cultural/nnchppts.shp). NLD used color and black and white DOQQs, Chapter boundaries, surface roads, and Division of Community Development chapter websites to update the locations of the Chapter Houses.

Another source of information about where people live on the Navajo Nation is the Geographic Names Information System (GNIS), which was developed by the U.S. Geological Survey in cooperation with the U.S. Board on Geographic Names. This point dataset provides the locations and names of populated places for the Navajo Nation and the surrounding region (DB/Cultural/NN\_Pop\_Places.shp).

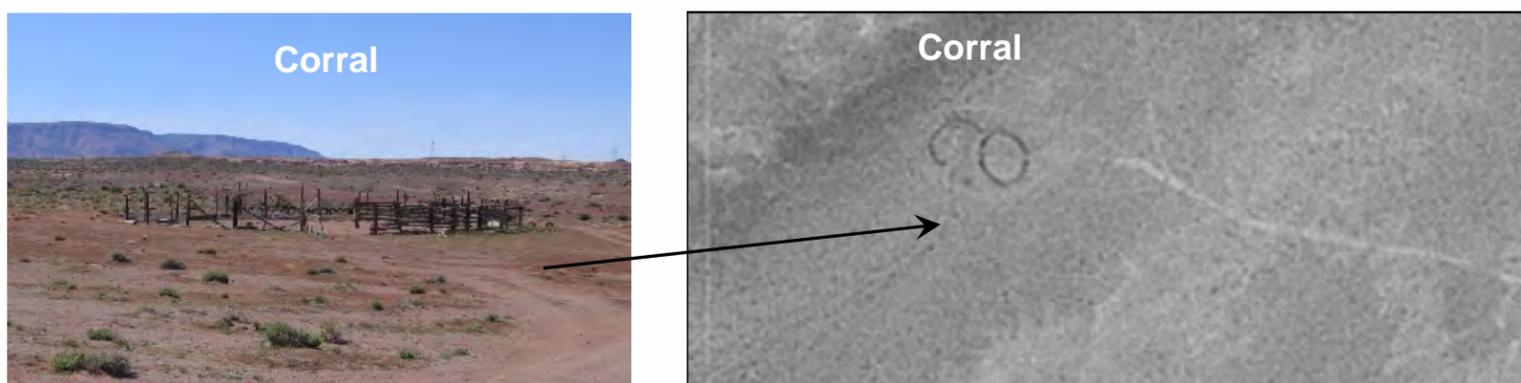
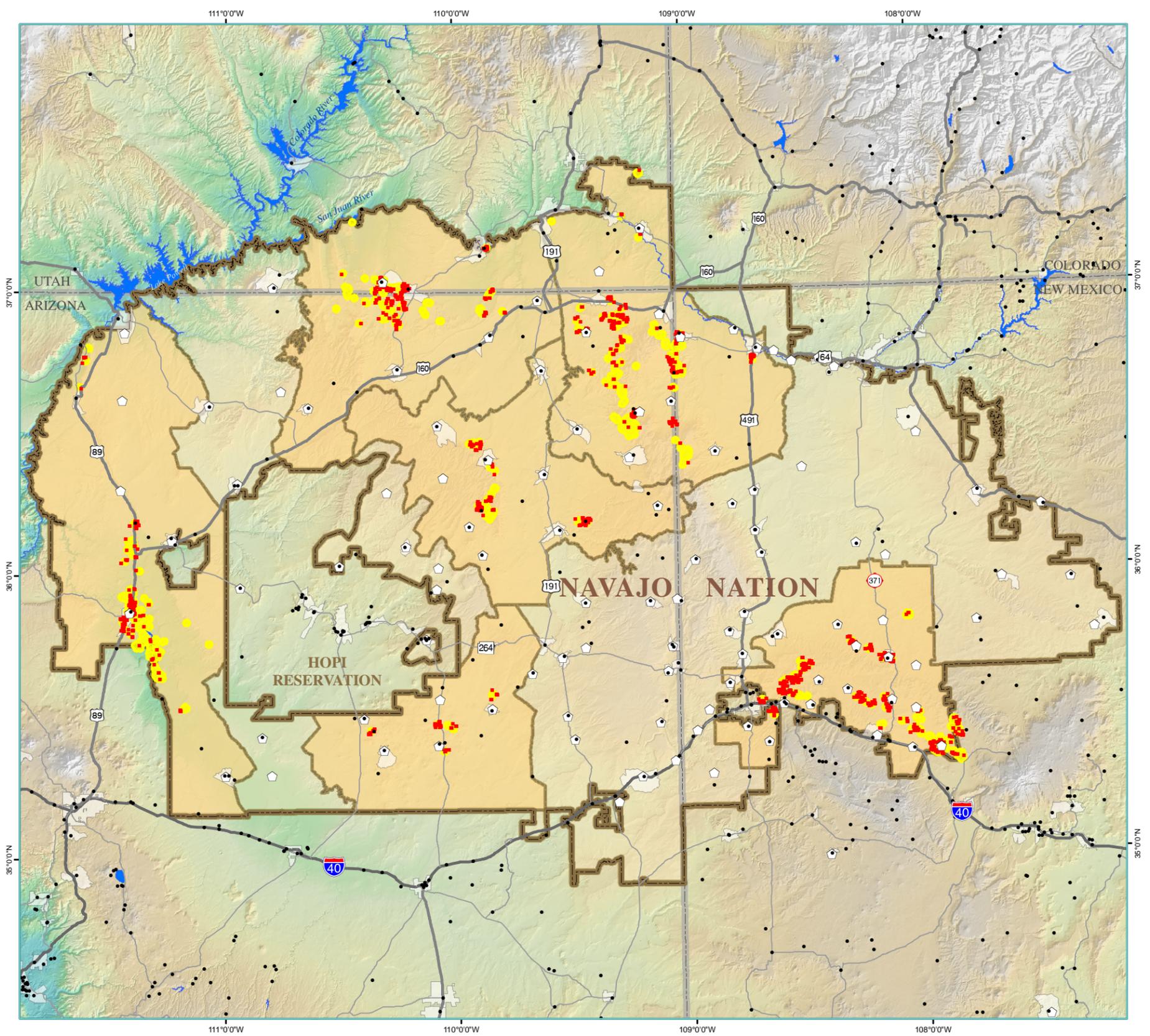
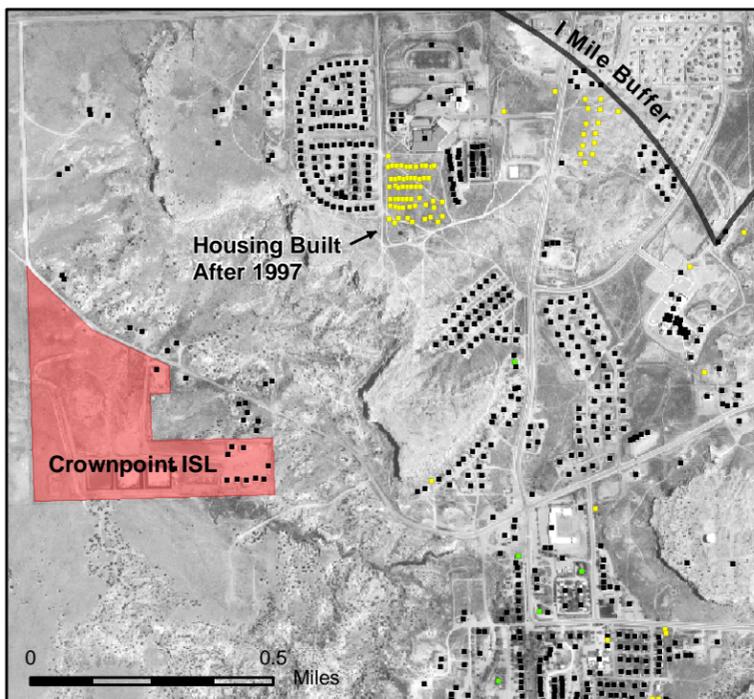
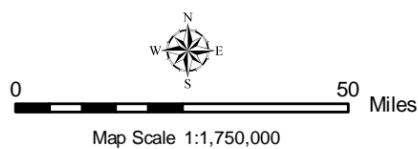


