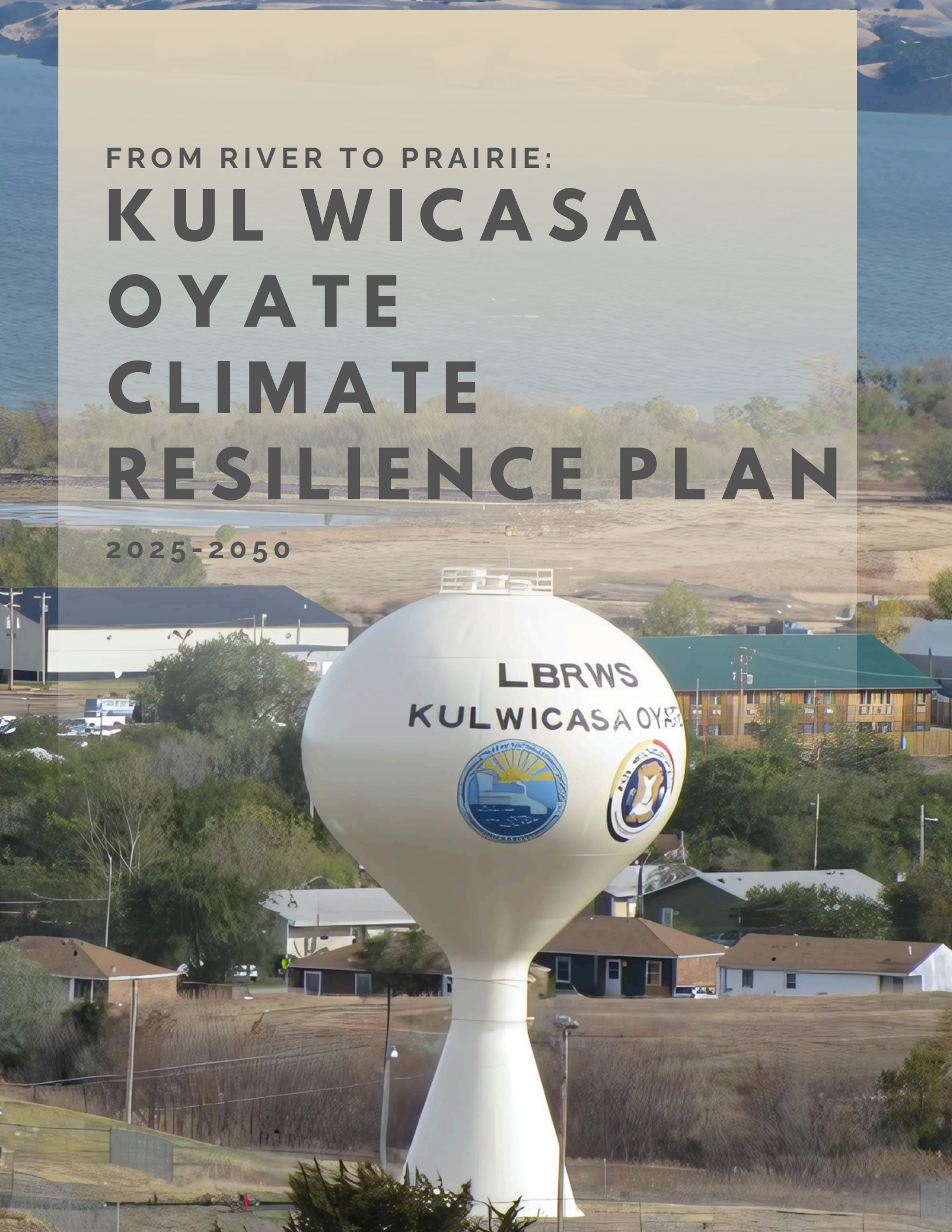
FROM RIVER TO PRAIRIE:

KUL WICASA OYATE CLIMATE RESILIENCE PLAN

2025-2050



From River to Prairie:
Kul Wicasa Oyate Climate Resilience Plan

Presented to the Lower Brule Tribal Council
by the
Lower Brule Sioux Tribe Climate Change Advisory Committee

October 2025

Lower Brule Tribal Building. Photo source: Sheldon Fletcher

About this Report

This plan was made possible by funding from the Climate Smart Communities Initiative and a collaborative effort led by the Lower Brule Climate Change Advisory Committee, the Great Plains Tribal Water Alliance, and Lark Environmental, Inc., a woman-owned environmental consulting firm.

Expert guidance and review of the climate-trend analysis and projection data were provided by Laura Edwards, South Dakota State Climatologist at South Dakota State University, and Imtiaz Rangwala of the North Central Climate Adaptation Science Center at the University of Colorado Boulder.

Lower Brule Climate Change Advisory Committee

Mary Jane Gourneau
Director, Lower Brule Sioux Tribe (LBST) Environmental Protection Office

Jim McCauley
Lower Brule Rural Water Supply System

Brian Molyneaux
LBST Cultural Resources

Marlene Crowe
Human Services Department

Larry Jandreau
Director, LBST Facilities Management Program

Ben Janis
LBST Wildlife

Sheldon Fletcher
LBST Environmental Protection Office

Lance Witte
Superintendent, Lower Brule Schools

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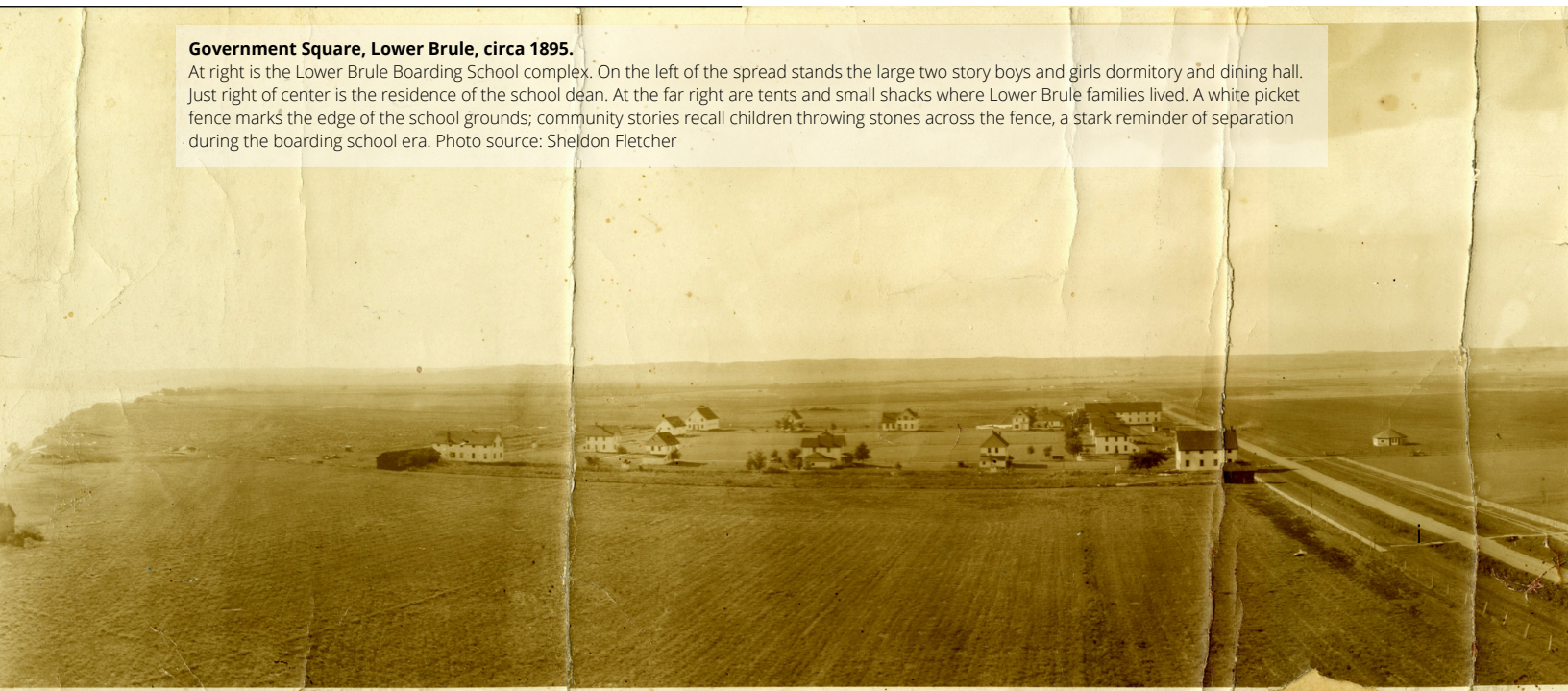

Government Square, Lower Brule, circa 1895.
At right is the Lower Brule Boarding School complex. On the left of the spread stands the large two story boys and girls dormitory and dining hall. Just right of center is the residence of the school dean. At the far right are tents and small shacks where Lower Brule families lived. A white picket fence marks the edge of the school grounds; community stories recall children throwing stones across the fence, a stark reminder of separation during the boarding school era. Photo source: Sheldon Fletcher

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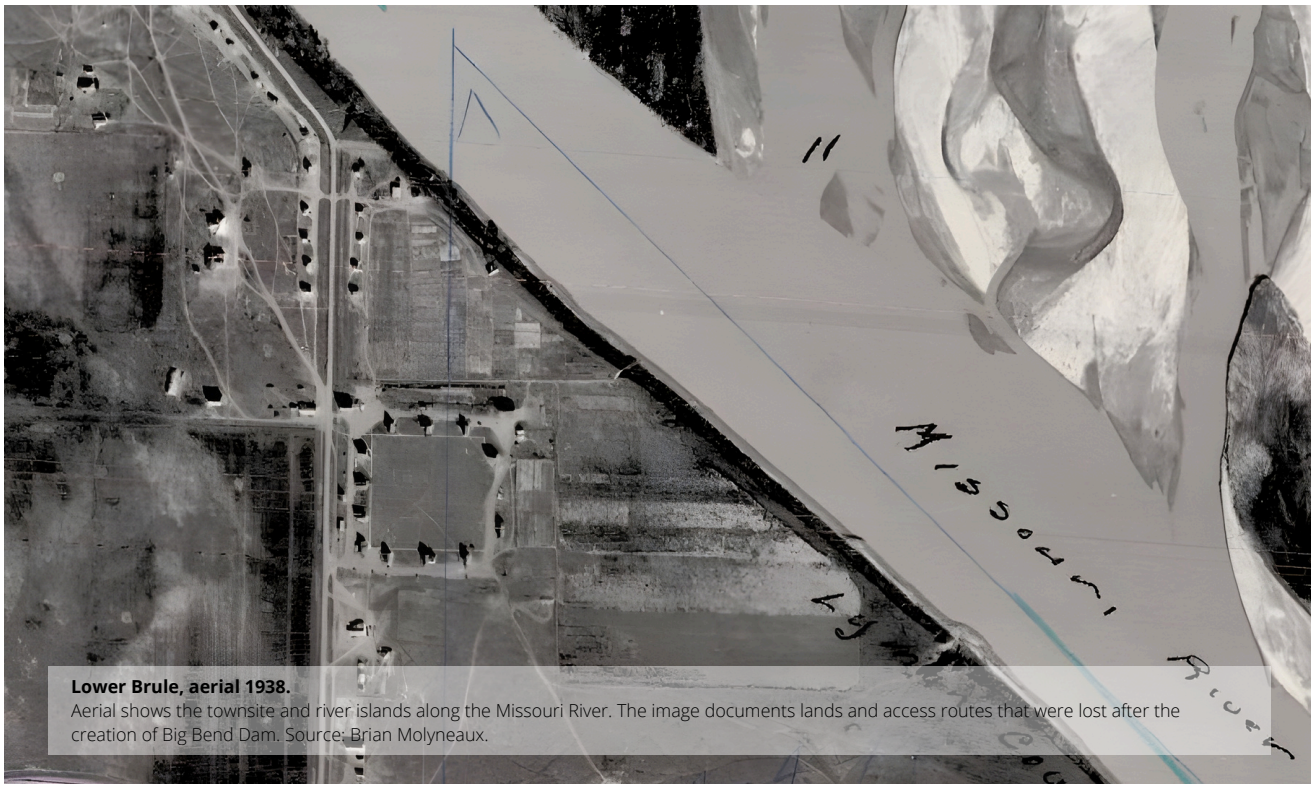


Lower Brule, aerial 1938.
Aerial shows the townsite and river islands along the Missouri River. The image documents lands and access routes that were lost after the creation of Big Bend Dam. Source: Brian Molyneaux.

Key Terms

Adaptation: Actions that prepare for or respond to climate effects in ways that reduce harm or make use of helpful opportunities.

Adaptive capacity: The ability of a species, system, or service to adjust, cope, or recover when conditions change.

Anomaly: A departure from an average. For example, temperature anomaly is how much a given year differs from the baseline average.

Baseline period: The reference window used to compute averages for comparison. In this plan we most often use 1971 to 2000. For the drought frequency check we compared future periods to an observed baseline of 1981 to 2005 due to lack of data previous to 1979.

Climate change: Long term shifts in temperature, precipitation, and related systems, often driven by increased greenhouse gases.

Climate futures (naming): Plain language scenario storylines built from model data to test a range of local conditions.

Cracked Earth: A climate future with persistent warmth and drying through the growing season. Winters and falls may be wetter, but summers are hotter and drier with declining soil moisture.

Drought intensity: How severe dry conditions are, often summarized with indices like SPEI. Strong negative values indicate more intense drought.

Expected range: For monitoring, the band that shows what values are considered normal over time after accounting for trend and season. Values touching or leaving this band signal growing concern.

Extreme precipitation metrics: Rx5day is the largest total over any five consecutive days in a year. 1 hour rainfall intensity: highest hourly rainfall in a year (in/hr), a proxy for flash flood potential and culvert or storm-drain stress.

Hazard: A climate driven stress or event such as drought, extreme heat, flooding, or wildfire conditions.

Monitoring triggers: Simple cues linked to action. Watch when an indicator approaches the expected range. Warning when it moves outside for a season. Action when it remains outside for two seasons or crosses a critical threshold.

Peaks and Valleys: A climate future with strong seasonal swings. Winters and springs are wetter and warmer, while summers are hot with pronounced dry spells.

Primary driver future: The climate future that most increases risk for a given item because it most strengthens the key hazard for that item.

Representative Concentration Pathway RCP 8.5: The high emissions pathway used for future projections in this plan. It specifies greenhouse gas concentrations and land use that models use to simulate climate.

Resilience: The capacity to anticipate, prepare for, respond to, and recover from change while sustaining community well being.

Risk: A function of how likely a hazard is and how serious its consequences would be.

Risk categories: Labels used in the tables: Low Risk, Medium Risk, High Risk, and Very High Risk.

Risk Priority Score: A combined score that scales vulnerability and hazard pressure to help rank actions.

Sensitivity: How strongly a species, service, or system responds to a given climate stress.

Standardized Precipitation Evapotranspiration Index (SPEI): An index of drought that blends precipitation with temperature driven water demand.

Standardized Precipitation Index (SPI): An index of wetness and dryness based on precipitation alone.

Temperature anomaly: The difference between observed temperature and the baseline average, shown as degrees above or below normal.

The Trickster: A climate future with mixed signals. Cold season moisture often increases, but summer and fall trend drier and soils lose water across the year.

Very high fire danger days: Days when fires start easily, spread rapidly, and are difficult to control due to dry fuels and weather conditions.

Vulnerability: Susceptibility to harm, based on sensitivity and adaptive capacity.

Introduction

Our Kul Wicasa Oyate homeland has no formal boundaries. We have always lived in the grasslands and river valleys between the Rocky Mountains and the Great Lakes. Within recent memory, our ancestors settled where the White River and the Missouri River meet in present-day South Dakota.

After US soldiers first came into our lands in 1804, however, our world drastically changed. Beginning in 1825, their government induced our people to make 'treaties' that gradually reduced our territory. By 1900, we had even lost our White River homeland, as they forced us to move to the area of the Big Bend along the Missouri. And this was not the end of our land losses (**Fig. 1**).

In the twentieth century the Pick Sloan Missouri River Basin program altered our landscape again. Between 1958 and 1964 they built two large dams along the Missouri – one just south of our old town of Lower Brule – to protect farmers from flooding far downstream. To carry out these projects they took Lower Brule lands, 7,997 acres for the Fort Randall dam and 14,299 acres for the Big Bend project. This drove us for good out of the fertile valley bottomlands of our ancestors and into the dry gumbo hills and terraces on the valley side, as the waters flooded out most of our forests, hunting, fishing and gathering grounds, gardens and sacred places.

In these upland terraces and breaks in the Missouri River valley, we had to move into a new unfamiliar town, set on a flat, treeless claypan terrace above the Lake Sharpe reservoir. The government had to build a new infrastructure of roads, water systems and all the other facilities people need to sustain life, and we were faced with finding new ways to farm and ranch the poorer soils in this drier and windier setting. Despite these disruptions, we adapted. We rebuilt housing and roads, shifted agriculture and grazing to the more difficult challenges in the dry uplands, and began to regain the lives we lost in our old homes by the river. Through all this, we worked hard to maintain our Lakota tradition of living in practical and spiritual ways that integrate people, land, and all the other living things and resources in our homeland.

Congress later admitted to some of the damage they had done. In 1997, they provided partial compensation when the Lower Brule Sioux Tribe Infrastructure Development Trust Fund became a public law. The 1997 settlement transformed a federal taking into a forward-looking fund sensitive to the needs and desires of our tribal communities. It now serves as a secure base for long term tribal recovery.

As our elders did in the past, we show our resilience by all the positive changes at Lower Brule since this most recent disaster, and our Kul Wicasa families will always thrive here, despite the challenges of the future.

We remain close by the river of our ancestors, and we have the strength and wisdom of the elders to help us follow the path of our Lakota ways. These historical shifts matter for today's climate work. Our experience with forced relocation, fragmented landholdings, and a river system regulated by upstream dams has already required flexible management of water, roads, housing, and habitat. It has also strengthened our habit of planning for change, rebuilding after loss, and investing in the next generation. The implementation and monitoring steps in this plan build on that record. They focus on protecting what remains of riparian corridors and benches, improving water and road systems shaped by the reservoirs, and sustaining the cultural practices that have carried our community through each change in our homelands over the generations.

Today, climate change presents a new kind of challenge. It is not one single event. It is a set of changes happening at the same time. Longer dry periods, stronger storms, hotter temperatures (**Fig. 2**), unpredictable winters, and shifting seasons. These changes affect how we live, how we use our resources, and how we plan for the future. They touch nearly every part of life on the Reservation, from water and infrastructure to food systems, health, and culture.

This Climate Resilience Plan (Plan) is a tool for the Lower Brule Sioux Tribe (Tribe) to respond to those changes. It reflects the observations and knowledge shared by the elders, other community members, and Tribal staff. It builds on the results of the Vulnerability Assessment, which identified where we are most at risk and which parts of our community may need the most support in the face of climate stress. It also draws from both traditional knowledge and scientific data to better understand the challenges ahead.

Adaptation, as we define it here, means taking practical steps to prepare for climate impacts and reduce the risks to our land, our people, and our way of life. It means looking at what is already happening, thinking ahead about what is likely to come, and choosing actions that can help us stay strong in the face of uncertainty.

Diminishment of Land for the Lower Brule Sioux Tribe

1851-Present

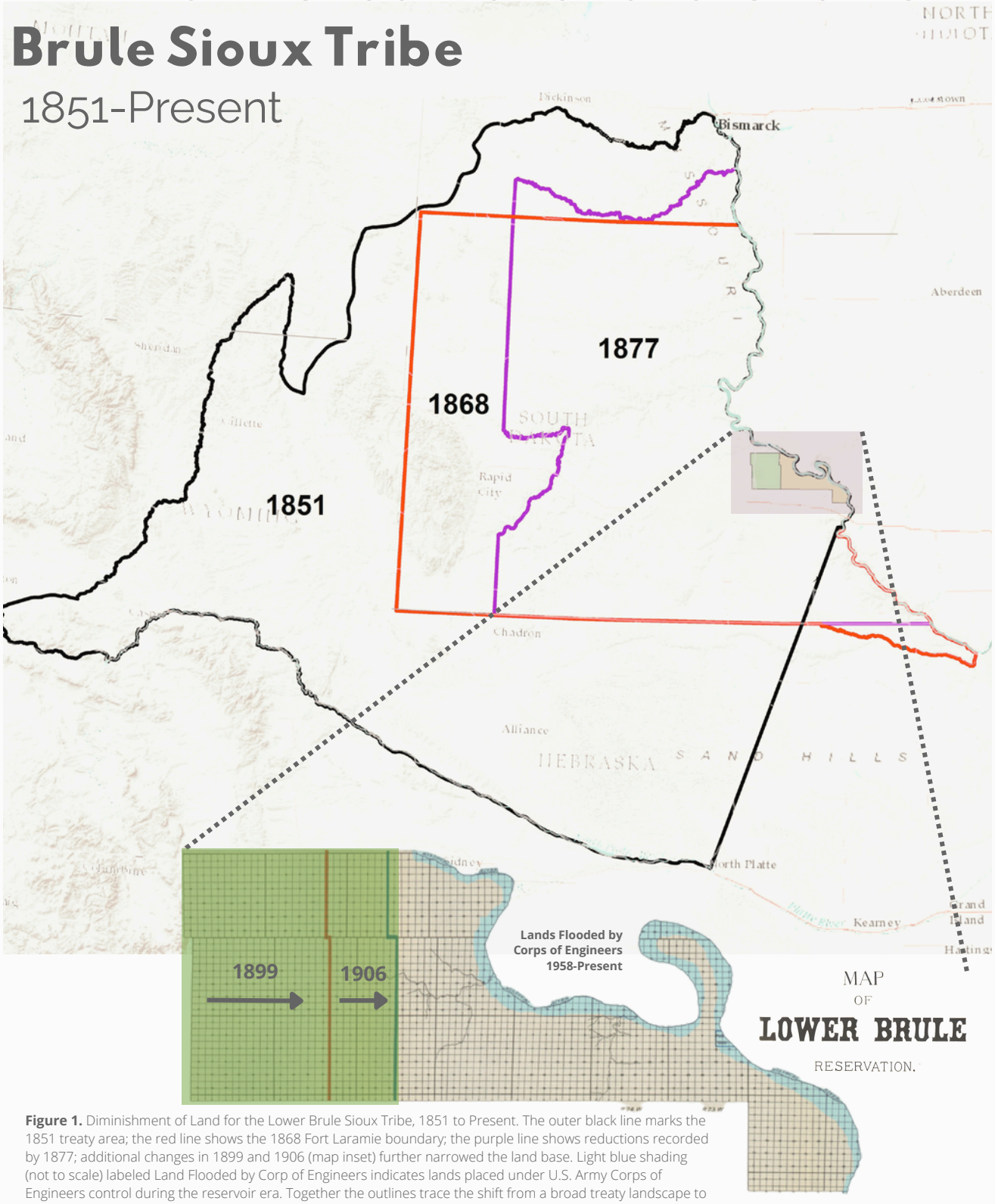
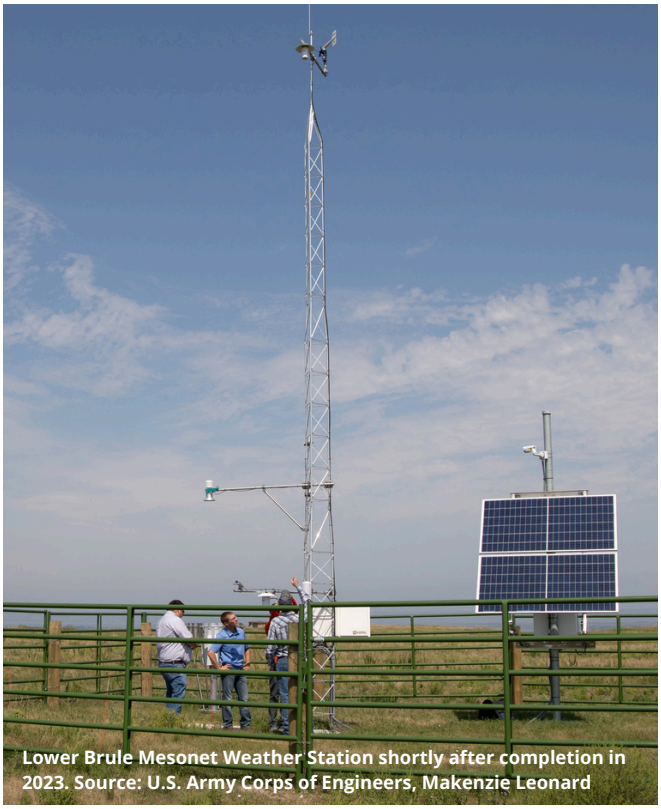


Figure 1. Diminishment of Land for the Lower Brule Sioux Tribe, 1851 to Present. The outer black line marks the 1851 treaty area; the red line shows the 1868 Fort Laramie boundary; the purple line shows reductions recorded by 1877; additional changes in 1899 and 1906 (map inset) further narrowed the land base. Light blue shading (not to scale) labeled Land Flooded by Corp of Engineers indicates lands placed under U.S. Army Corps of Engineers control during the reservoir era. Together the outlines trace the shift from a broad treaty landscape to the present reservation along the Missouri River near Big Bend. Sources: Sheldon Fletcher and Brian Molyneaux.

Adaptation is not about fear or retreat. It is about preparation and protection. It is about planning for a future that honors our values, our sovereignty, and our responsibility to future generations.

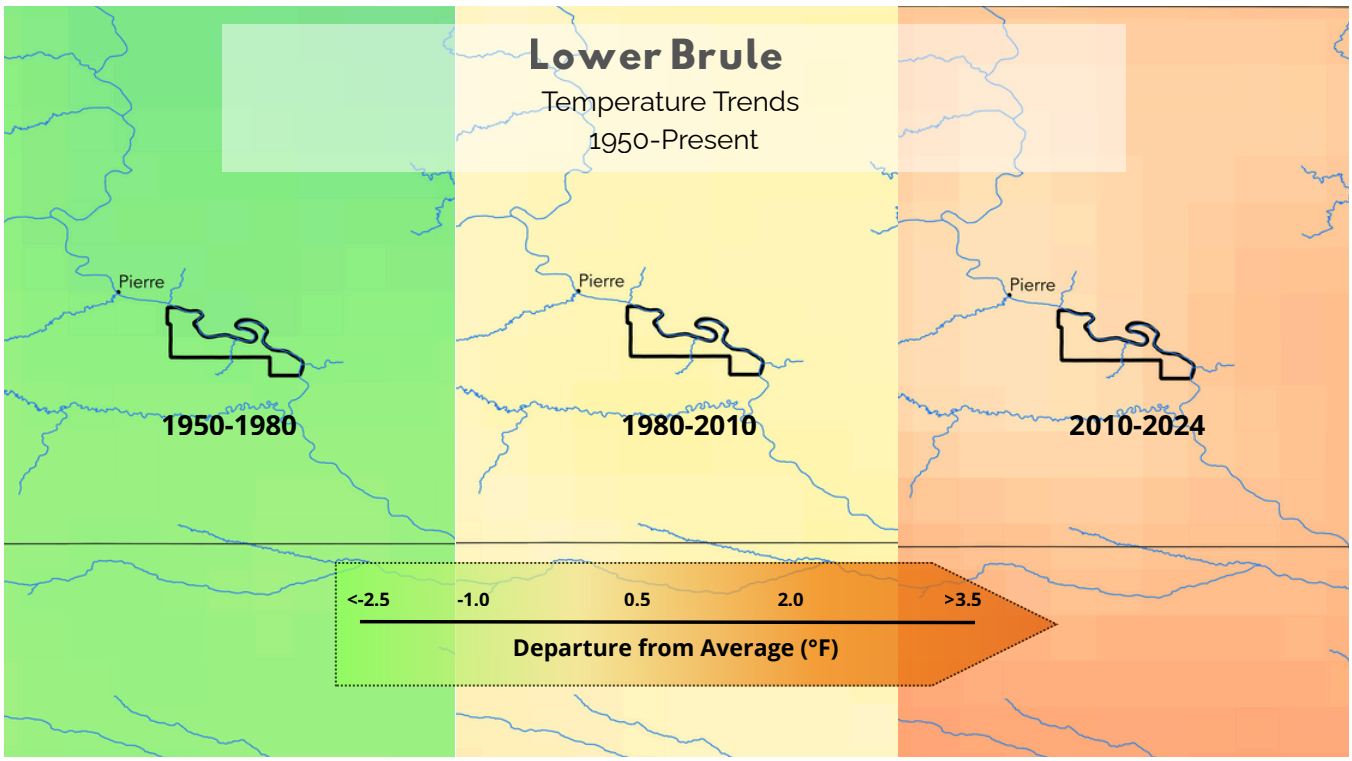
This plan focuses on strategies that reflect the priorities of the Tribe and the realities of life on the Reservation. It does not try to address every possible climate impact or solve every problem. Instead, it focuses on actions that are realistic, meaningful, and aligned with existing Tribal goals. Many of the strategies in this plan could be considered win-win solutions. These are actions that support climate resilience but also help us address other challenges like improving public health, protecting cultural knowledge, managing natural resources, or maintaining vital infrastructure.

Throughout this process, we have heard many voices from across the community. Elders have described how the land has changed over their lifetimes. The youth have expressed concern for the future they will inherit. Farmers, ranchers, and land managers have talked about how climate change is affecting daily operations and long-term planning. Health professionals have raised concerns about rising rates of illness tied to extreme heat, poor air quality, and water-related hazards. These perspectives are not separate from this Plan. They are its foundation.



Lower Brule Mesonet Weather Station shortly after completion in 2023. Source: U.S. Army Corps of Engineers, Makenzie Leonard

Figure 2. Annual temperature departure from average (°F) for the Reservation relative to the 1971–2000 climatological baseline. Panels show departures for three periods: (A) 1950–1980, (B) 1980–2010, and (C) 2010–2024. Red-Yellow areas indicate warmer-than-average conditions; blue-green areas indicate cooler-than-average conditions. These shifts highlight a clear warming trend over time. Source: [1].



The strategies included in the following sections are organized around four major areas of concern that have emerged through the planning process:

1. **Caring for Our People: Health, Housing, and Community Vitality:** Climate change does not only affect the environment. It also affects our homes, our health, and the wellbeing of our families. When extreme heat, flooding, or storms threaten housing and put elders and children at risk, these are climate impacts that require our attention. This section outlines strategies to strengthen essential infrastructure, expand access to health services, and support the physical and emotional needs of the community. Building resilience means not only preparing for emergencies, but also fostering connection, care, and shared responsibility among our community.
2. **Guidance from the Ancestors: Knowledge, Vision, and Ceremony:** Climate change also disrupts our ways of knowing, our ceremonies, and our relationships with the land. When weather extremes interfere with seasonal traditions or when traditional foods and medicines become harder to find, the loss is cultural as much as it is ecological. This section highlights the importance of preserving and carrying forward traditional knowledge, supporting cultural practices, and honoring the guidance of elders and ancestors in shaping our response to a changing climate.
3. **Protecting What Sustains Us: Water, Planning, and Preparedness:** Access to clean, reliable water is essential for health, food production, livestock, ceremony, and cultural practices. Climate change is already affecting the timing and amount of water available on the Reservation. Drought, flooding, and seasonal shifts in precipitation all pose risks. This section identifies actions to strengthen our water systems, protect water quality, and plan for long-term changes in water availability.
4. **Walking with the Land: Plants, Animals, and Seasonal Balance:** The land is central to our identity and survival. Changes in temperature and rainfall patterns are affecting where plants grow, how animals move, and what can be gathered or hunted. Some species are becoming harder to find, while others are arriving in new areas. This section focuses on actions that protect habitat, restore native species, and support the connection between people and land. It also recognizes the importance of teaching younger generations how to read the landscape and care for it in changing conditions.

This Plan is not the final word. It is a living document. As conditions change, and as the Tribe's capacity grows, this Plan will need to be revisited and updated. It provides a clear starting point and outlines where we are now, what we are concerned about, and what we can do to prepare. It is rooted in the values of the Kul Wicasa Oyate and guided by the knowledge and leadership of our people.

Photos from the Annual Kul Wicasa Wacipi (PowWow), Fair and Rodeo 2025. Source: Sheldon Fletcher

CLIMATE CHANGE

IMPACTS VULNERABILITIES & RISKS

2025-2050

Section One

Climate Impacts & Vulnerabilities

Since the late 19th Century, the Earth has been getting warmer. On average, global temperatures have increased by about 0.14°F per decade. In the past 40 years, that rate has more than doubled. The 10 hottest years ever recorded have all happened since 2005. This rapid warming is mostly caused by human activities that release greenhouse gases like carbon dioxide, methane, and nitrous oxide into the atmosphere. These gases trap heat, changing the climate.

The Tribe is already seeing these changes. Our seasons are shifting, temperatures are rising (**Fig. 3**), and rainfall patterns are becoming less predictable. These changes affect not just the land, but also our homes, our animals, our water, and the cultural practices that have guided us for generations.

This section is meant to provide a clear picture of how climate is already changing our lands, and what we might expect in the years ahead. It includes three key parts:

1. Observed Climate Trends: This part describes the changes we've already seen in recent decades based on local weather and climate records.

2. Three Climate Scenarios: To help us prepare for what's ahead, this part considers three distinct climate futures developed by different climate modeling groups. These models are built by scientists using decades of atmospheric data, satellite observations, and physical principles to simulate how the climate system behaves over time. Each model gives us a slightly different perspective on what future conditions could look like for our culture, people, lands, and our resources.

3. Impacts and Risks to the Tribe: This part connects the climate data to what matters most: our lives, our homes, and our future as a Tribe. We look at:

- *Housing & Infrastructure:* Flooding, high winds, and extreme heat can damage roads, homes, and wastewater systems. Freeze-thaw cycles may break down older buildings.
- *Culture & Community Life:* Warmer winters and shifting seasons may disrupt ceremonies, subsistence practices, or access to traditional plants and medicines.
- *Water Resources:* Drought and evaporation can reduce water levels in lakes and rivers. Flooding can overwhelm treatment systems or contaminate water sources.
- *Land & Wildlife*: Changes in precipitation and temperature may affect where animals live, when they breed, and what plants grow. Invasive species may move in, while important species may decline.

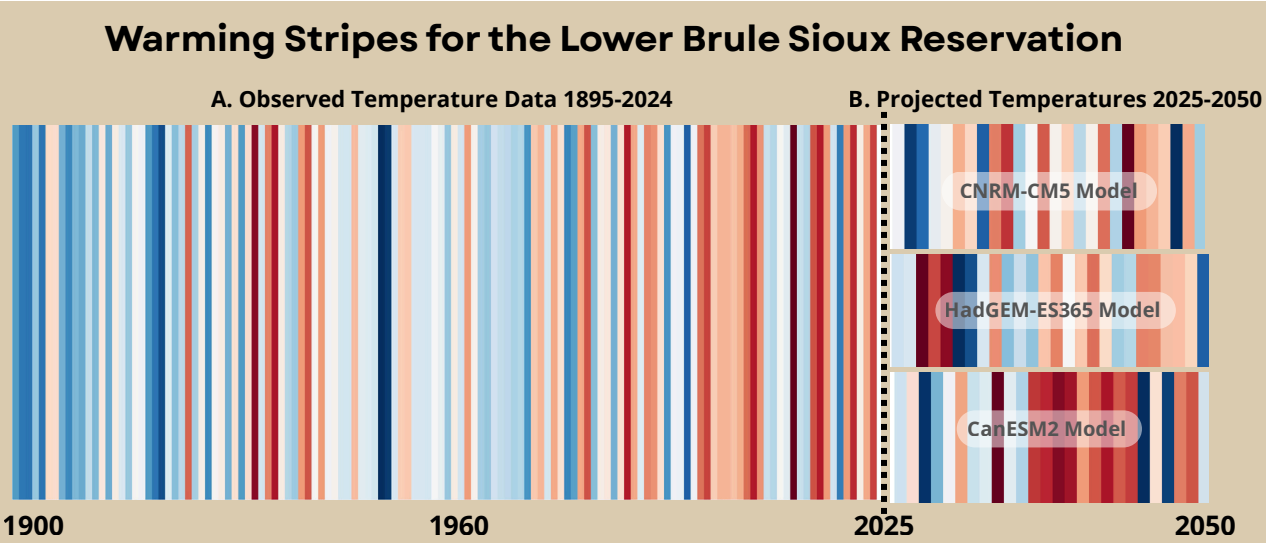


Figure 3. Warming stripes for the Reservation. Each colored stripe represents the annual average temperature relative to the long-term average from 1895 to 2024. Blue stripes indicate cooler-than-average years; red stripes show warmer-than-average years. The first portion of the graphic reflects observed temperature data, while the three sets of future stripes illustrate projected temperature trends from the three climate models used in this assessment. These models represent a range of plausible futures from moderate to more extreme warming, which helps visualize how the climate may continue to change through the middle of the century. Source: [2]. Observed data: NCEI U.S. Climate Divisional Database (nClimDiv), South Dakota Climate Division 6, monthly mean temperature, 1895 to 2024. Annual values were averaged from monthly data and shown as departures from the 1895 to 2024 mean; Projected data: MACAv2-METDATA for mid-century (2040-2069, RCP8.5) for the three Climate Futures listed.

