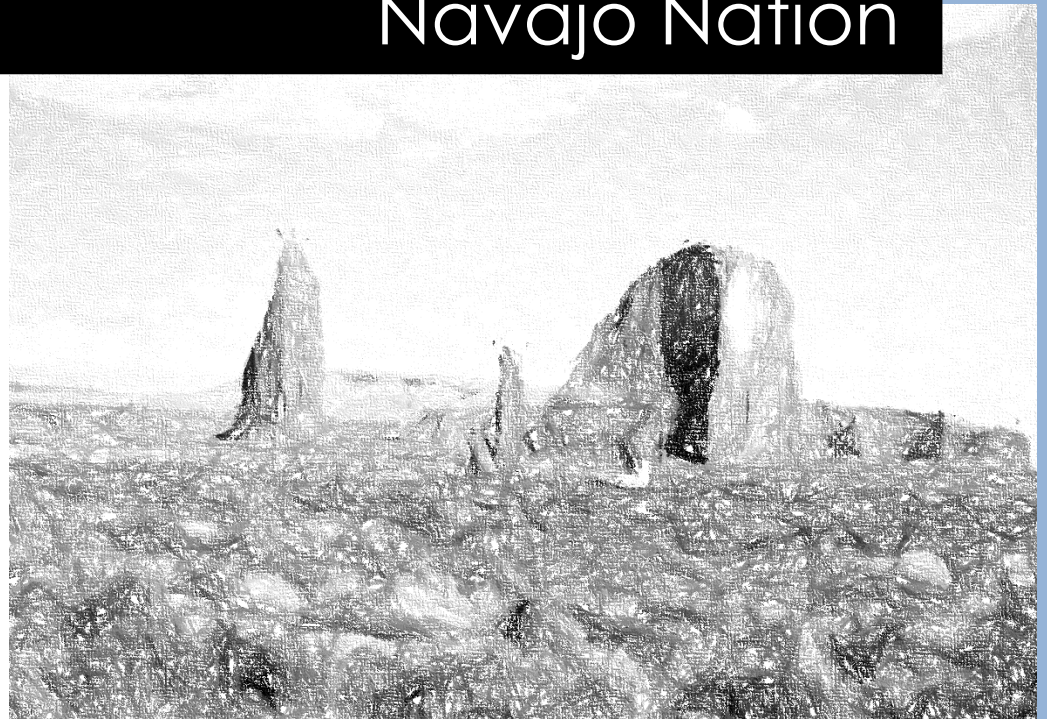


2018

# Climate Adaptation Plan for the Navajo Nation



Climate Change Program  
Navajo Nation  
Department of Fish and Wildlife  
December 2018

Authors of this Adaptation Plan:

Navajo Nation Department of Fish and Wildlife

Gloria Tom, Department Director

Carolynn Begay, Climate Change Program

Raylene Yazzie, Climate Change Program

December 2018



Climate Change Adaptation Plan for the Navajo Nation  
Version 1  
December 20



# Contents

List of Figures.....	0
List of Tables.....	0
Tribal Council Commitment.....	1
Acknowledgments.....	2
The Navajo Nation Climate Change Vision Statement.....	3
Key Terms.....	4
Executive Summary.....	6
General Characteristics and History of the Navajo Nation.....	10
Importance of Cultural Traditions, Sites, and Associated Natural Resources:.....	11
Tribal and Local Government.....	12
Elected Agriculture Community Leaders.....	12
Geology.....	12
Climate.....	13
Navajo Nation Priority List.....	14
Priority Point 1: Water.....	16
Priority Point 2: Feral Horses.....	17
Priority Point 3: Communication.....	17
Priority Point 4: Enforcement and Compliance.....	17
Priority Point 5: Pollution, Air Quality, and Illegal Dumping.....	17
Priority Point 6: Grazing Management.....	18
Identifying Vulnerabilities on the Navajo Nation.....	19
Priority Point 1: Water.....	19
Priority Point 2: Feral Horses.....	19
Priority Point 3: Communication.....	19
Priority Point 4: Enforcement and Compliance.....	20
Priority Point 5: Pollution, Air Quality, and Illegal Dumping.....	20
Priority Point 6: Grazing Management.....	20
Goals and Adaptation Strategies.....	21
Priority Point 1: Water.....	21
Priority Point 2: Feral Horses.....	22

Priority Point 3: Communication ..... 23

Priority Point 4: Enforcement and Compliance..... 23

Priority Point 5: Pollution, Air Quality, and Illegal Dumping ..... 24

Priority Point 6: Grazing Management..... 26

Assessing Priorities and Risk..... 28

    Priority Point 1: Water ..... 28

    Priority Point 2: Feral Horses ..... 28

    Priority Point 3: Communication ..... 28

    Priority Point 4: Enforcement and Compliance..... 29

    Priority Point 5: Pollution, Air Quality, and Illegal Dumping ..... 29

    Priority Point 6: Grazing Management..... 30

Implementation of Plan ..... 31

    Priority Point 1: Water ..... 31

    Priority Point 2: Feral Horses ..... 32

    Priority Point 3: Communication ..... 34

    Priority Point 4: Enforcement and Compliance ..... 35

    Priority Point 5: Pollution, Air Quality, and Illegal Dumping..... 37

    Priority Point 6: Grazing Management ..... 39

References ..... 41

Notes..... 42

## List of Figures

Figure 1. DNR Professionals’ Priority List.....	6
Figure 2. Community Leaders Priority List.....	7
Figure 3. The Navajo Nation Boundary Map.....	10
Figure 4. The Type of Navajo Nation Lands and Leases.....	11
Figure 5. Traditional Wool Dyes.....	13
Figure 6. Impact Concern by Climate Change.....	16
Figure 7. Age: Who takes the surveys?.....	20

## List of Tables

Table 1. Western and Eastern Navajo Priority Lists.....	14
Table 2. Priority List Comparison.....	15
Table 3. Priority and Risk Levels for Water.....	28
Table 4. Priority and Risk Levels for Feral Horses.....	28
Table 5. Priority and Risk Levels for Communication.....	28
Table 6. Priority and Risk Levels for Enforcement and Compliance.....	29
Table 7. Priority and Risk Levels for Pollution, Air Quality, and Illegal Dumping.....	29
Table 8. Priority and Risk Levels for Grazing Management.....	30
Table 9. Goals and Strategies for Water.....	31
Table 10. Goals and Strategies for Feral Horses.....	32
Table 11. Goals and Strategies for Communication.....	34
Table 12. Goals and Strategies for Enforcement and Compliance.....	35
Table 13. Goals and Strategies for Pollution, Air Quality, and Illegal Dumping.....	37
Table 14. Goals and Strategies for Grazing Management.....	39





## Tribal Council Commitment

Resource Committee can approve when ready, do not erase.

## Acknowledgments

This project received financial support from the 2016 Bureau of Indian Affairs Tribal Resiliency Grant for Tribal Adaptation and Capacity Building. Many people participated in the development and preparation of this plan.

The Navajo Nation would like to acknowledge contributions of the following individuals:

### *The Navajo Nation Climate Change Planning Team:*

Gloria Tom, Director, Department of Fish and Wildlife  
Carolynn Begay, Climate Change Team, Department of Fish and Wildlife  
Raylene Yazzie, Climate Change Team, Department of Fish and Wildlife  
Taylor Greene, Forest Biologist, Department of Fish and Wildlife  
Chad Smith, Zoologist, Department of Fish and Wildlife  
Aileen Hale-Chee, Administrative Service Officer, Department of Fish and Wildlife  
Vernonda Howard, Office Specialist, Department of Fish and Wildlife  
Carlee McClellan, Senior Hydrologist, Department of Water Resource

### *Additional Contributions:*

Institute for Tribal Environmental Professionals, Northern Arizona University  
Division of Natural Resources, Navajo Nation

### *Special thanks also to the following groups and individuals for their dedicated participation:*

District Grazing Committee, Navajo Nation Department of Agriculture  
Farm Board, Navajo Nation Department of Agriculture  
Navajo Land Board, Navajo Nation Department of Agriculture

Ahéhee'! (*Thank you*)

## The Navajo Nation Climate Change Vision Statement

To prepare the Navajo Nation to adapt to our changing climate, and implement strategies that will preserve and enhance natural resources and provide a resilient future for the Navajo communities by:

- Protect and enhance native species of both vegetation and animals, and;
- Establish and manage their natural habitats;
- Reduce, Reuse, and Recycle;
- Implement and enforce sustainable, long-term livestock management goals;
- Recognize vulnerable areas and prepare for natural disasters;
- Provide sustainable healthy food sources for a healthier lifestyle;
- Taking advantage of advanced technology to encourage innovation and create a more efficient and livable community;
- Protect and enhance watersheds;
- Cleaning up polluted areas;
- Implement natural resource management plans (fire, erosion, etc.), and;
- Educating the public.

## Key Terms

**Adaptation (climate change):** actions in response to actual or expected climate change and its effects, that lessen harm or exploit beneficial opportunities. It includes reducing the vulnerability of people, places, and ecosystems to the impacts of climate change.

**Adaptation Actions:** actions or activities that the tribe could take to achieve its climate change adaptation or preparedness goals.

**Adaptation Goals:** what the tribe wants to accomplish in the priority planning areas through adaptation or preparedness actions.