Figure 8. Photo Key Showing Ground Photo and Corresponding DOQQ Image of Corrals.



**ABANDONED URANIUM MINES AND THE NAVAJO NATION**  
**STRUCTURES WITHIN 1 MILE OF AUMS AND OTHER POPULATED PLACES**



- Legend**
- STRUCTURES AND POPULATED PLACES
    - Structures within 1 Mile of an AUM
    - ◡ Chapter Houses
    - GNIS Populated Places
    - Designated Census Place
  - One Mile Buffer Around an Abandoned Uranium Mine
    - Navajo Nation and AUM Region Boundaries

- Sources**
- Structures within one (1) mile of an AUM were photo-interpreted by TerraSpectra Geomatics. Filename: DB/Cultural/NN\_Structures\_1mi.shp
  - Chapter House locations from the Navajo Land Department - GIS Section. Filename: DB/Cultural/nnchppts.shp
  - Populated places points were extracted from the Geographic Names Information System (GNIS) database developed by the U.S. Geological Survey. Filename: DB/Cultural/NN\_Pop\_Places.shp
  - Designated Census Place from the U.S. Census Bureau - 2000 Census. Filename: DB/Demog/nn\_censuspl.shp

Community of Crownpoint, which is proximal to the Crownpoint In-Situ Leach facility. Structures were mapped from 1997 orthophotography (shown in black). "Assumed structures" (shown in yellow) were added from utility meter locations provided by the Navajo Tribal Utility Authority (NTUA). These structures are not present on the 1997 orthophotography.

**Figure 9. Structures Within 1 Mile of AUMs and Other Populated Places.**