Climate Trends

Temperature & Precipitation Trends over the Last 100 Years

Temperature

Over the past century, annual temperatures on the Reservation and the surrounding region have risen by approximately 2.5°F. But this warming has not been spread evenly throughout the year. Winters have warmed the most (**Fig. 4**), while summer averages have climbed more modestly. Still, minimum summer temperatures are on the rise, which limits nighttime cooling and increases heat stress for both livestock and wildlife.

Recent decades underscore the warming trend. Six of the ten hottest years on record have occurred since 1999, with 2012 topping the list. In contrast, only one of the ten coldest years (2019) occurred after 2000. This shift suggests that cooler years are becoming increasingly rare, while record-setting heat is becoming more common. The seasonal nature of this warming, especially the rise in winter lows and summer nighttime temperatures, has implications not just for comfort, but for ecosystems, agriculture, and health.

Extreme Temperatures

Analysis of daily high and low temperatures shows that extreme heat and cold events are not becoming more frequent, but some specific patterns are emerging. The number of hot days (above 90°F) and freezing days (below 32°F) each year has remained relatively stable over the past several decades. However, winter minimum temperatures have shown a statistically significant increase, rising about half a degree (°F) per decade since 1950. This warming of winter nights may reduce risks like livestock cold stress but could also lead to lower snowpack, changes in spring runoff, and shifts in overwintering pest populations. A warming winter trend does not, however, rule out that extreme cold stress can still occur due to natural fluctuations in severe winter storms.

While summer nighttime lows did not show a statistically significant trend in the local data, rising summer minimum temperatures are a well-documented regional and global signal. Even small increases can reduce overnight relief during heatwaves, compounding stress for people, crops, and animals. Though not yet pronounced locally, this emerging pattern warrants attention in future planning for agriculture, public health, and emergency response.

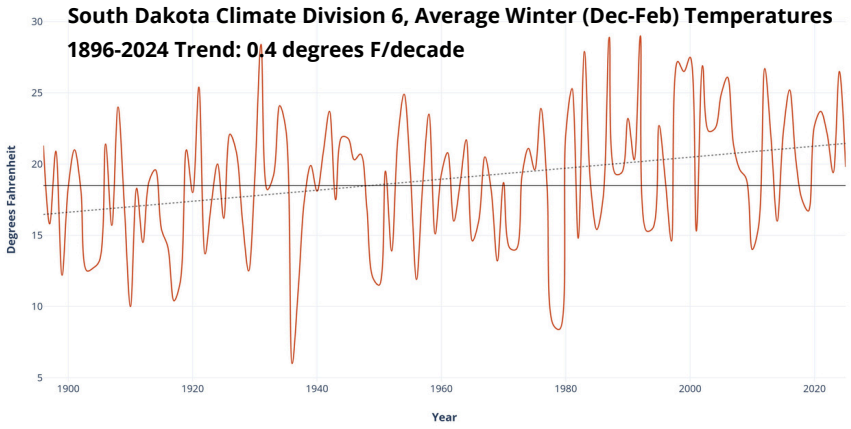


Figure 4. Average winter (Dec–Feb) temperatures across the Reservation and surrounding region, 1896–2024. The data show a long-term warming trend of 0.4°F per decade, consistent with broader regional and global climate patterns. Warmer winters have become increasingly common since the late 20th century. Source: [2] NCEI U.S. Climate Divisional Database (nClimDiv), South Dakota Climate Division 6.

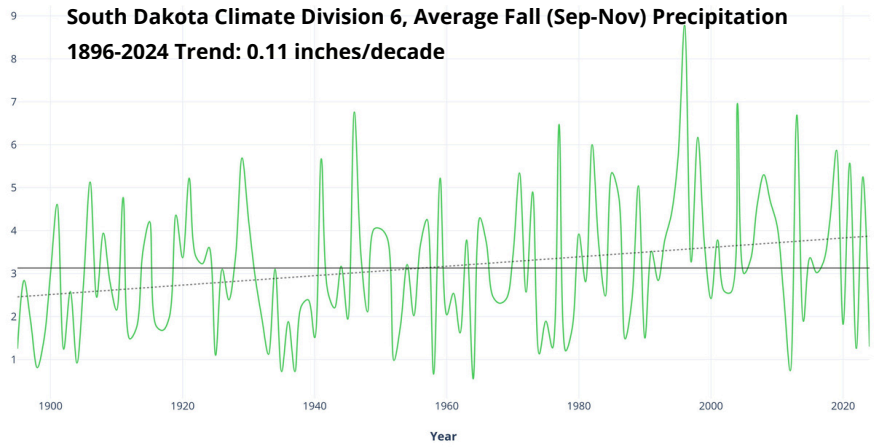


Figure 5. Average fall (Sep-Nov) precipitation for the Reservation and surrounding region. This long-term trend, shown from 1895 to present, reflects a shift toward wetter conditions, though year-to-year variability remains high. Source: [2]. NCEI U.S. Climate Divisional Database (nClimDiv), South Dakota Climate Division 6, fall (Sep-Nov) mean precipitation, 1895 to 2024.

Precipitation

Annual precipitation (1895-present) has increased over the past century (**Fig. 5**), with particularly high totals recorded in recent decades. Several of the wettest years on record (e.g., 1993, 1996, 1998, 2010, and 2019) have occurred since the mid-1990s, and among these 2019 received over 30 inches of precipitation. This pattern aligns with results from the 12-month Standardized Precipitation Index (SPI) (**Fig. 6**), which shows a statistically significant trend toward wetter conditions beginning in the early 2000s). While overall precipitation has increased, the variability from year to year remains high. These findings suggest a climate that is trending wetter, though potentially more volatile, with implications for both water availability and flood risk depending on how precipitation is distributed throughout the year.

Precipitation Intensity

Over the past two decades, rainfall on the Reservation has become more erratic and it has also gotten more intense. Recent research has shown that short, heavy downpours are increasing as the climate warms worldwide, and our experience reflects that pattern [3]. Precipitation intensity refers to how much rain falls in a short period of time. Instead of gentle, soaking rains spread out over several hours or days, we are seeing more frequent bursts of heavy downpours. These short, high intensity rain events can lead to flash flooding, soil erosion, and damage to roads and culverts.

Our analysis of local weather station data from the Pierre Regional Airport since 2001 shows a clear increase in both the intensity of rain and the number of extreme rainfall events, particularly in the summer (**Fig. 7**). This shift in rainfall patterns can have a big impact on the land, water systems, and infrastructure the community relies on.

Drought

As mentioned in the Precipitation section, analysis of the 12-month SPI from 1895 to 2024 shows a slight trend toward wetter conditions in the area around Lower Brule. Despite this, drought remains a recurring feature of the climate. Our analysis found no significant long-term changes in the frequency, duration, or intensity of drought events over the last century. Instead, droughts have occurred in stretches of long dry periods like those in the early 2000s and then been followed by wetter periods like the early 2010s. Recent years have remained close to average, with no clear shift in either direction. However, when temperature is considered using the Standardized Precipitation Evapotranspiration Index (SPEI), a different picture begins to emerge. Rising temperatures and higher evaporative demand are amplifying drought impacts, even when precipitation remains steady. This warming effect suggests that future droughts may feel more intense-not necessarily because of less precipitation-but because the land is drying out faster.

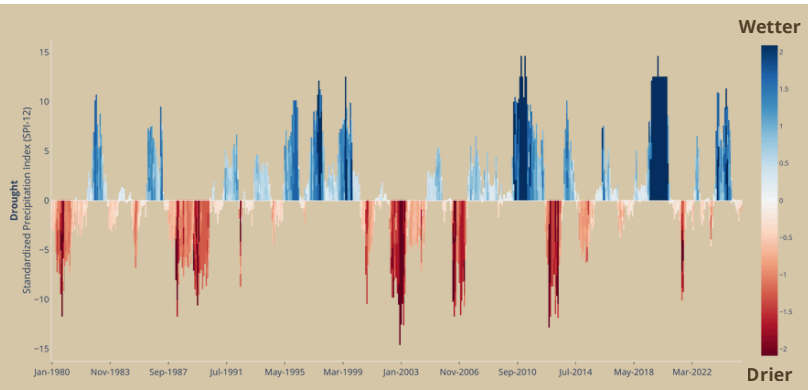


Figure 6. 12-Month Standardized Precipitation Index (SPI) values for the Reservation. Blue bars indicate wetter-than-normal periods and red bars represent dry/drought conditions. While individual drought events, especially in the late 1980s, early 2000s, and mid-2010s stand out as severe, the overall trend does not suggest a long-term increase in drought frequency or intensity. Source [4].

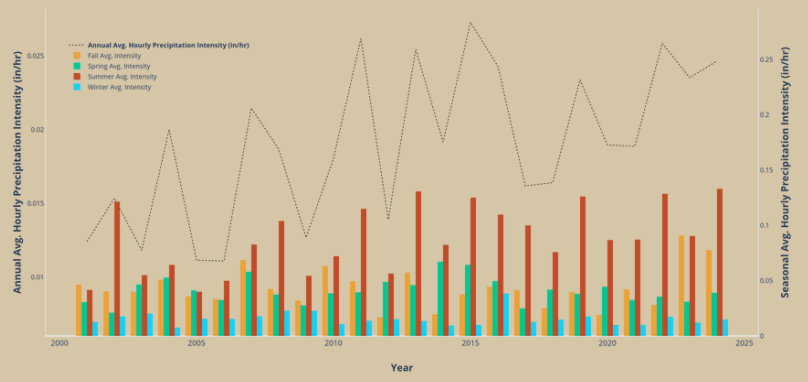


Figure 7. Average hourly precipitation intensity by season (colored bars) and year (black dashed line). Based on data from the Pierre Regional Airport station. While year-to-year variability is high, there is an upward trend in annual precipitation intensity since 2001. Recent increases in summer values suggest a shift toward more intense rainfall during the warm season, which is consistent with expectations under climate change. Source [5]. Analysis uses hourly precipitation from 1980–2024.

Section One

Projected Climate Futures: 2040–2069

Exporing Future Climate Scenarios for Planning

Introduction

The purpose of the Climate Change Vulnerability Assessment (Assessment) for the Tribe is to evaluate the potential impacts of climate change on the Tribe's environment, resources, way of life, and to identify specific vulnerabilities within the Tribe's lands, ecosystems, infrastructure, and cultural practices that are sensitive to changes in climate, such as altered precipitation patterns, increasing temperatures, and extreme weather events.

The Assessment uses historical data and climate projections focused on the 30-years around the middle of this century (2040-2069). To make a specific prediction about this future climate, it starts with a general climate framework for this future period, and then it applies several different climate models (technically, General Circulation Models or GCMs). Each model is a formula with a specific version of climate conditions such as variations in precipitation or temperature.

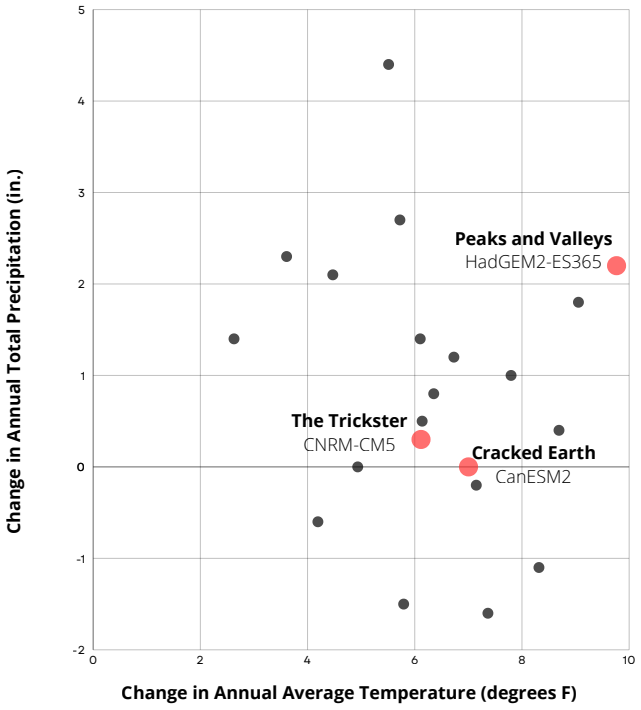


Figure 8. Mid-century (2040-2069, RCP8.5) projected changes for annual total precipitation and annual average temperature for the 20 GCMs that are included in the MACAv2-METDATA dataset. Orange circles show the models used in this Assessment. The large spread among the different models underscores the importance of exploring multiple models when conducting a vulnerability assessment. Source [6].

Climate Futures

The scenario used as a background to the models is the Representative Concentration Pathway (RCP8.5). It imagines that the world will be in a worst-case situation, a future of high greenhouse gas emissions leading to significant global warming and changes to global climate patterns. This does not mean that this is the world to come. This extreme scenario is used because it will clearly highlight the differences between the results for each model applied. When these models are deployed in this common RCP8.5 scenario, they will show different, yet plausible patterns of temperature, precipitation, and seasonal variability. Each model will describe the world that might exist if its combination of climate variables and processes comes true.

From these results, we can then analyze how the conditions it predicts might influence the Tribe's environmental, social, and economic systems. For this reason, we describe each of these models as a climate future (**Fig. 8**). Because each future will be different, the whole process will highlight specific challenges and opportunities tied to climate change, and the Tribe will be better able to assess the risks and resilience strategies in these different situations and scenarios.

Figure 9A-C illustrates the projected trends in temperature, precipitation, and soil moisture under each climate future, while **Table 1** summarizes expected changes in key climate hazards, such as flooding, drought, and wildfire.

Climate Future 1: *The Trickster*

The Trickster climate future, which was generated by the National Centre of Meteorological Research CNRM-CM5 model, represents a climate that could be described as deceptive and uneven, where modest changes in temperature and precipitation potentially conceal underlying disruptions to ecosystems, water resources, and land health. This scenario is characterized by the following anomalies:

- **Temperature Changes:** Across all seasons, temperatures are significantly warmer than the 1971-2000 base period, with the largest anomalies in winter (+8°F) and the smallest in spring (+4°F). The annual average temperature increases by approximately 6°F, signaling a consistent warming trend throughout the year.

- **Precipitation Changes:** Despite an overall increase in annual precipitation (+3%), the seasonal distribution is uneven. A wetter winter (+19%) and spring (+15%) contrast with a drier summer (-5%) and fall (-5%), leading to periods of both excess and scarcity. Soil moisture declines across all seasons, with annual reductions of -20%. Summer and fall show a particularly large decline (-34% and -41%, respectively).

- **Extreme Conditions:** Under The Trickster, expect an increase in extreme weather, with 19 additional days per year where the heat index exceeds 100°F and an additional 8 days of "Extreme" Fire Danger annually. These extremes increase risks to public health, agriculture, and ecosystems.

The Trickster future is deceptive in that its initial appearance of wetter winters and springs, which enhance soil moisture and water availability, seems beneficial; however, warmer temperatures accelerate evaporation, leading to drier soils and reduced runoff, particularly in summer and fall. This creates a seemingly contradictory pattern where wetter winters and springs may offer some benefits, while hotter, drier summers and falls could still bring drought stress during the most critical parts of the growing season. The warmer winters also disrupt snowpack, further stressing water supplies in spring and summer.

Ultimately, **The Trickster** poses significant challenges for land productivity, water management, and ecosystem resilience. Increased fire danger and prolonged heat stress exacerbate vulnerabilities for communities and natural systems, demanding adaptive strategies to navigate this unpredictable and shifting climate.

Climate Future 2: *Peaks and Valleys*

The **Peaks and Valleys** climate future produced by the Met Office Hadley Centre (HadGEM2-ES365 model) shows contrasting extremes, where pronounced seasonal variations in temperature and precipitation could create significant challenges for ecosystems, agriculture, and water management. This scenario is defined by the following climate anomalies:

- **Temperature Shifts:** Like The Trickster scenario, temperatures are warmer across all seasons, with the largest anomalies in winter (+13°F) and fall (+9°F). The annual mean temperature rises by +9°F, indicating a consistent warming trend from the 1971-2000 base period. Summer (+8°F) is particularly significant due to its intensifying heat stress and prolonged dry spells. The extended growing season benefits crop productivity, but extreme heat days and reduced frost chill hours may stress heat-sensitive crops and ecosystems.

- **Precipitation Extremes:** Annual precipitation increases substantially compared to the base period (+11%), but the seasonal distribution is more uneven. Winter (+38%) and fall (+38%) both show significant increases in precipitation. Spring is also expected to be wetter (+22%), but less so compared to winter/fall. In contrast, summer trends (-14%) show significant dryer conditions, creating prolonged dry spells during critical periods for agriculture and ecosystems in general. Altered water availability with wetter winters but drier summers could strain water management systems, increase flood risks, and exacerbate drought impacts.

- **Extreme Conditions:** The **Peaks and Valleys** climate future could result in an additional 34 days per year with a heat index of 100°F or higher, amplifying heat-related health and agricultural stresses. Furthermore, 14 more annual "Extreme" Fire Danger Days highlight increased wildfire risks during hot, dry summers.

The **Peaks and Valleys** future scenario represents a contrasting set of conditions: wet seasons could bring opportunities for water resource recovery and vegetation growth but also increase risks of flooding and soil erosion. Conversely, the hot and dry summers could create water scarcity, stress crops, and heighten fire danger. These fluctuations could strain natural systems and infrastructure, requiring adaptive strategies to navigate both the highs and lows of this unpredictable future.

Climate Future 3: *Cracked Earth*

The **Cracked Earth** climate future, produced by the Canadian Earth System Model (CanESM2) shows a future climate with significant warming, uneven precipitation patterns, and heightened risks of extreme weather. This scenario shows the following trends:

- **Temperature Changes:** Annual mean temperatures increase by +7°F, with summer seeing the largest increase (+8°F). Minimum temperatures in winter are also significantly warmer (+8°F), reducing cold extremes but potentially disrupting some ecosystem functions reliant on colder conditions. Days with heat indices ≥100°F increase by +31 annually, with days ≥105°F rising by +18. This could amplify risks to public health, infrastructure, and agriculture.

- **Precipitation Changes:** Annual precipitation increases by +5%, but the distribution is seasonal. Winter (+34%) and fall (+20.1%) are wetter, while summer (-7%) is significantly drier, stressing water availability during peak demand. Annual soil moisture decreases (-6%), with summers seeing a sharp decline of -52%. This would likely exacerbate drought conditions and significantly reduce vegetation growth and agriculture. Winter runoff significantly increases (+330%), increasing flood risks, but summer runoff decreases by -17%.

- **Extreme Conditions:** Annual extreme fire danger days increase by +7.03, The combined heat, dryness, and reduced fuel moisture amplify wildfire risks.

- **Ecosystem Impacts:** The growing season increases by over three weeks, supporting longer crop growth periods but also increasing competition for water and vulnerability to late-season drought. Earlier last spring freezes (-9.75 days) and later first fall freezes (+11.5 days) could disrupt phenological cycles for plants and wildlife.

Section One

The **Cracked Earth** future depicts a challenging set of conditions where warming temperatures and uneven water availability stress ecosystems, agriculture, and the Lower Brule community. The benefits of wetter winters and longer growing seasons are countered by hotter, drier summers, reduced snowpack, and increased risks of wildfires and heat stress. This scenario calls for targeted strategies to optimize water management, reduce fire risks, and build climate resilience in both natural and human systems.


Horses on Lower Brule. Source: Sheldon Fletcher

Figure 9. Seasonal variation of temperature (panel A), precipitation (panel B), and soil moisture (panel C) for the three climate futures. Source [6].

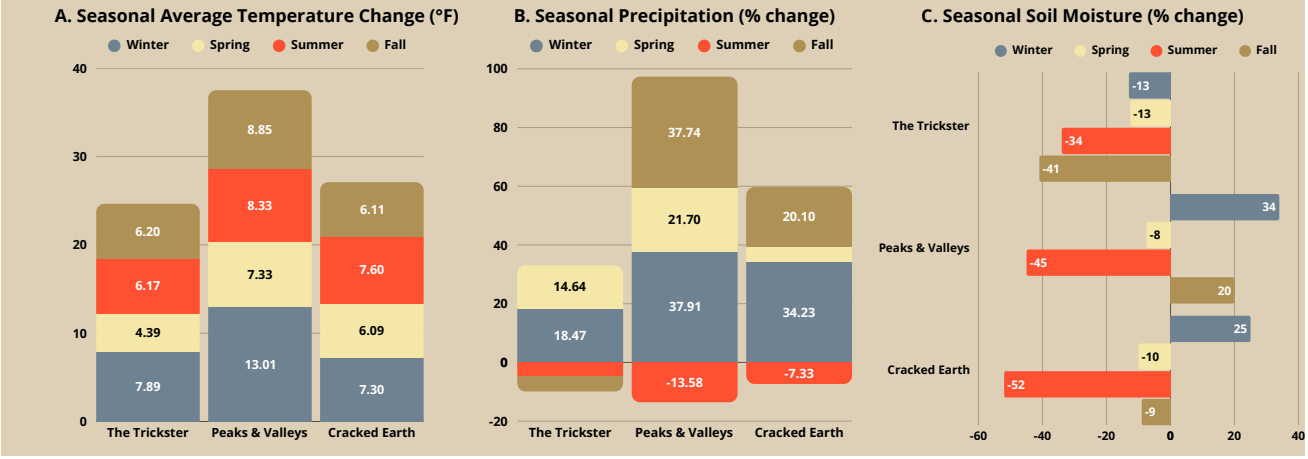


Table 1. Expected changes in key climate hazards among the different climate futures. **Flooding** is characterized as the heaviest 5-day rainfall increases by mid-century. The total number of days which are classified as **extreme** fire danger, are calculated as the days with 100-hour fuel moisture that is below the 3rd percentile from historical years. A **drought** is characterized by conditions equal to or less than -0.8 using the Standardized Precipitation-Evapotranspiration Index (SPEI) on a 12-month timescale (SPEI-12). **Drought frequency** compares the number of droughts projected between 2040-2069 compared to what was estimated in the base period of 1971-2000. **Drought intensity:** By 2031-2050, the chance of a drought as severe as 2012 above the 1981-2005 baseline of 65 percent per decade. **Drought duration** compared the number of multi-year droughts (i.e., drought lasting two or more years) to the 1971-2000 base period. Data source: Climate Toolbox (gridMET) time series. Sources [6-8].

Climate Feature 2040-2069	**The Trickster** CNRM-CM5	**Peaks and Valleys** HadGEM2-ES365	**Cracked Earth** CanESM2
Extreme Temperatures: Increase in days with Heat Index >= 100 deg F.			
Flooding: Percent increase in the heaviest 5-day storms compared to 1971-2000.	**15%**	**58%**	**13%**
Wildfire Increase in summer "Extreme" fire danger days.			
Drought Frequency: Percent increase in the number of droughts compared to 1971-2000.	82%	42%	75%
Drought Intensity: By 2031-2050, chance of a drought as severe as 2012 (compared to the 1981 to 2005 baseline of 65% per decade).	97% per decade	57% per decade	82% per decade
Drought Duration: Number of multi-year droughts above the 1971-2000 baseline.	**+8**	**+2**	**+5**

Resource Vulnerabilities

Water Resources

The Trickster: Decreased soil moisture and runoff would lead to reduced availability of water for agriculture, domestic use, and ecosystem needs. Lower precipitation in summer and fall would exacerbate water scarcity, stressing reservoirs and groundwater supplies. Elevated temperatures would contribute to more days with extreme heat (e.g., 19 additional days ≥100°F), intensifying water demand for agriculture, livestock, and domestic use. Increased demand and potential distribution system failures could threaten reliable access to potable water if these trends are experienced broadly across the Mni Wiconi system.

Peaks and Valleys: The combination of wetter seasonal and annual conditions would increase water availability in reservoirs, rivers, and groundwater. However, dry-hot summers could cause temporary water shortages during peak agricultural and recreational demand. High summer temperatures combined with low water availability may also degrade water quality, causing health impacts to our community and livestock. This fluctuation may challenge water management systems, increasing the risk of flooding during wet seasons and acute water stress during dry periods.

Cracked Earth: Wet winters would help replenish the Missouri River along with the various sources of groundwater vital for domestic and municipal supplies, agriculture, and ecosystems on the Reservation. However, warmer winters could reduce snowpack in upstream areas, leading to lower water flow in late spring and summer. With reduced surface water availability, reliance on groundwater would increase, leading to overuse with possible reductions in water quality. Maintenance of drinking water systems was noted as a vulnerability (Water Resources and Integrated Management Plan 2023), which could further decline under the Cracked Earth future due to increased demand and potential system failures.

Water Resources
Common Vulnerabilities
The three climate futures all show a complex relationship between seasonal climate trends, water availability, and the challenges they pose to water management. Some of the specific common themes include:

- Decreased Runoff and Soil Moisture: Across the Futures, reductions in runoff and soil moisture affect water availability for agriculture, ecosystems, and domestic use, particularly during summer and fall.
- **Reliance on Groundwater**: All scenarios point to increased dependence on groundwater due to reduced surface water availability, raising concerns about overuse and declining water quality.
- **Rising Temperatures**: Elevated temperatures increase evaporation rates and exacerbate water demand across sectors.
- **Extreme Heat Events**: More days of extreme heat (e.g., days ≥100°F) are common, further straining water supplies and systems.
- **System Failures**: Increased demand, combined with potential distribution system failures, emerges as a consistent risk. Vulnerabilities in maintaining drinking water systems and infrastructure (i.e., Mni Wiconi system) are highlighted across all Futures.
- **Seasonal Extremes**: While some Futures, like Peaks and Valleys, predict wetter conditions in certain seasons, all Futures deal with periods of low precipitation or dry seasons that challenge water storage and distribution.
- **Flooding and Drought Risks**: Wetter winters or seasons, as seen in Peaks and Valleys and Cracked Earth, could replenish reservoirs and groundwater but also increase flood risks.
- **Decreased Surface Water Quality**: High temperatures and low water levels across all Futures may degrade water quality, increasing risks of harmful algal blooms and waterborne diseases.

Land Resources

The Trickster: Persistent low soil moisture would weaken soil structure, increasing vulnerability to erosion. Moderately warm temperatures may promote drought-tolerant invasive species, reducing land productivity and ecological health. Increased potential evapotranspiration would result in greater water loss from soil, reducing agricultural productivity and making drought recovery more difficult. An extended growing season could allow for different crop choices but could also increase water demand for crops during hotter months. Prolonged growing seasons would also require more irrigation, putting pressure on water resources and infrastructure. Declining forage quality due to heat, drought, and invasive species could harm livestock production on the Reservation. Additional heat stress from more days with heat indices ≥100°F could also reduce crop yields and increase water demand due to higher evapotranspiration rates. The annual increase of "High" fire danger days would increase the risk of wildfires, particularly during dry summers and falls and a drop in 100-hour fuel moisture would exacerbate fire risks by making vegetation more flammable.

Land Resources

Peaks and Valleys: Wet conditions in winter, spring, and fall may enhance soil moisture and vegetation growth but could also increase the risk of soil erosion and waterlogging in some areas. Summer soil moisture, however, would decline sharply, which would lead to reductions in soil moisture during the critical growing season. Annual potential evapotranspiration would rise significantly, due to higher temperatures, increasing water demand from soil and plants. This would exacerbate summer drought conditions despite higher annual precipitation. More extreme heat days and higher temperatures would increase the risk of heat stress and water demand for crops like corn. Increased fall and spring runoff could cause localized flooding, eroding riverbanks and potentially damaging critical infrastructure near the Missouri River.

An increase in annual "High" fire danger days could elevate wildfire risks, particularly in areas where invasive species increase fuel loads.

Cracked Earth: Wet winters could enhance soil moisture levels for the spring planting season, supporting the Tribe's agricultural activities. However, warmer winters could cause early soil saturation and erosion, potentially degrading grazing lands and agricultural fields and increase localized flooding. Stable spring precipitation may maintain agricultural productivity, but the long-term sustainability of tribal lands could be at risk due to climate-induced changes in soil structure. For example, declines in summer and fall soil moisture could increase vulnerability to wind and water erosion, particularly in agricultural and rangeland areas. Higher winter soil moisture may temporarily improve conditions but could be offset by the overall decline in annual soil moisture.

Land
Common Vulnerabilities
The three climatre Futures all exhibit fluctuations in precipitation with impacts to soil health, land productivity, and the broader ecosystem. Some of the specific common features include:

- **Seasonal Soil Moisture Fluctuations:** While wet winters temporarily improve soil moisture, summer and fall experience sharp declines in all scenarios, leading to drier soils during critical growing periods.
- **Increased Erosion:** Low soil moisture combined with extreme weather patterns increases vulnerability to wind and water erosion, particularly in agricultural and rangeland areas. Wet winters may exacerbate water-driven erosion due to early soil saturation and localized flooding.
- **Heat Stress on Crops:** Rising temperatures and more extreme heat days (e.g., days with heat indices ≥100°F) stress crops like corn, reducing yields and increasing irrigation needs.
- **Water Demand:** Higher evapotranspiration across all scenarios elevates water demand for agriculture, straining water resources and infrastructure.
- **Extended Growing Season:** While a longer growing season allows for new crop choices, it also increases the need for water during hotter months, compounding resource challenges.
- **Forage Quality Decline:** Heat and drought conditions lead to poor forage quality, harming livestock production and requiring supplemental feeding.
- **Fire Risks:** All scenarios report an increase in "High" fire danger days, particularly during summer and fall. Reduced fuel moisture further exacerbates wildfire risks, making vegetation more flammable.
- **Invasive Species Contribution:** Growth of invasive species adds to fuel loads, amplifying wildfire hazards.
- **Localized Flooding:** Wet winters and higher spring and fall runoff could cause localized flooding, which threatens riverbanks, critical infrastructure, and cultural sites near the Missouri River.
- **Pressure on Water Resources:** Declines in soil moisture during summer and fall, coupled with increased evapotranspiration, strain water supplies for agriculture and ecosystems despite occasional wetter conditions.

Cultural Traditions

The Trickster: Increased soil erosion due to fluctuating soil moisture and localized flooding from higher winter and spring runoff could threaten culturally significant lands and sacred sites near the Missouri River and other vulnerable areas. Altered growing seasons and declining soil moisture could also reduce the availability of traditional plants. Changes in water availability and ecosystem health could reduce important fish and wildlife populations. Increased heat stress and fire risks may limit outdoor events and ceremonies.

Peaks and Valleys: The variability in climate may disrupt traditional agricultural practices tied to specific seasons. While wet conditions may support cultural practices like planting or ceremonies related to water, the dry summer might hinder harvests or gatherings that depend on consistent weather conditions.

Cracked Earth: Traditional practices tied to winter and spring, such as ceremonies, could be disrupted by less predictable seasonal patterns. However, wet winters may enhance water-dependent cultural practices. Warmer winters might reduce the availability of culturally significant plants and wildlife that are adapted to winters that are typically colder.

Cultural Traditions
Common Vulnerabilities: The three climate Futures share a common thread in how changes in water availability, seasonal variability, or changing temperatures may threaten the continuity of traditional cultural practices. Some specific common features include:

- Altered seasonal patterns and less predictable weather may disrupt traditional ceremonies and practices.
- Increased soil erosion and localized flooding may jeopardize culturally significant lands, particularly near vulnerable areas like the Missouri River.
- Shifts in growing seasons, warmer winters, and declining soil moisture may reduce the availability of culturally significant plants and wildlife.
- Higher heat stress and increased wildfire risks limit outdoor cultural events, ceremonies, and gatherings that rely on stable environmental conditions.

Fish, Wildlife, & Recreation

The Trickster: Decreases in runoff and water availability disrupt aquatic ecosystems, threatening fish populations and habitats. Wildlife may struggle to find water sources, altering migration patterns. Recreational activities such as fishing and boating may also suffer due to lower water levels.

Peaks and Valleys: The wet periods could improve aquatic ecosystems, which would benefit fish populations and increase opportunities for recreational activities like fishing. However, the dry summer may lead to temporary reductions in stream flows and habitat quality, stressing wildlife and limiting recreational activities at a time when the public expects to use the resource and could lead to conflict.

Cracked Earth: Wet winters would benefit aquatic habitats along the Missouri River, supporting important fish species, however, warmer winters could disrupt migration and breeding patterns of wildlife that the Tribe depends on for hunting. Recreational activities, such as ice fishing or winter gatherings, might decline due to inconsistent ice cover.

Fish, Wildlife, and Recreation
Common Vulnerabilities
Vulnerabilities consistent across the three climate futures include:

- Increasing variability of wet winters and springs might improve aquatic habitat in some years, while in other years, dry summers and declining stream flows could also stress those same habitats, reducing habitat quality and threatening culturally significant species.
- Changes in water availability and seasonal patterns may alter wildlife migration, breeding, and access to water sources, affecting hunting and fishing opportunities.
- Recreational activities like fishing and boating may benefit from wetter periods but decline during dry summers or due to inconsistent ice cover in warmer winters, potentially limiting opportunities for traditional and social gatherings.

Public Health & Safety

The Trickster: The rise in summer temperatures and heat indices could increase the risk of heat-related illnesses, such as heat exhaustion and heat stroke. Vulnerable populations, including elders and those with preexisting conditions, would face heightened health risks. Prolonged droughts and extreme weather could exacerbate stress, anxiety, and depression, particularly for those who rely on agriculture for their livelihoods. Increased temperatures combined with changes in runoff could promote harmful algal blooms, increasing risks for water supplies and recreational water use. This could lead to health risks such as respiratory issues and skin irritation. Increased wildfires due to more "High" fire danger days would result in degraded air quality, causing respiratory problems and exacerbating conditions such as asthma. Higher temperatures would result in greater need and reliance on cooling systems, which could stress energy infrastructure. Increased fire risks, combined with insufficient fire response capacity and emergency resources, could increase safety threats and impact community health.

Peaks and Valleys: Similar to The Trickster, increased mean temperatures and more frequent heat index days above 90°F, 100°F, and 105°F would likely exacerbate heat-related illnesses, including heat stroke and dehydration. Vulnerable populations, such as elders, children, and those with pre-existing health conditions, are particularly at risk. Longer heatwaves could lead to heat stress, requiring public health advisories and increased cooling center access.

An increase in precipitation in the Peaks and Valleys Future compared to The Trickster, could reduce some drought-related stressors on public health. However, it would also increase the risks of flooding and subsequent infrastructure damage, and soil erosion, which could hinder access to emergency services. While harmful algal bloom risks are present in The Trickster, the larger temperature increases and summer runoff variability in Peaks and Valleys could increase the risks of harmful algal blooms and associated illnesses. The more intense shifts between wet and dry conditions in Peaks and Valleys could create greater uncertainty and stress for those reliant on natural resources compared to the more consistent dryness of The Trickster Future. Increased flooding and wildfire risks may impose greater costs on the community for infrastructure repair, fire management, and healthcare.