**Adaptive Capacity:** the ability of a system to accommodate or respond to the changes in climate with minimum disruption or cost. Generally, systems that have high adaptive capacities are better able to deal with climate change.

**Climate:** the "average weather" generally over a period of three decades. Measures of climate include temperature, precipitation, and wind.

**Climate Change:** any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period of time (decades or longer). Climate change may result from natural factors and processes and from human activities that change the atmosphere's composition and land surface.

**Exposure:** The presence of people, assets, and ecosystems in places where they could be adversely affected by hazards.

**Global Warming:** average increase in the temperature of the atmosphere, which can contribute to changes in global climate patterns. Global warming can occur from a variety of causes, both natural and human induced.

**Greenhouse Gas (GHG):** any gas that absorbs infrared radiation in the atmosphere; examples include carbon dioxide, methane, nitrous oxide, ozone, and water vapor.

**Mitigation (climate change):** actions that reduce the levels of greenhouse gases in the atmosphere; includes reducing emissions of greenhouse gases and enhancing sinks (things that absorb more greenhouse gases than they emit). Examples include switching to renewable energy sources and implementing energy efficiency measures.

**Planning Area:** this is an area in which the tribal government manages, plans, or makes policy affecting the services and activities associated with built, human, and natural systems. For example, within the sector Utilities, you might have planning areas of Water and Electricity.

**Priority planning areas:** planning areas of particular importance to the tribal government or community which are vulnerable to climate change impacts.

**Resilience:** ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to absorb stress and change.

**Risk:** Risk= Consequence of an impact X Probability or likelihood that the impact will happen.

**Sector:** general grouping used to describe any resource, ecological system, species, management area, etc. that may be affected by climate change. For example, Transportation, Utilities, Water Resources, Forest Resources, Human Health, or Cultural Resources and Traditions.

**Sensitivity:** how much a system is directly or indirectly affected by changes in climate conditions (e.g., temperature and precipitation) or specific climate change impacts (e.g., sea level rise, increased water temperature). If a system is likely to be affected as a result of projected climate change, it should be considered sensitive to climate change.

**Vulnerability:** the susceptibility of a system to harm from climate change impacts. It's a function of how sensitive the system is to climate and the adaptive capacity of the system to respond to such changes. Generally, systems that are sensitive to climate and less able to adapt to changes are considered to be vulnerable to climate change impacts.

## Executive Summary

Impacts to the Navajo people, both directly and indirectly, won't be seizing so it is up to the people to adapt to the future changes. This ongoing change due to the climate around us is the reason the Navajo Nation Department of Fish and Wildlife (NNDFW) established the Climate Change Program and team. The purpose for the program is to spread awareness of climate change to the Navajo people. Several hours were spent visiting communities all over the reservation to present on impacts and suggested adaptive solutions for climate change. Along with presenting, the program distributed a climate change survey which community members were able to fill out at community events, schools, and chapter houses. This survey was also uploaded to the Navajo Nation Department of Fish and Wildlife's website for easier access. Overall, the team's main goal was to communicate with community leaders to create the Navajo Nation's first ever adaptation plan for climate change.

The Climate Change Program recruited several community leaders to assist in the assessment of vulnerabilities and impacts. At the beginning of 2018, the Navajo Nation Division of Natural Resource (NNDNR) planned a workshop with professionals. This workshop was the Professional's Workshop. Many of these professionals were field personnel rather than department managers. With the help of the Institute of Environmental Professionals (ITEP) to assist in facilitating the workshop, the NNDNR professionals were able to get their priority list together. This list shows was established

### NNDNR Professionals Priority List:

1. **Overgrazing (feral horses, livestock)**
2. **Water Security (quality, quantity)**
3. **Land use management and planning**
4. **Interdepartmental collaboration and communication**
5. **Education, information and outreach**
6. **Enforcement**

Figure 1. DNR Professionals' Priority List.

based on the natural resource concerns which each department of the Navajo Nation expressed concern for. Along with the priority list, many of the professionals had the opportunity to talk about adaptation strategies and what could be improved. Many of the attendees aspired to make the Navajo Nation a healthier land that their kids, grandchildren, and great grandchildren could grow up in.

In March of 2018, building off the NNDNR Professionals' Workshop, the NNDFW hosted two of its own workshops for community leaders, the Climate Change Workshop. The participants consisted of Navajo Nation District Grazing Officials, Farm Board Members, and Navajo Land Board members. The two workshops were held in both Flagstaff, Arizona and Nenahnezad, New Mexico. Twenty-five attendees were invited to each workshop. The two groups discussed both climate change observations within their own communities and natural resource priority concerns on the Navajo Nation.

A summary report<sup>1</sup> was drafted with information from the Climate Change Workshop, including the recent workshops in August and October. The report summarized the detailed planning process for each workshop. The report was drafted for the purpose to: serve as a learning tool for community leaders to host workshops in their own community; showing the comparison in natural resource priorities for both the western and eastern half of the Navajo Nation; and show the difference in concerns, policies, and laws based on the diverse topography.

Building off the workshops in March, a follow-up workshop was planned for August 27-29 of 2018 in Flagstaff, Arizona. Participants were introduced to the summary report which included the two top natural resource priorities established at the previous workshops. Workshop participants then combined the two priority lists. The newly unified list initiated the establishment of each natural resource concerns' goals and adaptation strategies.

Unfortunately, these goals and strategies were not completed due to the lack of time. Therefore, another workshop was planned for October 23-26 of 2018 in Albuquerque, New Mexico to finish framing the goals and adaptation strategies. Aside from these, participants also rated the risk and priority associated for each goal and strategy of every natural resource concern. Figure 2 displays a few key areas, which participants established amongst themselves, that will be focused on in this adaptation plan.

#### NNDFW Workshop Priority List:

1. **Water**
2. **Feral Horses**
3. **Communication**
4. **Enforcement/Compliance**
5. **Pollution, Air Quality, Illegal Dumping**
6. **Grazing Management**

Figure 2. Community Leaders Priority List.

Workshop attendees generated adaptation plans for each natural resource concern from the priority list. Many of these proposed plans had been shared with other community leaders, which did not attend the workshops, at their local agency meetings which the climate change team presented at. Participants were spilt up into groups of four to minimize distractions during the group discussions. This “round robin” allowed members to voice their opinion without being overshadowed or critiqued by the rest of the attendees. The groups rotated between all the stations, which presented a concern from the priority list, to give their inputs on the rating process.

<sup>1</sup> Navajo Nation Community Leaders Climate Change Report.  
(<https://nndfw.org/docs/Navajo%20Nation%20Community%20Leaders%20Climate%20Change%20report.pdf>)

## Introduction

### General Characteristics and History of the Navajo Nation

The Navajo Nation is settled in the Four Corners area of the Colorado Plateau which expands into Arizona, New Mexico, and Utah. The Navajo Nation is surrounded by four mountains, the sacred mountains, which are Mt. Blanca to the east, Mt. Taylor to the south, San Francisco Peak to the west, and Mt. Hesperus to the north. The Navajo Nation's reservation is approximately 26,634 square miles making it the largest area occupied by any Native American tribe in the United States (Navajo, 2018).

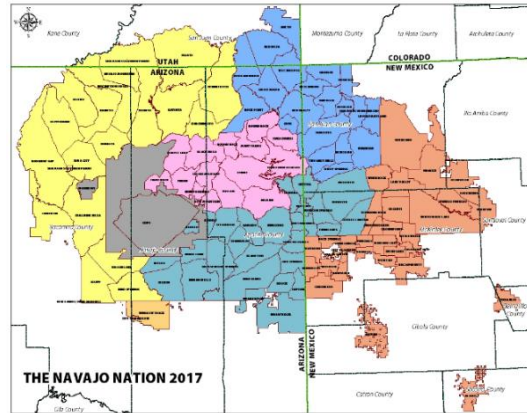


Figure 3. The Navajo Nation Boundary Map.

The Navajo people have their own story of origin which tells of our emergence through the four different colored worlds before reaching this current level, the Glittering World. The First World, where the Navajo People started their journey to the present world, was black. The Second World was blue. The Third World was yellow. The Fourth World, the present world, is white or glittering which is located between the four sacred mountains.

Long before the origin story's time period, Ice-Age Paleo-Indian hunters inhabited thousands of years earlier between 12,000-6,000 B.C. Followed by archaic hunters and gathers between 6,000 B.C-1 A.D. Recordings of the Anasazi people date back before 1300 A.D. Some of the first evidence discovered of the Navajo's existence is dated back before Columbus's exploration in 1491. The first recorded contact made with the Navajo people was in 1581 by the Spaniards (Navajo, 2018). Before the Long Walk of 1864, the Navajo people roamed the region as hunters and gatherers. In the beginning of 1864, thousands of Navajo people were forced to walk to Fort Sumner in New Mexico. Two years later, the Treaty of 1868 was created which allowed the Navajo people to return back to their newly established reservation. Eventually, the reservation expanded from the original 5,400 square miles to 27,425 square miles (Era, 2018).

The census total for the Navajo Nation topped over 300,000 enrolled tribal members as of 2010, which is the most recent census count done yet (Donovan, 2011). According to the 2010 U.S. Census, there was a total of 332,129 enrolled Navajo tribal members across the United States (Center, 2013). Of those, only 156,823 Navajos solely reside on the reservation, 33,370 Navajos reside in border towns (e.g. Gallup, Holbrook, Winslow), 86,455 Navajos reside in metro areas (e.g. Phoenix, Albuquerque), while the remaining 55,481 reside in other places.



The Navajo Nation's large acreage extends the reservation boundary into the three states of Arizona, Utah, and New Mexico. Listed in Figure 1 are different aspects of land associated with the overall 27,425 square miles.

**TYPE OF NAVAJO NATION LANDS AND LEASES**  
as of 3/31/1998

Types of Lands	Arizona	New Mexico	Utah	Total
Navajo Nation Trust	10,158,784.82	2,795,418.26	1,223,933.96	14,178,137.04
Navajo Nation Fee	585,169.98	357,000.00	424.90	942,594.88
Individual Indian Allotment	81,963.81	671,043.50	9,741.80	762,749.11
State Lands Lease	256,905.79	126,760.10	-	383,665.89
BLM Leases	-	150,002.23	-	150,002.23
U.S. Forest Service Permit	174,000.00	-	-	174,000.00
Government E.O. PLO & School Tract		91,838.99	5.99	91,844.98
New Lands	345,032.00	-	-	345,032.00
	<b>11,601,856.40</b>	<b>4,192,063.08</b>	<b>1,234,106.65</b>	<b>17,028,026.13</b>

The Navajo Nation has: 17,028,026.13 Acres of land or  
26,606.29 Sections Square miles of land or  
739.06 Townships of Navajo Nation Lands and Lease Lands.

Source: Title Section ONLA, Lands Department, Division of Natural Resources.

Figure 4. The Type of Navajo Nation Lands and Leases.

### Importance of Cultural Traditions, Sites, and Associated Natural Resources:

With a majority of the Navajo Nation still practicing traditional dances, ceremonies, and other culturally sensitive events, it becomes hard to implement new strategies that do not go against what many Navajos were taught and continue to live by. In the culture, there are several animals which are considered to be sacred to the people. For example, horses are meant to be both powerful and sacred. This perception makes it difficult to resolve the reservation's overall overpopulation of feral horses. Aside from animal culture, many tribal members have expressed their concerns for the neglect and loss of traditional practices due to climate stress. Community members articulated on these concerns, and more, during community presentations and climate adaptation workshops.

## Tribal and Local Government

The Navajo Nation has an elected tribal government that includes an executive office, legislative house, and judicial system. However, the United States federal government still holds power over all decisions. The executive branch is led by the Navajo Nation President and Vice President whom are elected officials, based on the popular vote of the Navajo people, and serve a four-year term. The judicial branch is led by the Chief Justice of the Navajo Nation who is appointed by the President and is confirmed by the Navajo Nation Council. Lastly, the legislative branch is composed of eighty-eight members called Council Delegated or the Navajo Nation Council. The delegated are elected by registered voters from all 110 chapters across the Navajo and also serve a four-year term (The Navajo Nation Economic Development, 2004).

Another sector of the Navajo Nation government is the local government that occurs through chapters which are geographically subdivided populations of tribal members. There is a total of 110 chapters divided into five agencies (Northern, Eastern, Ft. Defiance, Central, and Shiprock Agency) within the Navajo Nation. With these chapters, they allow tribal members to vote on local economic development issues and have significant power in the community with planning and development. However, the authority legally remains with the Navajo Nation Council (The Navajo Nation Economic Development, 2004).

## Elected Agriculture Community Leaders

Along with the local government system, each chapter within the Navajo Nation has their own elected agriculture community leader. Elected leaders will belong to one of three organizations of District Grazing Committee, Navajo Land Board, or Farm Board. These three organizations are in charge of implementing both agriculture and livestock laws and regulations within their chapters' community. These elected agriculture community leaders work closely with the Navajo Nation Department of Agriculture (NNDA) which is a department under the Navajo Nation Division of Natural Resources (NNDNR).

---

*“We always hear plans being done at Window Rock and we get a paper telling us to implement these laws, so thank you Fish and Wildlife for including us at the ground level.”*

---

## Geology

The Navajo Nation is located on the Colorado Plateau with a variety of geological settings such as the Chuska Mountains and Defiance Uplift that separate the San Juan Basin and the Black Mesa-Holbrook Basin (Klauk, 2005). The altitude can reach a low of 5,500 feet to a high of 10,500 feet from the desert region to the mountains that are

covered in alpine forests. Due to the wind and water erosion over the years has created mesas, mountains, and canyons that the Navajo Nation is known for such as Canyon de Chelly, Shiprock Peak, Monument Valley, Window Rock and more.

## Climate

Due to the variety of geological settings within the Navajo Nation, the climate can vary in different regions and even in between. Fluctuating climate patterns across the reservation from south to north has caused both severe cold winds and hot summers. The entire southwest has been experiencing a long-term trend toward a hotter and drier weather throughout the year. Many individuals within the Navajo Nation have noticed this temperature change. Elders reminiscence of their childhood years when there was an abundance of snow which lasted for months and long monsoon seasons. Whereas now, the snowfall melts within the day and rainfall run-off has drastically increased. These present-day problems effect the natural aquifers' recharging process.

## Why the Navajo Nation is Planning for Climate Change

Climate Change is real. Effects from climate change are happening right now and the Navajo people are witness to its continuing outcome. Analyzing the effects to the Navajo Nation in all aspects, the culture and traditions are at risk. Many areas are being jeopardized by climate change, one of those is – natural resources. Navajo culture is centered around the available, yet diminishing, sources of natural resources. The people established their cultural lifestyle from the earth itself. The ceremonial herbs, scared stones, wildlife, and more are important elements to the people. Relations

amongst families are also significant to the culture, hence the clan system. Many tribal and local monuments also hold a large importance to our self-identity.



Figure 5. Traditional Wool Dyes.

This is the reason why the Navajo Nation is planning for climate change. With the effects from the changing climate, there are risks associated with everything in our natural environment, the population, and places. Planning for the oncoming change helps to reduce those future risks. Climate change cannot be stopped so we must plan and adapt to those future impacts.

## Navajo Nation Priority List

In March of 2018, the Navajo Nation Department of Fish and Wildlife held two workshops with a select group, from the group of elected agriculture officials, whom volunteered their attendance. These participants contributed their time to bring up natural resource concerns which they observe within their own communities. The focuses of these workshops were to gain an insight on natural resources management at the community-level. Followed by a comparison to the NNDNR Professionals' Workshop, which was held in January of 2018. For the Professionals' Workshop, under the Division of Natural Resources, all departments sent field personnel to represent single departments. These representatives acquired knowledge on both the department and community's daily operations. Representatives conveyed their affiliated department's concerns, while still considering communities, to the workshop facilitators. In conclusion, the participating representatives created a priority list for the Division of Natural Resources.

After the NNDNR Professionals' Workshop, the climate change team attended the Navajo Nation Department of Agriculture's reservation wide meeting for all elected members. There, the team showed attendees results from the NNDNR Professionals' Workshop and asked for participants in March of 2018 for the Climate Change Program's own workshop. Since participants were located all over the Navajo Nation, the workshop in March were split into two. This was done to accommodate the participants' various locations and minimize traveling. Both workshops ended with a new priority specific to the western and eastern half of the Navajo Nation.

**Table 1. Western and Eastern Navajo Priority Lists.**

Western Navajo Nation Priority List	Eastern Navajo Nation Priority List
1. Communication	1. Enforcement
2. Enforcement/ Compliance	2. Feral Animals
3. Education/ Outreach	3. Water
4. Water (management, security, conservation)	4. Grazing Management
5. Feral Horses	5. Air Quality
6. Grazing Management	6. Funding
7. Animal Control	7. Education
8. Sustainability Resources (clean, alternative)	8. Communication
9. Soil Conservation	9. Forestry
10. Land Use	10. Illegal Dumping
11. Restoration/Rehabilitation	11. Land Management
12. Pollution	12. Pollution
13. Youth	13. Animal Control
14. Invasive Species	14. Invasive Species
15. Record Keeping/ GPS Data	15. Youth
16. Forest Management	16. Erosion

Continuing the pursuit of an adaption plan, a follow-up workshop was scheduled later in the year for August. The intent of this workshop was getting previous participants to return and amalgamate the two priority lists for one unified list for the entire Navajo Nation. The workshop hosted both sides of the Navajo Nation to give participants the opportunity to state their opinions on the unification process and differences in challenges amongst agencies. Several participants discussed different procedures they must follow based on their agency and land classifications (Navajo Partitioned Lands, Navajo Nation Trust, Individual Indian Allotment, BLM Leases, State Land Lease, New Lands, etc.).

Table 2 displays a comparison of priority lists from the Division of Natural Resources Professionals' Workshop and Department of Fish and Wildlife's Climate Change Workshop, with the elected officials from Department of Agriculture.

Although ranked and worded differently, priority lists from the Professionals' Workshop and Climate Change Workshop are comparable. Both workshops brought up similar priorities along with concerns. Priority lists were created by the attendees with little to no help from the workshop facilitators. Goals were also established to further support the adaptation strategies.