Cracked Earth: This climate future shows a more moderate increase in temperatures, although there is still a substantial increase in days with heat indices ≥90°F and ≥100°F. Water availability would improve in winter and spring due to higher precipitation and runoff, but flood risks could increase, although not at the level of the Peaks and Valleys Future. Health impacts from heat would be less severe in this future due to fewer extreme heat days, but increased runoff and flooding risks in winter and spring would pose challenges absent in The Trickster Future. Compared to the Peaks and Valleys Future, the Cracked Earth Future has a more stable seasonal pattern, which could reduce mental health stressors related to uncertainty. While the Peaks and Valleys future creates health and safety risks from sharp wet-dry transitions, this future's moderate balance offers a less extreme variation.

Public Health and Safety
Common Vulnerabilities

Despite the differences in impacts and vulnerabilities among the three climate futures, there are several areas of overlap. These include:

- **Heat-Related Illnesses and Mortality**: All futures involve significant increases in temperature, leading to more frequent extreme heat days (e.g., heat indices ≥90°F and ≥100°F). This raises the risk of heat-related illnesses such as heat stroke, dehydration, and cardiovascular stress, especially among vulnerable elders, children, and outdoor workers.
- **Wildfire Risks and Air Quality:** Increased "High" and "Extreme" fire danger days are a shared vulnerability, as smoke from increased wildfires will degrade air quality. This exacerbates respiratory illnesses such as asthma and bronchitis and increases hospital visits during fire-prone periods.
- **Water Quality and Availability:** Declines in summer soil moisture and increased climatic water deficits threaten water availability. Harmful algal blooms are a shared risk across all scenarios due to warming water temperatures and changing runoff patterns, affecting drinking water quality and increasing risks of gastrointestinal and respiratory illnesses.
- **Mental Health and Community Stress:** Climate-induced stressors, including heat, drought, flooding, and the unpredictability of increased climate/weather variability, elevate anxiety, depression, and other mental health challenges. Economic pressures on land-based livelihoods, such as farming and ranching, further contribute to mental health issues.
- **Flooding and Infrastructure Damage:** Increased winter and spring runoff raises the risk of localized flooding, damaging infrastructure, homes, and critical facilities. This could also isolate parts of the Reservation, reducing access to emergency services and posing public safety risks.
- **Emergency Preparedness Limitations:** Across all futures, the Tribe faces challenges with emergency response capacity, including limited resources for firefighting, flood management, and public health advisories. These gaps increase vulnerabilities during extreme events.

Ditch flooding during a storm. Source: Larry Jandreaur

Focused Climate Risk Analysis for Species and Tribal Systems

To complement the resource-level Assessment presented above, which covered water, land, cultural traditions, fish, wildlife, and recreation, and public health and safety, a more detailed analysis was conducted for several specific plant and animal species, as well as key Tribal infrastructure and services. This deeper assessment allowed us to assess vulnerabilities and risks that may not be fully captured at the broader resource scale.

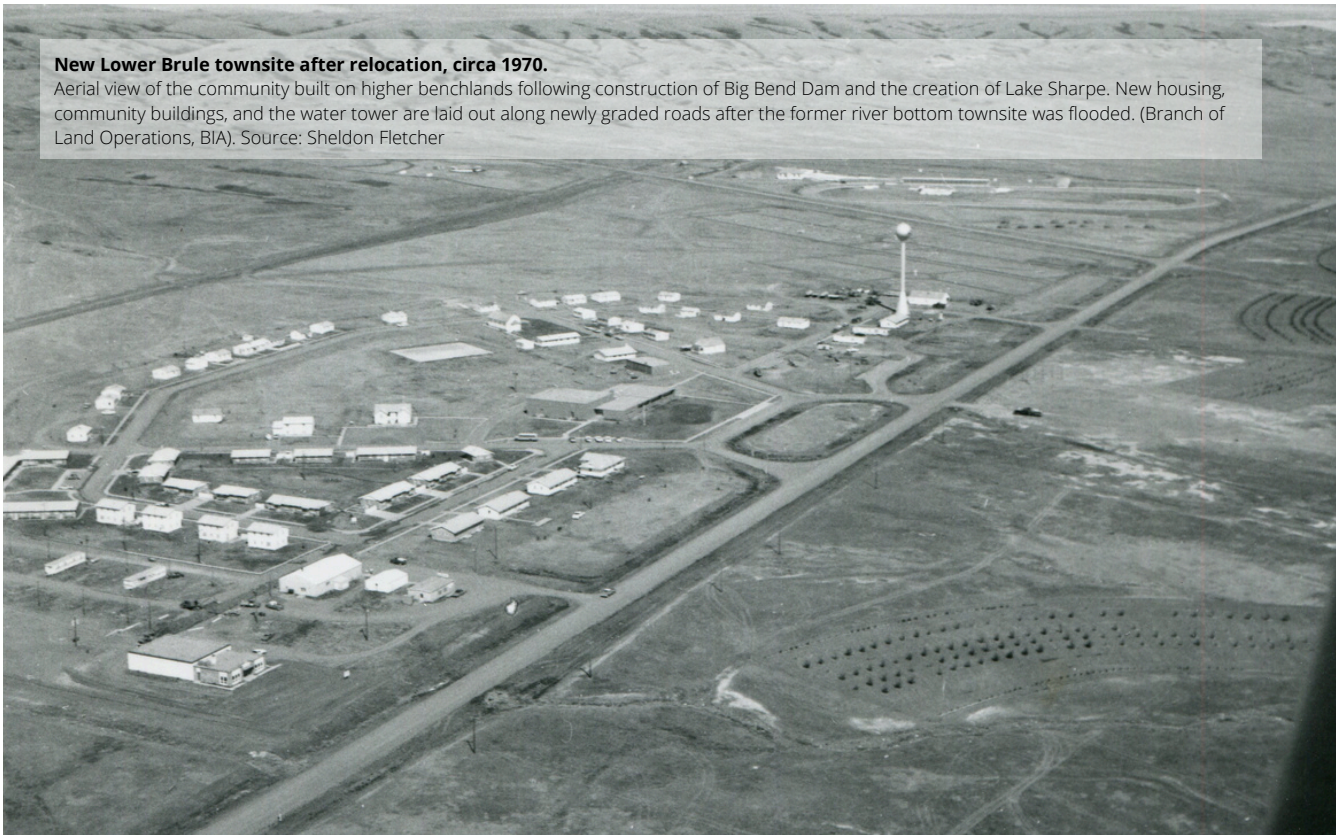
The species selected reflect their importance to our food systems, traditional practices, and ecological health. By examining projected climate impacts, such as changes in habitat suitability, breeding cycles, or water dependence we can better understand how these stressors may affect fish and wildlife populations, ecosystems, and cultural lifeways.

Likewise, evaluating the vulnerability and risk to infrastructure and essential services helps identify potential challenges to long-term community resilience and safety.

For each resource, risk was estimated based on vulnerability times the degree of hazard pressure. This was done for each climate future, then weighted to the primary driver hazard if one clearly dominated. The model whose projected changes do the most to explain the overall risk is considered the primary climate future. When models disagree, we favor the one that shows a consistent pattern across several measures.
We then categorized risks by:

- **Low Risk (LR):** Status quo is adequate under projected hazards. Monitor and keep routine maintenance or stewardship.
- **Medium Risk (MR):** Emerging concerns. Plan low-cost adjustments and start targeted monitoring; conduct a pilot adaptation project where feasible.
- **High Risk (HR):** Clear risk under one or more futures. Prioritize adaptation projects, secure funding, and set timelines.
- **Very High Risk (VHR):** Likely and consequential impacts without intervention. Immediate action, contingency planning, and sustained investment are warranted.

Tables 2 to 4 summarize findings for key plant species, wildlife, and Tribal infrastructure and services, showing how climate change may affect not only land and water but also the systems and traditions that sustain the Kul Wicasa Oyate.

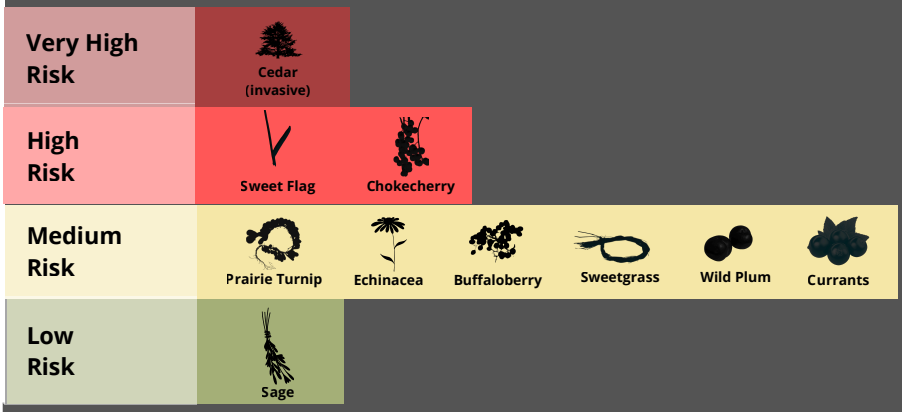


New Lower Brule townsite after relocation, circa 1970.
Aerial view of the community built on higher benchlands following construction of Big Bend Dam and the creation of Lake Sharpe. New housing, community buildings, and the water tower are laid out along newly graded roads after the former river bottom townsite was flooded. (Branch of Land Operations, BIA). Source: Sheldon Fletcher

Table 2. Risk assessment of culturally and ecologically important plant species under future climate scenarios. Each row lists a species followed by observed or anticipated climate impacts, its sensitivity and adaptive capacity, and modeled risk projections for the three climate futures: The Trickster (CNRM-CM5), Peaks and Valleys (HadGEM2-ES), and Cracked Earth (CanESM2). Risk categories include Very High Risk (VHR), High Risk (HR), Medium Risk (MR), and Low Risk (LR). This table illustrates how shifts in climate may affect food systems, traditional practices, and native plant communities. Lakota names are listed below each species name [9].

Risk Profile for Key Native & Culturally Significant Plant Species

The Risk Profile ranks key native and culturally significant plant species based on degree of vulnerability times the magnitude of the hazard pressure. Species with high vulnerability (highly sensitive with low adaptive capacity) and severe hazard pressure (modeled strength of climate stress such as drought, heat, or flooding) are at greatest risk, guiding conservation priorities to protect ecologically and culturally significant plants.



Plants	Potential & Historical Impacts	Sensitivity	Adaptive Capacity	The Trickster "Soil Depletion"	Peaks and Valleys "Seasonal Extremes"	Cracked Earth "Moderate Variability"
Buffalo Berry *Masticapute*	Extended droughts could reduce flowering and fruit set, especially during early spring bud development. Seedling establishment and regeneration could decline due to reduced germination, shallow-root desiccation, and higher seedling mortality; mature plants may experience canopy dieback and greater susceptibility to pests and fire. This risk is most pronounced under The Trickster because wetter winters and springs are followed by hotter, drier summers and falls with declining soil moisture.	Medium-High	Medium	MR	MR	MR
Cedar (Invasive) *Hante*	Cedar spreads more quickly when fires are less frequent and seasons are warmer. Thick stands shade out native grasses and forbs, reduce forage, dry soils, and use more water in draws, which can lower spring and stream flow. Dense thickets also add ladder fuels that make range fires burn hotter and raise control costs, while fragmenting habitat for grouse and other grassland species. This risk is most pronounced under Peaks and Valleys because wetter winters and falls help cedar seedlings establish, and the very hot, dry summers weaken grass competition and lengthen the growing season, allowing cedar recruitment to outpace control unless fire is used regularly.	High	High	VHR	VHR	VHR
Chokecherry *Chanpha*	Reduced soil moisture can weaken roots and lower fruit yield. Delayed or failed flowering disrupts fruiting cycles. Increased wildfires can destroy chokecherry thickets, kill cambium in trees, and remove seed sources; heat and late frosts can also scorch blossoms and suppress pollinators. This risk is most pronounced under The Trickster because wetter winters and springs are followed by hotter, drier summers and falls with declining soil moisture, amplifying heat stress during flowering and fruiting and increasing fire susceptibility.	Medium-High	Medium	HR	HR	HR
Currants *Chapcheyazala*-Black Currants *Wichagnaska hu*-Golden/Buffalo Currants	Drought reduces berry production and stresses both mature plants and seedlings. Shallow soils or slopes dry faster, leading to root desiccation, poor seedling establishment, and higher mortality. Early warm spells can trigger bud break and flowering, which are then damaged by a late frost, reducing fruit set and weakening plants for the season; pollinator timing can also fall out of sync. This risk is most pronounced under Cracked Earth because wetter winters and falls are followed by significantly drier summers, overall soil moisture declines, and earlier spring warmth increases the chance that a late frost will hit sensitive buds and flowers.	Medium-High	Low-Medium	MR	MR	MR

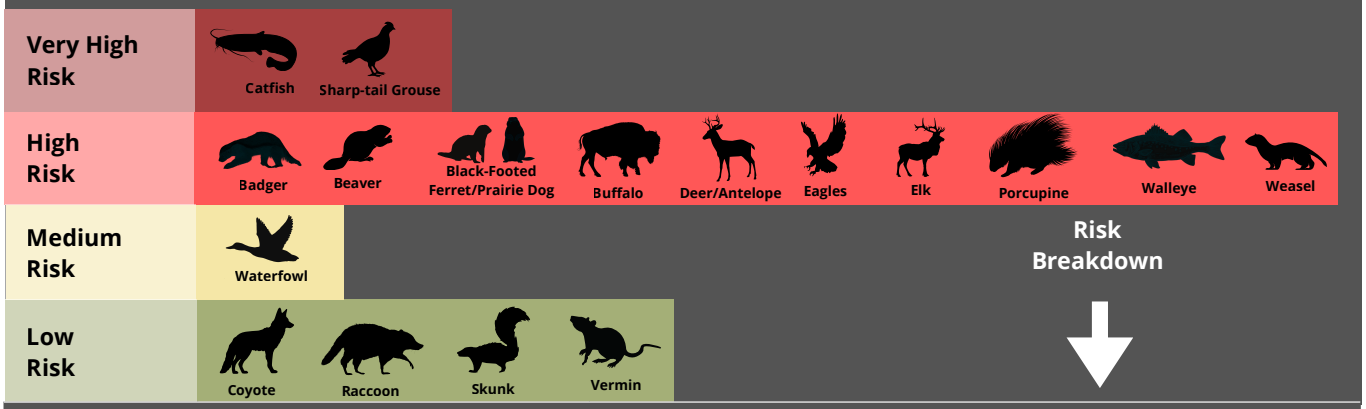
Plants	Potential & Historical Impacts	Sensitivity	Adaptive Capacity	Climate Future		
				The Trickster "Soil Depletion"	Peaks and Valleys "Seasonal Extremes"	Cracked Earth "Moderate Variability"
Echinacea *Ichahpe hu*	Faster plant growth can coincide with reduced medicinal potency due to changes in secondary compounds. Early flowering may cause pollinator mismatch, lowering seed production and recruitment; heat and dryness also increase seedling mortality and stress mature plants. This risk is most pronounced under Cracked Earth because substantial warming, a longer warm season, and more very hot days increase evaporative demand and summer soil moisture loss, amplifying heat stress and phenological mismatch.	High	Medium	MR	LR	MR
Prairie Turnip *Thinpsila*	Fewer native bees and other pollinators reduce successful seed set. Disrupted dispersal limits natural regeneration; lower genetic diversity and more fragmented stands raise extinction risk at dry margins. Heat and moisture stress cut nectar production and seed viability, shorten flowering windows, and reduce seedling survival. This risk is most pronounced under Peaks and Valleys because strong seasonal extremes with hot dry summers, high evaporative demand, and soil moisture deficits compress flowering and foraging windows and depress recruitment.	High	Medium	MR	MR	MR
Sagebrush *Phezi hota Thoth o*	Heat stress could reduce plant vigor, leading to thinner leaves and lower essential oil content, which reduces ceremonial and medicinal quality. Earlier flowering may disrupt pollinator timing and harvest schedules, lowering seed set and recruitment; heat and dryness can also scorch flower heads and suppress regrowth after cutting. This risk is most pronounced under Peaks and Valleys because it shows the largest warming signal with many additional high heat index days, increasing evaporative demand, compressing the flowering window, and further depressing oil production.	Medium	Medium-High	LR	LR	LR
Sweet Flag *Sinkpe thawote*	Loss of wetland habitat from prolonged drought causes die off or failure to regenerate on exposed soils. Root systems desiccate, rhizomes and seedlings die back, and organic mats oxidize and subside; lowered water tables invite invasive upland species, concentrate nutrients, and degrade water quality. Repeated dry downs fragment habitat and increase fire risk in emergent vegetation. This risk is most pronounced under Cracked Earth because wetter winters and falls are followed by significantly drier summers and annual soil moisture declines, leading to longer drawdowns and more frequent complete dry outs.	Medium-High	Low-Medium	MR	HR	HR
Sweetgrass *Phezi wachanga*	Heat stress could reduce plant height and thin leaves, affecting ceremonial use. Higher temperatures may cause earlier flowering, leading to misalignment with pollinators and traditional harvest timing, which lowers seed set and braid quality; repeated hot spells and dry soils also shorten regrowth intervals and reduce tiller density. This risk is most pronounced under Peaks and Valleys because it shows the largest warming signal with many additional high heat index days, raising evaporative demand, shrinking the flowering window, and intensifying summer water stress.	Medium-High	Medium	LR	MR	LR
Wild Plum *Khanta*	Early warm spells can push buds and flowers to open too soon. If cold returns, blossoms and new shoots can be killed, wiping out the year's fruit and leaving damage that invites pests and disease. Repeated false springs drain stored energy, weaken plants, reduce new growth, and throw off timing with pollinators. This risk is most pronounced under Cracked Earth because warmer winters and early springs make plants break dormancy earlier and the season runs longer; when a late cold snap still arrives, even a brief freeze causes more damage, and more hot days make plants lose cold hardiness while frost is still possible.	Medium-High	Medium	MR	MR	MR

Indian Relay Race, Annual Kul Wicasa Wacipi (PowWow), Fair and Rodeo 2025. Source: Sheldon Fletcher

Table 3. Risk assessment of culturally and ecologically important wildlife species under future climate scenarios. Each row lists a species, the observed or anticipated climate impacts, its sensitivity and adaptive capacity, and modeled risk projections for the three climate futures: The Trickster (CNRM-CM5), Peaks and Valleys (HadGEM2-ES), and Cracked Earth (CanESM2). Risk categories are Very High Risk (VHR), High Risk (HR), Medium Risk (MR), and Low Risk (LR). This table shows how changing temperature, water, and habitat conditions may affect subsistence, treaty harvests, and ecosystem balance, and helps set priorities for habitat work, monitoring, and protective measures. Lakota names are listed below each species name [10-12]

Risk Profile for Key Native & Culturally Significant Wildlife Species

The Risk Profile ranks key native and culturally significant wildlife species based on degree of vulnerability times the magnitude of the hazard pressure. Species with high vulnerability (highly sensitive with low adaptive capacity) and severe hazard pressure (modeled strength of climate stress such as drought, heat, or flooding) are at greatest risk, guiding conservation priorities to protect ecologically and culturally significant wildlife..



Species	Potential & Historical Impacts	Sensitivity	Adaptive Capacity	Climate Future		
				The Trickster "Soil Depletion"	Peaks and Valleys "Seasonal Extremes"	Cracked Earth "Moderate Variability"
Badger *Hoka*	Increased wildfire frequency reduces vegetative cover, which can temporarily decrease prey and expose badgers to predators, heat stress, smoke, and den loss. This risk is most pronounced under Cracked Earth because heat and summer dryness reduce fuel moisture and increase wildfire risk.	High	Medium	MV	HV	HV
Beaver *Capa*	Sudden high-flow events from intense storms may wash out dams and lodges, especially in incised or unstable channels. This risk is most pronounced under Cracked Earth because higher winter runoff increases flood potential, though summer flows drop.	Medium	Medium	MV	HV	HV
Black-Footed Ferret *Pispiza Utopia sapa* & Prairie Dog *Pispiza*	Heat stress may reduce activity levels, making it harder for ferrets to hunt prairie dogs. Warmer temperatures could reduce reproductive success, lowering litter sizes. Increased heat can also shift prairie dog activity to cooler hours, further reducing hunting overlap, and raise dehydration and disease risks for ferrets. This risk is most pronounced under The Trickster because significant warming across seasons, including warmer winters, increases evaporative demand and cumulative heat exposure.	High	Medium	HV	HV	HV
Buffalo *Tatanka*	Heat stress reduces buffalo weight gain, fertility, and overall health. Fewer water sources and increased water needs force longer travel to water, raising energy expenditure and exposure. Hot, dry spells lower forage quality and shade availability, compounding thermal load and increasing dehydration risk, especially for calves and older animals. This risk is most pronounced under Peaks and Valleys because it shows the largest warming signal and many additional high heat index days, extending and intensifying periods of heat stress.	High	Medium	HV	HV	HV

Species	Potential & Historical Impacts	Sensitivity	Adaptive Capacity	Climate Future		
				The Trickster "Soil Depletion"	Peaks and Valleys "Seasonal Extremes"	Cracked Earth "Moderate Variability"
Catfish *Howasapa*	Drought and upstream diversions reduce base flows in tributary streams, degrading spawning habitat and nursery conditions. Lower summer flows warm more quickly, reducing dissolved oxygen, increasing metabolic stress, and concentrating pollutants; this can shift spawning timing, lower egg and larval survival, and raise risks of disease and harmful algal blooms. This risk is most pronounced under Peaks and Valleys because strong seasonal extremes with hot dry summers, high evaporative demand, and soil moisture deficits push summer temperatures higher while reducing flows.	Medium-High	Medium	MV	EV	HV
Coyote *Sunmanitu*	Warmer winters may improve juvenile survival, extend foraging windows, and reduce winter stress. Denning success may increase, leading to higher overwinter survival, earlier breeding, larger litters, and population growth that expands range, elevates disease transmission, and increases conflicts with people and domestic animals. This risk is most pronounced under Peaks and Valleys because the largest winter warming signal, along with many additional high heat index days overall, reduces cold-related mortality and lengthens the active season.	Low	High	LV	MV	MV
Deer *Tahca* & Antelope *Tato Kala*	Declining plant diversity from drought and extreme weather reduces available forage and increases competition with livestock for resources. Soil erosion and desertification reduce carrying capacity, degrade riparian areas, and limit water infiltration, forcing longer movements for forage and water. This risk is most pronounced under Cracked Earth because wetter winters and falls are followed by significantly drier summers and annual soil moisture declines, intensifying multi-year water deficits.	High	Medium	HV	HV	HV
Eagle *Wabli*	Reduced fish populations in the Missouri River and other body of waters. Declining wetlands cut prey availability, especially waterfowl and shorebirds. Prolonged low flows warm and deoxygenate water, increasing fish stress and kills; eagles must range farther, raising energy costs and lowering nest success. This risk is most pronounced under Peaks and Valleys because strong seasonal extremes with hot, dry summers, high evaporative demand, and soil moisture deficits could depress summer flows and shrink wetlands.	Medium-High	Medium	MV	HV	MV
Elk *Hehaka*	Increased body stress and dehydration reduce activity and can drive population declines. Heat stress can lower breeding success, especially if rutting overlaps late summer heat waves; poorer body condition reduces conception rates and calf or fawn survival. This risk is most pronounced under Peaks and Valleys because the largest warming signal with many additional high heat index days prolongs hot dry spells and intensifies water deficits.	High	Medium	HV	HV	HV
Porcupine *Pahi*	Drought reduces the nutritional value and availability of cottonwood, willow, buffaloberry, and other browse. Porcupines must range farther, lose body condition, face higher late-winter mortality, and shift toward shelterbelts and buildings as wildfire and dieback reduce denning sites and shade. This risk is most pronounced under Peaks-Valleys because strong seasonal contrasts produce hot dry summers with high evaporative demand and soil moisture deficits, depressing browse quality and availability when needs are highest.	Medium-High	Low-Medium	MV	HV	HV
Racoon *Wiciteglega*	Denser populations and longer activity periods can increase transmission of rabies, distemper, leptospirosis, and Baylisascaris; higher overwinter survival and earlier breeding will expand numbers and range; more nest predation on ground-nesting birds and greater conflicts around dumpsters, pet food, and livestock barns. Hotter, drier summers then concentrate animals at limited water sources and near people, raising contact rates. This risk is most pronounced under The Trickster because wetter, warmer winters and springs boost survival and food availability, followed by drying in summer and fall with declining soil moisture that pushes animals into developed areas, amplifying disease spread and human-wildlife conflicts.	Low	High	LV	MV	MV
Sharp-tail Grouse *Casiyo*	Drought reduces forb and insect abundance that chicks rely on. Dry conditions thin nesting and brood cover, exposing hens and chicks to predators and heat, increasing nest abandonment, lowering hatch rates, and reducing brood survival; limited green-up near leks fragments habitat and shortens the brood-rearing window. This risk is most pronounced under Peaks and Valleys because strong seasonal extremes with hot, dry summers, high evaporative demand, and soil moisture deficits suppress forb bloom and insect emergence and leave nesting cover sparse during the critical rearing period.	High	Low	MV	EV	HV

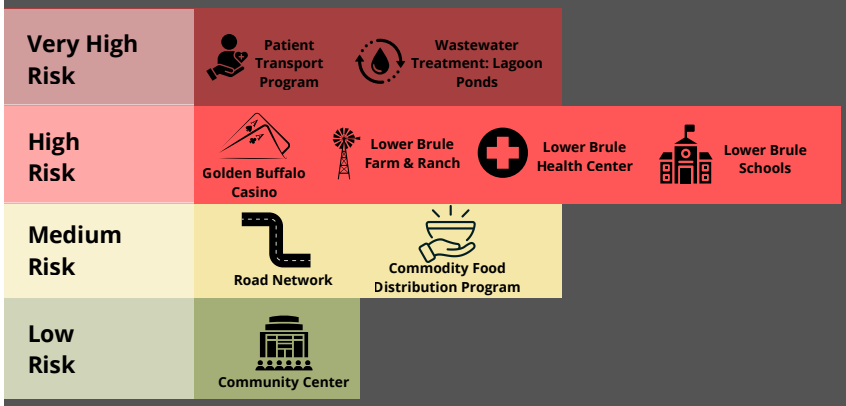
Species	Potential & Historical Impacts	Sensitivity	Adaptive Capacity	Climate Future		
				The Trickster "Soil Depletion"	Peaks and Valleys "Seasonal Extremes"	Cracked Earth "Moderate Variability"
Skunk *Maka*	Warmer winters shorten torpor, so animals stay active, eat more, and start breeding earlier. Higher overwinter survival leads to larger spring populations and sometimes more litters per year. More winter foraging around homes, barns, and dumpsters raises property damage, predation on ground nesting birds, and contamination of feed and stored food. Longer mild seasons also extend parasite and disease cycles (rabies, distemper, leptospirosis), increasing risk to pets and people. This risk is most pronounced under Cracked Earth because substantial warming and a longer warm season reduce winter die off and expand active months, allowing populations to grow while conflicts and disease pressure rise.	Low	Medium-High	LV	MV	MV
Vermin (*Itukala*-Mouse; *Itunk Tanka*-Rat)	Drought reduces natural food and water, pushing mice, rats, raccoons, and starlings into gardens, buildings, and food storage areas. Warmer winters boost survival and earlier breeding, driving larger infestations, food contamination, property damage, and higher risks of rabies, leptospirosis, and salmonella. This risk is most pronounced under Peaks and Valleys because strong seasonal extremes with hot dry summers and high evaporative demand deplete natural forage and water, concentrating pests around homes and facilities while milder winters sustain higher populations into spring.	Low	High	LV	MV	MV
Walleye (*Hogan*-common name for fish)	Spring water-level swings and hot, dry summers could cut walleye spawning success and shrink summer habitat. Eggs could be left dry if levels drop; warm surface water and low oxygen deeper down leave fewer safe places for fish. Primary driver climate future: Peaks and Valleys if spring flow swings dominate; Cracked Earth if summer heat and low water dominate. Peaks and Valleys brings the biggest spring runoff pulses, making steady levels for eggs and young fish harder to maintain. Cracked Earth brings long, hot summers and lower summer flows that warm the shallows and reduce cool, well-oxygenated refuge unless cold releases are used.	High	Medium	LV	HV	HV
Waterfowl (*Magasapa*-Goose; *Bleza*-Pelican)	Heat stress can lower survival, especially for hatchlings and nesting birds. Warmer water disrupts food webs, reducing insect and aquatic plant production that broods depend on. As wetlands shrink and become shallow, salinity and temperature rise, algal blooms and avian botulism become more likely, and thinning emergent cover exposes nests to predators. Crowding on the remaining water increases competition, disease spread, and disturbance; late summer dry downs can strand broods and reduce fledging success. This risk is most pronounced under Peaks and Valleys because the largest warming signal and many additional very hot days, combined with hot dry summers and high evaporative demand, accelerate wetland drying during the brood rearing season despite wetter cool seasons.	Medium-High	Medium	HV	HV	MV
Weasel *Itukasa*	Weasels need a high daily intake; drought driven declines in small mammals can lead to starvation, poor body condition, and fewer successful litters. Reduced and patchy snow cover creates camouflage mismatch, with white coats on bare ground increasing detection by predators and alerting prey. Rain on snow and frequent freeze–thaw events collapse subnivean tunnels, remove thermal refuge, and disrupt hunting; crusted surfaces also aid predators while exposing weasels during travel. This risk is most pronounced under Peaks and Valleys because it combines the strongest winter warming (snow loss, rain on snow, camouflage mismatch, subnivean collapse) with hot, dry summers that depress small-mammal prey and cover. Secondary: Cracked Earth due to wetter winters but very hot and dry summers, which could decrease rodent prey and protective cover, and raises predation and energetic stress. Rain on snow can still occur, but the dominant pressure is summer drought on prey and cover.	Medium-High	Medium	MV	HV	HV

Lower Brule Tribal Building at dusk. Source: Sheldon Fletcher

Table 4. Risk assessment of essential Tribal infrastructure and community services on the Reservation under future climate scenarios. Each row lists a facility or service, the observed or anticipated climate impacts, its sensitivity and adaptive capacity, and modeled risk projections: The Trickster (CNRM-CM5), Peaks and Valleys (HadGEM2-ES), and Cracked Earth (CanESM2). Risk categories include Very High Risk (VHR), High Risk (HR), Medium Risk (MR), and Low Risk (LR). This table highlights how climate shifts may affect operations, safety, access, and economic stability, and helps prioritize near term actions and investments.

Risk Profile for Key Infrastructure & Services

The Risk Profile ranks essential Tribal infrastructure and community services by combining vulnerability with the magnitude of climate hazard pressure. Assets with high vulnerability (high sensitivity and limited adaptive capacity) and strong hazard pressure (for example drought, heat, flooding, wind, or wildfire) have the greatest risk. These results guide priorities for upgrades, maintenance, redundancy, siting, and emergency operations so the Tribe can protect public health, keep services accessible, and maintain economic stability.



Building/Service	Potential & Historical Impacts	Sensitivity	Adaptive Capacity	Risk Breakdown → Climate Future: The Trickster "Soil Depletion"	Peaks and Valleys "Seasonal Extremes"	Cracked Earth "Moderate Variability"
Golden Buffalo Casino	Higher cooling costs result from increased air conditioning demand. Heat stress for staff and guests can reduce visits and time on site. Increased wear on HVAC shortens equipment life and raises failure risk during peak demand, especially if the grid is strained. This risk is most pronounced under The Trickster and Peaks and Valleys because sustained warming across seasons and more days with heat index at or above 100°F lengthen the cooling season and push peak loads higher, increasing the chance of equipment failure and service disruptions.	High	Medium	VHR	VHR	HR
Lower Brule Community Center	Extreme heat can drive up cooling demand, raising operating costs and stressing older HVAC systems. High indoor temperatures reduce occupant comfort and safety, increase heat illness risk for elders and children, and can force service interruptions. Prolonged heat can also degrade electronics, shorten equipment life, and require temporary cooling centers or backup power to maintain safe conditions. This risk is most pronounced under Peaks and Valleys because it shows the largest warming signal with many additional high heat index days, leading to longer, more frequent heat waves and limited overnight relief.	Medium	Medium	LR	MR	MR
Lower Brule Commodity Food Distribution Program	Heat stress on perishable foods (e.g., dairy, frozen meats, fresh produce) can cause spoilage during storage or transport. Higher energy demand for refrigeration raises operating costs and the risk of equipment overload or failure. Prolonged heat waves increase cold chain breaks during loading and delivery, especially if there are power interruptions, and can limit safe work hours for staff, causing delays. This risk is most pronounced under Peaks and Valleys because substantial warming with a longer warm season and more heat days extends peak cooling demand and heightens the likelihood of outages and transport delays.	High	Medium	MR	HR	MR

Building/Service	Potential & Historical Impacts	Sensitivity	Adaptive Capacity	Climate Future		
				The Trickster "Soil Depletion"	Peaks and Valleys "Seasonal Extremes"	Cracked Earth "Moderate Variability"
Lower Brule Farm & Ranch	Reduced soil moisture and irrigation shortages lower crop yields. Greater dependence on pumping and hauling raises costs and strains limited water rights and delivery systems. Repeated dry downs and erratic storms accelerate soil degradation through crusting, wind erosion, salinization on poorly drained fields, and loss of organic matter. Heat and water stress shorten grain fill and raise livestock water demand, squeezing operations. This risk is most pronounced under The Trickster because winter and spring moisture do not carry into summer; hotter, drier late seasons and higher evapotranspiration create the largest mismatch between peak crop water demand and available supply.	High	Medium	HR	HR	HR
Lower Brule Indian Health Center	Increased heat-related illness and more cardiovascular and respiratory events affect elders, infants, and people with chronic conditions. Higher cooling demand raises costs and outage risk, and reduces safe outdoor work and activity windows. This risk is most pronounced under Cracked Earth because sustained warming, a longer warm season, and many more very hot days increase cumulative heat exposure and peak electricity loads.	High	Medium	MR	HR	HR
Lower Brule Road Network	Washed out roads and bridges can isolate residents and emergency services. Erosion undercuts shoulders, clogs culverts with sediment and debris, and destabilizes embankments, driving up maintenance and emergency repair costs. Repeated saturation weakens the road base and leads to potholes, slumps, and culvert overtopping. This risk is most pronounced under Peaks and Valleys because it produces the largest increases in winter and fall precipitation leading to more frequent overtopping and washouts. A secondary concern remains under Cracked Earth, where very wet winters and rain on snow events can still overwhelm drainage and damage low crossings.	Medium-High	Low-Medium	MR	HR	MR
Lower Brule Schools	Poor air quality can raise student asthma and respiratory illness. Outdoor sports and activities may be canceled during hazardous air days. Heat drives up classroom temperatures and HVAC load, while wildfire smoke infiltrates buildings, elevating indoor PM2.5 and forcing filtration upgrades, schedule changes, or temporary closures. This risk is most pronounced under Cracked Earth because heat and summer dryness reduce fuel moisture and increase wildfire risk, lengthening the smoke season and compounding indoor heat and air quality problems.	High	Medium	MR	HR	HR
Lower Brule Patient Transport Program	Heat stress increase for elderly and chronically ill patients during long transport; in-cabin temperatures threaten comfort and safety. Continuous air conditioning raises fuel use and failure risk; vehicles face more overheating and tire blowouts; temperature-sensitive medications need stricter cold-chain management; driver fatigue and delays increase under sustained heat. This risk is most pronounced under Peaks and Valleys because the largest warming signal and many additional high heat index days prolong heat waves, elevate road and cabin temperatures, and push peak cooling demand during transport.	High	Low-Medium	LR	HR	HR
Wastewater Treatment: Lagoon Ponds	Heavy storms can overwhelm lagoon berms or bypasses, causing overtopping, erosion, liner damage, and unpermitted discharges. Runoff surges dilute and short-circuit treatment, carry sediment and trash, and weaken embankments through prolonged high water. This risk is most pronounced under Peaks and Valleys because winter and fall are much wetter and annual runoff increases the most, driving more frequent high inflow pulses and saturation around the cells. A secondary concern persists under Cracked Earth due to very wet winters and rain-on-snow events that can still overwhelm drainage even though summers are drier.	Medium-High	Low-Medium	MR	VHR	HR
Lower Brule Rural Water Project	Lower river stages can reduce intake depth and safe pumping rates. Prolonged dry spells build sand bars around the intake, clog screens, and raise turbidity when storms finally arrive. Warm, slow moving water concentrates nutrients and organics, increasing taste and odor episodes, algal blooms, and chemical demand at the plant. Very low levels can draw air into pumps and force shutdowns. Hotter summers also push peak-day demand higher (household use, lawn and garden, cooling), straining storage and treatment capacity exactly when supply is most constrained. This risk is most pronounced under The Trickster because wetter winters and springs are followed by hot, dry summers with declining soil moisture, which reduce summer base flows and pool elevations when demand is highest. A close secondary driver is Peaks and Valleys because it produces the largest increase in very hot days, further elevating peak demand and treatment loads.	High	Low-Medium	MR	HR	HR


VOICES OF THE KUL WICASA OYATE
Listening to the People

Section Two

Community Engagement

Community Meeting

To help guide the development of the Plan, we hosted a community meeting focused on gathering input from Tribal members. The goal was to create space for community voices to share how climate change is impacting the plants, animals, infrastructure, and cultural lifeways of the Reservation, and to identify shared concerns and priorities moving forward. Approximately 70 people attended.