**Table 2. Priority List Comparison.**

NNDNR Professionals Priority List:	Agriculture Elected Community Leaders Priority List:
<ol style="list-style-type: none"> <li>1. Overgrazing (feral horses, livestock)</li> <li>2. Water Security (quality, quantity)</li> <li>3. Land use management and planning</li> <li>4. Interdepartmental collaboration and communication</li> <li>5. Education, information and outreach</li> <li>6. Enforcement</li> </ol>	<ol style="list-style-type: none"> <li>1. Water</li> <li>2. Feral Horses</li> <li>3. Communication</li> <li>4. Enforcement/ Compliance</li> <li>5. Pollution, Air Quality, Illegal Dumping</li> <li>6. Grazing Management</li> </ol>

The Climate Change Program created a survey with the help of the elected community leaders from the Navajo Department of Agriculture. These surveys were distributed out in communities which the program was presenting in. An online version of the survey was also uploaded to the Navajo Department of Fish and Wildlife's website for individuals. Questions in this survey include but were not limited to: observations in environmental changes, participant knowledge on climate change, participants' usage of land and importance of natural resources.

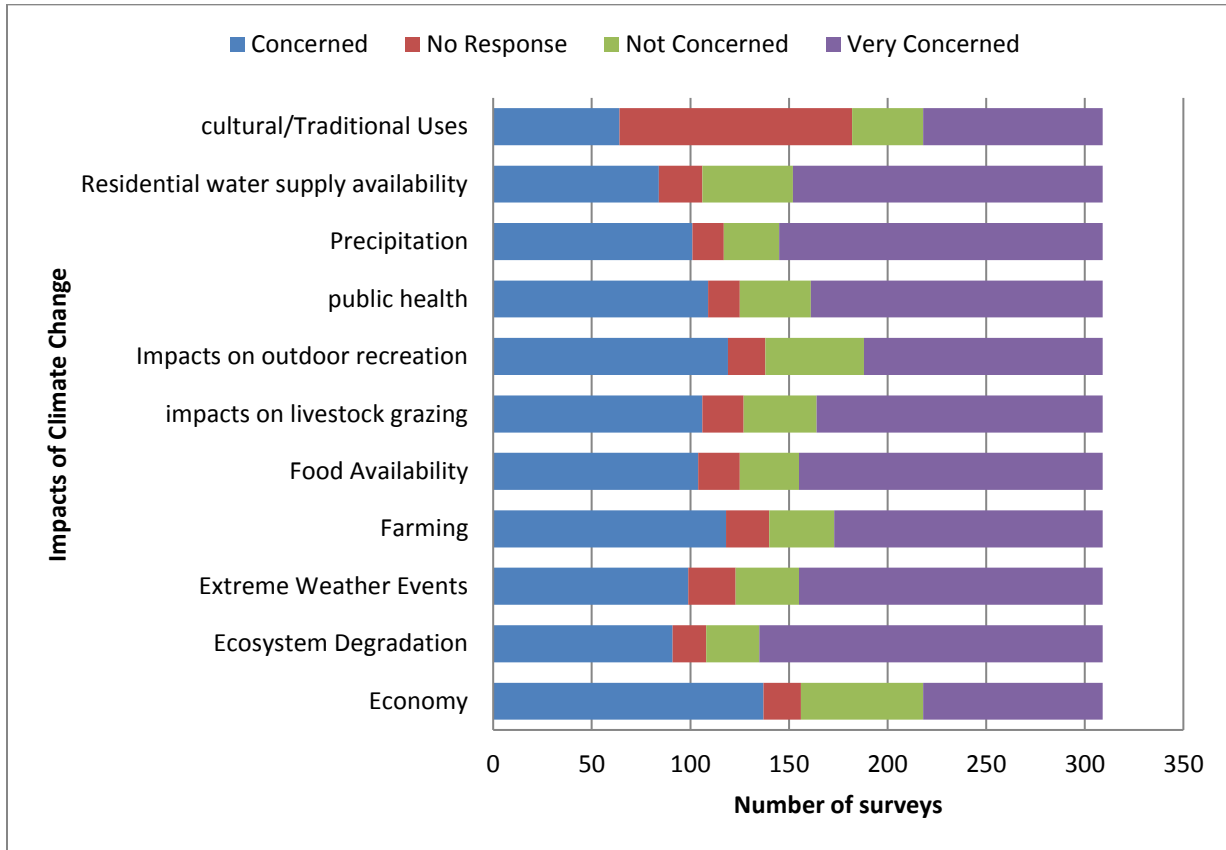


Figure 6. Impact Concern by Climate Change

### Priority Point 1: Water

Water is considered to be one of the major natural resources that is needed to survive. Throughout the years, our clean water resources have been depleting and contaminated with no real solutions or strategies. Attendees reflected on potential new objectives and regulations for water at the Climate Change Workshop. One suggestion was requiring homeowners and contractors to install water efficient systems into homes. Many attendees also discussed the rising concern of diminishing water levels in their community wells due to the relaxed recharging rate. Many wells would reach an adequate level of water until the early mornings. Attendees mentioned having to wait till early morning to retrieve water. Mining industries also contribute to the diminishing levels in the natural aquifers. Because of this, attendees suggested revisiting water rights pertaining to the General Leasing Act.

## Priority Point 2: Feral Horses

There have been countless debates regarding solutions for the overpopulation dilemma with the feral horses on the reservation. The Navajo Department of Fish and Wildlife conducted a study to gather more information on the feral horse issue. The study's report claimed to have surveyed 89 east-west transects across the Navajo Nation and recorded over 38,000 horses within those survey areas (Wallace, Stahlecker, Ruehmann, Nielson, & DiDonato, 2017). Due to the increasing number of feral horses, annually, damage to the natural resources and property are also increasing. Horses are not native to the area and are considered to be an invasive species. There are several characteristics in horses which are different from common wildlife, such as elk and deer. Some distinctive characteristics between horses and wildlife are hoof variations, eating behavior, and damage possibilities. Hooves are solid while deer have two main hooves on each foot, a cloven hoof. Constant impact from hooves, cause the soil to compact and damage vegetation. Deer nibble on vegetation leaving plant roots for regrowth. Horses consume the whole plant and rip out plant roots. Property damage has a higher association with feral horses. Although free-roaming studs on the Navajo Nation is against rules and regulations, studs are still known for breaking fencing and running off with other enclosed horses.

## Priority Point 3: Communication

During the Professionals' Workshop and the Climate Change Workshop, communication between departments and governments was repeatedly voiced. Attendees discussed the submitted paperwork's processing time and wait time to get results back. The attendees expressed the concern of misinformation they're given from different departments and personnel. A contribution to the miscommunication is the language barrier from English to Navajo, and vice versa. Meaning is lost through translations between member and departments because of improper translation.

## Priority Point 4: Enforcement and Compliance

Enforcement and compliance to rules and regulations is lacking across the Navajo Nation because of the vast area of land. Limited resources, including enforcement personnel, leaves community leaders within each chapter the responsibility of enforcing rules and regulations. Members of the community are advised to report to the Division of Natural Resource's enforcement section or the Navajo Nation Police.

## Priority Point 5: Pollution, Air Quality, and Illegal Dumping

Members of the three agriculture organizations witness the daily changes in their community and across the Navajo Nation. Observing changes such as growing

pollution levels in the land, air, and water. Members shared with others at the Climate Change Workshop that rural communities are more prone to illegal dumping because approved dump sites are too far away. Community members will dump trash along the road in washes, which leads to chemical contamination in the ground and underground water reservoirs. Livestock and wildlife are also known to consume particles from these sites and causing internal damage to themselves.

## **Priority Point 6: Grazing Management**

Ranchers have entrusted the land to repair itself. They've relied on the method of open grazing their livestock. However, many have not implemented strategies to help repair the land or replant native grasses to help the land grow back what their animals have consumed. Members of the District Grazing Committee and Navajo Land Board have the job of educating the permit holders in their community. Meetings are held every month for permittees to convene and learn new grazing management strategies. Many permittees are elderly and despite these efforts from the officials these permittees do not fully understand. Officials work to teach new strategies but elders refuse to implement them. Another problem officials face is the loss of knowledge. Knowledge is not being passed down from old to new permit holders and therefore new permittees are not as prepared to run the ranch on their own.



## Identifying Vulnerabilities on the Navajo Nation

With a newly combined priority list from the Climate Change Workshop, we moved into finding strategies that accomplished the goals for each priority. The goals were established on a bigger scale. Therefore, goals were dissected into smaller steps which would assist in achieving goals. Steps also involved other departments under the Navajo Division of Natural Resources, as well as chapter house officials. The different classified land types added a difficulty when taken into account as far as potential impacts each can incur. Therefore, there will be multiple plans for the various sections.

### Priority Point 1: Water

Attendees discussed new adaptation strategies for the water resources. Many thought of new objectives or regulations for the water, such as new regulations to require installations of water efficient systems. The involvement of community members was needed to install water saving systems in community homes which would benefit everyone from the farm to household. Strategies of communication with Navajo and Non-Navajo corporations for expert opinions for efficient resources, financial included, was also encouraged.

### Priority Point 2: Feral Horses

Facilitators informed attendees of current feral horse management plans. However, many attendees expressed their limited abilities, proper equipment being one of them. Some attendees assumed they had to go through a process in order to do a community round-up, beforehand. Whereas, some officials were able to take advantage of their job description for an easier process. The topic opened up another discussion amongst the entire group on how they each deal with their community's feral horse situation. A resolution for horse round-ups was also a topic of discussion. Attendees mentioned the resolution only needed a single approval and would stay in affect until the end of that specific official's term.