In the weeks leading up to the event, outreach included flyers posted around the community, notices sent home with students, and announcements shared through Tribal communication channels. Students also received climate-focused materials to take home, sparking family discussions and encouraging participation. At the event, youth were recognized for their engagement with small prizes and gift cards.

The meeting opened with a welcome, a blessing, and an overview of the planning process. A brief presentation shared local climate trends and invited participants to reflect on what they've observed, warmer winters, shifting seasons, or drier summers, and how those changes are affecting daily life.

The heart of the meeting focused on discussion and listening. Tribal members worked through a community questionnaire together, sharing stories, concerns, and suggestions. Participants identified specific climate impacts and offered ideas for how the Tribe can adapt.

Key themes included:

- Vulnerability Assessment: Understanding how climate change may impact different parts of Tribal life
- Plants and Wildlife: Noticing shifts in species important to food, traditions, and ecosystems
- Infrastructure and Homes: Exploring risks to buildings, roads, and essential services
- Livelihoods and Traditions: Discussing impacts on farming, hunting, fishing, and cultural practices

This conversation was an important step in ensuring that the Adaptation Plan is grounded in the lived experiences, values, and vision of the Kul Wicasa Oyate.

Ideas Expressed at the Meeting

Every plant has a purpose.

If one fruit tree is destroyed, others will be affected.

Birds, bees, and butterflies matter. Our schools and Wopasi are already doing the work.

Try to implement sustainable agriculture.

Let's use wind, solar, geothermal. That will create jobs for our people.

Storm shelters. Back-up freezers. Places we can go when things get bad.

Being able to sustain ourselves is more important than just transportation.

Community Perspectives on Climate Change

To guide the Plan, we asked members of our community to share their experiences, concerns, and ideas about the changes we are seeing in our environment. This survey was created to make sure the voices of our people were front and center in shaping how the Tribe responds to a changing climate.

We know that climate change will likely affect the plants we gather, the animals we hunt, the water we rely on, and even the roads we travel. Through the survey, we asked people what worries them most, what changes they have noticed, and how the Tribe should prepare for what lies ahead. We also asked how concerned they are about impacts on the land, cultural traditions, and the health of our families.

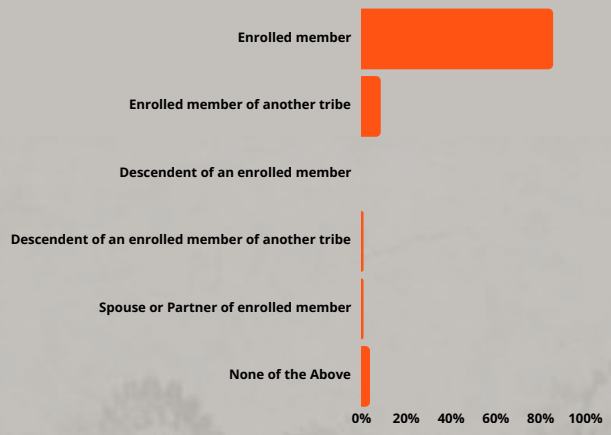
Many of us have already noticed hotter summers, drier conditions, stronger storms, and changes in animal patterns. Others shared ideas for how we can respond like building stronger infrastructure, improving emergency preparedness, or focusing on food and water security.

This section of the Plan highlights what we heard. It reflects the real experiences and concerns of the people who live here and care for this land. Our goal is to use this input to guide future planning, so our response to climate change reflects the values and priorities of our people, the .

The following pages summarize the results of the survey.

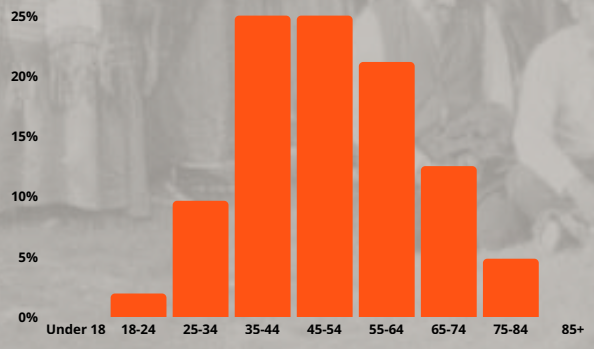
Tribal Affiliation

Over 80% of the survey respondents were enrolled members of Lower Brule. **Over 100 total responses to the survey were received.**



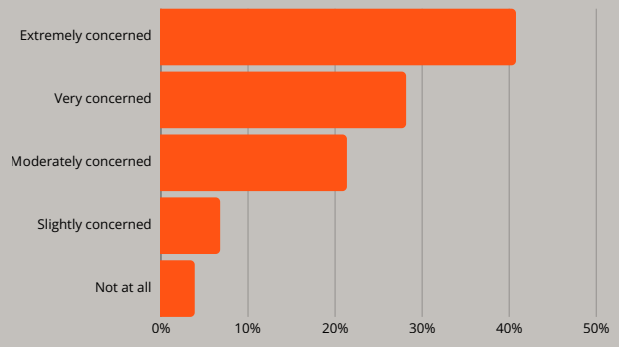
Age of Respondents

Participants represented a broad age range, with particularly strong input from those aged 35 to 64, who made up over half of all responses.

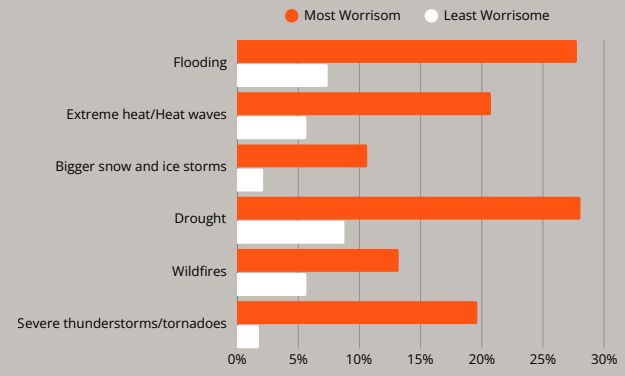


Section Two

How concerned are you about the effects of climate change on the land and natural resources important to the community?



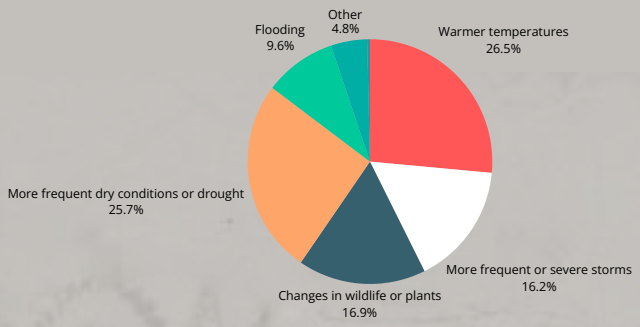
What worries you most about potential changes to the climate? Please rank the following (1 = most worrisome; 6 = least worrisome). Select N/A if a responses is not applicable.



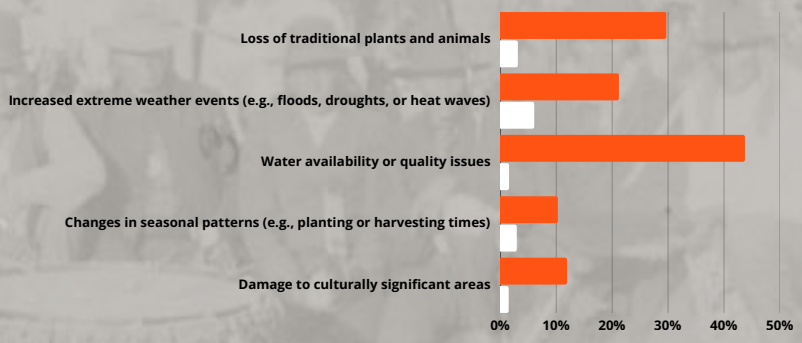
Community Concerns

Many in the community expressed concern about the impacts of climate change. Flooding and drought emerged as the top concerns, with additional worries about rising temperatures, dry conditions, and the increasing frequency of severe storms. Many respondents also reported noticing warmer weather and more frequent periods of dryness and drought in recent years.

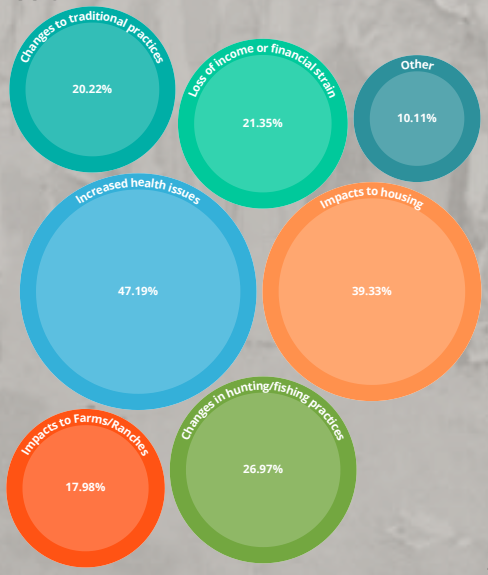
What changes in the climate or environment have you noticed in recent years? Please check all that apply.



Rank the following environmental changes in terms of how much they concern you (1 = most concerning; 5 = least concerning). Select N/A if any of the changes are not applicable.



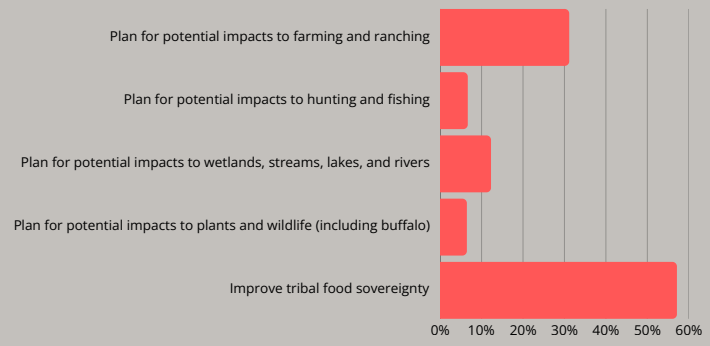
Have you or your family experienced any of the following due to changes in the climate and environment? Please select all that apply.



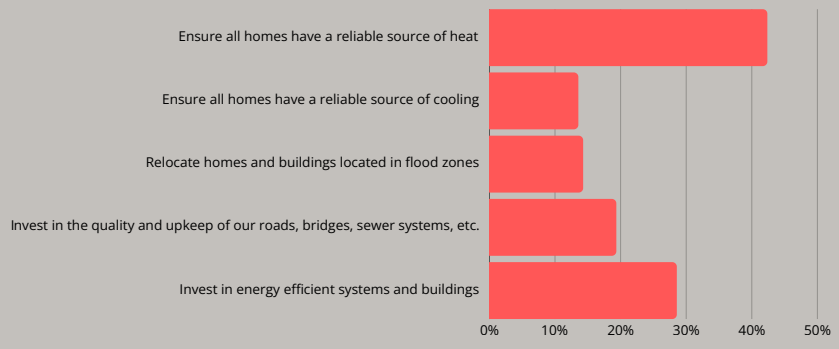
What Should the Tribe Do to Take Action?

Based on survey responses, community members voiced strong preferences for proactive strategies to prepare for climate change. Many emphasized the importance of improving tribal food sovereignty and planning for impacts to farming and ranching, both seen as vital to long-term resilience and self-sufficiency. Water security stood out as the single most important area for climate planning, with many respondents noting its critical role in daily life, land management, and cultural traditions. Ensuring that all homes have a reliable and safe source of heat was also ranked as a top priority, especially as temperature extremes become more common. When asked how the Tribe should strengthen infrastructure, respondents prioritized efforts to reinforce buildings, roads, and utility systems to withstand extreme weather events. Overall, the community expressed a clear desire for strategies that support both immediate needs and long-term adaptation.

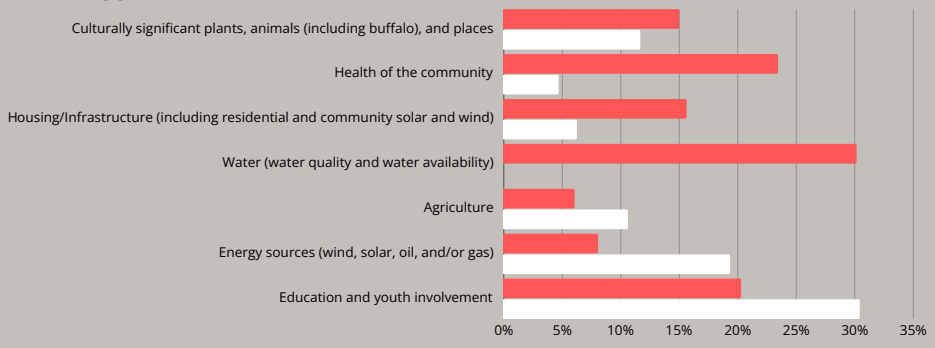
How should the Tribe best prepare for the effects of climate change on our lands? Please rank the following responses (1 = most important; 5 = least important). Select N/A if any of the responses are not applicable or appropriate.



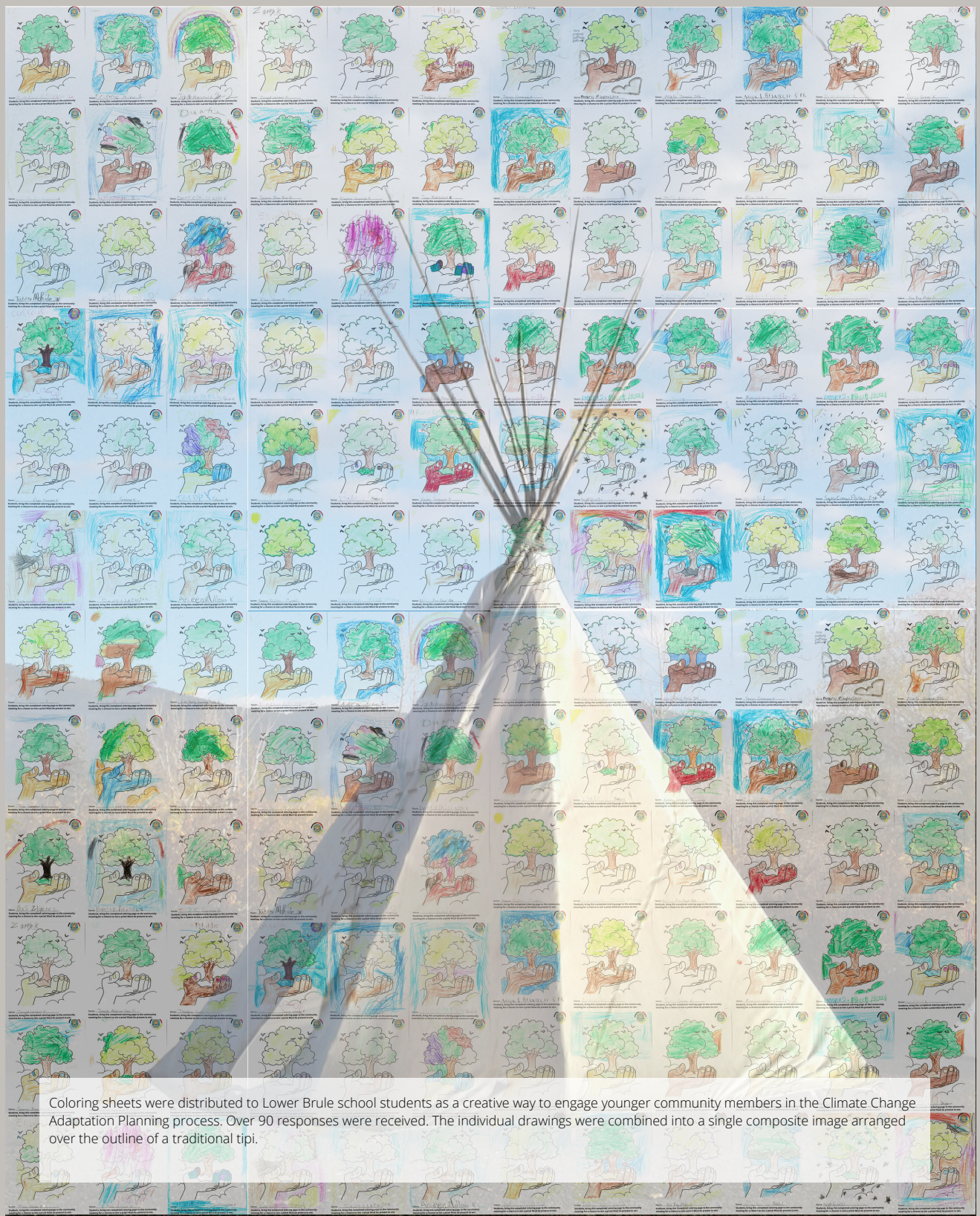
How should the Tribe make sure our infrastructure (e.g., homes, roads, facilities, utilities, etc.) can withstand climate driven weather extremes? Please rank the answers below in order of importance (1 = most important; 5 = least important). Select N/A if any of the responses are not applicable or appropriate.



What are the most important things for the Tribe to focus on for climate change planning? Please rank the following responses (1 = most important; 7 = least important). Select N/A if any of the changes are not applicable.



Section Two



Coloring sheets were distributed to Lower Brule school students as a creative way to engage younger community members in the Climate Change Adaptation Planning process. Over 90 responses were received. The individual drawings were combined into a single composite image arranged over the outline of a traditional tipi.

Reflections from Our Elders

As part of this plan, we sat down with elders from the Kul Wicasa Oyate to listen. Not just to gather information but to learn from those who've lived longest with the land, the weather, the animals, and the changes that have come. These conversations were followed by individual interviews with many of the elders.

What we heard confirmed what many of us already feel: the land is changing. And not in small ways.

Weather Feels Different

Elders spoke of fewer blizzards, drier winters, and summers that feel heavier, with more humidity and longer stretches of extreme heat. Some said it now gets hotter than they ever remember (sometimes over 110°F) and homes without air conditioning make it hard to rest.

There used to be real winters. Deep snow, long cold stretches. Now we hardly see snow at all.
— Wilma Wilson

They also remembered big storms from the past and worried that younger generations wouldn't know what to do if we had another one. One person recalled the high snowdrifts of the late 1990s and said, "We had to dig out and get by. Young folks haven't had to go through that."

Animals & Plants are Changing

Many elders have noticed fewer birds—especially meadowlarks, hawks, and woodpeckers. Prairie dogs are disappearing. At the same time, they've seen more bats, raccoons, and ticks. Some believe the tick problem has gotten worse due to the spread of cedar trees.

Deer numbers have gone up and down, but one elder shared that they've started to see more again in recent years. Grouse are now showing up in high numbers, which surprised many. Antelope, on the other hand, are almost completely gone from the area.

There used to be a little herd of antelope we'd see every year. I haven't seen them in five years now.
— Red Langdeau

Plants are struggling, too. Elders talked about how hard it's become to find plums, chokecherries, turnips, and even sage—plants that were once easy to gather, and part of how we lived and healed. Last year, one elder said, there were no plums at all.

I had to change my buffalo recipe. No cherries. I used cranberries instead. That's not how we're supposed to do it.
— Shirley Crane

They also mentioned that red willow is shorter and lilac bushes aren't blooming like they used to, which affects what can be used for natural medicines and tobacco.

Concerns for the Next Generation

Over and over, elders expressed concern for the health and well-being of the younger generations. They talked about how food has changed—less cooking, more microwavable meals, more sugar. Some said children are being raised on cereal and boxed foods, and that diabetes is rising as a result.

Nobody cooks anymore. Everything's quick or in a box. We used to cook from scratch, and we were healthier for it.
— Marlene Crowe

There were also worries about the local clinic not always being open and young parents being hesitant about vaccines. Some elders linked the rise in bronchitis and whooping cough to those choices.

Drug and alcohol use came up, too. One Elder said they've noticed higher death rates between ages 45 and 59—and they worry those numbers are going up.

A Way of Life at Risk

Beyond health and weather, there was a deeper thread of concern: the loss of traditional knowledge. Elders said fewer young people are learning how to gather seasonal plants, how to cook traditional foods, or how to live with the land the way their grandparents taught them.

We're not passing things down like we used to. And the young ones aren't asking.
— Marlene Crowe

They worry that in a crisis, whether a storm, a flood, or a fire, many young people might not know how to respond, simply because they haven't had to before.

CLIMATE ADAPTATION:

Strategies for a Changing Future

Climate Adaptation: Strategies for a Changing Future

The effects of climate change are already being felt across the Reservation. We have documented the trends in the Assessment: warmer temperatures, longer dry periods, more intense storms, and growing uncertainty in seasonal patterns. These changes don't just show up in the data, but they are visible on the landscape, in the river, in the health of plants and animals, and in the stories and concerns shared by community members and elders.

This section of the Plan is about what can be done in response. Specifically, it focuses on adaptation, which are actions the Tribe can take to reduce risks, respond to change, and strengthen long-term resilience. Some of these actions are straightforward and can be implemented relatively soon. Others are more complex, requiring additional resources, partnerships, or time to put in place. But all of them are aimed at the same goal: helping the Tribe become more prepared, more self-sufficient, and more secure in the face of climate-related challenges.

Adaptation does not solve climate change. It helps us live with the realities we are already facing and prepare for what is ahead. The strategies outlined here are intended to be practical, flexible, and supportive of broader community priorities like protecting water quality, improving public health, preserving traditional knowledge, and maintaining vital infrastructure.

One of the challenges in putting together this section was that climate change touches everything: food, housing, culture, health, roads, wildlife, ceremony. So, to organize things in a way that makes sense, we have grouped the adaptation strategies under four broad categories focused on the resources that are the most vulnerable. These reflect the major concern areas from discussions with the community, our elders, tribal program managers, and from the vulnerability analysis.

Caring for Our People: Health, Housing, and Community Vitality

Climate change does not just affect the land and water, it affects our homes, our health, and the well-being of our entire community. Rising temperatures, stronger storms, and shifting seasonal patterns are already putting stress on our food systems, housing, and public health.

These changes can worsen existing challenges, from access to safe housing to the availability of traditional foods and the risk of extreme weather events. For the Tribe, protecting community vitality means ensuring our people have the resources, support, and infrastructure to live well, physically, mentally, and spiritually.

Table 5 (Adaptation actions for Caring for Our People: Health, Housing, and Community Vitality) reflects our responsibility to protect one another and future generations by preparing for a changing climate. These actions include reinforcing buildings, improving drainage, and elevating critical infrastructure to reduce flood impacts; strengthening emergency response and transportation plans; and expanding water storage and sanitation systems to protect the health of our people during droughts and floods. Together, these efforts are about more than infrastructure, they reflect our values of care, connection, and long-term resilience as a community rooted in place.

Guidance from the Ancestors: Knowledge, Vision, and Ceremony

Climate adaptation must speak to the heart of who we are as a people. Climate change threatens more than the environment, it disrupts our cultural practices, the availability of traditional foods and medicines, and our ability to gather and hold ceremony in rhythm with the seasons. Elders speak of the changes in plant cycles, animal behavior, and the land's response, and younger generations feel the weight of what may be lost.

Table 6 (Adaptation actions for Guidance from the Ancestors: Knowledge, Vision, and Ceremony) offers actions that strengthen our collective resilience by supporting intergenerational knowledge transfer and protecting the relationships that tie us to land, plants, and animals. It includes actions to preserve traditional plant knowledge and practice sustainable harvesting to maintain balance and avoid depletion. Restoring native grasslands, safeguarding riparian habitats for relatives like the eagle, and caring for climate-resilient prairies reflect our responsibility to steward the land as our ancestors did. By grounding adaptation in cultural values and traditional practices, we affirm that resilience is not only about adapting to change, it is about honoring our ways of life, sustaining what is sacred, and ensuring that future generations can continue to live in good relationship with the land.

Protecting What Sustains Us: Water, Planning, and Preparedness

Water was spoken of often in community conversations and the community survey, reflecting its deep importance to the Lower Brule Sioux way of life. Mni, our sacred water, touches every part of our lives. It nourishes our bodies, our gardens, our animals, and the plants we gather for food and medicine. It flows through our ceremonies and connects us to our ancestors. The Missouri River and the waters that surround us are not just resources, they are living relatives, central to our history, well-being, and future. But climate change is putting stress on these systems. We're seeing longer dry periods, more intense rain events, and increasing pressure on both water quality and quantity.

Table 7 (Adaptation actions for Protecting What Sustains Us: Water, Planning, and Preparedness) reflects our responsibility to care for water and land in ways that sustain life now and for future generations. Actions include restoring native prairie and wetland ecosystems, improving water quality through buffer zones, and protecting key habitats for beaver and waterfowl—relatives who help shape and care for water systems. By expanding water storage, upgrading irrigation systems, and creating water retention ponds, we prepare for times of drought while ensuring year-round water availability. These efforts honor our traditional knowledge and reflect a deep understanding: that water is life, and its protection is central to the health of our people, our food systems, and the lands we call home.

Table 5. Adaptation actions for Caring for Our People: Health, Housing, and Community Vitality.

Adaptation Actions Table		
CARING FOR OUR PEOPLE: HEALTH, HOUSING, AND COMMUNITY VITALITY		
Specific Resource(s) Based on the Assessment	**Adaptation Objectives**	**Specific Implementation Actions**
Lower Brule Schools; Lower Brule Health Center; Lower Brule Commodity Food Distribution Program; Golden Buffalo Casino	Fire Prevention - Reduce wildfire risk around critical infrastructure	Identify areas where overgrown vegetation is present near critical infrastructure; thin trees, clear brush, and remove ladder fuels around those buildings; promote or require the use of fire-resistant native plants and non-flammable ground cover near these buildings; develop and maintain fuel breaks between wildlands and infrastructure corridors; and create regular maintenance schedules for clearing brush and inspecting tree growth near critical infrastructure
	Upgrade HVAC and Air Filtration Systems	Conduct building assessments for HVAC vulnerability and prioritize upgrades where heat, cold, or smoke exposure is highest; replace outdated units with high-efficiency heat pumps or HVAC systems designed for extreme temperature events; install advanced air filtration systems; equip critical HVAC systems with solar and battery or generator backup systems; and improve insultation, window sealing, and weather stripping to reduce energy load on HVAC systems and better control indoor air quality
	Storm-Resistant Infrastructure – Reinforce buildings and flood-proof essential facilities	Identify buildings and essential facilities that are vulnerable to storms and flooding; reinforce roofs to withstand high winds and inspect/retrofit foundations for erosion or water damage resistance; replace vulnerable building materials with water-resistant and wind-rated alternatives; use flood-proof doors, waterproof membranes, and backflow valves to protect facilities from flooding; and raise generators and key systems above flood levels
	Emergency Response Planning – Protect the community by planning for extreme weather	Invest in backup power for refrigerators/freezers for use during extreme weather to safeguard the commodity food distribution program; identify and/or build emergency shelters for weather emergencies (e.g., flooding, extreme heat or cold, etc.); assess fire response and suggest ways to improve responses to structure fires; stock emergency supplies; conduct community drills and trainings; and use text alerts, social media, radio, and flyers to keep residents informed before and during extreme weather events
	Emergency Transportation Plans – Address road vulnerabilities and ensure alternative routes	Map high-risk and flood prone roads; develop and maintain alternative evacuation routes; map vulnerable populations and assets; ensure the Roads Department and Emergency Response Team have shared access to route plans, equipment, and response timelines; install early warning and signage systems during unsafe conditions; and create plans to maintain transportation access to these critical facilities
Cedar	Wildfire Prevention & Fuel Load Reduction – Reduce overgrown cedar areas near homes and infrastructure	Identify and prioritize areas where cedar is within 200 yards of homes and structures; plan for removal priority; if wildfire occurs, use as opportunity to plant native grasses and remove additional seedlings around wildfires to reduce seed sources

Adaptation Actions Table		
CARING FOR OUR PEOPLE: HEALTH, HOUSING, AND COMMUNITY VITALITY		
Specific Resource(s) Based on the Assessment	**Adaptation Objectives**	**Specific Implementation Actions**
Lower Brule Rural Water Project	Expand Water Security Measures – Improve drinking water storage and sanitation systems	Upgrade and expand water storage infrastructure to increase capacity and reduce losses due to leakage and evaporation; establish early warning systems and monitoring programs for water quality and quantity; promote water conservation education; implement rainwater harvesting systems at community and household levels; and protect and restore natural water sources to maintain water quality and flow
Lower Brule Road Network; Lower Brule Patient Transport Program	Flood-Resilient Road Design – Improve drainage and elevate roads in flood-prone areas	Conduct flood risk assessments to identify vulnerable road segments and prioritize areas for improvement; retrofit roadways with enhanced drainage systems, such as larger culverts, improved ditches, and stormwater management practices or consider the feasibility of elevating the roadways; regularly maintain and clear drainage systems to ensure they function effectively during heavy rainfall; and incorporate natural flood management techniques such as restoring wetlands or creating buffer zones alongside roads
Lower Brule Road Network; Lower Brule Patient Transport Program; Lower Brule Health Center; Lower Brule Commodity Food Distribution Program	Emergency Response Planning – Improve rural road access and ensure alternative routes	Assess and map current road conditions and vulnerabilities to identify critical points at risk from climate impacts like flooding, landslides, or wildfire; upgrade and maintain primary roads to withstand extreme weather by improving drainage and stabilizing slopes; engage community members in reporting road hazards and suggesting improvements; and identify and map alternate routes for roadways prone to flooding, particularly for first responders
Wastewater Treatment: Lagoon Ponds	Flood and Drought Resilient Design - Improve drainage, elevate critical infrastructure, and reduce potential evaporation	Upgrade drainage systems around lagoons to quickly divert floodwaters and prevent inundation or damage to lagoon banks; elevate pumps, control panels, and electrical equipment on raised platforms or stilts above anticipated flood levels; construct berms or levees around lagoons; use floating covers, shade balls, or shade cloths on lagoon surfaces to reduce evaporation; implement wind breaks around lagoons; and develop emergency action plans to respond quickly to extreme flood or drought events

Walking with the Land: Plants, Animals, and Seasonal Balance

Many of the clearest signs of climate change are showing up on the land. Plants are flowering earlier or not at all. Animals are changing their migration patterns or disappearing from places they once thrived. Some species are showing up in new numbers or behaving differently. These ecological shifts can affect gathering practices, hunting, and the overall balance between our people and the natural systems we rely on.

Table 8 (Adaptation actions for Walking with the Land: Plants, Animals, and Seasonal Balance) outlines strategies to enhance habitat quality, control invasive species, protect culturally significant plants, and promote healthy wildlife populations. It emphasizes that land-based adaptation goes beyond simply understanding ecological changes; it involves revitalizing the community's connection to the land, strengthening traditional knowledge, and actively safeguarding the resources that sustain us. Because the land offers more than just food and shelter, it is central to our identity.

To be clear, this list of adaptation strategies is not exhaustive. And it is not meant to be a rigid checklist. These lists of strategies are a starting point or a set of priority options the Tribe can draw from as conditions change and as new opportunities or challenges arise. Some of these actions will require outside funding or technical support. Others can be done in-house with the right people and leadership in place.

What ties all of these adaptation strategies together is the goal of building resilience. These strategies are about protecting what matters, strengthening what works, and making smart decisions for the long term. Climate adaptation is not separate from other Tribal goals. It is part of how we make sure that the future of the Kul Wicasa Oyate reflects our values, our priorities, and our commitment to each other.

Table 6. Adaptation actions for Guidance from the Ancestors: Knowledge, Vision, and Ceremony.

Adaptation Actions Table		
GUIDANCE FROM THE ANCESTORS: KNOWLEDGE, VISION, AND CEREMONY		
Specific Resource(s) Based on the Assessment	**Adaptation Objectives**	**Specific Implementation Actions**
Sweetflag	Sustainable Harvesting – Manage this traditional resource to maintain balance and avoid depletion	Create a guide on respectful and traditional harvesting methods authored by tribal elders and knowledge keepers, incorporating cultural practices and ecological principles that ensure the long-term health of the traditional plant populations.; distribute among tribal community
	Traditional Plant Knowledge - Understanding and preserving native plants	Talk with elders about the traditional uses of sweetflag, where it was once found and where it can be found today, identify traditional planting and harvesting practices; and identify and protect critical habitat for the plant
Chokecherry	Protect Traditional Fruit Producing Plants	Start a community-led seed sharing program; plant wildflowers near fruit plants to attract native bees and butterflies; avoid using chemical pesticides near fruiting plants; monitor known chokecherry populations regularly; control invasive plants and pests that compete with or damage the plant; and develop community education programs to raise awareness about the plant's cultural and ecological importance and ways to protect it
Eagle	Riparian Habitat Protection – Conserve and restore habitat to support nesting eagles	Consult with tribal elders to identify key areas where nesting eagles are found; protect and restore native tree species along riparian zones to maintain and enhance canopy cover crucial for eagle nesting and shade; develop and implement strategies to limit development and human activity near eagle nesting sites; monitor the health of these habitats regularly to ensure they remain conducive to eagle nesting; and prevent livestock from overgrazing surrounding areas
Badger, Buffalo, Deer, Antelope, Elk	Habitat Restoration – Preserve native grasslands and increase forage and for climate-resilient prairies	Consult with tribal elders to identify and protect key areas of native grasslands that are crucial for elk, deer, and antelope foraging; consider land management practices that promote the growth of native grasses and other forage plants; and work with agricultural producers to minimize the impact of agricultural activities on these habitats

Table 7. Adaptation actions for Protecting What Sustains Us: Water, Planning, and Preparedness.

Adaptation Actions Table		
PROTECTING WHAT SUSTAINS US: WATER, PLANNING, AND PREPAREDNESS		
Specific Resource(s) Based on the Assessment	**Adaptation Objectives**	**Specific Implementation Actions**
Sweetflag, Buffalo, Sharp-tailed Grouse, Weasel	Native Prairie & Water Conservation – Restore and protect native prairie and wetland ecosystems	Conduct native prairie and wetland restoration to enhance habitat quality for sweetflag and buffalo, while providing essential cover and foraging areas for sharp-tailed grouse and weasel; control invasive species that threaten the diversity and health of these ecosystems; restore natural hydrology by repairing or removing drainage systems that disrupt wetland water levels, supporting the growth of wetland plants like sweetflag and maintaining water sources vital to wildlife; implement sustainable grazing and land-use practices to prevent overuse and soil degradation, ensuring resilient grasslands and wetlands that sustain buffalo populations and the diverse wildlife, including sharp-tailed grouse and weasels, that depend on them
Walleye, Catfish	Water Quality Management – Reduce nutrient pollution through buffer zones	Identify areas where buffer zones are needed to reduce nutrient pollution that negatively impacts catfish and walleye habitats; develop guidelines for buffer zone implementation and maintenance; work with landowners and agricultural producers to establish buffer zones; develop and finalize resolution for buffer zones inclusion into agricultural leases; implement buffer zones and improved land-use practices to reduce nutrient pollution in water bodies; and restore riparian wetlands and floodplains to act as natural filters and nutrient sinks

Table 7. Adaptation actions for Protecting What Sustains Us: Water, Planning, and Preparedness.

Adaptation Actions Table		
PROTECTING WHAT SUSTAINS US: WATER, PLANNING, AND PREPAREDNESS		
Specific Resource(s) Based on the Assessment	**Adaptation Objectives**	**Specific Implementation Actions**
Deer, Antelope, Elk	Water Source Protection – Develop water retention ponds and artificial water sources, and ensure year-round water availability	Construct water retention ponds, cisterns, and reservoirs to capture and store rainwater and seasonal runoff for use during dry periods; use traditional knowledge and local expertise to identify reliable and culturally appropriate locations for artificial water sources; implement water conservation practices across community, agricultural, and livestock uses to stretch stored water through dry seasons; restore and protect natural recharge areas, such as wetlands and floodplains to enhance groundwater replenishment; monitor water levels regularly, and educate the community about the importance of water conservation for these habitats
Beaver, Waterfowl	Wetland Conservation & Restoration – Protect and expand wetland habitats	Identify and map existing wetlands and areas suitable for restoration using TEK, local input, and ecological assessments; protect existing wetlands through the use of buffers and improved land-use practices; restore degraded wetlands by reintroducing native vegetation, improving hydrology, and removing drainage structures; control invasive species; and support community education and stewardship programs
	Waterfowl Habitat Protection – Identify, preserve, and monitor important beaver and waterfowl areas	Consult with tribal elders to identify key areas where waterfowl and beaver are and/or were plentiful; develop and implement strategies to protect these areas from development; monitor the health of these habitats regularly to ensure they remain healthy and available for waterfowl and beaver
Lower Brule Farm & Ranch	More Efficient Irrigation – Upgrade irrigation systems	Assess the current irrigation systems and identify areas for improvement or replacement; research and identify which modern, efficient irrigation techniques would be best to implement (e.g., drip irrigation, sprinkler systems, and sub-surface irrigation, etc.); install soil moisture sensors and weather-based irrigation scheduling tools to reduce unnecessary watering and optimize timing; conduct regular maintenance and inspections of irrigation infrastructure; and line or pipe open ditches and canals
	Storm-Resilient Farming – Establish windbreaks, contour farming, and buffer strips to prevent erosion	Collaborate with NRCS (if appropriate) to identify areas on the tribal farm where windbreaks, contour farming, and/or buffer strips could help prevent erosion; develop and implement a plan for planting and maintaining windbreaks, contour farming, and/or buffer strips; identify areas on the tribal farm susceptible to flooding and consider limiting planting there to more water-hardy crops
Lower Brule Rural Water Project	Water Conservation Measures – Implement policies to encourage water conservation	Conduct a comprehensive assessment of current water use across the community to identify patterns of overuse and opportunities for conservation; develop a set of water conservation policies informed by the assessment findings and present them to the Tribal Council for consideration and adoption; integrate TEK into conservation strategies to align with local cultural values and practices; and collaborate with community members to co-create conservation policies that reflect both ecological needs and community priorities;
	Water Storage – Expand and optimize water storage capacity to prepare for drought conditions	Construct and expand water storage infrastructure, such as retention ponds, cisterns, and reservoirs to capture seasonal runoff; restore natural water storage areas like wetlands, floodplains, and riparian zones to increase groundwater recharge and surface water retention; and upgrade existing storage systems to reduce evaporation losses (e.g., using covers, shade structures, or lining materials)

Community leaders at Government Square, c. 1920.
Elders gathered outside the Tribal Office. Among those gathered are the "Twelve Leaders," who guided Lower Brule governance before the Indian Reorganization Act and the later Tribal Council era. Source: Sheldon Fletcher

Table 8. Adaptation actions for Walking with the Land: Plants, Animals, and Seasonal Balance.

Adaptation Actions Table		
WALKING WITH THE LAND: PLANTS, ANIMALS, AND SEASONAL BALANCE		
Specific Resource(s) Based on the Assessment	**Adaptation Objectives**	**Specific Implementation Actions**
Cedar, Sharp-tailed Grouse, Weasel	Controlled Burns & Mechanical Removal – Reduce cedar spread and prevent ecosystem imbalance	Conduct annual monitoring and early seedling removal of cedar to prevent further encroachment that threatens native grassland habitat critical for sharp-tailed grouse and weasel populations; identify and prioritize areas with high cedar infestation, focusing especially on seed-producing trees aged 6 years and older; develop and implement targeted controlled burn plans designed to reduce cedar density while restoring open grassland structure essential for sharp-tailed grouse lekking grounds and providing cover and hunting opportunities for weasels; combine mechanical removal with controlled burns to maximize cedar reduction and promote native vegetation recovery; incorporate TEK by integrating cultural fire practices and ecological insights into the timing and methods of burns
	Native Grassland Restoration – Replant native grasses in areas impacted by cedar encroachment	Assess and prioritize restoration sites with cedar impact in mind by targeting areas where cedar encroachment has displaced native grasslands, recognizing that dense cedar stands reduce habitat quality for sharp-tailed grouse and weasels, which rely on open grasslands and edge habitats; collect and propagate native grass seeds that support sharp-tailed grouse and weasel habitat; and engage community members in restoration and wildlife monitoring
Deer, Antelope, Elk, Sweetflag	Controlled Burns & Invasive Species Removal - Reduce the spread of invasive species	Create invasive species management plans that combine controlled burns and mechanical removal while protecting and promoting native vegetation that provides food and cover for deer, antelope, and elk, and supports sweetflag growth in wetlands; collaborate with the Tribal Council to establish an invasive species control requirement within agricultural lease agreements on tribal lands; and regularly map invasive species spread and monitor habitat conditions, prioritizing areas critical for deer, antelope, elk, and sweetflag
Walleye, Catfish	Invasive Species Control – Reduce the spread of invasive fish that compete with walleye and catfish	Conduct regular monitoring of invasive fish species and collaborate with South Dakota Game, Fish, and Parks Department for assistance (if appropriate); identify and target invasive fish species for removal using targeted removal techniques such as netting, electrofishing, or introducing native predators; restore and protect native fish habitats; engage local community members about the risks of invasive fish and promote practices that prevent their spread; and study how climate change affects invasive fish behavior and habitat to adapt control strategies accordingly
Eagle	Prey Population Monitoring – Ensure stable fish, waterfowl, and small mammal populations	Collaborate with South Dakota Game, Fish, and Parks Department for assistance (if appropriate) to conduct regular assessments of prey populations in eagle habitats; implement conservation measures to maintain healthy populations of fish, waterfowl, and small mammals; protect and restore critical habitats that provide breeding, feeding, and sheltering areas for prey species; prevent and reduce invasive species that compete with or prey upon native fish, waterfowl, and small mammals; encourage grazing, agriculture, and development practices that minimize habitat degradation and support prey species diversity
	Improve Eagle Habitat - Create new habitat for nesting eagles	Identify key areas that could benefit from creation of nesting platforms for bald eagles and install artificial nesting platforms; protect existing nesting habitat; and plant and promote the growth of nesting trees
Black-footed ferret and Prairie Dog	Prairie Dog Conservation Efforts - Maintain black-footed ferret populations	Maintain existing efforts for the black-footed ferret reintroduction; consult with tribal elders and Tribal Council to determine if continuing the black footed ferret reintroduction program is desired
	Protect Prairie Dogs from the Plague - Keep prairie-dog populations healthy	Continue to acquire funding to maintain a vaccination program to protect prairie dogs from plague outbreaks; implement regular monitoring and early detection; promote habitat management to reduce disease risk by controlling invasive species and ensure diverse vegetation which supports prairie dog resilience; control flea populations
Lower Brule Farm & Ranch	Drought-Resilient Crops – Shift to drought-tolerant varieties	Research and identify drought-tolerant crop varieties suitable for the farm; collaborate with agricultural experts to develop a plan for transitioning to these varieties; and consider conducting field trials to test the performance of those crop varieties
	Soil Health Restoration – Implement no-till farming, cover cropping, and composting to prevent nutrient loss	Work with the Lower Brule Farm & Ranch staff to identify the feasibility of implementing no-till farming, cover cropping, and/or compositing on Lower Brule farm and ranch lands; work with the Tribal Council to pass a resolution requiring the implementation of soil health restoration initiatives, if applicable
	Emergency Plans - Address livestock vulnerability to extreme weather	Develop an emergency livestock plan to implement in the case of wildfire, flooding, drought, etc.; the plan should include evacuation routes, shelter locations, feed and water stockpiling, and health care protocols for extreme weather events; and construct or reinforce shelters that protect livestock from heat, cold, wind, and flooding

IMPLEMENTATION FRAMEWORK

From Plan to Action

Section Four

Creating a Framework for Implementation

This section provides a framework for building and managing an Implementation Plan. The goal is simple. We want to protect what sustains us, reduce risk where it is highest, and build capacity where we need it most.

The Implementation Framework is a repeatable way to move from goal to strategy to action while keeping our values at the center. The purpose is to make decisions clear, link every action to the risks we identified, and set up a process that can continue year after year regardless of staff changes. The Framework consists of four steps: 1. Governance and Decision Structure, 2. Phased Timeline and Milestones, 3. Funding and Partnerships, and 4. Monitoring and Evaluation.

The framework starts with how decisions are made. The Tribe designates a small group with representation from water, land and wildlife, health and community, and infrastructure and services. Elders, youth, and culture programs have a regular voice in the work. The group meets to review progress, resolve trade-offs, and confirm what comes next. The Council is updated periodically.

Project ideas come from the Assessment. Species, places, and systems that scored Very High or High risk move to the top of the candidate list. Each candidate action is captured on a short proposal that states the hazard it addresses, the vulnerability it reduces, and the specific benefit to the community. This approach keeps proposals focused and makes it easy to see why each action is important.

Ranking: Items that are Very High or High risk are the first for consideration for projects. Items that are ready to start within the next year move up the list of projects to start first. Actions that bring clear benefits such as improved health, protection of cultural practice, local jobs, or lower operating costs are favored. The Tribe can publish the scores, so the order is clear to the Tribal Council and community.

Funding is planned early. For each action the Tribe identifies one primary funding pathway and if feasible a backup. Common language for applications, letters of support, cost estimates, and maps are stored in one place.

Monitoring turns information into action. For a focused set of indicators tied to our main climate hazards, we project an expected range for the next 25 years using observed trends and the three climate futures described in this report.

The center line represents the expected path, while the upper and lower bounds show a reasonable range based on the different climate futures. When an indicator approaches the edge of this range, we issue a watch or take other precautionary steps. If it moves beyond the range for a full season, a warning is issued. Should it remain outside the range for two seasons—or cross a critical threshold—we initiate action. Each trigger connects to a concise response plan outlining who does what within the next 72 hours, the next 30 days, and the following year, depending on the nature of the issue. Examples include managing high heat or poor air quality at schools, adjusting reservoir operations near water intakes, maintaining safe lagoon pond levels before major storms, monitoring summer soil moisture on key range units, and tracking the spread of invasive plants.

Many of these responses build on existing plans and programs, such as the Lower Brule Drought Adaptation Plan [13]. This monitoring process complements those efforts and helps link them together. On the next page, the Kul Wicasa Wopasi program illustrates how youth learning, local food systems, and small business development can all contribute to a more resilient community. Delivery is staged to build momentum. Early work focuses on setup and fast wins that cut near term risk and build confidence. The next stage moves into design and first builds for larger needs. The following stage scales what works and sets a budget for operations and maintenance so gains last. Throughout, the Tribe invests in skills such as grant writing, purchasing, project oversight, emergency exercises, and data management. Tools for tracking projects and storing data are simple and owned by the Tribe.

A short quarterly scorecard tracks schedules, budgets, and indicator status. An annual summary reports what was completed, what changed in the indicators, and what will change next. Every three years the Tribe revisits the risk tables, updates the tracking bands with new data, and refreshes priorities. This steady cycle keeps the work practical, accountable, and aligned with community guidance.

Overnight rain of 8-9 inches overtopped and washed out the road; a power pole stands in open water showing the depth. Source: Lower Brule Environmental Protection Office.

Community Spotlight

Kul Wicasa Wopasi Youth Internships for Community Resilience

Kul Wicasa Wopasi helps our youth learn, earn, and serve in ways that strengthen the whole community. The program teaches real skills in science, technology, engineering, and math while keeping learning rooted in culture, language, and place. Students restore native plants, tend gardens, test water, map local places, help with community events, and share what they learn with families and Elders. Markets organized by Wopasi every other Friday give first time vendors a place to sell produce, crafts, and baked goods, which keeps dollars local and build confidence.

At the heart of Wopasi is the Youth Internship Program. These internships are mission driven opportunities for young people who want to grow as leaders. Interns are selected because they are ready to take responsibility, work with mentors, and contribute to projects that matter for the Oyate. Internships are a guided practice that builds knowledge, character, and pride in serving our people.

The internship rests on clear expectations that reflect community values:

Commitment to learning: They explore science and technology in ways that connect to our history, culture, and land. Even when they are still finding their path, they are present, prepared, and open to learning.

Community engagement: Interns work on projects that serve the Tribe. They help with gardens, habitat work, food events, inventories of important plants, and youth activities.

Academic prioritization: Interns must be enrolled in school and are encouraged to keep up with classes. Tutoring is available through Wopasi and counts toward internship time, because student success strengthens the well being of the whole community.

Conduct and communication: Interns practice honest, respectful, and responsible behavior. They learn to communicate with mentors, teammates, and community members, and to represent the program with humility and care.

What makes this internship different is its grounding in culture and service. It is not a traditional job. It is a supported space to grow into leadership. Youth learn practical skills such as field safety, record keeping, customer service, and public speaking. They also learn about respect for plants and animals, the importance of helping others, and the responsibility to care for their community. That mix of skills and values builds resilience that lasts far beyond a single season.

By investing in Wopasi internships, the Tribe is investing in its future leaders. Our interns learn how to solve problems, work with others, and create local solutions. They help strengthen food systems, community health, and the local economy while keeping cultural knowledge at the center. This is resilience in action, led by youth who are learning to serve with fairness, integrity, and pride.

Wopasi community garden created and maintained by the students. Source: Sheldon Fletcher

Section Four

Implementation Framework

Governance & Decision Structure

Lead: LBST Climate Change Advisory Committee
Implementing Programs: Water, Land and Wildlife, Health and Community, Infrastructure and Services
Advisory inputs: Elders, cultural leaders, youth council, farm/ranch interests, School District, Health Center, Rural Water, Emergency Management

Frequency:

- Monthly Implementation Team discussions as necessary
- Quarterly Steering review with Tribal Council
- Annual community report and listening session

How we make decisions:

- We use the Risk Priority Score that combines vulnerability and hazard pressure.
- We also use readiness (do we have authority, partners, and funds) and co-benefits (health, culture, jobs) to rank projects within each concern area.

Phased Timeline & Milestones

Phase 1: Stand-up and quick wins

- Confirm the highest priority actions in each concern area using the risk results and basic readiness. Establish a small coordination group and set a regular meeting schedule. Approve simple standards for how projects are proposed, scored, and reported. Stand up the monitoring effort by selecting a short list of indicators and agreeing on data sources, methods, and an expectation corridor for each. Compile baselines for those indicators. Build a funding calendar and identify at least one primary and one backup funding path for the first wave of actions.
- **Milestones:** governance in place, project list agreed, monitoring plan approved, baselines compiled, and first funding applications submitted.

Phase 2: Design and early delivery

- Develop clear two-page briefs for top-ranked actions that state purpose, scope, partners, cost, permits, schedule, and how success will be measured. Begin design and permitting for a first set of actions across water, land and wildlife, health and community, and infrastructure and services. Launch a few early actions that have low barriers and visible benefits to build momentum. Begin regular reporting on indicators and document how triggers will lead to operational steps when thresholds are crossed.
- **Milestones:** first designs underway, early actions delivered, indicator reporting on a steady frequency, playbooks drafted for heat, flood, fire, and power loss.

Phase 3: Build and expand

- Move from design to construction or implementation for actions that are ready. Scale up what is working and pause or redesign what is not meeting targets. Link capital planning and annual budgets to the ranked risk list and to trends in the indicators. Set operations and maintenance expectations for every completed action so benefits are sustained. Continue training in grant writing, procurement, data management, and emergency exercises.
- **Milestones:** construction underway on priority items, operations and maintenance commitments documented, training plan active.

Funding & Partnerships

- Federal and state programs
  - BIA Tribal Community Resilience, FEMA BRIC and Hazard Mitigation Grants, Reclamation WaterSMART, USDA NRCS EQIP and CSP, EPA 319 and Drinking Water SRF, DOE grid resilience and weatherization, USFS State and Private Forestry, NOAA climate and habitat programs.

- Regional and NGO partners
  - Great Plains Tribal Water Alliance, universities and climate centers, Nature Conservancy and similar habitat groups, local conservation districts, philanthropic climate and health funds.

- Private sector
  - Power and telecom companies for critical facility hardening, hospital and clinic partners for cooling and clean air rooms, agricultural suppliers for drought smart practices.

Monitoring & Evaluation

The goal of monitoring and evaluation is to track slow moving changes and step change events, link them to thresholds, and then link thresholds to actions.

Indicators and sources:

- Heat: annual hot days and hot nights, heat index days. Source: local stations plus reanalysis data to establish baseline data.
- Drought and dryness: SPEI-12 and seasonal soil moisture from the three climate futures and observed data.
- Water: winter and spring runoff proxies, reservoir or river stage near intakes, groundwater levels where available.
- Ecosystems: seasonal soil moisture on rangelands, invasive cedar spread, condition plots for priority plants, lek counts for grouse, sentinel wildlife observations.
- Public health and housing: heat illness visits, cooling support calls, home HVAC outages, smoke days in school closures.
- Infrastructure: lagoon freeboard and berm condition, culvert overtopping logs, road washouts, boil water advisories.

Expected Ranges:
For each indicator, define an expected range for 2025 to 2050 that blends past observations with the Climate Future that produces the highest risk for that indicator. The center line follows the recent observed seasonal cycle and trend, then extends forward using the projected trend from the risk-driving future; the corridor width reflects the larger of the historical year-to-year spread and the model spread around that center line, and it is updated each year as new data arrive. For example, using the one-hour rainfall intensity indicator, compute a three-year rolling average of the heaviest one-hour rain observed across the Reservation from gauges and radar. Select the future that shows the strongest increase in short, intense downpours to set the forward trend for that indicator, and size the expected range to cover both the historical variability and the model range. If the observed one-hour intensity begins to track the upper edge of that corridor, it is a signal that flash flood pressure is mounting. If it persists outside the range, it indicates that storm intensity is rising faster than expected and that flood preparedness actions should be escalated.

Triggers and Plans (examples)

- Heat: Warning if hot nights exceed the range in June and July. Action: open cooling rooms, extend clinic hours, distribute box fans and air cleaners, check on elders, shift outdoor work schedules.
- Drought: Warning if SPEI-12 drops below corridor for two seasons. Action: conserve water, prioritize stock water hauling zones, delay burns, expand shelterbelt watering, pre-stage hay and forage support.
- Flood: Create extreme hourly rainfall index (May-Sep) that tracks three-year running average of the biggest one-hour rain events each year on the Reservation. Action: Replace or upsize the top 10 to 20 problem crossings inside three years, starting with sites that have repeated overtopping, school bus routes, and health access routes.
- Wildfire: Warning if extreme fire danger days exceed the corridor for a month. Action: restrict burns, surge fuels reduction crews near facilities, pre deploy portable water tanks.

Evaluation

- Quarterly: implementation scorecard with completed tasks, budget burn, and trigger responses.
- Annual: effectiveness review that checks whether actions moved the needle on the indicator, and whether other benefits were realized.
- Every 3 years: external review and model refresh, with corridor updates if the science or data improve.

Examples of priority actions linked to risk and monitoring

- **Water Security and Climate Resilience**
  - Rural water intake and storage hardening
    - Link to indicators: winter and spring runoff index, river stage, summer demand.
    - 2025 design, 2026 construction.
  - Stormwater and road drainage upgrades at known choke points
    - Link: culvert overtops and washouts, peak rainfall intensity.
  - Lagoon berm and freeboard program
    - Link: berm condition, freeboard monthly, winter wind and storm logs.

- **Adapting Land and Wildlife**
  - Cedar control and rangeland recovery in two pilot watersheds
    - Link: cedar spread plots, soil moisture, fire danger days.
  - Riparian plantings for chokecherry and buffaloberry with youth crews
    - Link: plant condition plots, pollinator presence, soil moisture.
  - Sharp tailed grouse habitat and lek monitoring with rotational grazing pilots
    - Link: lek counts, forb richness, brood cover metrics.

- **Preserving Culture and Protecting Community**
  - Cooling and clean air rooms in the Community Center and Schools
    - Link: heat index days, smoke days, clinic visits.
  - Seasonal foods and medicines activities
    - Link: plant condition and harvest logs, youth participation.
  - Emergency transport reliability
    - Link: heat days, road interruptions, on-time medical trips.

Reporting & Adjustments

Organize delivery in three waves:

- Stand up and quick wins in the first year to build momentum and reduce immediate risk.
- Design and first builds in years two and three where larger investments begin.
- Scale and sustain in years four and five where successful approaches expand and operations and maintenance budgets are set.

Use a short quarterly or annual status update to track schedule, budget, and indicator status. Publish an annual summary that lists what was completed, what shifted in the indicators, and what changed in the rankings.

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Appendix I

LOWER BRULE SIOUX TRIBE CLIMATE ADAPTATION PLAN COMMUNITY SURVEY SUMMARY REPORT

July 2025

Table of Contents

Attachments

Introduction

The Lower Brule Sioux Tribe (Tribe), under the lead of the Tribe's Environmental Protection Office and the Lower Brule Climate Change Advisory Committee, and in conjunction with the Great Plains Tribal Water Alliance (GPTWA) and Lark Environmental (Lark) solicited community input on the development of the Climate Change Adaptation Living Plan for the Tribe through a community survey. The purpose of the survey was to understand what the community is experiencing from climate change and to obtain recommendations on how the Tribe should respond.

The Lower Brule Sioux Tribe Climate Change Adaptation Plan – Community Survey (hereafter Community Survey) was developed based on input received during planning meetings with the Tribe's Climate Change Advisory Committee. The Community Survey (Attachment A) was available from February 2025 through May 2025, both online (via SurveyMonkey) and via hard copy.

Community Survey Promotion and Distribution

The Community Survey was announced and advertised through various methods. Flyers advertising the survey were posted throughout the community, advertisements were posted on the Tribe's Facebook page, and postcards with information and links to the survey were mailed to nearly 300 community members. Attachment B includes copies of the flyer/Facebook announcement and the postcard that were distributed.

Community Survey Results

Overview of the Completed Surveys

A total of 106 completed surveys were received. The disaggregated qualitative results are included in Attachment C, and results that could be aggregated are summarized below. Note that the percentages (%) included below were rounded to the nearest whole number; therefore, all percentages are approximate. In addition, not all survey participants completed every survey question; the number of respondents that did not provide an answer for each question are noted below.

Question 1. What changes in the climate or environment have you noticed in recent years?

Survey Question 1 asked respondents to select all changes in the climate or environment they have noticed in recent years from a list of five choices. The changes in the climate or environment most noticed by respondents included **Warmer temperatures** with approximately 68% of respondents selecting and **More frequent dry conditions or drought** with approximately 66% of respondents selecting. **Changes in wildlife or plants** was selected by approximately 43% of respondents and **More frequent or severe storms** was selected by approximately 42% of respondents. Figure 1 shows the percentage of survey responses for each of the changes listed. The question also allowed respondents to share written responses. Some written responses included extremely hot summers, freezing temperatures in the winter; less snow; longer winters; drastic weather patterns; and seasons shifting later. All additional feedback has been compiled in Attachment C.

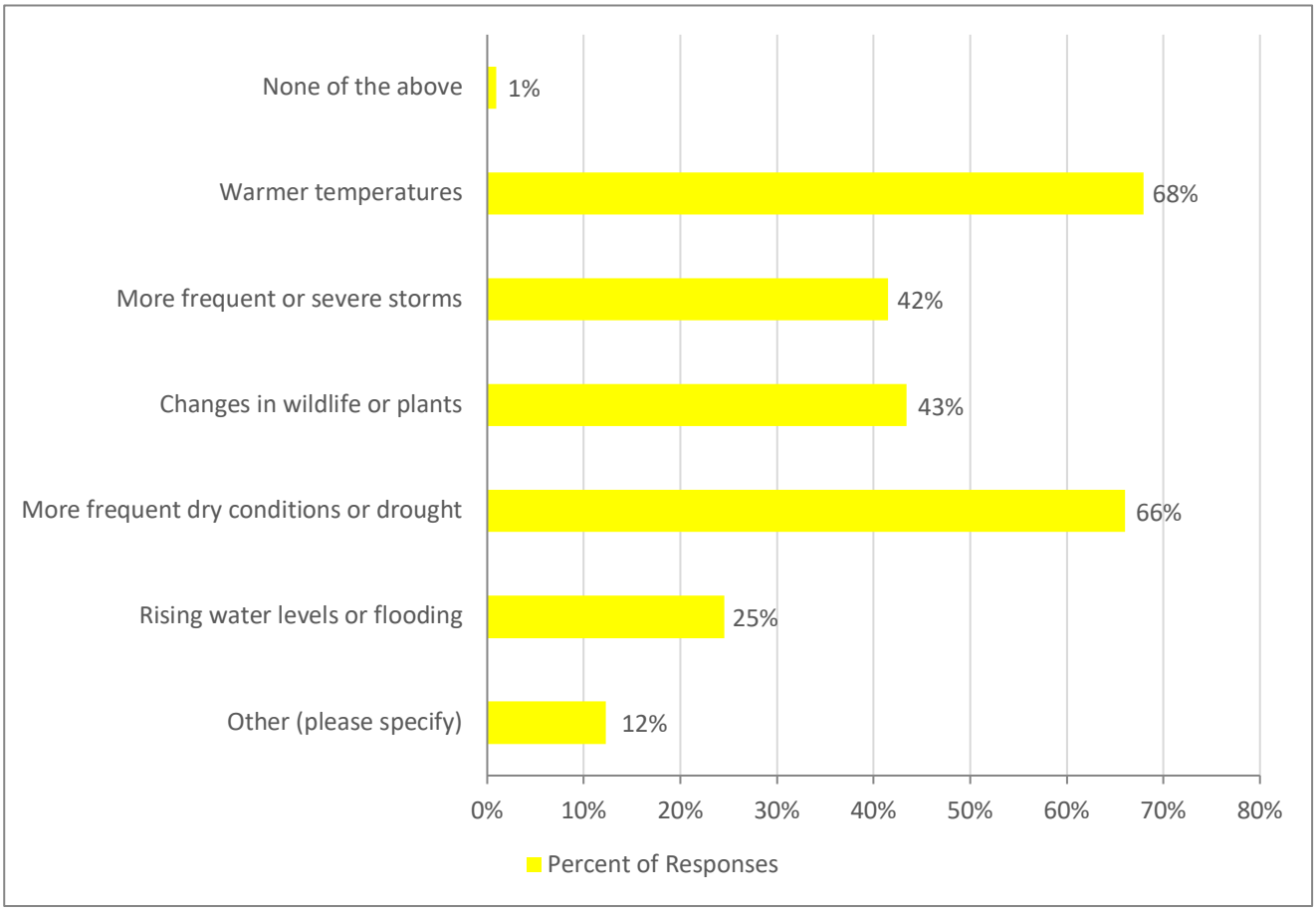


Figure 1

Question 2. How concerned are you about the effects of climate change on the land and natural resources important to the community?

Survey Question 2 asked respondents how concerned they are about the effects of climate change on the land and natural resources important to the community. The majority of respondents indicated they are concerned about climate change; approximately 41% of respondents answered that they are **Extremely concerned** and approximately 28% of respondents indicated that they are **Very concerned.** In addition, approximately 21% of respondents answered that they are **Moderately concerned**; and approximately 7% indicated they are **Slightly concerned**. Approximately 4% selected that they are **Not at all concerned**. Figure 2 shows the breakdown of the answers. Three respondents skipped this question.

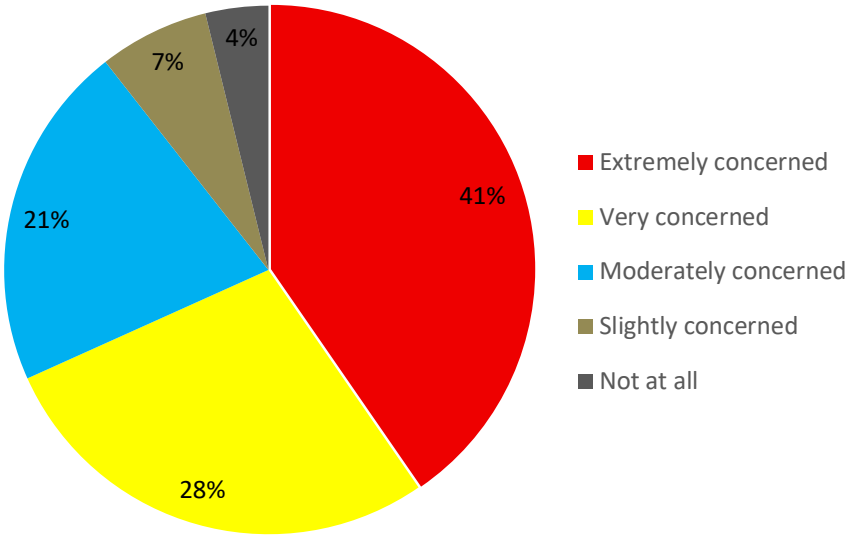


Figure 2

Question 3. What worries you most about potential changes to the climate?

Survey Question 3 asked respondents to rank a list of six weather events/natural disasters from most worrisome to least worrisome. Based on the responses, **Drought**, with a score of 4.6, is what most of the respondents worry about from the potential changes to climate. This is closely followed by **Extreme heat/Heat waves**, which received a score of 4.2. Figure 3 shows the score for each of the six weather events/natural disasters based on the rankings completed by the respondents. Twenty-five respondents skipped this question.

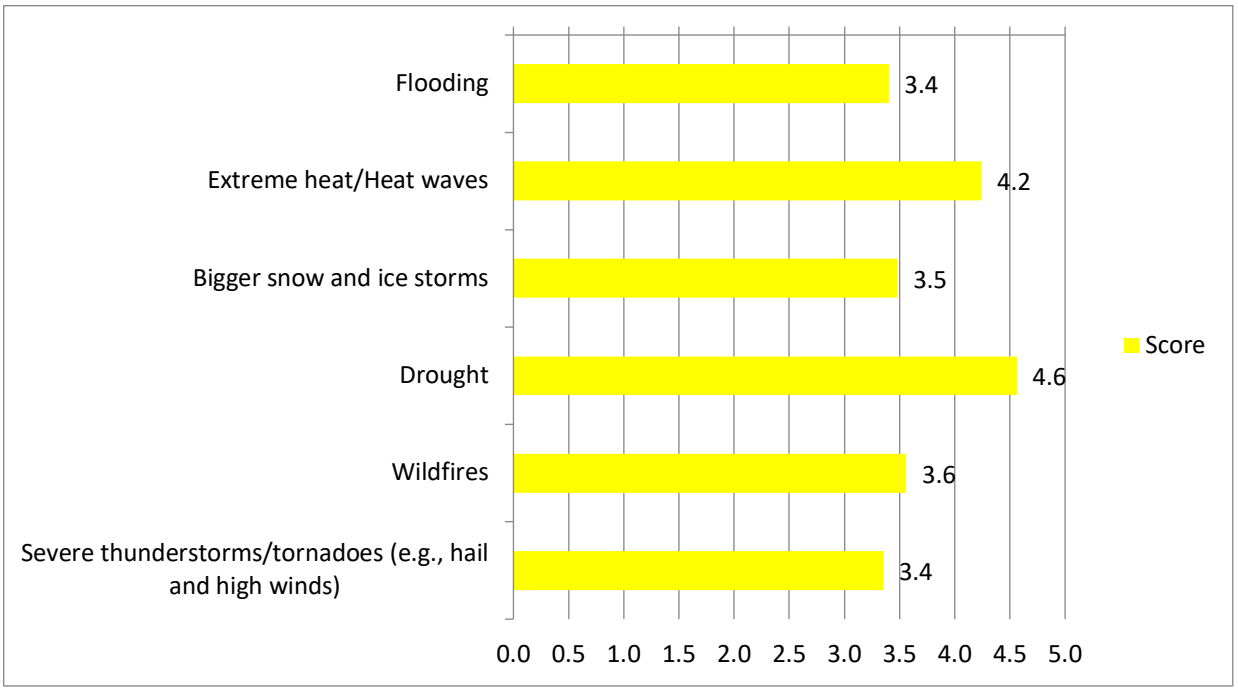


Figure 3

Question 4. Any other worries about the changing climate?

Survey Question 4 asked respondents to write in any other worries they had about the changing climate. In general, written concerns involved changing weather patterns and extremes including flooding, droughts, tornadoes, heat, and increased shoreline erosion; the economic effects and strain on resources from the effects of climate change; impacts to wildlife; and community preparedness. All written responses have been compiled in Attachment C. Forty-two respondents skipped this question.

Question 5. Rank the following environmental changes in terms of how much they concern you.

Survey Question 5 asked respondents to rank a list of five environmental changes in terms of how much they concerned the respondents. **Water availability or quality issues** ranks the highest as the environmental change that causes the most concern, scoring 3.9. This is followed by **Increased extreme weather events (e.g., floods, droughts, or heat waves)**, which scored only slightly higher (i.e., 3.4) than **Loss of traditional plants and animals** (i.e., 3.3). Figure 4 shows the score for each of the five environmental changes based on the rankings completed by the respondents. Twenty-two survey respondents skipped this question.