### Priority Point 3: Communication

On the topic of communication adaptation plans, attendees conversed over the Navajo Nation government system and the time frame for paperwork to be finalized. Concerns were mentioned regarding information given to attendees. When contacting a department, the information is inconsistent with other departments. Some contributing factors for that are: personnel giving incorrect information; available personnel do not speak Navajo fluently and misinterpret what is being asked of them;

and current personnel are not willing to pass on information to new personnel. Aside from the miscommunication issues, the younger generations are more willing to give information.

Figure 4 it shows how the younger generation was more willing to finish the climate change survey.

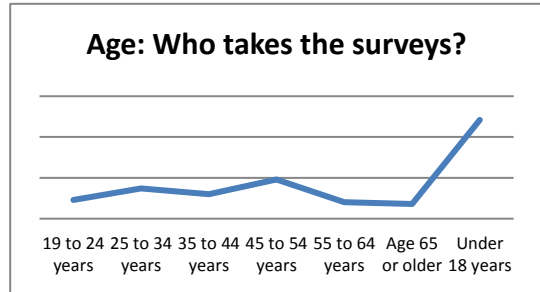


Figure 7. Age: Who takes the surveys?

### Priority Point 4: Enforcement and Compliance

With the lack of enforcement and compliance to grazing regulations, this topic was heavily discussed. Reason being, the community leaders are left to enforce the regulations in their community and have conflicts with doing so. A majority of the attendees have trouble either enforcing or getting assistance from other departments. Many shared their personnel stories of what they've encountered when trying to enforce the laws and regulations within their communities. They spoke about being placed in the line of fire during round-ups. Also, of how they're left to experience the repercussions from the community because law enforcement can't protect them for extended periods of time.

### Priority Point 5: Pollution, Air Quality, and Illegal Dumping

The main objective of this priority was to reduce and control pollution, bad air quality, and illegal dumping for the Navajo people, land, and animals. District Grazing Committee, Navajo Land Board, and Farm Board officials see a majority of the pollution that occurs within the communities. Attendees discussed implementing new recycling centers within the Navajo Nation and providing mobile centers to visit secluded communities. Attendees stressed the importance of educational outreach to educate the various communities of these centers and how to take advantage of them. Lastly, it was mentioned to have these centers assessed and created to the standard of the Environmental Protection Agency to eliminate contamination.

### Priority Point 6: Grazing Management

Attendees shared their current efforts to contain the feral horse population on the Navajo Nation with horse surrenders, horse sales, and round-ups. The lack of community involvement and education on new grazing techniques is the main obstacle for community leaders. Personal experiences of round-ups were shared amongst the group, along with the physical and verbal backlash they receive from members of the community. Many of which they have to deal with after law enforcement leaves. This has the community leaders questioning their involvement in helping the community.

## Goals and Adaptation Strategies

Members from the District Grazing Committee, Farm Board, and Navajo Land Board discussed goals they wanted to accomplish for every priority point, natural resource concern. Multiple goals were then established for every concern. Since the goals are set on a larger scale, attendees created adaptation strategies which would support the accomplishment of goals when followed.

### Priority Point 1: Water

**To adjudicate water rights.** Revisit current Navajo and Non-Navajo water rights. Seek expert advice to adjudicate current water rights. File water use under the Water Code. Obtain a permit. Provide data that justifies water needs.

**To recycle water.** Update both the Drought Contingency Plan of 2003 and the Water Resources Development Strategy. Also send a copy of these plans to the community leaders. Develop drought mitigation measures for each region on the Navajo Nation. Prioritize each region. Implement objectives from both documents.

**To protect, preserve, and restore watershed and head waters.** Use the Water Resource Strategy document to construct and/or repair dams, wells, solar powered windmills, vegetation reconstruction. This will help to recharge the aquifers. Also, look into Little Colorado River Water Settlement and water level. Develop a conservation plan for the entire Navajo Nation. Some examples are: erosion control; grass replanting; livestock removal by cancelling and deferring permits from the permittees.

**To provide reliable water supply.** Amend the Homesite Lease regulations. Require water and energy efficient designs in buildings. Create building codes for the Navajo Nation. Incorporate use of grey water for plants not for consumption which will need a permit from the Navajo Tribal Utility Authority (NTUA). Establish a collection system.

**To have clean water.** Stop the use of the ground water for industrial use, specifically for mining. Revisit the current water rights pertaining to the General Leasing Act.

**To ensure high quality water for all users.** Evaluate and assess the Managed Aquifer Recharge (MARS).

**To provide educational outreach.** Revive 4-H and Future Farmers of America (FFA) in schools. Coordinate with these schools to establish a natural resource curriculum.

**To secure funding for local communities for natural resources management.** Coordinate with NTUA to implement tiered rate on water usage. Meaning rewarding people who use less than a set amount of water with lower rates, compared to those who use larger

amounts of water. Create community driven projects, such as drip irrigation, water harvesting, usage of straw bales, selecting water efficient crops only, and implementing home-based education on natural resources over school driven.

**To obtain more water statistics and data.** Complete an assessment of earthen dam conditions with Navajo Department of Water Resources. Establish rehabilitation plans based on the assessment. Also, create and implement a plan for the earthen dams. Contract outside companies for projects. Place a “freeze” on livestock water due to the lack of filing from farmers and ranchers with the Water Code section. Also, pay for the water being used upfront. Provide water to last year-round, per water source. Using “dirty” water for compaction. Lastly, dam-up all run-offs.

## Priority Point 2: Feral Horses

**Improve the Navajo Nation’s ability to effectively enforce livestock management regulations.** Enforcing all rules and regulations for livestock management. Making ownership of studs illegal and using artificial of insemination as an alternative, refer to Title III – Chapter 7. Amend the regulations which are in effect today. Build communication with livestock rangers because citations are not enforced and there is no support from them for Grazing Officials whom write up the non-compliant citations. Create resolutions to support round-ups of unbranded horses on the Navajo Nation. Obtain resource and a development committee.

**To address the need for an informed Navajo Nation citizenry by developing livestock management education programs to inform communities about the need for sustainable management, environmental impacts by unmanaged horses, and introduce curriculum programs to elementary schools.** Establishing a Cattlemen’s Association to create a plan of operations and conservation plan. Continuing to educate permittees at meetings and when a permit is being issued to a new holder. This is in the job description of the community leaders. Prohibit fractionizing permits which currently two people are needed per fraction to stop a family dispute. Revisit codes from the CFR, State Codes, and Water Codes. Overall, reorganize.

**Improve the interest in Navajo horse adoption programs by forming effective partnerships and conducting outreach.** Providing copies of an indefinite Horse Management Plan (HMP), which chapters support, to officials including the drafted resolution. Orchestrating voluntary horse round-ups in sections and regions. Provide unified training for all officials to ensure consistency. Strategize with livestock rangers to designate pick-up locations of feral livestock. Allocate funds at the chapter level and create new accounts solely for the officials.

### Priority Point 3: Communication

**To ensure safety and the wellbeing of the community during climate change and establish a long-term plan.** Improve communication by holding departments and council accountable. Complete and evaluation or hold all stipends. Shorten the timeframe of the paperwork process for all documents sent to Window Rock. This can be accomplished by providing direct line of responses, digitizing paperwork, updating material, and creating a new database and office for each agency. Improving communication between officials and Directors. Hiring a receptionist who is fluent in Navajo and English.

**Inform and direct community to follow standard protocol, establish a strong communication network within the community, and create partnerships with emergency management.** Establishing T.V. and news stations which are specific to the Navajo Nation and its concerns and resources. Collaborating with local news channels. Develop a series regarding natural resources with local colleges. Create a short film or documentary in Navajo.

**To develop a strong interdepartmental communication strategy and improve communication with a chain of command.** Appoint the Climate Change Program to develop community engagement strategy. Engage with the community through the Navajo Department of Fish and Wildlife's website, news media, informational booths, presentations, posters, and diagrams.

### Priority Point 4: Enforcement and Compliance

**To ensure long-term funding. Hire a grant writer.** Apply a grazing fee which needs to be in a separate account away from General Funds. Establish a 5-year lease for drought insurance. Require application fees for all permit transfers.

**To have an abundant amount of resources.** Hire reliable personnel. Reschedule livestock rangers to make them available throughout the Navajo Nation 24/7. Build inspection stations throughout the Navajo Nation with equipment storages. Require and enforce officials to submit quarterly and annual reports for future recommendations. Encourage livestock rangers and Deputy livestock Inspectors (DLI) to provide hauling permit records to officials for verification purposes. Establish and improve coordination between livestock rangers and officials from the District Grazing Committee, Farm Board, and Navajo Land Board.

**To provide educational outreach.** Present at permittee, district, agency, and chapter meetings. Educate community members on regulations, procedures, and to clarify on policies, procedures, and regulations. Distribute information via email to everyone from a listing. Create an informational website for the public to educate themselves.

**To have a court system which is familiar with natural resource rules and regulations to strengthened the fundamental law, with respect to law enforcement.** Train court system personnel about laws and regulations, along with proper ways to address related issues. Hiring personnel with related work history and has experience with current natural resource issues. Environmental attorneys would be ideal for this position. Update the court system's laws, regulations, procedures, and record keeping. Establish laws through the Navajo court system to handle transportation across the Navajo Nation by Non-Navajo entities. Clarify what the Navajo Nation is and what belongs to the tribe. Example, unbranded horses. Provide an attorney and/or a technical assistant to assist with interpretation of the Navajo Nation laws.

**Finding harmony between being culturally sensitivity and compliance with rules and regulations.** Amend the Homesite Lease regulations for culturally sensitive areas. An example given was having the ability to relocate previously buried remains if in an area of a newly approved homesite lease. However, culturally this is frowned upon and the land should be left alone.

**To provide protection against threats for enforcement.** Create a law to protect officials from the District Grazing Committee, Farm Board, Navajo Land Board, and all volunteers. Address mediations in designated areas with operating procedures. Establish equality amongst officials. Create an incident command operation plan for horse round-ups. Provide life/health insurance or coverage to participants.

**Mandate all department and officials to comply with the grazing management booklet.** To have department heads support officials.

### Priority Point 5: Pollution, Air Quality, and Illegal Dumping

**Create re-usable energy to establish sources on the Navajo Nation.** Conduct studies to establish areas to build solar and wind turbine farms across the reservation.

**Establish landfill centers to reduce pollution on the Navajo Nation.** Build centers to the standards of the U.S. Environmental Protection Agency (EPA). Conduct studies on soil quality at potential locations. Design designated carcass disposal areas. Consent and withdraw the land.

**Establish recycling centers on the Navajo Nation to control illegal dumping.** Build a recycling center with designated personnel. Consent and withdraw the land. Educated communities, schools, divisions, departments, and businesses on the purpose and benefits of recycling. Build to the standards of the U.S. EPA and near landfill facility to maximize recycling potential. Establish relationships with reliable buyers for all recycled material. Contract green driven companies for Navajo Nation needs.

**To develop a policy to reduce and eliminate trash burning.** Keep educating people about this particular policy. Bring the information to schools and community events. Fine violators on violations.

**Establish education programs on the effects of pollution, air quality, and illegal dumping.** Distribute informational booklets to Homesite Lease applicants about policies and sign an acknowledgement of understanding. Although applicants will be informed, they are only responsible for one acre of land.

**To have land and water free of toxic wastes.** Continue the uranium waste clean-up and create toxic waste depositories to remove from the Navajo Nation. Comply with standards from the Navajo Nation Environmental Protection Agency. Also, report all operations to the Navajo Nation Environmental Protection Agency.

**For the Navajo Nation to comply with environmental standards.** Create positions for compliance officers and law enforcement programs under the U.S. Environmental Protection Agency.

**Implement a carbon tax on the Navajo Nation.** Invite professionals to community meetings and educate the public on carbon taxes.

**To control carbon emissions.** Implement an emission testing station.

**Mandate laws of transporting hazardous and toxic materials on the Navajo Nation.** Lobby against the transporting of toxic and hazardous wastes across the Navajo Nation. Build tolls for those transporting these types of wastes. Create laws and regulations for transporting toxic and hazardous wastes.

**To establish an airspace initiative and prevent contamination across large areas during air transport.** Consult with professionals whom are experience in the related issue. Educate the public on the topic of airspace initiatives and federal communications, which has control over all air space.

**To establish natural gas lines to minimize the usage of harmful emissions.** Take full advantage of partially implemented natural gas lines. Majority of towns taking advantage are border towns. Natural gas lines need to run across the entire reservation, since natural gas lines have a right-of-way and lines can be tapped into for easier access.

**Protect the Navajo Nation from fracking, and chemical injection, activities to prevent pollution to our land and water resources.** Conduct more studies, environmental impact study, on environmental dangers. Oppose “chemical injection” under the General Leasing Act. Enforce the No Drill Act of 1997. Educate schools on fracking and its dangers.

## Priority Point 6: Grazing Management

### **Educate the youth, elders, and fellow peers about grazing management topics.**

Educational topics can be rules and regulations, soil sciences, pasture rotations, disease prevention, and more. Professionals experienced with all views can be brought in to host workshops and educate.

**Establish separation of power amongst NPL, ARMA, New Lands, Navajo Nation, and the Federal Government.** Convene with head personnel of the organizations in a meeting. From there, establish authorities and boundaries between all organizations.

**Have better control on the overall Navajo Nation's livestock population.** A rangeland inventory needs to be completed. A land availability needs to be reassessed. Data needs to be updated and digitized for easier access in the future. The carrying capacity needs to be readjusted based on new research data. A conservation plan and plan of operations needs to be created. Birth controls methods need to be taken of advantage of such as castration and other birth control options.

**To improve the Navajo Nation's overall vegetation health.** Establishing range unit fencing for the entire Navajo Nation. Establish a grazing schedule since the Eastern and Northern regions have rotation grazing. Implement and enforce a conservation plan. Provide educational outreach to communities across the Navajo Nation. Implement deferred grazing, meaning pausing grazing for a certain amount of time. Reseed the area while the area is being deferred.

**Have the ability to protect and provide adequate forage for both wildlife and endangered species on the range.** Identify sensitive areas across the reservation. Establish a wildlife reserve and seed bank.

**Establish relationships with outside non-profit natural resource organizations and/or cost-sharing programs.** Start off by hiring a grant writer. Get involved with multiple benefiting organizations. Another option would be to create a non-profit and co-ops on the reservation.

**Complete all existing fencing projects on the Navajo Nation. Utilize the available drought insurance funding.** Communicate with the Bureau of Indian Affairs for supplies and funding. Utilize proposals which may have already been submitted or create a new one. Get consent and withdraw from surrounding permittees. Have permittees build and repair their own fencing and cattle guards.

**To develop a chemical disposal policy.** Collaborate with the U.S. Environmental Protection Agency. Seek advice from other experienced Native American tribes.



**To eliminate invasive species.** Provide certified reservation-grown hay for the Navajo people. Encourage the use of environmentally friendly forms and using certified personnel to eradicate invasive species. Also, using forms which will benefit both the vegetation and animals on the range whether this is livestock or wildlife. Lastly, implement a weed policy for the Navajo Nation.

**Revisit the Rangeland Improvement Act of 2014 and amend Title III.** Involve the District Grazing Committee, Farm Board, and Navajo Land Board in the redrafting process. Provide outreach to communities about the Rangeland Improvement Act.

## Assessing Priorities and Risk

With identified vulnerabilities and established goals, the attendees of the Adaptation Workshop could assess the level of importance, or priority, and associated risk for adaptation strategies. The group went through each goal and ranked them accordingly. Strategies are taken into account and goals are ranked between a low to high scale for priority and a low to high scale for associated risk for the actions.

### Priority Point 1: Water

Table 3. Priority and Risk Levels for Water.

Goals	Priority	Risk
To adjudicate water rights.	High	High
To recycle water.	Medium	Medium-High
To protect, preserve and restore watershed and the head waters.	High	High
To provide reliable water supply (maintain a current water level).	High	High
To have clean water.	High	High
To ensure high quality water for all users.	High	High
To provide educational outreach.	High	High
To secure funding for local communities for natural resource management.	Medium	Medium
To obtain more water statistics/data.	High	Low
	High	High

### Priority Point 2: Feral Horses

Table 4. Priority and Risk Levels for Feral Horses.

Goals	Priority	Risk
Improve the Navajo Nation's ability to effectively enforce livestock management regulations.	High	High
	High	High
To address the need for an informed Navajo Nation citizenry by developing livestock management education programs to inform communities about the need for sustainable management, the environmental impacts from unmanaged horses, and to introduce curriculum programs to elementary schools.	High	Medium
	High	High
	Medium	High
	High	High
Improve interest in Navajo horse adoption programs by forming effective partnerships and conducting educational outreach.	High	High

### Priority Point 3: Communication

Table 5. Priority and Risk Levels for Communication.

Goals	Priority	Risk
To ensure safety and wellbeing of the community during climatic change and establish a long-term plan.	High	High
Inform and direct the community to follow standard protocol, upgrade a strong communication network within the community, and create partnerships with emergency management.	High	High
To develop a strong interdepartmental communication strategy and improve communication with a chain of demand.	High	High

### Priority Point 4: Enforcement and Compliance

Table 6. Priority and Risk Levels for Enforcement and Compliance.

Goal	Priority	Risk
To secure long- term funding.	High	High
	Low	High- Medium
	Low	High
	Low	Medium
To have adequate resources.	High	Medium
	High	High
	High	High
	Low	Medium
	High	High
	High	High
To provide educational outreach.	High	High
	High	High- Medium
	Medium	High- Medium
	Medium	High
	High	High
To have a court system that is familiar with natural resource laws and regulations (strengthened fundamental law with respect to enforcement).	High	High
	High	High
	High	high
	High	High
Finding Harmony between being culturally sensitive and following the laws and regulations.	High	High
To provide protection against threats for enforcement.	High	High
	High	High
	High	High
Mandate all department and officials to comply with the grazing management booklet.	High	High

### Priority Point 5: Pollution, Air Quality, and Illegal Dumping

Table 7. Priority and Risk Levels for Pollution, Air Quality, and Illegal Dumping.