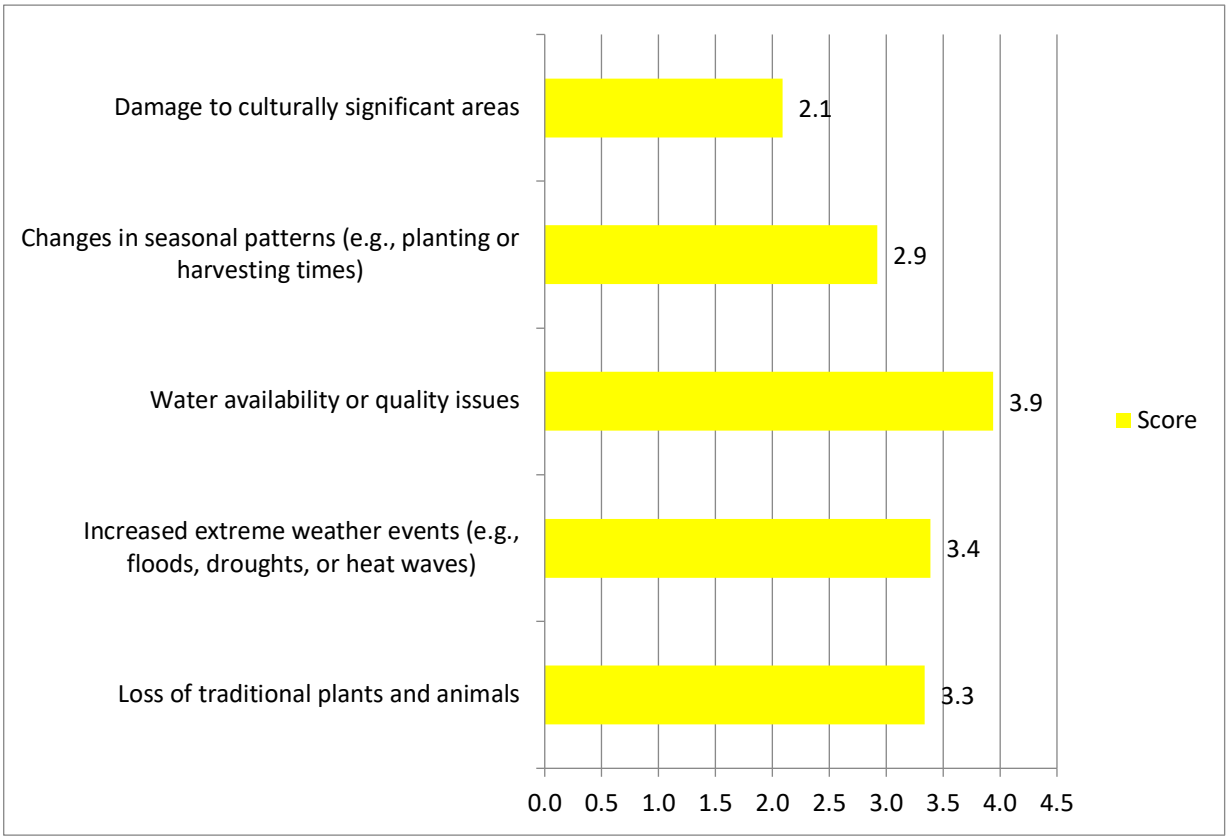


Figure 4

Question 6. Have you changed any of the activities (work, personal, or cultural) that you do because of climate change?

Survey Question 6 asked respondents if they have changed any of the activities (work, personal, or cultural) they do because of climate change. Most respondents indicated they have not changed activities they complete because of climate change. Approximately 33% of respondents answered that "Yes", they have changed activities that they do because of climate change, while approximately 67% of respondents answered that "No".

If respondents answered "Yes", they were asked to explain. Most written explanations indicated that outside activities have been limited or altered due to hot temperatures, causing respondents to work outside earlier in the day, canceling outdoor activities, or limiting time outside. Other responses noted that calving season, garden and crop planting times, and harvesting seasons have changed. All written responses have been compiled in Attachment C. Figure 5 shows the "Yes" verses "No" responses. Seven survey respondents skipped this question.

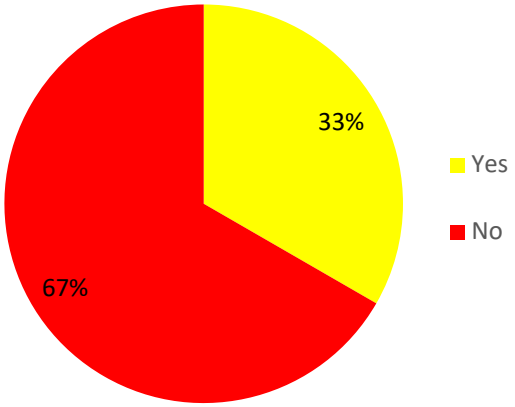


Figure 5

Question 7. Have you or your family experienced any of the following due to changes in the climate and environment?

Survey Question 7 asked respondents to select all impacts due to changes in the climate and environment they or their family have experienced from a list of six choices. Figure 6 shows the percentage of survey responses for each of the listed impacts. The top three impacts selected were as follows: 1) **Increased health issues** (selected by approximately 47% of respondents), 2) **Impacts to housing** (selected by approximately 39% of respondents), and 3) **Changes in hunting or fishing practices** (selected by approximately 27% of respondents). The question also allowed respondents to add written responses. Some of the written responses included flooding, weatherizing homes during the winter, and a loss of food. All additional feedback has been compiled in Attachment C. Seventeen survey respondents skipped this question.

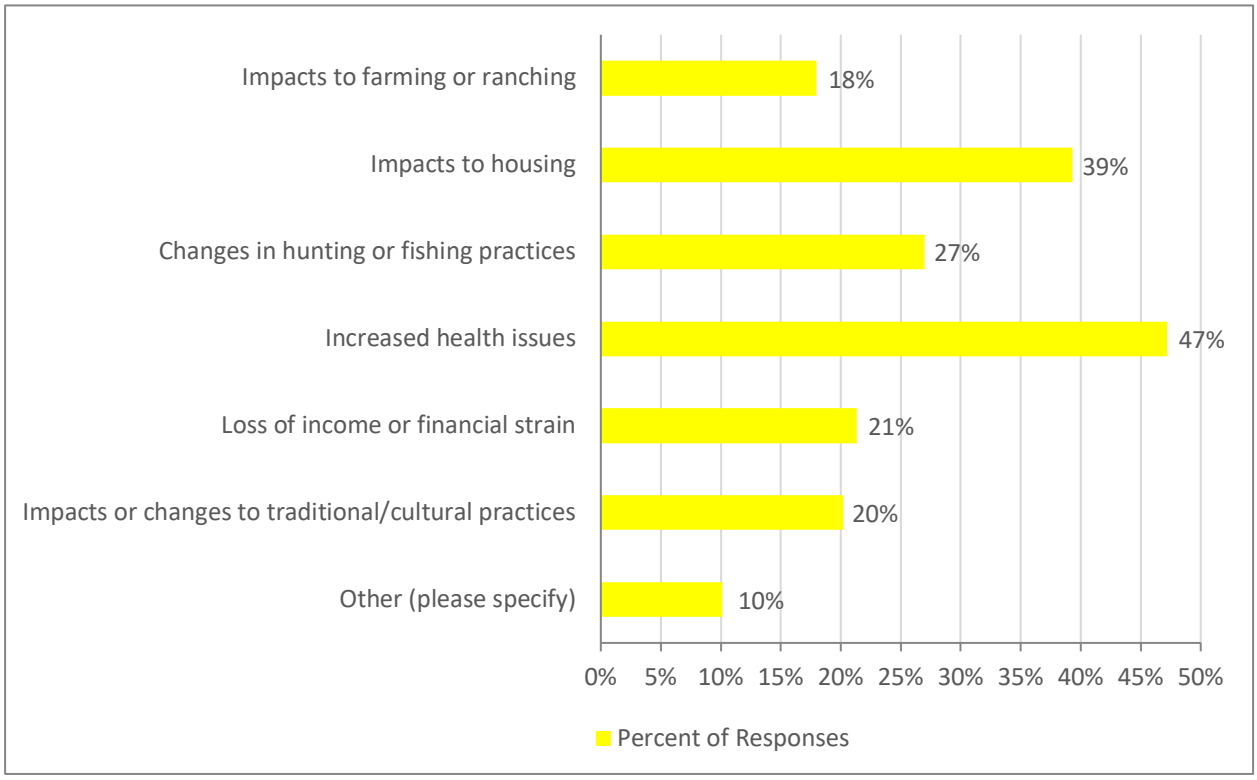


Figure 6

Question 8. What are the most important things for the Tribe to focus on for climate change planning?

Survey Question 8 asked respondents to rank a list of seven items in order of importance that the Tribe should focus on for climate change planning. **Water (water quality and water availability)** ranks the highest (i.e., 5.5) as for what respondents consider the most important thing for the Tribe to focus on for climate change planning. This is followed by **Health of the community** and **Housing/Infrastructure (including residential and community solar and wind)**, which both received similar rankings (i.e. 5.1 and 4.9, respectively). Figure 7 shows the score for the seven items that the Tribe should focus on for climate change planning based on the rankings completed by the respondents. Twenty-four survey respondents skipped this question.

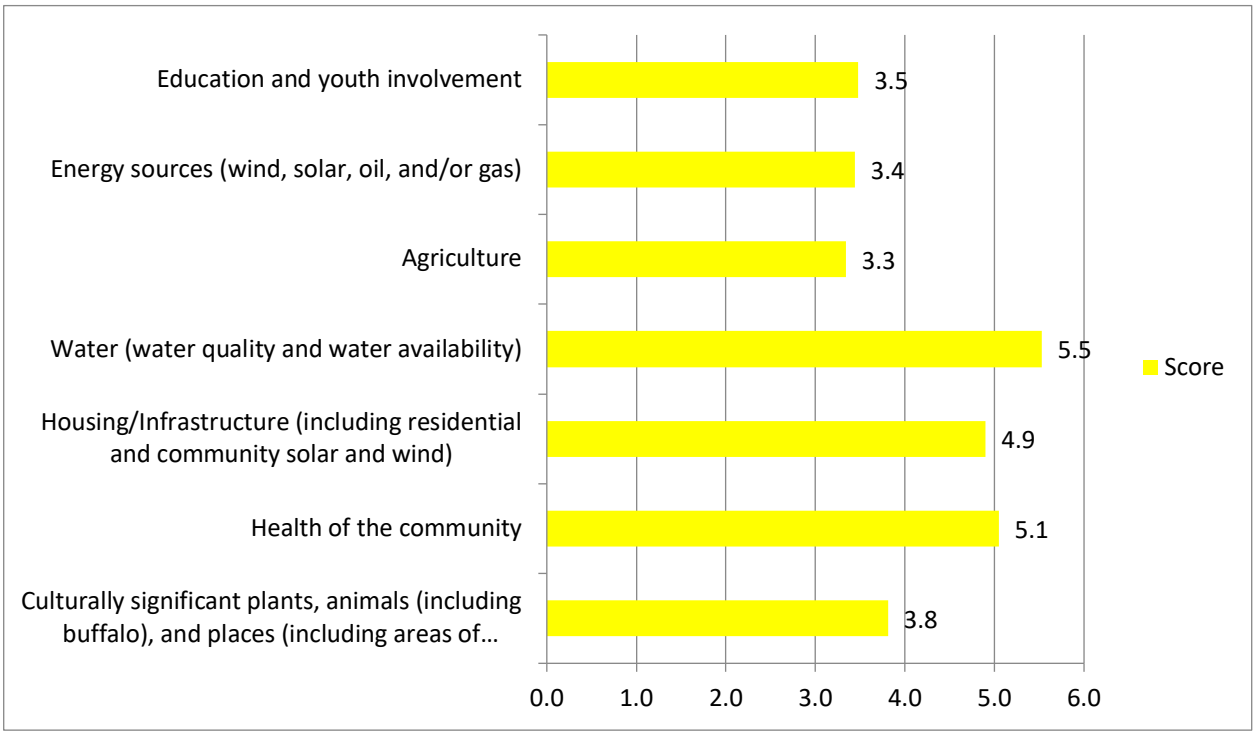


Figure 7

Question 9. Other ideas or suggestions?

Survey Question 9 asked respondents to list any other ideas or suggestions they had regarding climate change planning. Some written suggestions included keeping the community involved and engaged; adopting holistic agriculture and regenerative agriculture practices; promoting environmental education; modifying homes and schools for extreme weather conditions; starting community gardens; and generally preparing the community for climate change. All feedback has been compiled in Attachment C. Fifty-nine survey respondents skipped this question.

Question 10. How should the Tribe best prepare for the effects of climate change on our people and culture?

Survey Question 10 asked respondents to rank a list of six actions the Tribe can do to best prepare for the effects of climate change on its people and culture. **Protecting water resources** scored the highest (i.e., 5.0) as to what the Tribe should do to best prepare for the effects of climate change on people and culture. This was followed by **Improve health and safety during extreme events (e.g. upgrading the community center so that it can be a place for people to go when there is a weather emergency)**, **Supporting sustainable agriculture and food sovereignty,** and **Upgrade infrastructure (e.g., roads, electricity, sewage, internet)** which all scored relatively similarly with 4.1, 3.9, and 3.8, respectively. Figure 8 shows the score for the six actions that the Tribe should focus on for preparing for the effects of climate change on people and culture based on the rankings completed by the respondents. Twenty-two survey respondents skipped this question.

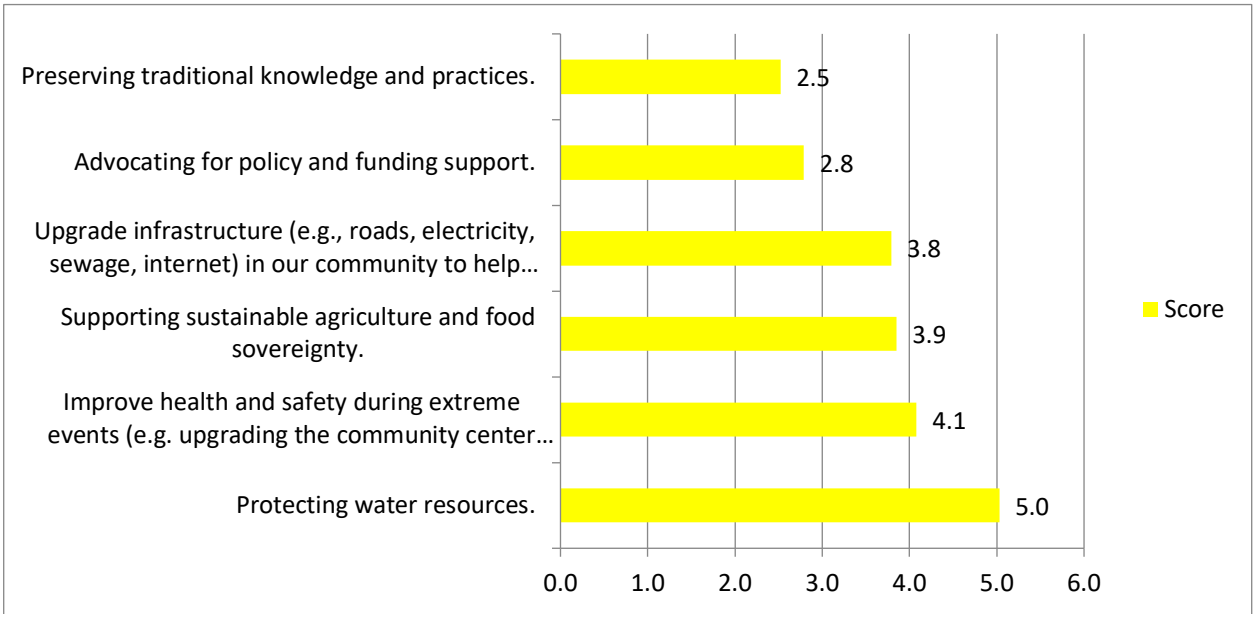


Figure 8

Question 11. Other ideas or suggestions?

Survey Question 11 asked respondents if they had other ideas or suggestions regarding how the Tribe should best prepare for the effects of climate change. In general, responses emphasized the importance of the Tribe working together, reviving traditional practices, and engaging the youth. In addition, respondents highlighted the need for disaster preparedness such as building shelters, conducting trainings, and providing emergency services. All feedback has been compiled in Attachment C. Sixty-four respondents skipped this question.

Question 12. How should the Tribe make sure our infrastructure (e.g., homes, roads, facilities, utilities, etc.) can withstand climate driven weather extremes?

Survey Question 12 asked respondents to rank a list of five actions the Tribe can implement to make sure community infrastructure can withstand climate driven weather extremes. **Ensure all homes have a reliable source of heat** received the highest score (i.e., 3.9) for what respondents think the Tribe should do to make sure infrastructure can withstand climate driven weather extremes. This action is followed by **Invest in the quality and upkeep of our roads, bridges, sewer systems, etc. and ensure that there are "rescue routes" throughout the Reservation**, and **Invest in energy efficient systems and building (e.g., better insulation) and/or sustainable sources of energy (e.g., solar and wind) for Tribal buildings and area homes, and work to ensure new homes built are suitable for the environment**, all of which scored similarly with 3.2, 3.1, and 3.0. Figure 9 shows the score for the five actions for the Tribe to take to make sure infrastructure can withstand climate driven weather extremes. Twenty-two respondents skipped this question.

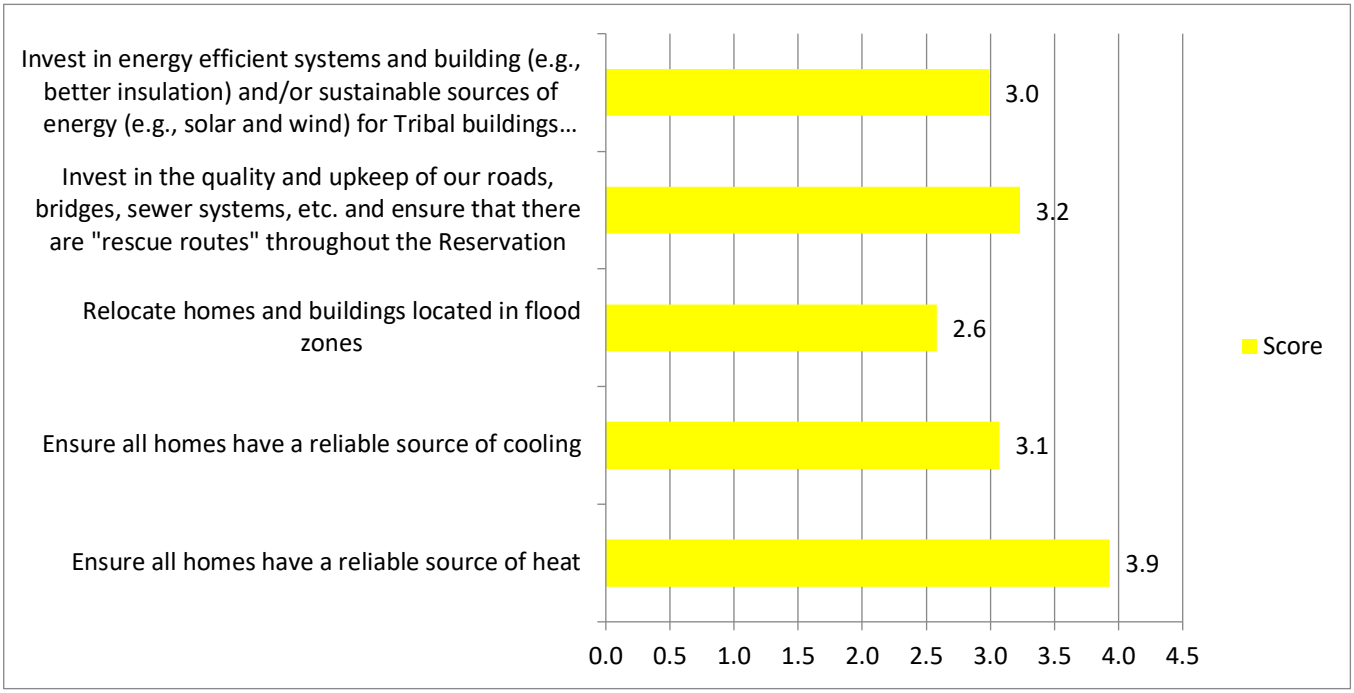


Figure 9

Question 13. Please rank the following water uses from most important for the Tribe to focus on to least important regarding planning for the impacts of climate change.

Survey Question 13 asked respondents to rank a list of five water uses from most important for the Tribe to focus on to least important regarding planning for the impacts of climate change. **Drinking Water/Domestic Uses** scored the highest (i.e., 5.7). This was followed by **Plant and Wildlife (including buffalo)** and **Irrigation and Livestock Uses** which tied, each with a score of 4.1. Figure 10 shows the score of the five water uses the Tribe should focus on regarding planning for the impacts of climate change. Twenty-five respondents skipped this question.

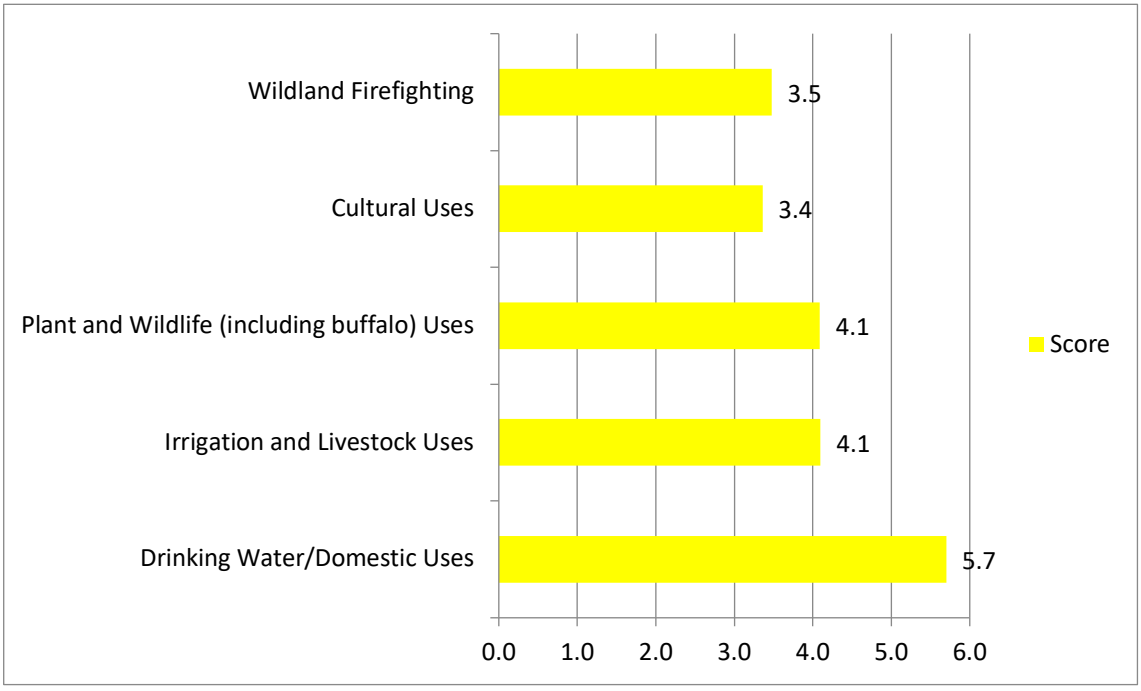


Figure 10

Question 14. How should the Tribe best prepare for the effects of climate change on our lands?

Survey Question 14 asked respondents to rank a list of five options for how the Tribe should best prepare for the effects of climate change on tribal lands. **Make a greater effort to ensure tribal food sovereignty (e.g., opportunities for community and individual gardens)** ranked the highest, with a score of 3.7, but it was followed closely by **Plan for potential impacts to farming and ranching**, which received a score of 3.5. Figure 11 shows the score of the five options available for ranking in terms of what the Tribe should do to best prepare for the effects of climate change on tribal lands. Twenty-five survey respondents skipped this question.

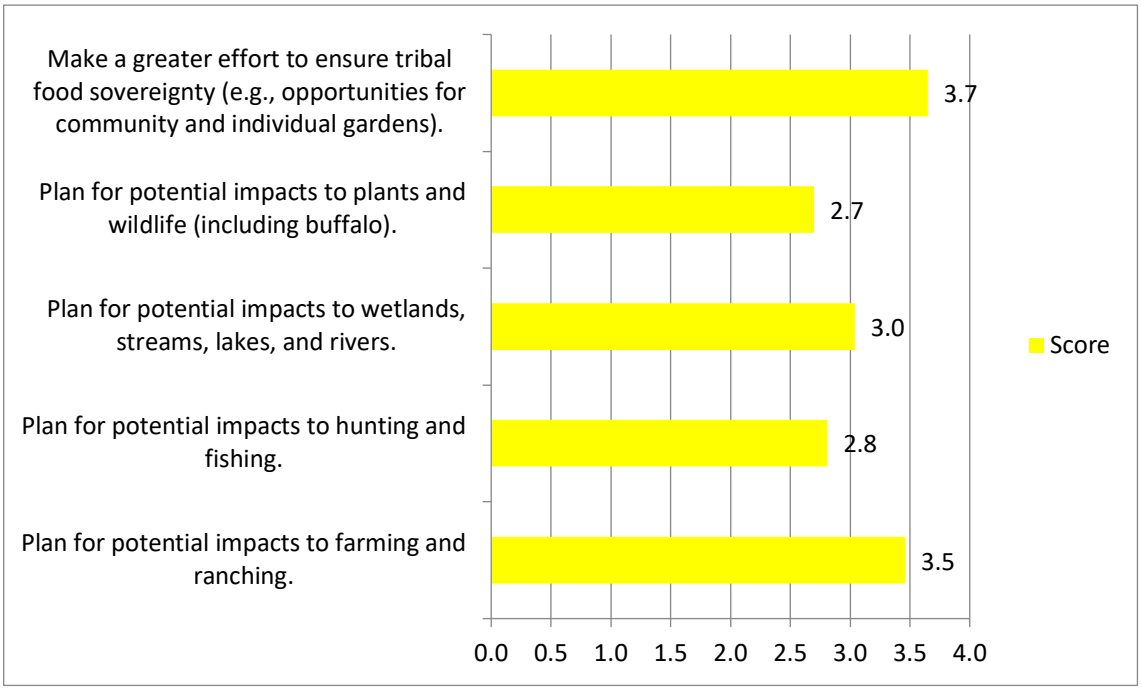


Figure 11

Question 15. How important is it for the Tribe to pursue alternative/renewable energy development on the Reservation?

Survey question 15 asked respondents how important it is for the Tribe to pursue alternative/renewable energy development on the Reservation by shading in stars to indicate the level of importance, with 5 stars indicating that it is very important and 1 star indicating that it is not very important. Approximately 74% of respondents shaded all five stars, denoting that it is **very important** for the Tribe to pursue alternative/renewable energy development on the Reservation. Approximately 5% of respondents selected one star, indicating that it is not very important for the Tribe to pursue alternative/renewable energy development on the Reservation. Figure 12 shows the distribution of the number of stars selected, indicating the level of importance. Fourteen survey respondents skipped this question.

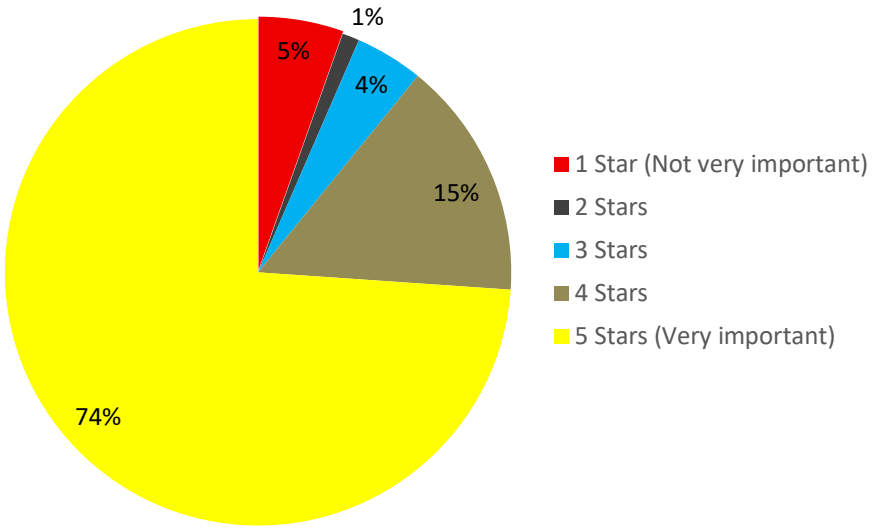


Figure 12

Question 16. What gives you hope about addressing climate challenges?

Survey question 16 asked respondents to write in what gives them hope about addressing climate challenges. A total of 79 respondents provided input to this question. Many responses highlighted the importance of being prepared for climate-related disasters, with tribal councils and forward-thinking leaders taking proactive steps. Others noted the importance of planning, having emergency shelters, and ensuring that the Tribe is ready to address future challenges. Respondents also emphasized working together, building self-sustainable habits, and striving for self-sufficiency. Some suggestions to ensure long-term survival and resilience included using renewable energy, growing food locally, reducing dependence on external support, raising awareness and educating both current and future generations. Finally, respondents expressed hope for positive change, referencing spiritual beliefs, prayer, the need for ongoing action, and the protection of the Tribe's natural resources. All written feedback and responses have been compiled in Attachment C.

Question 17. What specific climate-related challenges do you personally face?

Survey question 17 asked respondents to describe specific climate-related challenges they personally face. Many respondents reported increased heat waves, hotter summers, prolonged droughts, loss of plants and grass, flooding, intense winds, shoreline erosion, and unpredictable seasonal shifts. These changes have caused anxiety, emotional distress, and challenges in daily routines such as transportation and road maintenance. Respondents also noted housing and infrastructure challenges including inadequate housing insulation, difficulty keeping homes comfortable during extreme weather, costly repairs due to weather damage, and homesites located in flood zones. Others noted health concerns such as increased air pollution, vector-borne diseases, and difficulty breathing during extreme heat. A total of 77 responses were received. All written feedback has been compiled in Attachment C.

Question 18. Where would you like to hear or see emergency notifications and information for how the Tribe is preparing for impacts from climate change?

Survey question 18 asked respondents where they would like to hear or see emergency notifications and information for how the Tribe is preparing for impacts from climate change. The **Tribal website** was the most popular answer with approximately 79% of respondents selecting. **Facebook** was the second most popular answer with approximately 70% of respondents selecting. **Radio** was selected by approximately 40% of respondents followed by the **newspaper**, which was selected by approximately 34% of respondents. The question also allowed respondents to submit other written suggestions. Some written responses included the Tribal Newsletter, a text messaging service, the school website, television, mailings, and flyers. All written responses have been compiled in Attachment C. Figure 13 shows the distribution of responses for communication methods of notifications and information. Eight survey respondents skipped this question.

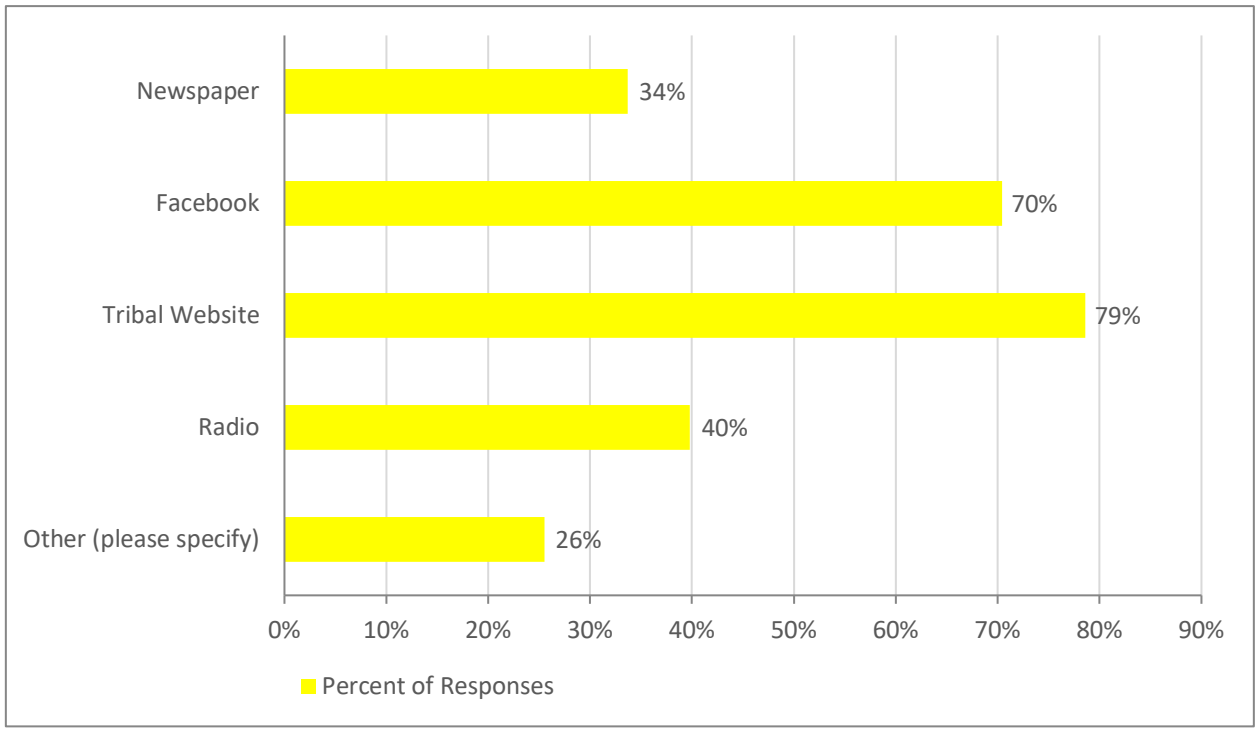


Figure 13

Demographics

Survey questions 19 through 21 were related to demographics. These questions asked respondents to indicate their age, tribal affiliation, and where they reside. Results for these three questions are described in the following sections.

Question 19. What is your age?

Survey respondents were asked to identify their age by selecting from the following nine age ranges: under 18, 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, or 85 and older. The 18- to 24-year age range represented approximately 2% of respondents; the 25- to 34-year age range represented approximately 10% of respondents; the 35- to 44-year age range represented 25% of respondents; the 45- to 54-year age range represented 25% of respondents; the 55- to 64-year age range included approximately 21% of the respondents; the 65- to 74-year age range included approximately 13% of the respondents; and the 75- to 84-year age range represented approximately 5% of respondents. No respondents under the age of 18 or 85 or older completed the survey. Figure 14 shows the distribution of the respondents' ages. Two survey respondents skipped this question.

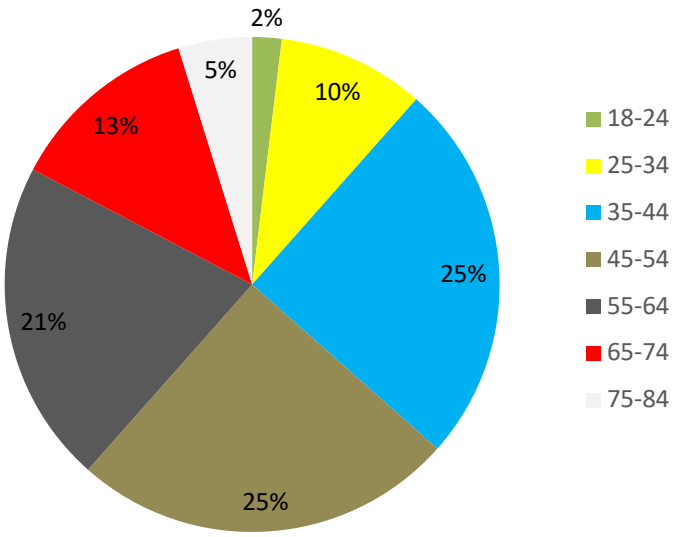


Figure 14

Question 20. What is your Tribal affiliation?

Survey question 20 asked respondents about their tribal affiliation. Approximately 86% of respondents indicated that they are enrolled members of the Lower Brule Sioux Tribe. Approximately 9% of respondents indicated that they are an enrolled member of another Tribe. Approximately 1% of respondents indicated that they are a descendent of an enrolled member of another tribe and approximately 1% of respondents indicated that they are a spouse or partner of an enrolled member of the Lower Brule Sioux Tribe. Approximately 4% of respondents noted that they are not affiliated with Tribe in any of the listed categories. Figure 15 shows the distribution of tribal affiliation. Two survey respondents skipped this question.

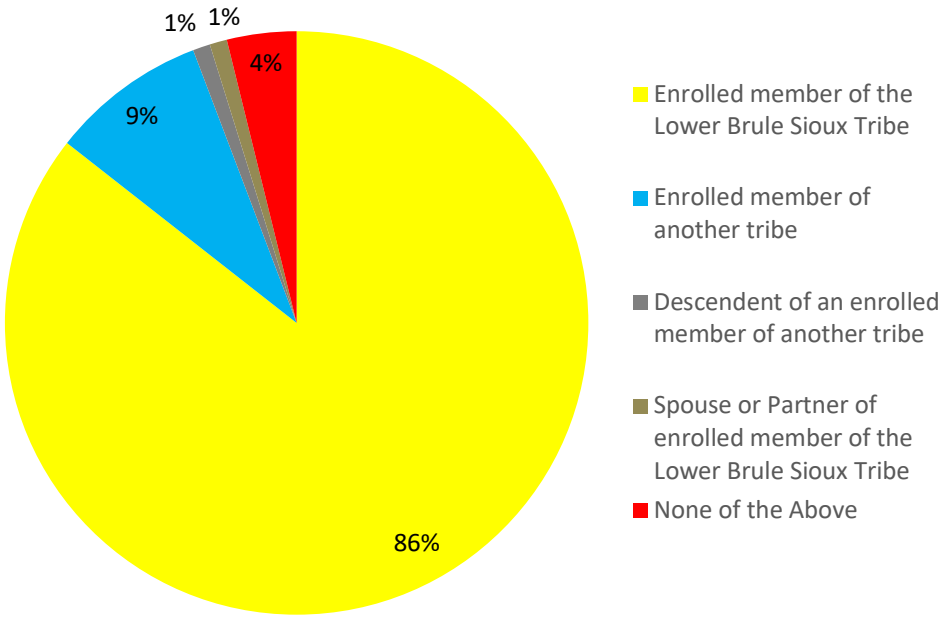


Figure 15

Question 21. Where do you currently reside?

Survey respondents were asked to identify where they live. Lower Brule was the community with the most responses, with approximately 59% of respondents residing there, followed by West Brule which had approximately 15% of respondents living there. Approximately 13% of respondents indicated that they live on the Reservation but outside of the listed communities in the survey. Approximately 8% of respondents answered that they live off the Reservation and approximately 6% indicated that they live out of state or on another Reservation. Figure 16 shows the distribution of areas where the respondents reside. Two survey respondents skipped this question.

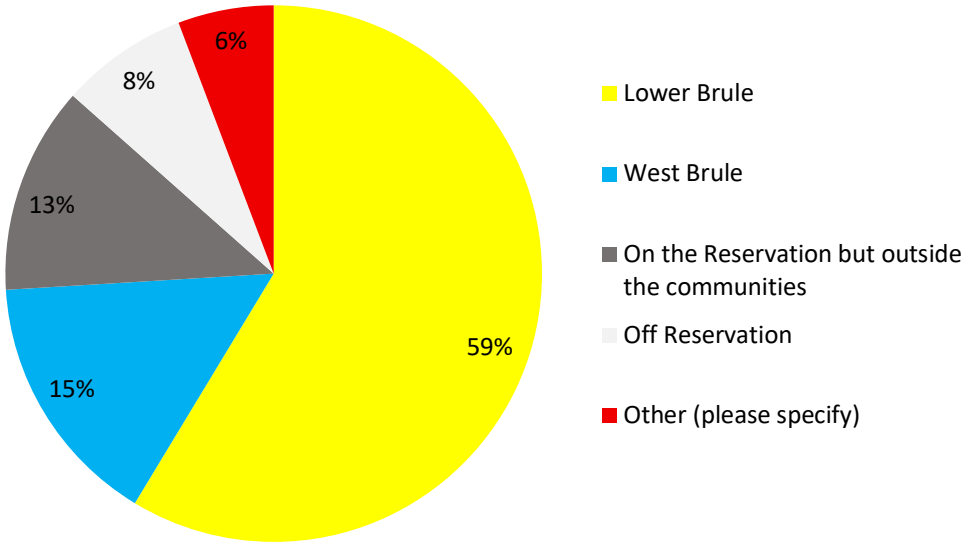


Figure 16

Survey Limitations and Conclusions

Respondents to the Lower Brule Sioux Tribe Climate Change Adaptation Community Survey provided their input on what they are community experiencing from climate change and recommendations on how the Tribe should respond to the effects of climate change on tribal lands. This section highlights the majority opinions from the results summarized above to provide recommendations in the Climate Change Adaptation Plan. Note that the term "majority" refers to at least 50% from hereon.

Community Survey Limitations

One limiting factor of interpreting the survey results was that rather than rank the options for the ranking questions, numerous respondents rated each of the options as a "1", thus not allowing for the data to be submitted for those questions. In addition, despite various methods of advertising the availability of the survey, including survey flyer distribution, Facebook and Tribal website advertisements, and postcard mailings, only 106 surveys were completed.

Conclusions

The results of the Community Survey underscore the Tribal community's deep awareness of and concern for the impacts of climate change. Respondents reported widespread observations of environmental changes, especially rising temperatures, more frequent drought, and altered wildlife patterns. A strong majority also expressed high levels of concern, particularly over water availability, health risks, infrastructure vulnerabilities, and the future of culturally important lands and resources.

Several key themes emerged:

- **Water security** is a top priority. Across multiple questions, water, both for drinking and cultural/ecological use, was the most consistently elevated concern.
- **Community health and safety** are directly affected by climate stressors, with respondents citing heat waves, respiratory challenges, and housing vulnerabilities as personal impacts.
- **Food systems and land use** were identified as crucial planning areas, including calls for expanded gardening, agriculture, and food sovereignty initiatives.
- **Infrastructure upgrades**, such as ensuring heating and cooling, improving roads, and incorporating renewable energy, are considered vital for climate resilience.
- **Cultural continuity and community preparedness** were highlighted in open-ended responses, with strong interest in preserving traditional knowledge, involving youth, and building local self-reliance.

In summary, the Community Survey provided valuable insights into how community members are experiencing and responding to climate change. Respondents emphasized the importance of protecting water resources, improving infrastructure, supporting community health, and preserving cultural practices. While the survey results offer a strong foundation for climate adaptation planning, continued community engagement will be essential to ensure the plan continues to reflect shared priorities and values. Moving forward, the Tribe may consider additional outreach to deepen understanding, fill gaps, and build momentum for collective action.

Attachment A

Lower Brule Sioux Tribe Climate Change Adaptation Plan Community Survey

Lower Brule Sioux Tribe Climate Change Adaptation Plan - Community Survey

The Lower Brule Sioux Tribe is working on a plan to prepare for the impacts of a changing climate. Lower Brule will likely see an increase in extreme weather and climate events, that could include more frequent flooding, larger snow and ice storms, and an increase in heat waves and drought.

Please share your thoughts and help the Lower Brule community prepare for the future and these changes in the climate. Everyone's input is valuable! The survey should take about 10 - 15 minutes to complete.

For a chance to win a gift card, please complete the survey including the contact information at the end of the survey. Your responses are **anonymous** and voluntary.

1. What changes in the climate or environment have you noticed in recent years? Please check all that apply.
   - ☐ Warmer temperatures
   - ☐ More frequent or severe storms
   - ☐ Changes in wildlife or plants
   - ☐ More frequent dry conditions or drought
   - ☐ Rising water levels or flooding
   - ☐ Other (please specify):
   - ☐ None of the above

2. How concerned are you about the effects of climate change on the land and natural resources important to the community?
   - ☐ Extremely concerned
   - ☐ Very Concerned
   - ☐ Moderately concerned
   - ☐ Slightly concerned
   - ☐ Not at all

3. What worries you most about potential changes to the climate? Please rank the following (1=most worrisome; 6=least worrisome). Write N/A next to a response if it is not applicable.
   - ☐ Flooding
   - ☐ Extreme heat/Heat Waves
   - ☐ Bigger snow and ice storms
   - ☐ Drought
   - ☐ Wildfires
   - ☐ Severe thunderstorms or tornadoes (e.g. hail and high winds)

4. Any other worries about the changing climate? Please write-in your response below.

5. Rank the following environmental changes in terms of how much they concern you (1=most concerning; 5=least concerning). Write N/A next to a response if it is not applicable.
   - ☐ Loss of traditional plants and animals
   - ☐ Increased extreme weather events (e.g., floods, drought, or heat waves)
   - ☐ Water availability or quality issues
   - ☐ Changes in seasonal patterns (e.g., planting or harvesting times)
   - ☐ Damage to culturally significant areas

6. Have you changed any of the activities (work, personal, or cultural) that you do because of climate change?
   - ☐ Yes
   - ☐ No
   - ☐ If yes, please explain:

7. Have you or your family experienced any of the following due to changes in the climate and environment? Please select all that apply.
   - ☐ Impacts to farming or ranching
   - ☐ Impacts to housing
   - ☐ Changes in hunting or fishing practices
   - ☐ Increased health issues
   - ☐ Loss of income or financial strain
   - ☐ Impacts or changes to traditional/cultural practices
   - ☐ Other (please specify):

8. What are the most important things for the Tribe to focus on for climate change planning? Please rank the following responses (1=most important; 7=least important). Write N/A next to a response if it is not applicable.
   - ☐ Culturally significant plants, animals (including buffalo), and places (including areas of harvesting or gathering)
   - ☐ Health of community
   - ☐ Housing/infrastructure (including residential and community solar and wind)
   - ☐ Water (water quality and water availability)
   - ☐ Agriculture
   - ☐ Energy sources (wind, solar, oil, and/or gas)
   - ☐ Education and youth involvement

9. Other ideas or suggestions?

10. How should the Tribe best prepare for the effects of climate change on our people and culture? Please rank the following responses (1=most important; 6=least important). Write N/A next to a response if it is not applicable.
    - ☐ Protecting water resources
    - ☐ Improve health and safety during extreme events (e.g., upgrading the community center so that it can be a place for people to go when there is a weather emergency)
    - ☐ Supporting sustainable agriculture and food sovereignty
    - ☐ Upgrading infrastructure (e.g., roads, electricity, sewage, internet) in our community to help everyday living
    - ☐ Advocating for policy and funding support
    - ☐ Preserving traditional knowledge and practices

11. Other ideas or suggestions?

12. How should the Tribe make sure our infrastructure (e.g., homes, roads, facilities, utilities, etc.) can withstand climate driven weather extremes? Please rank the answers below in order of importance (1=most important; 5=least important). Write N/A next to a response if it is not applicable.
    - ☐ Ensure all homes have a reliable source of heat
    - ☐ Ensure all homes have a reliable source of cooling
    - ☐ Relocate homes and buildings located in flood zones
    - ☐ Invest in the quality and upkeep of our roads, bridges, sewer systems, etc. and ensure that there are “rescue routes” throughout the Reservation
    - ☐ Invest in energy efficient systems and building (e.g., better insulation) and/or sustainable sources of energy (e.g., solar and wind) for Tribal buildings and area homes, and work to ensure new homes built are suitable for the environment.

13. Please rank the following water uses from most important for the Tribe focus on to least important regarding planning for the impacts of climate change (1=most important; 5=least important). Write N/A next to a response if it is not applicable.
    - ☐ Drinking water/domestic uses
    - ☐ Irrigation and livestock use
    - ☐ Plant and wildlife (including buffalo) uses
    - ☐ Cultural uses
    - ☐ Wildland firefighting

14. How should the Tribe best prepare for the effects of climate change on our lands? Please rank the following responses (1=most important; 5=least important). Write N/A next to a response if it is not applicable.
    - ☐ Plan for potential impacts to farming and ranching
    - ☐ Plan for potential impacts to hunting and fishing
    - ☐ Plan for potential impacts to wetlands, streams, lakes, and rivers
    - ☐ Plan for potential impacts to plants and wildlife (including buffalo)
    - ☐ Make a greater effort to ensure tribal food sovereignty (e.g., opportunities for community and individual gardens).

15. How important is it for the Tribe to pursue alternative/renewable energy development on the Reservation? Indicate the number of stars for importance: 5 stars is very important and 1 is not very important.

16. What gives you hope about addressing climate challenges? Please write your answer below:

17. What specific climate-related challenges do you personally face? Please write your answer below:

18. Where would you like to hear or see emergency notifications and information for how the Tribe is preparing for impacts from climate change?
    - ☐ Newspaper
    - ☐ Facebook
    - ☐ Tribal Website
    - ☐ Radio
    - ☐ Other (please specify below)

Demographic Questions

Thank you for completing the survey! This survey is completely anonymous, but your questions below will help us better analyze all of the responses received.

19. What is your age?
    - ☐ Under 18
    - ☐ 18-24
    - ☐ 25-34
    - ☐ 35-44
    - ☐ 45-54
    - ☐ 55-64
    - ☐ 65-74
    - ☐ 75-84
    - ☐ 85+

Please return your completed survey to [redacted] at the Environmental Protection Office by Friday, May 30, 2025

20. What is your tribal affiliation?
    - ☐ Enrolled member of the Lower Brule Sioux Tribe
    - ☐ Enrolled member of another tribe
    - ☐ Descendent of an enrolled member of the Lower Brule Sioux Tribe
    - ☐ Descendent of an enrolled member of another tribe
    - ☐ Spouse or Partner of an enrolled member of the Lower Brule Sioux Tribe
    - ☐ None of the Above

21. Where do you currently reside?
    - ☐ Lower Brule
    - ☐ West Brule
    - ☐ On the Reservation but outside the communities
    - ☐ Off Reservation
    - ☐ Other (please specify below)

_____

Drawing for a Chance to Win a $100 Visa Gift Card

Thank you for taking the time to complete this survey!

If you would like to be entered in a drawing for a chance to win a $100 Visa gift card, please complete the information below.

Only 1 entry per person. Your contact information will be kept confidential and separate from your responses to the survey. Gift card winners will be notified by phone or email. Winners can pick up their gift cards at the Tribal Office. Winners will be announced May 2025.

Contact Information:

Name: _____

Address: _____

Address 2: _____

City/Town: _____

State: _____

Zip/Postal Code: _____

Email address: _____

Phone: _____

Attachment B

Survey Announcements/Advertisements

Lower Brule Sioux Tribe
Environmental Protection Office
187 Oyate Circle
Lower Brule, SD 57548

WE NEED YOUR INPUT

Survey

HELP SHAPE THE FUTURE OF THE KUL WICASA OYATE

HELP BUILD OUR CLIMATE PLAN

Three ways to take the survey

1. Take the survey online: ***https://www.surveymonkey.com/r/2SNC56P***

2. Scan this QR Code

3. Get A Hard Copy at the Tribal Administration Building

Take the Survey for a Chance to Win a $100 Visa Gift Card

Surveys Due by May 30, 2025

BUILDING A CLIMATE PLAN

KUL WICASA OYATE

GIVE US YOUR THOUGHTS

SURVEY

FEB-MAY 2025

WIN $100 GIFT CARD

THREE WAYS TO TAKE THE SURVEY

1. USE THE LINK: ***HTTPS://WWW.SURVEYMONKEY.COM/R/2SNC56P***

2. SCAN THIS QR CODE

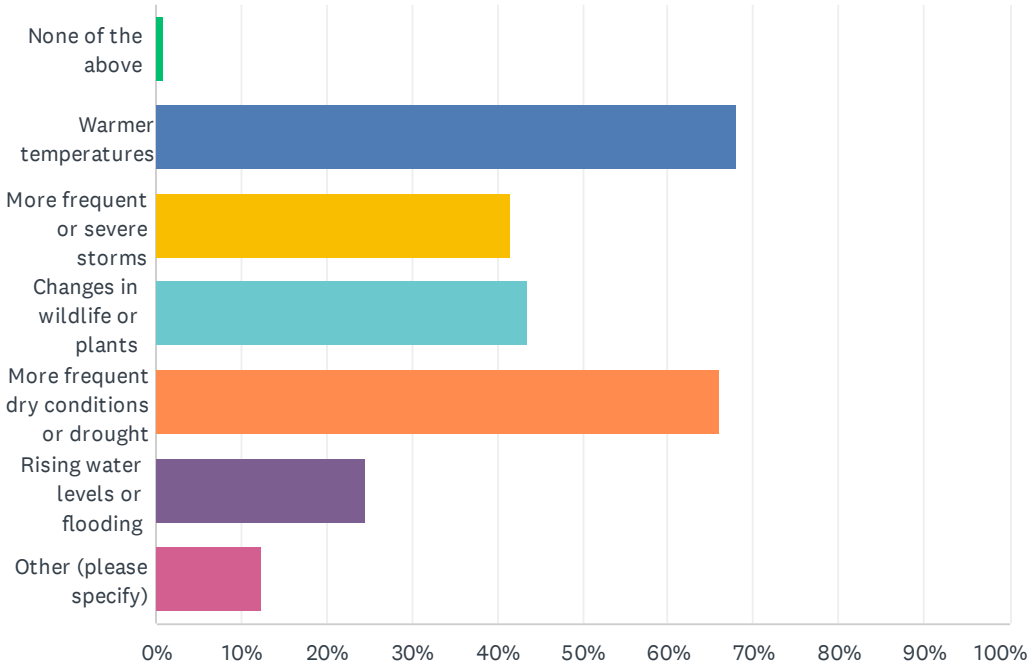
3. GET A HARD COPY AND RETURN COMPLETED SURVEYS AT THE TRIBAL OFFICE

Attachment C

Lower Brule Sioux Tribe Climate Change Adaptation Plan Community Survey Complete Disaggregated Qualitative Results

Q1 What changes in the climate or environment have you noticed in recent years? Please check all that apply.

Answered: 106 Skipped: 0



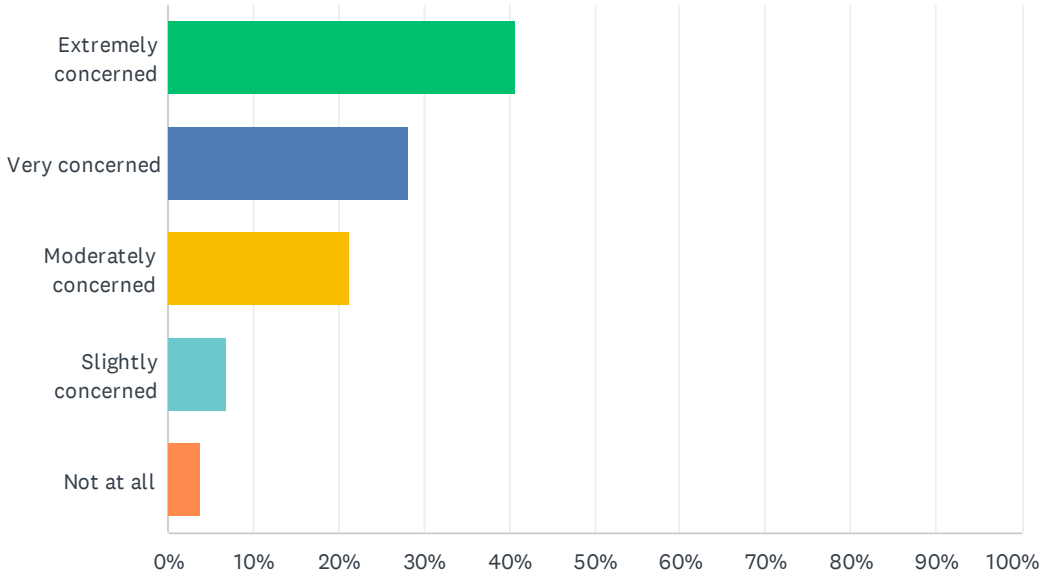
ANSWER CHOICES	RESPONSES	
None of the above	0.94%	1
Warmer temperatures	67.92%	72
More frequent or severe storms	41.51%	44
Changes in wildlife or plants	43.40%	46
More frequent dry conditions or drought	66.04%	70
Rising water levels or flooding	24.53%	26
Other (please specify)	12.26%	13
Total Respondents: 106		

#	OTHER (PLEASE SPECIFY)	DATE
1	increase in pandemics (e.g. COVID), increase in infections (e.g. bird flu, RSV, Dengue fever, zika, SARS and MERS).	[redacted]
2	No response was given	[redacted]
3	Less birds and bugs	[redacted]
4	Less snow	[redacted]
5	Extremely hot Summers, freezing temperatures in the Winter	[redacted]

6	longer Winters	[redacted]
7	drastic weather patterns	[redacted]
8	Bank Erosion	[redacted]
9	None basically the same ebb and flow throughout my 60 plus years	[redacted]
10	Chem trails	[redacted]
11	NO MORE SUMMER	[redacted]
12	Caring for the elderly during climate change	[redacted]
13	Seasons are shifting later and we dont really experience fall anymore. It goes straight from summer to winter	[redacted]

Q2 How concerned are you about the effects of climate change on the land and natural resources important to the community?

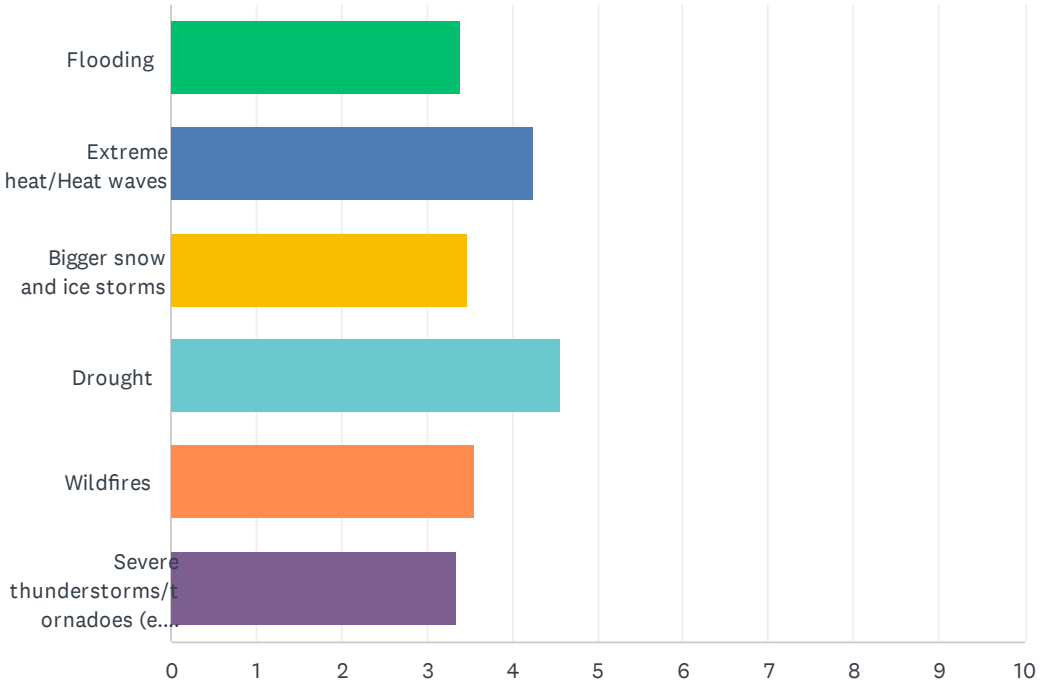
Answered: 103 Skipped: 3



ANSWER CHOICES	RESPONSES	
Extremely concerned	40.78%	42
Very concerned	28.16%	29
Moderately concerned	21.36%	22
Slightly concerned	6.80%	7
Not at all	3.88%	4
Total Respondents: 103		

Q3 What worries you most about potential changes to the climate? Please rank the following (1 = most worrisome; 6 = least worrisome). Select N/A if a responses is not applicable.

Answered: 81 Skipped: 25



	1	2	3	4	5	6	N/A	TOTAL	SCORE
Flooding	27.78% 15	9.26% 5	7.41% 4	7.41% 4	9.26% 5	31.48% 17	7.41% 4	54	3.40
Extreme heat/Heat waves	20.75% 11	22.64% 12	22.64% 12	15.09% 8	13.21% 7	0.00% 0	5.66% 3	53	4.24
Bigger snow and ice storms	10.64% 5	21.28% 10	23.40% 11	10.64% 5	12.77% 6	19.15% 9	2.13% 1	47	3.48
Drought	28.07% 16	24.56% 14	21.05% 12	10.53% 6	1.75% 1	5.26% 3	8.77% 5	57	4.56
Wildfires	13.21% 7	13.21% 7	20.75% 11	20.75% 11	18.87% 10	7.55% 4	5.66% 3	53	3.56
Severe thunderstorms/tornadoes (e.g., hail and high winds)	19.64% 11	8.93% 5	10.71% 6	23.21% 13	17.86% 10	17.86% 10	1.79% 1	56	3.35

Q4 Any other worries about the changing climate?

Answered: 64 Skipped: 42

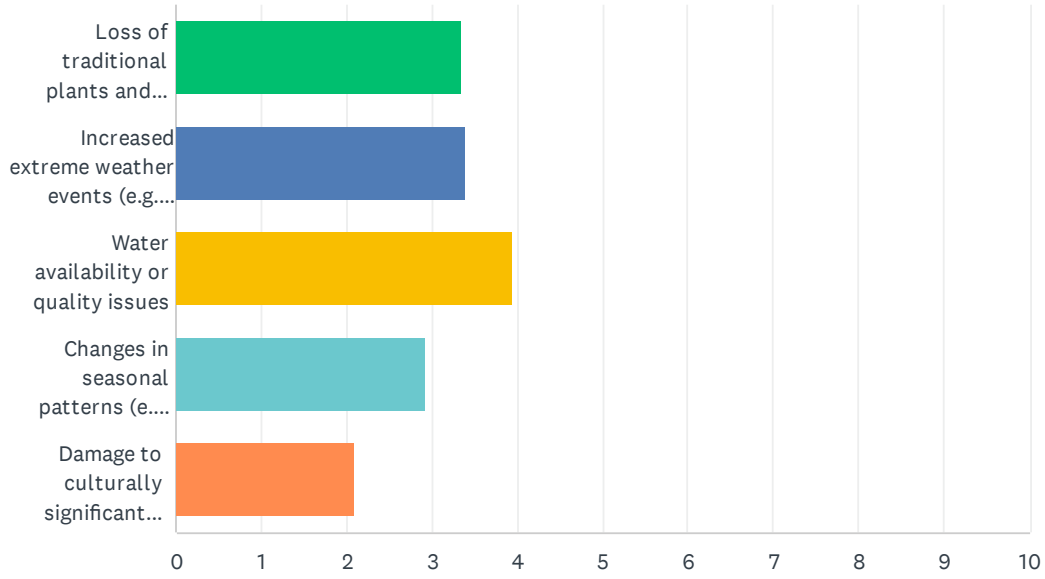
#	RESPONSES	DATE
1	Strain put on public, private, nonprofit resources & personal usage due to damaging effects ofclimate change.	[redacted]
2	It just seems like our weather patterns are changing a lot.	[redacted]
3	As the world warms. There's no relief in sight for humankind. It seems the end is coming.	[redacted]
4	Install radar dopplers below and West Brule	[redacted]
5	Not really	[redacted]
6	The heat will be a factor in heat exhaustion	[redacted]
7	What concerns me is them trying to change our weather.	[redacted]
8	Increased river shoreline erosion	[redacted]
9	None	[redacted]
10	N/A	[redacted]
11	Hopefully we take care of the Earth.	[redacted]
12	How it's going to affect other species! How it will effect the weather!	[redacted]
13	I am worried about the water rising and about the snowstorms, like more snow.	[redacted]
14	The impact it has on emerging infectious diseases such as outbreaks of new diseases that were unknown before; known diseases that are now spreading quickly in an increased number of cases, new areas that previously had no disease; infectious disease that are persistent and can't be control.	[redacted]
15	It's important that we stay connected to the land "we are one"	[redacted]
16	Bipolar weather causing tornadoes	[redacted]
17	Flooding	[redacted]
18	Changes in wildlife	[redacted]
19	Can't stop others who don't care!! Although it is possible to try to get solar panels those big wind mills...and instead of just one person in one car. Motor Pool!!! Then we can start to learn to get along and get to know each other.	[redacted]
20	Not too much snow this past winter but that can all change. Flooding is my big concern, effecting the shoreline, especially the mouth of the South Creek. All homesites along the South Creek and the river.	[redacted]
21	earthquakes	[redacted]
22	Economic effects	[redacted]
23	Be prepared: Have storm shelters available and have supplies.	[redacted]
24	Below zero temperatures and windchill	[redacted]
25	Changes in weather on off season	[redacted]
26	If a natural disaster hits, how are we going to place so many families and ensure that they have a safe place to rest, eat and feel safe until other arrangements can be made.	[redacted]
27	No	[redacted]

28	The Summers will go right into fall, an the Winters are falling right into the spring that's gotta be a lil bit conserning!	[redacted]
29	Precautions	[redacted]
30	Droughts	[redacted]
31	The quickly eroding shorelines	[redacted]
32	Flooding brought on by the warmer temperatures.	[redacted]
33	Not right now	[redacted]
34	Animal life	[redacted]
35	Road rupture	[redacted]
36	How it will affect the ecosystem, things are rapidly changing and it’s scary time to live in.	[redacted]
37	N/A	[redacted]
38	None	[redacted]
39	Erosion of topsoil	[redacted]
40	Not right now	[redacted]
41	n/a	[redacted]
42	None	[redacted]
43	Increase of cancer cases due to the depletion on the ozone layer	[redacted]
44	None at this time.	[redacted]
45	Scary	[redacted]
46	ice caps, destruction of rain forests, decimation of honey bees, ect....	[redacted]
47	Its all worrisome with the climate.	[redacted]
48	No	[redacted]
49	None at the moment.	[redacted]
50	None	[redacted]
51	Bad intentions from humans to bring about wildfires on purpose and having a yearly plan for each season ahead of these events. Putting food away in storage for hunger relief etc. meat, water, survival supplies.	[redacted]
52	THE EFFECTS ON WILDLIFE?	[redacted]
53	Chem trails	[redacted]
54	Loss of habitat and wildlife could threaten ability to farm/hunt and hurt the economy and potential to grow food.	[redacted]
55	SHORT PLANTING SEASON	[redacted]
56	The weather changes can affect the older units throughout the community and damages may occur more frequently due to too much moisture. This can cause many troubles for the low income demographic of our area.	[redacted]
57	It’s in Gods hands	[redacted]
58	How it affects the road and housing conditions	[redacted]
59	No	[redacted]
60	How it's going to affect the lands and wildlife in our area	[redacted]
61	Help the people that this affects. In 2015 we had 100 miles straight line winds in that twisted it our mobile home trailer up That my son and his family was living in in. It rolled over with my two grandbabies and a babysitter, thank God that they made it through that storm. Red Cross	[redacted]

	helped him out with $300 but we as a community didn't help clean up the trailer but get a dumpster here for us to take care of ourselves. I was so traumatized by this incident and plus having to clean up our own and wonder why our own community didn't step up but yet they went out to other communities and help clean like Westington Springs, South Dakota when they had a tornado that ripped through. That's so sad that our own people own community couldn't help our own people. My son And his familylost everything, our tribe didn't help out with anything if they help out other tribes with money to help support them put supporting us to get us back on our feet while Red Red Cross only gave $300 for them to purchase clothing.	
62	Not everyone will be involved in making changes to the homeland are not being aware and preparing for it	[redacted]
63	Just the impact of how my family will survive some of the storms knocking some power out	[redacted]
64	People not being ready and knowing how to survive by themselves and depending on the government or Tribe.	[redacted]

Q5 Rank the following environmental changes in terms of how much they concern you (1 = most concerning; 5 = least concerning). Select N/A if any of the changes are not applicable.

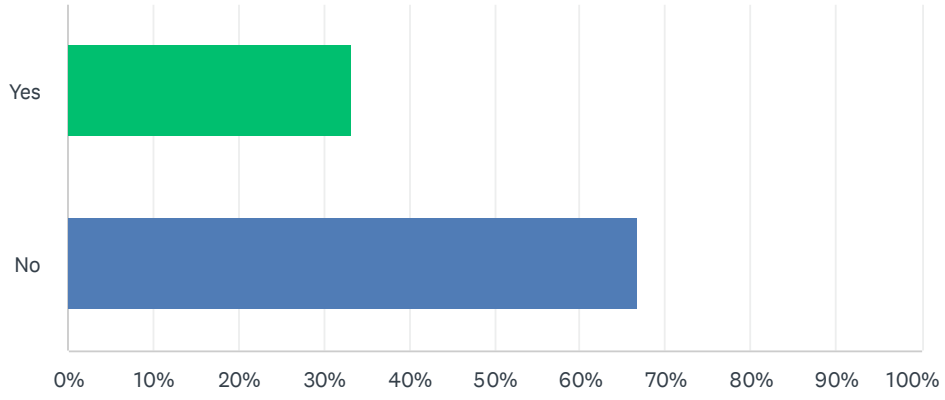
Answered: 84 Skipped: 22



	1	2	3	4	5	N/A	TOTAL	SCORE
Loss of traditional plants and animals	29.69% 19	17.19% 11	14.06% 9	28.13% 18	7.81% 5	3.13% 2	64	3.34
Increased extreme weather events (e.g., floods, droughts, or heat waves)	21.21% 14	30.30% 20	18.18% 12	12.12% 8	12.12% 8	6.06% 4	66	3.39
Water availability or quality issues	43.75% 28	20.31% 13	23.44% 15	6.25% 4	4.69% 3	1.56% 1	64	3.94
Changes in seasonal patterns (e.g., planting or harvesting times)	10.29% 7	19.12% 13	30.88% 21	26.47% 18	10.29% 7	2.94% 2	68	2.92
Damage to culturally significant areas	11.94% 8	8.96% 6	8.96% 6	14.93% 10	53.73% 36	1.49% 1	67	2.09

Q6 Have you changed any of the activities (work, personal, or cultural) that you do because of climate change?

Answered: 99 Skipped: 7



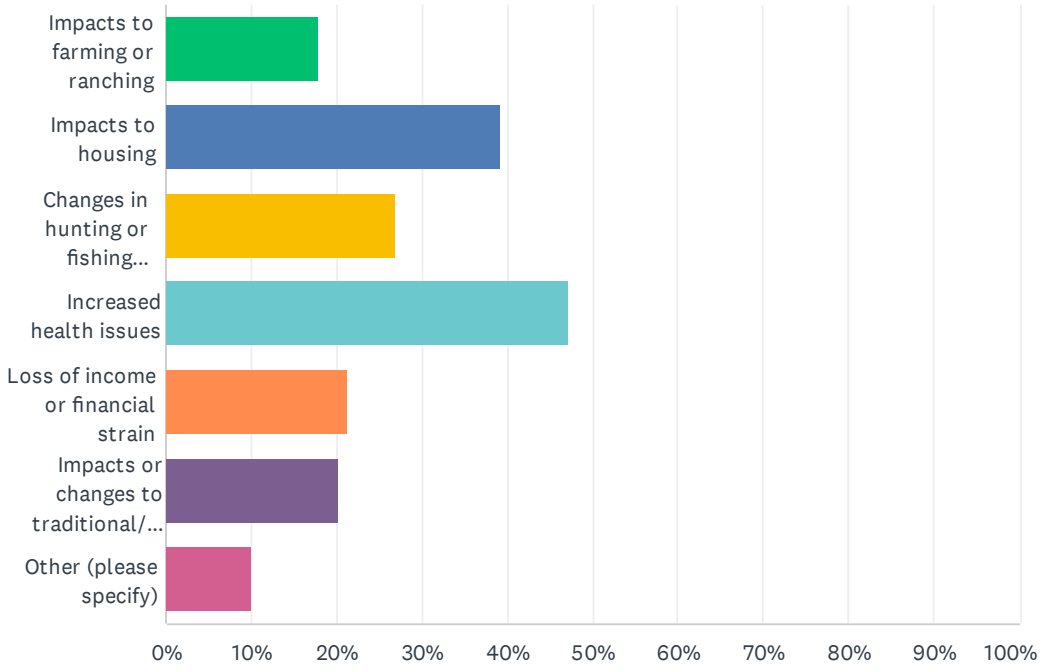
ANSWER CHOICES	RESPONSES	
Yes	33.33%	33
No	66.67%	66
TOTAL		99

#	IF YES, PLEASE EXPLAIN:	DATE
1	Try to avoid activities during more extreme weather.	[redacted]
2	No response given	[redacted]
3	Getting up earlier to beat the heat. Work later in the day.	[redacted]
4	water consensus	[redacted]
5	I see myself going and spending more time with younger siblings outside. As for work, can't wait to start working outside again on lawns.	[redacted]
6	Recycle more	[redacted]
7	Too hot, stay inside	[redacted]
8	I don't go outside as much in the summer time because it's too hot! It never used to be this hot. It gets cold way too early in the day.	[redacted]
9	Calving season has changed; don't go to very crowded event or domains; crop planting, harvesting and soil presswork is at a different season.	[redacted]
10	We cannot stay in the sun for long because harmful rays.	[redacted]
11	No response given	[redacted]
12	No response was given	[redacted]
13	drive less	[redacted]
14	No answer was given	[redacted]
15	Health issues	[redacted]

16	Unable to access site to get traditional plants, roads, paths washed out.	[redacted]
17	Yard work routines is somewhat affected	[redacted]
18	I no longer sundance, because the heat has become so extreme that my body can no longer handle it. Also sometimes the rains will be so bad that it impacts our ability to complete our ceremonies. ceremonies.	[redacted]
19	Physical activity	[redacted]
20	can not hike,walking due to weather	[redacted]
21	Less outdoor events	[redacted]
22	I am not outside as much as I used to be	[redacted]
23	The weather is unpredictable	[redacted]
24	DAMAGES ON HOME	[redacted]
25	Moving to colder climate.	[redacted]
26	GARDEN PLANTING TIMES	[redacted]
27	I have had to do more research into greenhouse gardening and creating a budget to construct an underground greenhouse. The can goods from my home garden feed my family for most of the year.	[redacted]
28	work	[redacted]
29	canceled events (pow wows)	[redacted]
30	Bcuz of the damages on the roads I can't drive my vehicle even if it's to and from school and daycare and to my job	[redacted]
31	Our paint on our house has worn faster, the heat to keep the place cool in this summer and the winter extreme weather having to try to care for our house and keep it extra warm worn out our wood outside siding of our house. Our grass drives up faster	[redacted]
32	Trying to grow grass in my yard and when I put seed down, it’s a drought	[redacted]
33	Sledding	[redacted]

Q7 Have you or your family experienced any of the following due to changes in the climate and environment? Please select all that apply.