Goal	Priority	Risk
Create re-usable energy to establish new sources on Navajo Nation.	High	High
Establish landfill centers to reduce pollution on Navajo Nation.	High	High
	High	High
	High	High
	High	High
	High	High
Establish recycling centers on Navajo Nation to control illegal dumping.	High	High
	High	High
	High	high
	High	High
	High	High-medium
	High	High
	High	High
	High	High
To develop a policy to reduce and eliminate trash burning.	High	High
Establish education programs on the effects of pollution, air quality and illegal dumping.	High	High
	High	High
To have land and water free of toxic wastes.	High	High-Medium
	High	High

	High	high
For Navajo Nation to comply with environmental standards.	High	High
	Medium	High
Implement carbon tax on the Navajo Nation.	High	High
To control carbon emissions.	Medium	High-Medium
Mandate laws of transport of hazardous and toxic materials on the Navajo Nation.	High	High
	High	Medium
To establish air space initiative to prevent contamination across large areas while in air transport.	Low	Medium
	High	Medium
	High	Medium
To establish natural gas lines and minimize the usage of more harmful emissions.	High	High-Medium
Protect Navajo Nation from future fracking, and chemical injection, activities to prevent pollution to our land and water resources.	High	high
	High	High
	High	High
	High	high

### Priority Point 6: Grazing Management

Table 8. Priority and Risk Levels for Grazing Management.

Goal	Priority	Risk
Educate the youth, elders, and our fellow peers about grazing management topics such as rules and regulations, soil sciences, pasture rotation, disease prevention, etc.	High	High
Establish separation of power among NPL, ARMA, New Lands, Navajo Nation, and the federal government.	High	High
Have better control on the overall Navajo Nation's livestock population.	High	Medium
To improve the Navajo Nations overall vegetation health.	Low	High
	High	High-Medium
	High	High-medium
	High	High
	High	Medium
Have the ability to protect and provide adequate forage for both wildlife and endangered species on the range.	High	High-Medium
	High	High
Establish relationships with outside non-profit natural resource organizations and/or cost-sharing programs.	High	High
	High	High-Medium
Complete all existing fencing projects on the Navajo Nation.	High	High
	High	High
	High	Medium
	High	High
	High	High
To develop a chemical disposal policy.	High	High-Medium
	High	High
To eliminate invasive species.	High	High-Medium
	High	High
	High	High
Revisit the rangeland improvement act of 2014 and amend Title III.	High	High
	High	High

## Implementation of Plan

The first step to the Implementation this plan is completing the adaptation strategies listed under each concern. These strategies were created to help all the involved entities accomplish natural resources goals. Once completed, the goals will further support resolutions for each natural resource concern which were established by the workshop attendees, the community leaders. Based on the priority ranking set by the community leaders will determine which goal and strategies should be completed first. The question of support from potential partnerships is also asked in the following tables. Any goal needing supporting partnership state so in the tables as well.

Participation from all involved entities which have been stated in this adaptation plan are key to an overall success in its implementation for the Navajo Nation. This plan may be updated depending on the new research data which correlates to the natural resource concerns discussed in this document.

### Priority Point 1: Water

**Table 9. Goals and Strategies for Water.**

Goals	Strategies	Priority	Risk	Partnerships Required
To adjudicate water rights	Water shed (affect winter doctrine) by revisiting water rights, we would need expertise, and file water use with Water Code, which would result in permit, and provide data that justifies water needs.	High	High	Yes (Water Code)
To recycle water	Update the Drought Contingency Plan of 2003 and Water Resources Development Strategy (send a copy of the plan to community leaders), Develop drought mitigation measures for each region on the Navajo Nation, and prioritized by region. Implement objectives from both documents.	Medium	Medium-High	Yes (Dept. of Water Resources)
To protect, preserve and restore watershed and the head waters	Water Resource Strategy document (strategies specific to the community) to construct and/or repair dams, wells, solar powered windmills, vegetation reconstruction (to recharge aquifers). Look into LCR (Little Colorado River) Water Settlement and water level, Peabody water treatment, develop 5- and 10-year phases/plan, develop a conservation plan for the entire Navajo Nation (erosion control, grass replanting, livestock removal (e.g. cancel/defer permits))	High	High	Yes
To provide reliable water supply and maintain a current water level	Amend the Homesite Lease regulations, require water/energy efficient designs, create building codes for the Navajo Nation, incorporate use of grey water for trees, shrubs (need permit from	High	High	Yes (NTUA, NHA, etc.)

	Navajo Tribal Utility Authority (NTUA)), and establish collection systems			
To have clean water	Industrial use of natural aquifers, stop use of ground water for industrial use of water for mining, revisit water rights pertaining to the General Leasing Act,	High	High	Yes
To ensure high quality water for all users	Evaluate and Assess Managed Aquifer Recharge (MARS)	High	High	Yes
To provide educational outreach	Revive 4-H, FFA in schools to coordinate with schools to establish natural resource curriculums	High	High	Yes (schools)
To secure funding for local communities for natural resource management	NTUA to implement tiered rate for water use (where people are rewarded with lower rates if they stay under using *blank* amount of water)	Medium	Medium	Yes (NTUA/Community)
	Community driven projects (drip irrigation water harvesting, use of straw bales, select water efficient crops, home-based education instead of school driven)	High	Medium-Low	Yes (community, chapters)
To obtain more water statistics/data	Navajo Nation Department of Water Resources complete an assessment of earthen dam conditions and establish rehabilitation plans, create and implement the plan, contracted project with an outside company	High	Low	Yes (NNWR, outside company)
	Farmers/Ranchers are not filing with Water Code section, possible put a freeze on livestock water, water paid up front, water to last all year per source, dirty water should be used for compaction (revisit the water use and water code through water resources is in process but still being worked on), dam up run-offs	High	High	Yes

## Priority Point 2: Feral Horses

Table 10. Goals and Strategies for Feral Horses.

Goals	Strategies	Priority	Risk	Partnerships Required
Improve the Navajo Nation's ability to effectively enforce livestock management regulations	Enforcing the laws, making it illegal to own studs, and use artificial insemination (Title III, Ch. 7) Amend Regulations. Citations are going nowhere, build communication with rangers, grazing officials try to implement the laws by writing up non-compliant individuals but no one comes	High	High	No
	Obtain Resource and Development Committee Resolution supporting the round-up of unbranded horses Navajo Nation wide	High	High	Yes (RDC)
To address the need for an informed Navajo Nation citizenry by developing	Create a Cattlemen's Association to create a conservation plan and plan of operations	High	Medium	Yes

livestock management education programs to inform communities about the need for sustainable management, the environmental impacts of unmanaged horses, and to introduce curriculum programs to elementary school.	Officials educate the permittees during the permittee/ grazing meetings, educating when a permittee is given a grazing permit "We don't need to be told, it's already written in our job description."	High	High	No
	Revisit codes (CFR, State Code, Water) reorganization and educate the community	Medium	High	Yes (NN Water Resources)
	Prohibit fractionizing permits (two people per fraction to stop family disputes) educating permittees on open range	High	High	No
Improve interest in Navajo horse adoption programs by forming effective partnerships and conducting outreach beyond	Horse Management Plan (HMP) providing copies to Grazing Officials, as well as drafted resolution, voluntary round ups, chapter support of HMP through resolution both district and agency making resolution indefinite. Strategize with rangers to have feral livestock picked up at designated locations as determined by the grazing officials, round up in sections or regions (unified training for Grazing, Farm Board, and Land Board members to ensure consistency). Have funds allocated at the chapter level and creating a new account for elected agriculture officials.	High	High	Yes (community, NNDA, NNDFW)

**Priority Point 3: Communication**

**Table 11. Goals and Strategies for Communication.**

Goals	Strategies	Priority	Risk	Partnerships Required
To ensure safety and wellbeing of the community during climatic change, establish a long-term plan,	Improve communication by holding departments, council accountable, holding stipend or being evaluated, shorten timeframe for papers sent to Window Rock (direct line of response, digitizing papers sent in, update material, create new database/office for each agency), to expedite, Program Directors requiring their information be given to the local level to show "where we are going", hiring receptionist that can talk Navajo	High	High	Yes, Navajo Nation
Inform and direct community to follow standard protocol, upgrade a strong communication network within the community, partnership with emergency management	T.V Station/ Radio Station, specific to Navajo Nation resources and concerns, collaborating with local news channels, develop a series dealing with resources from local colleges, short film/ documentary in Dine Bizaad.	High	High	Yes (Navajo Nation and Radio Stations)
To develop a strong inter-departmental communication strategy, improve communication with a chain of demand	Climate Change Program develop community engagement strategy, website, news media, community assessment, booths, presentations (provided by professionals), poster, diagrams	High	High	Yes (Community, NNDNR Professionals)



**Priority Point 4: Enforcement and Compliance**

**Table 12. Goals and Strategies for Enforcement and Compliance.**

Goal	Strategies	Priority	Risk	Partnerships Required
To secure long- term funding	Hire grant writer	High	High	No
	Apply grazing fee (needs to go into separate account away from General Funds)	Low	High-Medium	No
	5- year lease with drought insurance	Low	High	Yes (NNDAs)
	Application fees for permit transfers	Low	Medium	No
To have adequate resources	Hire personnel	High	Medium	
	Have Rangers available 24/7 throughout the Navajo Nation	High	High	Yes (NN Rangers, Wildlife Conservation Officers)
	Build inspection stations throughout the Navajo Nation with equipment storages (livestock, emissions, etc.)	High	High	Yes
	To have Grazing Officials given Quarterly and Annually reports (Enforcement of reports/ recommendations)	Low	Medium	Yes
	Encourage Rangers/ Deputy Livestock Inspectors (DLI) to provide hauling permit records to Grazing Officials for verification purposes	High	High	Yes (Rangers, DLI, Grazing, Land Board)
	Need to have Ranger and Grazing, Land Board, and Farm Board Officials to coordinate	High	High	Yes
To provide educational outreach	Regulations and procedures	High	High	No
	Present at Permittee/ District/ Agency/ Chapter meetings	High	High-Medium	No
	Send out information via email	Medium	High-Medium	No
	Create an informational website for the public	Medium	High	No
	To clarify policies, procedures, and regulations	High	High	No
To have a court system that is familiar with natural resource laws and regulations (strengthened fundamental law with respect to enforcement)	Train court system personnel about laws and regulations and how to address related issues	High	High	Yes (NN Court System, NNDNR Law enforcement)
	Hiring personnel that has related work history and deals specifically with Natural Resource issues (e.g. environmental attorney)	High	High	
	Update court system's laws, regulations, procedures, and record keeping, establish the Navajo Nation law through tribal	High	high	

	<p>court system to deal with Non-Navajo transporting on the reservation, need to clarify who "The Navajo Nation" is (ex. Unbranded horses belong to the Navajo Nation)</p> <p>To have an attorney/ technical assistant to help interpret the Navajo Nation law (Office of Hearing and Appeal)</p>	High	High	
Finding Harmony between being culturally sensitive and following the laws and regulations	Amend home-site lease regulation in culturally sensitive areas (ex. If someone gets a home site they can move people that were previously buried there to another site, however culturally that area belongs to them and they should leave them)	High	High	No
To provide protection against threats for enforcement	Create a law to protect Grazing Officials/ Land Board/ Farm Board/ Volunteers	High	High	No
	To address mediations in designated areas (operating procedures)	High	High	No
	Establish equality among community leaders, incident command operation plan for horse round ups, insurance coverage (life/medical)	High	High	No
Mandate all department and officials comply with the grazing management booklet	To have department heads support officials	High	High	No

**Priority Point 5: Pollution, Air Quality, and Illegal Dumping**

**Table 13. Goals and Strategies for Pollution, Air Quality, and Illegal Dumping.**

Goal	Strategies	Priority	Risk	Partnership Required
Create re-usable energy to establish sources on Navajo Nation	Conduct studies to establish areas to build solar and wind turbine farms across the reservation	High	High	Yes
Establish landfill centers to reduce pollution on Navajo Nation (check DCD Solid Waste Program)	Build to the standards of EPA	High	High	Yes (EPA)
	Conduct studies on potential location's soil quality	High	High	No
	Design designated carcass disposal areas	High	High	Yes
	Consent and withdraw land	High	High	No
Establish recycling centers on Navajo Nation to control illegal dumping	Build a recycling center with designated personnel	High	High	Yes
	Consent and withdraw land	High	High	No
	Educate communities, schools, divisions, departments, businesses on the purpose and benefits of recycling	High	high	No
	Build to the standards of EPA	High	High	Yes (EPA)
	Build enter near landfill facility to maximize recycling potential	High	High-medium	No
	Establish reliable buyers for all recycled material	High	High	Yes
	Contract green driven companies for Navajo Nation needs	High	High	Yes
To develop a policy to reduce/ eliminate trash burning	Keep educating people about this policy, bring information to schools/ community events, not heavily enforce but fines are associated for violations	High	High	Yes (NN Forestry)
Establish education programs on the effects of pollution, air quality and illegal dumping	Hand home site lease applicants an informational booklet on policies and sign an acknowledgement (con- only required to care for one-acre)	High	High	No
	Have EPA present at schools and chapter meetings	High	High	No
To have a land and water free of toxic wastes	Report to NNEPA	High	High-Medium	Yes (NNEPA)
	Continue the uranium waste clean up	High	High	Yes
	Create toxic waste depositories to take off the Navajo Nation	High	high	Yes
For Navajo Nation to comply with environmental standards	Standards in place with NNEPA	High	High	Yes (NNEPA)
	Compliance officers/ law enforcement programs under EPA	Medium	High	No
Implement carbon tax on the Navajo Nation	Invite professionals to community meetings to educate the public	High	High	No
To control carbon emissions	Implement an emission testing station	Medium	High-Medium	Yes (EPA)

Mandate laws of transport of hazardous/toxic materials on the Navajo Nation	Lobby against the transporting toxic/ hazardous wastes across reservation	High	High	No
	Build tolls, laws and regulations	High	Medium	Yes (NDOT)
To establish air space initiative (prevent contamination across large areas while in air transport)	Consult with professionals experienced in the issue	Low	Medium	No
	Educate the public	High	Medium	No
	Federal communication commission has control over all air space	High	Medium	No
To establish natural gas lines to minimize the usage of more harmful emissions	Take full advantage of partially implemented lines (majorities are border towns and needs to run across entire reservation, natural gas lines have a right of way, can tap into the lines.)	High	High-Medium	Yes
Protect Navajo Nation from future fracking (chemical injection) activities to prevent pollution to our land and water resources	Conduct more studies on dangers to the environment (environmental impact study)	High	high	Yes
	Oppose "chemical injection" under the General Leasing Act	High	High	No
	Enforce the No Drill Act of 1997	High	High	No
	Educate schools on fracking and what fracking is	High	high	No

Priority Point 6: Grazing Management

Table 14. Goals and Strategies for Grazing Management.

Goal	Strategies	Priority	Risk	Partnerships Required
Educate the youth, elders, and our fellow peers about grazing management topics (such as rules and regulations, soil sciences, pasture rotation, disease prevention, etc.)	Bring in professions, all views, workshops	High	High	No
Establish separation of power among NPL, ARMA, New Lands, Navajo Nation, and the Federal Government	Bring head personnel of organizations and establish authorities and boundaries	High	High	Yes
Have better control on the overall Navajo Nation's livestock population	Rangeland inventory needs to be done, land availability needs to be reassessed, update data and digitize for easier access in the future, adjust the carrying capacity based on new research data, conservation plan/ plan of operations, and take advantage of castration and birth control options	High	Medium	Yes
To improve the Navajo Nations overall vegetation health	Establish range unit fencing	Low	High	Yes
	Establish grazing schedule (Eastern/Northern Rotation grazing)	High	High-Medium	No
	Implement and enforcement conservation plan	High	High-medium	No
	Provide education outreach	High	High	No
	Deferred grazing (pause grazing for certain amount of time), reseeding during deferment	High	Medium	Yes (community, NNDA)
Have the ability to protect and provide adequate forage for both wildlife and endangered species on the range	Identify sensitive areas	High	High-Medium	Yes (NNDFW)
	Establish a wildlife and seed source reserve	High	High	Yes (NNDFW, NN Forestry)
Establish relationships with outside non-profit natural resource organizations and/or cost-sharing programs	Hire a grant writer	High	High	No
	Get involved with organizations	High	High	Yes
	Create own non-profit/ co-ops on the reservation	High	High-Medium	No
Complete all existing fencing projects on the Navajo Nation	Utilize the drought insurance funding	High	High	No
	Communicate with BIA	High	High	Yes
	Utilize proposals	High	Medium	No
	Get consent and withdraw from surrounding permittees	High	High	Yes
	Have permittees build and repair their own fencing/ cattle guard (ROW, RMU, BIA)	High	High	No

To develop a chemical disposal policy	Collaborate with EPA	High	High-Medium	Yes
	Seek advice from other Native American tribes	High	High	Yes
To eliminate invasive species	Provide certified reservation-grown hay for the Navajo people	High	High-medium	Yes (NAPI)
	Encourage the use of environmentally- friendly forms by certified personnel to eradicate invasive species which benefit both vegetation and animals on the range	High	High	No
	Implement weed policy	High	High	No
Revisit the rangeland improvement act of 2014 (amend title 3)	Involve District Grazing Committee (DGC), Land Board, and Farm Board in the re-draft	High	High	Yes
	Provide outreach about the RIA to DGC	High	High	No

## References

(n.d.).

Center, N. E. (2013). *Navajo Nation Population Profile 2010 US Census*. Window Rock: Navajo Division of Health.

Development, T. N. (1998, March 31). *Table No. 1 Type of Navajo Nation Lands and Leases*. Retrieved from <http://navajobusiness.com/pdf/FstFctspdf/Tbl1Land%20Leases.pdf>

Donovan, B. (2011, July 7). *Navajo Times*. Retrieved from Census: Navajo Enrollment Tops 300,000: <http://navajotimes.com/news/2011/0711/070711census.php>

Era, R. (2018, 12). Retrieved from Navajo: <https://en.wikipedia.org/wiki/Navajo>

Klauk, E. (2005, June 05). *Impacts of Resource Development on American Indian Lands*. Retrieved November 20, 2018, from <https://serc.carleton.edu/details/images/4564.html>

*Navajo Business*. (1998, March 31). Retrieved November 27, 2018, from <http://navajobusiness.com/pdf/FstFctspdf/Tbl1Land%20Leases.pdf>

Navajo, D. (2018, 11 30). *Navajo History*. Retrieved from <http://www.discovernavajo.com/navajo-culture-and-history.aspx>

*The Navajo Nation Economic Development*. (2004). Retrieved November 14, 2018, from <http://navajobusiness.com/tribalDevelopment/BusinessEnvironment.htm>

Wallace, Z. P., Stahlecker, D. W., Ruehmann, M., Nielson, R. M., & DiDonato, G. T. (2017). *Survey of Free-Ranging Horses (Equus caballus) on the Navajo Nation Final Report*. Window Rock: Navajo Nation Department of Fish and Wildlife.

## Notes