Answered: 89 Skipped: 17



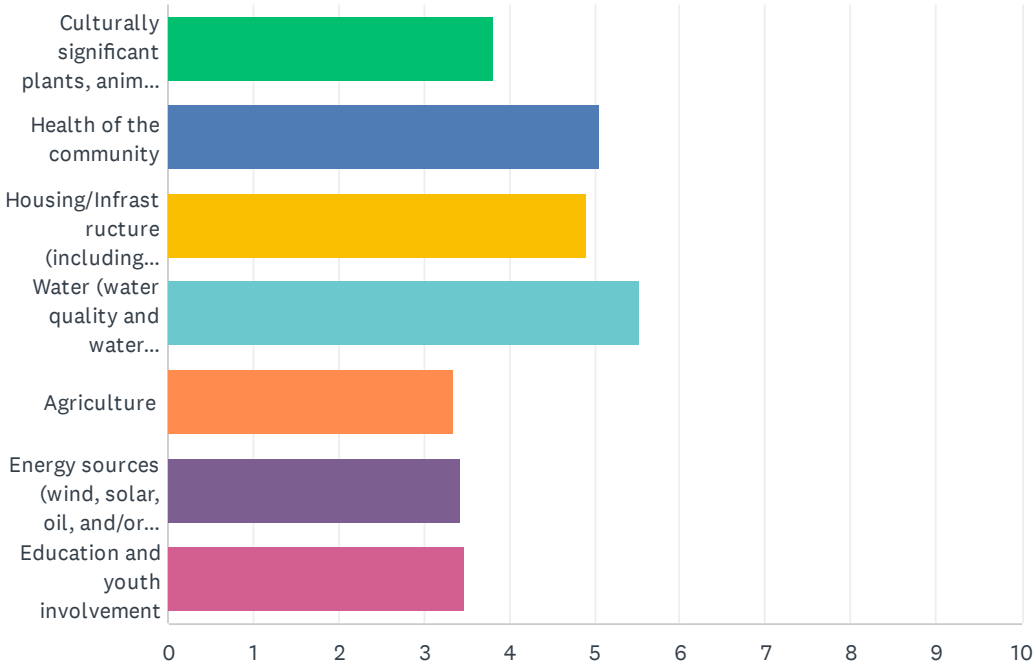
ANSWER CHOICES	RESPONSES	
Impacts to farming or ranching	17.98%	16
Impacts to housing	39.33%	35
Changes in hunting or fishing practices	26.97%	24
Increased health issues	47.19%	42
Loss of income or financial strain	21.35%	19
Impacts or changes to traditional/cultural practices	20.22%	18
Other (please specify)	10.11%	9
Total Respondents: 89		

#	OTHER (PLEASE SPECIFY)	DATE
1	No response provided	[redacted]
2	Flooding	[redacted]
3	None	[redacted]
4	None	[redacted]
5	Weatherizing home during the Winter	[redacted]
6	None	[redacted]

7	Only impacts were due to loss of freedom and mandates	[redacted]
8	LOSS OF FOOD	[redacted]
9	Help the people that this affects. In 2015 we had 100 miles straight line winds in that twisted it our mobile home trailer up That my son and his family was living in in. It rolled over with my two grandbabies and a babysitter, thank God that they made it through that storm. Red Cross helped him out with $300 but we as a community didn't help clean up the trailer but get a dumpster here for us to take care of ourselves. I was so traumatized by this incident and plus having to clean up our own and wonder why our own community didn't step up but yet they went out to other communities and help clean like Westington Springs, South Dakota when they had a tornado that ripped through. That's so sad that our own people own community couldn't help our own people. My son And his familylost everything, our tribe didn't help out with anything if they help out other tribes with money to help support them put supporting us to get us back on our feet while Red Red Cross only gave $300 for them to purchase clothing.	[redacted]

Q8 What are the most important things for the Tribe to focus on for climate change planning? Please rank the following responses (1 = most important; 7 = least important). Select N/A if any of the changes are not applicable.

Answered: 82 Skipped: 24



	1	2	3	4	5	6	7	N/A	TOTAL	SCORE
Culturally significant plants, animals (including buffalo), and places (including areas of harvesting or gathering)	15.00% 9	8.33% 5	5.00% 3	18.33% 11	26.67% 16	11.67% 7	11.67% 7	3.33% 2	60	3.81
Health of the community	23.44% 15	23.44% 15	17.19% 11	12.50% 8	7.81% 5	6.25% 4	4.69% 3	4.69% 3	64	5.05
Housing/Infrastructure (including residential and community solar and wind)	15.63% 10	28.13% 18	25.00% 16	6.25% 4	9.38% 6	6.25% 4	6.25% 4	3.13% 2	64	4.90
Water (water quality and water availability)	30.16% 19	28.57% 18	14.29% 9	17.46% 11	4.76% 3	3.17% 2	0.00% 0	1.59% 1	63	5.53
Agriculture	6.06% 4	4.55% 3	12.12% 8	18.18% 12	19.70% 13	25.76% 17	10.61% 7	3.03% 2	66	3.34
Energy sources (wind, solar, oil, and/or gas)	8.06% 5	4.84% 3	20.97% 13	14.52% 9	9.68% 6	20.97% 13	19.35% 12	1.61% 1	62	3.44
Education and youth involvement	20.29% 14	4.35% 3	8.70% 6	8.70% 6	11.59% 8	13.04% 9	30.43% 21	2.90% 2	69	3.48

Q9 Other ideas or suggestions?

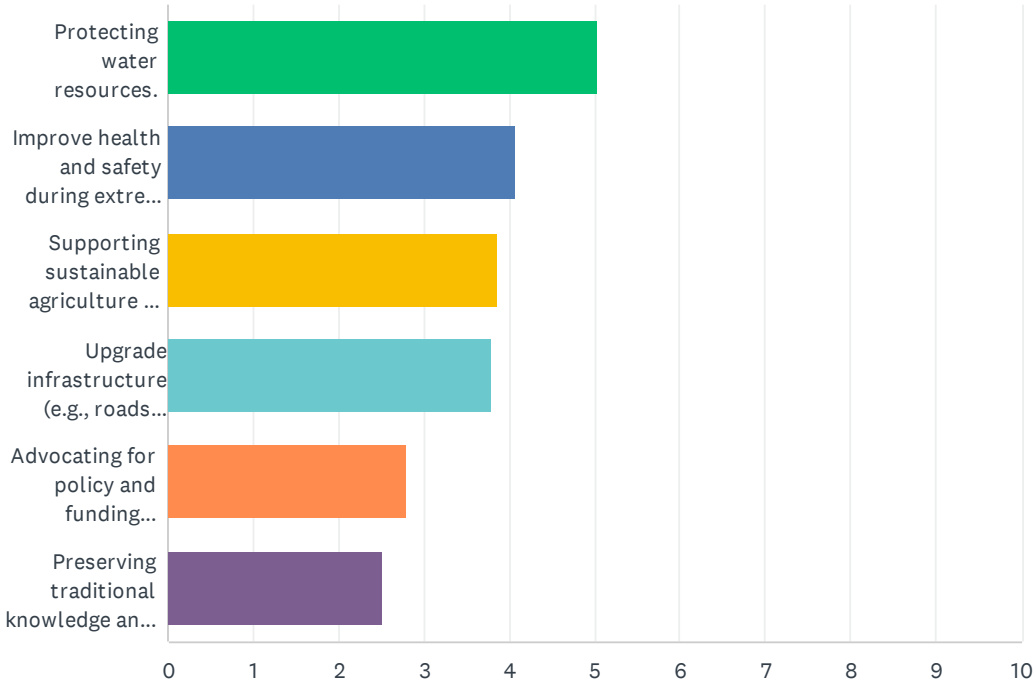
Answered: 47 Skipped: 59

#	RESPONSES	DATE
1	Pray to the great spirit for protection, guidance, strength and more to deal with climate change and hopefully reverse this.	[redacted]
2	None	[redacted]
3	None	[redacted]
4	Just keep community involvement one day they will see and understand!	[redacted]
5	N/A	[redacted]
6	Have dodge ball tournaments or racketball, corn hole, horse shoes...honestly anything to stay active throughout the summer. Hiking, walking/runs...I'd like to go around from time to time (once a week) and pickup yards.	[redacted]
7	Plant community gardens in both West Brule and Lower Brule.	[redacted]
8	Not at the moment	[redacted]
9	N/A	[redacted]
10	Public health interventions; implement public health measures to prevent and control diseases, a vector control programs; water purification and sanitation improvements.	[redacted]
11	Need to have places for the tribe to take shelter	[redacted]
12	Instead of judging one another...Respect and help one another.	[redacted]
13	Riprap shoreline north and south to protect shoreline and homesites.	[redacted]
14	River!	[redacted]
15	Modifying the schools to accommodate the students in extreme weather conditions (heat or cold)	[redacted]
16	Not atm	[redacted]
17	No	[redacted]
18	just be ready for Climate change!	[redacted]
19	Not at this time	[redacted]
20	No	[redacted]
21	Na	[redacted]
22	More surveys and community engagement.	[redacted]
23	Road rupture	[redacted]
24	No	[redacted]
25	None	[redacted]
26	Not at this time	[redacted]
27	n/a	[redacted]
28	None	[redacted]
29	None at this time.	[redacted]
30	Recycle	[redacted]

31	No	[redacted]
32	Promoting more education on our environment (littering and destruction- our home land is in danger)	[redacted]
33	None at the moment.	[redacted]
34	Regular Community Forums: Create ongoing feedback opportunities for community members to discuss their priorities, concerns, and potential solutions. Youth Involvement Ideas: Develop mentorship programs, internships, and community service projects, or collaborate with the local school to enhance engagement.	[redacted]
35	A in-depth investigation and study from all angles of data and research on the climate impacts. Not just politically one sided	[redacted]
36	Fixing or demolition of housing for those who are misplaced from their housing and using that land for farming or energy production	[redacted]
37	IDK	[redacted]
38	None	[redacted]
39	Adopt holistic agriculture and regenerative agriculture practices to restore land/ecosystem health. If you take care of the land, the land can take care of the people.	[redacted]
40	Starting a community garden, budgeting for new sewer system and lagoons for development in different areas to get off of the water tables, inform the community more of the changes in our environment through newsletters, facebook, etc.	[redacted]
41	Just always do what’s right	[redacted]
42	Gather the whole community. Council, housing authorities, directors farmers etc. Like a community gathering on the situation. Can have job opportunities on how to help or anything.	[redacted]
43	No	[redacted]
44	Council and housing should get together for more housing and fix up for those who don't get heat or air conditioning well.	[redacted]
45	Help the people that this affects. In 2015 we had 100 miles straight line winds in that twisted it our mobile home trailer up That my son and his family was living in in. It rolled over with my two grandbabies and a babysitter, thank God that they made it through that storm. Red Cross helped him out with $300 but we as a community didn’t help clean up the trailer but get a dumpster here for us to take care of ourselves. I was so traumatized by this incident and plus having to clean up our own and wonder why our own community didn’t step up but yet they went out to other communities and help clean like Westington Springs, South Dakota when they had a tornado that ripped through. That’s so sad that our own people own community couldn’t help our own people. My son And his familylost everything, our tribe didn’t help out with anything if they help out other tribes with money to help support them put supporting us to get us back on our feet while Red Red Cross only gave $300 for them to purchase clothing that’s all.	[redacted]
46	We need help with our houses/foundations due to weather	[redacted]
47	Teach our young men how to hunt and be men! Too many don't know how to be a man and even fix things around a home.	[redacted]

Q10 How should the Tribe best prepare for the effects of climate change on our people and culture? Please rank the following responses (1 = most important; 6 = least important). Select N/A if any of the responses are not applicable or appropriate.

Answered: 84 Skipped: 22



	1	2	3	4	5	6	N/A	TOTAL	SCORE
Protecting water resources.	57.14% 36	17.46% 11	4.76% 3	9.52% 6	7.94% 5	1.59% 1	1.59% 1	63	5.03
Improve health and safety during extreme events (e.g. upgrading the community center so that it can be a place for people to go when there is a weather emergency).	19.05% 12	30.16% 19	17.46% 11	11.11% 7	12.70% 8	7.94% 5	1.59% 1	63	4.08
Supporting sustainable agriculture and food sovereignty.	6.45% 4	27.42% 17	30.65% 19	19.35% 12	8.06% 5	6.45% 4	1.61% 1	62	3.85
Upgrade infrastructure (e.g., roads, electricity, sewage, internet) in our community to help everyday living.	14.93% 10	16.42% 11	22.39% 15	28.36% 19	10.45% 7	5.97% 4	1.49% 1	67	3.79
Advocating for policy and funding support.	8.06% 5	4.84% 3	14.52% 9	19.35% 12	33.87% 21	17.74% 11	1.61% 1	62	2.79
Preserving traditional knowledge and practices.	11.94% 8	8.96% 6	8.96% 6	5.97% 4	14.93% 10	47.76% 32	1.49% 1	67	2.52

Q11 Other ideas or suggestions?

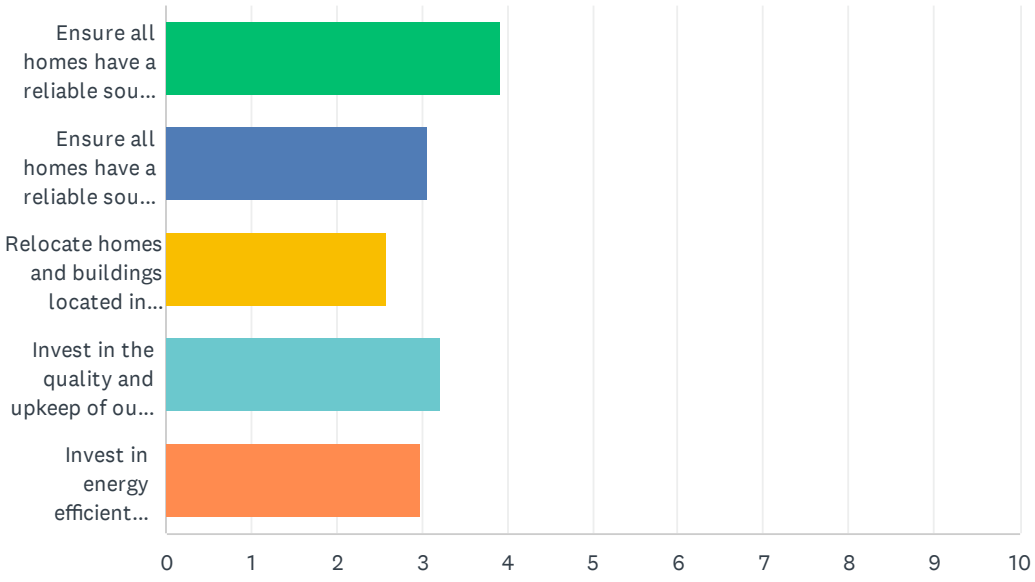
Answered: 42 Skipped: 64

#	RESPONSES	DATE
1	All of the above are important. Many of the items above should not be ranked from 1 to 6, but made number 1s!	[redacted]
2	None	[redacted]
3	Keeping a close eye on 1 another, 2 many people stealing from each other.	[redacted]
4	Plant more traditional plants	[redacted]
5	None at the moment	[redacted]
6	N/A	[redacted]
7	Work together.	[redacted]
8	Have a backup plan for or if we ever had a disaster.	[redacted]
9	Infectious diseases; direct and indirectly will increase in the future due to climate change we need to develop a strong pandemic preparedness. Keep eye on surveillance data; be prepared for outbreaks; have a strong health infrastructure to be ahead of diseases; be prepared!	[redacted]
10	Bring back the 4H to the younger generation. And definitely stop the drug problem. In our native culture (long ago) it didn't or never mattered about age!! WE all helped each other.	[redacted]
11	Meeting with community member about cultural traditional knowledge and practices. Especially with the youth.	[redacted]
12	Protect water, stop oil drilling	[redacted]
13	Have trainings on preparing for disasters	[redacted]
14	Build cellars for shelter for those who live in the country.	[redacted]
15	No	[redacted]
16	No	[redacted]
17	Reach out to support an recognition climate change!	[redacted]
18	Not right now	[redacted]
19	No	[redacted]
20	Na	[redacted]
21	None	[redacted]
22	No	[redacted]
23	No	[redacted]
24	None	[redacted]
25	Make a tribal pantry with stipulations of course.	[redacted]
26	n/a	[redacted]
27	None	[redacted]
28	None at this time.	[redacted]
29	Help to save environment	[redacted]
30	none	[redacted]

31	No	[redacted]
32	Provide jobs for repairing homes (residential as well as rentals). Repairing our streets and roads.	[redacted]
33	None at the moment.	[redacted]
34	Bring back community ceremony and praying together in ceremonies.	[redacted]
35	IDK	[redacted]
36	None	[redacted]
37	Look into sustainable businesses that can assist the tribe’s economy by building a workforce. Then expand businesses to keep the new workforce’s business in Lower Brule.	[redacted]
38	🥰	[redacted]
39	Unsure other than a community meeting	[redacted]
40	No	[redacted]
41	More job opportunities to help with construction to roads, land, and housing	[redacted]
42	More access to emergency services like food pantry or shelter if needed	[redacted]

Q12 How should the Tribe make sure our infrastructure (e.g., homes, roads, facilities, utilities, etc.) can withstand climate driven weather extremes? Please rank the answers below in order of importance (1 = most important; 5 = least important). Select N/A if any of the responses are not applicable or appropriate.

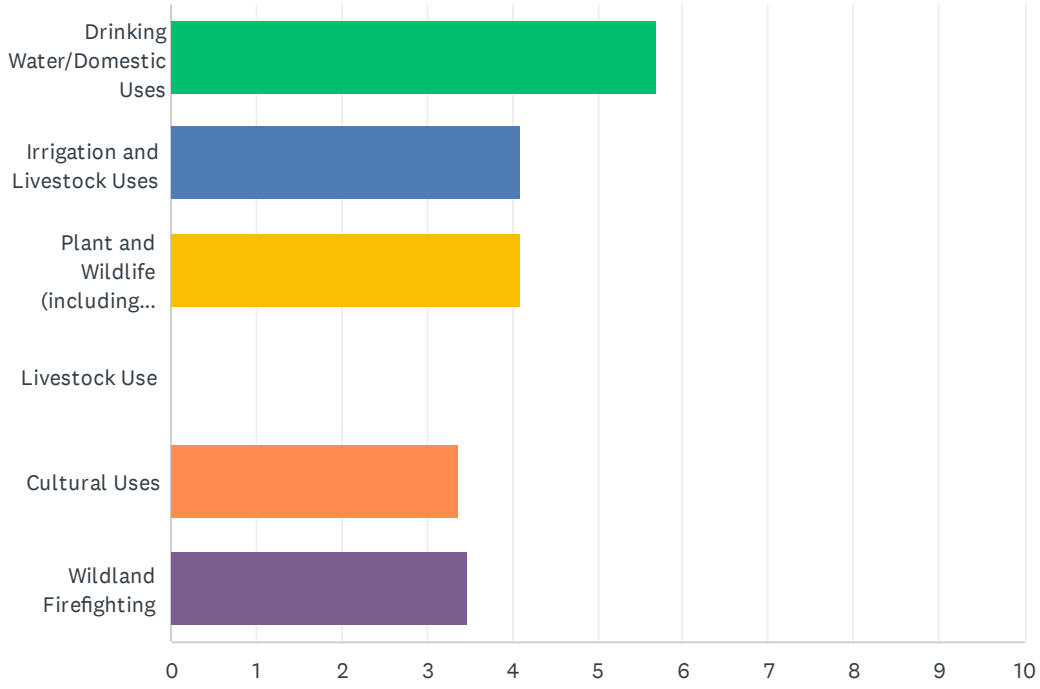
Answered: 84 Skipped: 22



	1	2	3	4	5	N/A	TOTAL	SCORE
Ensure all homes have a reliable source of heat	42.37% 25	22.03% 13	20.34% 12	11.86% 7	1.69% 1	1.69% 1	59	3.93
Ensure all homes have a reliable source of cooling	13.56% 8	23.73% 14	27.12% 16	23.73% 14	10.17% 6	1.69% 1	59	3.07
Relocate homes and buildings located in flood zones	14.29% 9	11.11% 7	23.81% 15	12.70% 8	33.33% 21	4.76% 3	63	2.58
Invest in the quality and upkeep of our roads, bridges, sewer systems, etc. and ensure that there are "rescue routes" throughout the Reservation	19.35% 12	29.03% 18	16.13% 10	22.58% 14	11.29% 7	1.61% 1	62	3.23
Invest in energy efficient systems and building (e.g., better insulation) and/or sustainable sources of energy (e.g., solar and wind) for Tribal buildings and area homes, and work to ensure new homes built are suitable for the environment.	28.57% 20	15.71% 11	7.14% 5	17.14% 12	28.57% 20	2.86% 2	70	2.99

Q13 Please rank the following water uses from most important for the Tribe to focus on to least important in regards to planning for the impacts of climate change (1 = most important; 5 = least important). Select N/A if any of the responses are not applicable or appropriate.

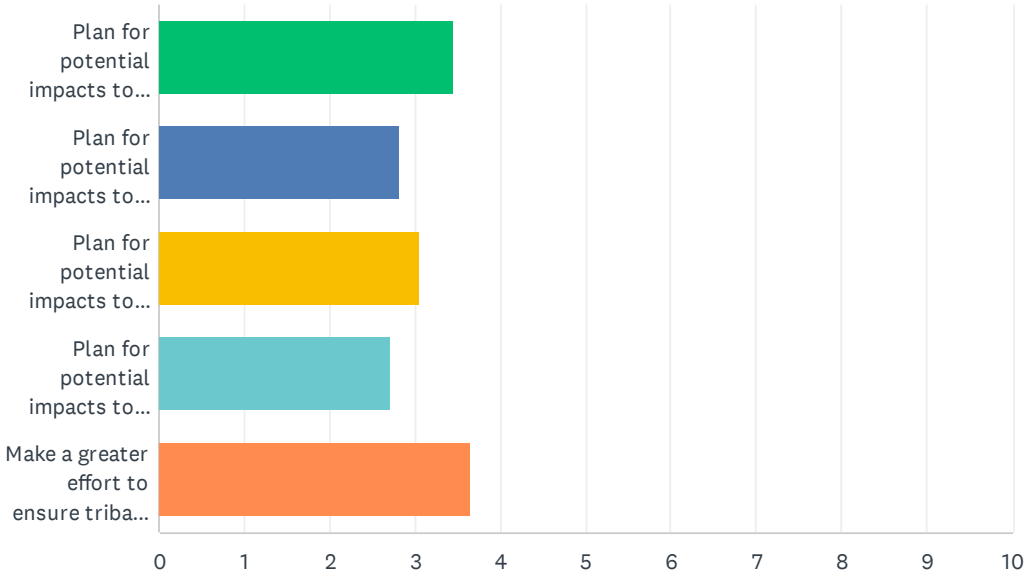
Answered: 81 Skipped: 25



	1	2	3	4	5	6	N/A	TOTAL	SCORE
Drinking Water/Domestic Uses	83.33% 55	6.06% 4	1.52% 1	4.55% 3	1.52% 1	0.00% 0	3.03% 2	66	5.70
Irrigation and Livestock Uses	8.33% 5	38.33% 23	15.00% 9	28.33% 17	8.33% 5	0.00% 0	1.67% 1	60	4.10
Plant and Wildlife (including buffalo) Uses	8.47% 5	20.34% 12	47.46% 28	15.25% 9	6.78% 4	0.00% 0	1.69% 1	59	4.09
Livestock Use	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Cultural Uses	0.00% 0	23.33% 14	20.00% 12	23.33% 14	31.67% 19	0.00% 0	1.67% 1	60	3.36
Wildland Firefighting	14.06% 9	14.06% 9	14.06% 9	18.75% 12	37.50% 24	0.00% 0	1.56% 1	64	3.48

Q14 How should the Tribe best prepare for the effects of climate change on our lands? Please rank the following responses (1 = most important; 5 = least important). Select N/A if any of the responses are not applicable or appropriate.

Answered: 81 Skipped: 25



	1	2	3	4	5	N/A	TOTAL	SCORE
Plan for potential impacts to farming and ranching.	31.15% 19	24.59% 15	13.11% 8	13.11% 8	14.75% 9	3.28% 2	61	3.46
Plan for potential impacts to hunting and fishing.	6.67% 4	26.67% 16	23.33% 14	21.67% 13	18.33% 11	3.33% 2	60	2.81
Plan for potential impacts to wetlands, streams, lakes, and rivers.	12.28% 7	26.32% 15	26.32% 15	19.30% 11	14.04% 8	1.75% 1	57	3.04
Plan for potential impacts to plants and wildlife (including buffalo).	6.45% 4	17.74% 11	30.65% 19	27.42% 17	16.13% 10	1.61% 1	62	2.70
Make a greater effort to ensure tribal food sovereignty (e.g., opportunities for community and individual gardens).	57.14% 40	5.71% 4	2.86% 2	10.00% 7	22.86% 16	1.43% 1	70	3.65

Q15 How important is it for the Tribe to pursue alternative/renewable energy development on the reservation? (5 stars = very important; 1 star = not very important)

Answered: 92 Skipped: 14

4.5★

average rating

	1	2	3	4	5	TOTAL	WEIGHTED AVERAGE
☆	5.43% 5	1.09% 1	4.35% 4	15.22% 14	73.91% 68	92	4.51

Q16 What gives you hope about addressing climate challenges?

Answered: 79 Skipped: 27

#	RESPONSES	DATE
1	Mother Nature, the Father Sky with the Great Spirit will help all that are willing to ask and work with the energies provided to heal the planet	[redacted]
2	That Indian County will continue to be self sufficient and prepared when disasters happen from climate change.	[redacted]
3	That it can be done	[redacted]
4	Vary	[redacted]
5	Because our tribe is addressing the situation ahead of the problem.	[redacted]
6	Just pray to the Lord.	[redacted]
7	Knowledge for next generation.	[redacted]
8	More people are learning about traditional plants and how they help people	[redacted]
9	More shelter for storms	[redacted]
10	The more info out there the better	[redacted]
11	No comment	[redacted]
12	We are thinking about it now	[redacted]
13	Not sure	[redacted]
14	N/A	[redacted]
15	Something will be done.	[redacted]
16	Information-action	[redacted]
17	Around the world more and more countries are getting involved.	[redacted]
18	That the tribe is watching out for us, our land, our water.	[redacted]
19	Increased awareness-like this survey; growing number of people, organizations, and tribes taking concrete steps to address climate change; people are start to focus on solutions; climate actions are designed to address disproportionate impacts on vulnerable communities (tribes).	[redacted]
20	Today's meeting about climate change!	[redacted]
21	Hoping to see better for our community	[redacted]
22	Outdoor activities	[redacted]
23	Nice weather	[redacted]
24	Working with the Tribal Council	[redacted]
25	We have ask the creator first in putting changes in place than good things come about.	[redacted]
26	Using dumpsters and not littering	[redacted]
27	Try to use less water and gases.	[redacted]
28	Better for the younger generation.	[redacted]
29	That we (the people) "community" are actually doing or preparing for our future.	[redacted]
30	Perserving our reservation-taking care of our people.	[redacted]

31	Taking care of the water	[redacted]
32	Being prepared for natural disasters	[redacted]
33	Having a plan	[redacted]
34	I'm glad we have our brownfield and EPO office who do awareness presentations	[redacted]
35	Grant funding	[redacted]
36	Idk but I know it’s important.	[redacted]
37	Good	[redacted]
38	Windmills/solar energy	[redacted]
39	I believe that by planning and acting now, we can ensure the survival of our people in the long term. I don't believe it's going to get better, I believe climate change is going to get worse. So we need to ensure our people can sustain themselves and survive what is coming. We are destroying the planet as a human race. We have to change that trajectory, or we won't survive. If we can't change it, then we need to ensure that our people can survive.	[redacted]
40	We live in an area where the plants and animals evolved with extreme variability in weather and climate.	[redacted]
41	people are being more involved an seeing what climate change can affect the planet	[redacted]
42	Very important information	[redacted]
43	Better food	[redacted]
44	This survey!	[redacted]
45	Meeting the needs of our people.	[redacted]
46	That there are people planning/looking into all whats needed	[redacted]
47	Na	[redacted]
48	Self sufficiency relearning how to be productive and build self sustainable habits.	[redacted]
49	Make sure lower brule residents are aware of flooding	[redacted]
50	elon	[redacted]
51	It is a valid issue and it’s great knowing the tribe is proactive in getting the opinions and information from members.	[redacted]
52	New living environment	[redacted]
53	The forward thinking people on council.	[redacted]
54	I'm thankful that it is being thought of for the tribe and that steps are being made in case that action needs to be taken.	[redacted]
55	n/a	[redacted]
56	Please consider addressing it more!	[redacted]
57	It shows there is a real concern for our future and it is being taken seriously.	[redacted]
58	Survival	[redacted]
59	Working together	[redacted]
60	ensuring a world that future generations can survive and thrive in.	[redacted]
61	Nothing	[redacted]
62	Rapid advancements in renewable energy technology, growing public awareness and activism, international climate agreements, and the potential for innovative solutions like carbon capture and storage.	[redacted]
63	Hoping changes will happen	[redacted]

64	Native Americans take more interest in the land unlike other races. I believe any kind of climate challenge that we face along our time on mother earth we always find a way to contribute not just for the time we are here but for our future generations. After all we are people of the land.	[redacted]
65	1. Indigenous people are leading on climate. 2. Seeing a increase in global awareness. 3. Growing public pressure for action. 4. Seeing a transition to clean energy.	[redacted]
66	Climate change is the least of the tribes problems	[redacted]
67	Gets everyone involved and thinking ahead.	[redacted]
68	IDK	[redacted]
69	This is the first time I've seen tribal authorities engage with tribal members regarding an important topic.	[redacted]
70	Addressing these issues must mean that there is something being planned for the future.	[redacted]
71	It's out of our hands	[redacted]
72	If council puts better effort in our land and our people	[redacted]
73	Renewable energy	[redacted]
74	Hoping the new council will look into our children's future better.	[redacted]
75	Addressing those issues	[redacted]
76	A better life for my family	[redacted]
77	If we can power ourselves and grow our own food and such, we can be self sufficient and move away from being government dependent. Also, jobs could be created if we have our own factories, slaughterhouses or farms	[redacted]
78	Nothing till I see it happening for everyone and not just people who are related to housing and council members!	[redacted]
79	That people are willing to help get as much information out there about climate change	[redacted]

Q17 What specific climate-related challenges do you personally face?

Answered: 77 Skipped: 29

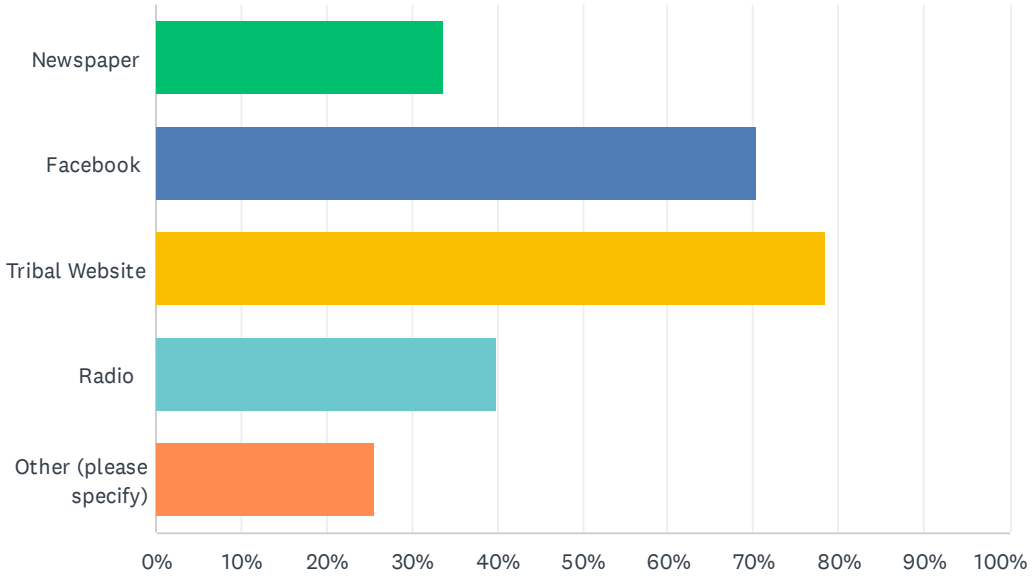
#	RESPONSES	DATE
1	Increased temperatures and air pollution.	[redacted]
2	The extreme and constant winds have caused significant damage to my home which cost me money to repair.	[redacted]
3	Drought	[redacted]
4	Heat	[redacted]
5	Flooding of our property in the past!	[redacted]
6	None at the moment (ATM)	[redacted]
7	Temperature dramatic change. My dad told me where was in the service (WWII) they were seeding clouds by airplane to make it rain.	[redacted]
8	My needs weatherization	[redacted]
9	We have no were to go in a disaster situation.	[redacted]
10	Sewer, heating, cool-AC, our driveway going away every other year	[redacted]
11	Anxiety about the ever changing weather.	[redacted]
12	No comment	[redacted]
13	Hot spells are hotter; cold spells are colder	[redacted]
14	Heat	[redacted]
15	N/A	[redacted]
16	Knowing more information about climate.	[redacted]
17	Heat; loss of plants-grass etc. because of drought.	[redacted]
18	Weather = winter and summer!	[redacted]
19	My home is shifting, water rising up to my home.	[redacted]
20	Drought; heat waves; flooding; epidemiology changes (alternations in the health of plants, mammals are interconnected to humans-all of us); we have all been impacted by the conditions that increase the risk of disease outbreak; exposed to more vector borne diseases.	[redacted]
21	Emotional and physical distress.	[redacted]
22	I don't think I do have any climate-related challenges	[redacted]
23	Cold weather	[redacted]
24	None	[redacted]
25	cold flu-season	[redacted]
26	Prairie Dogs	[redacted]
27	Not too much	[redacted]
28	Weather	[redacted]
29	Erosion and drought plus the heat...mostly we need to be nice and respectable to each other AND help one another.	[redacted]
30	Worried the river shoreline will erode if we don't do something especially for the homesites.	[redacted]

31	water and land	[redacted]
32	The toxins that are in the air with the spraying, over use of fertilizers etc.	[redacted]
33	The extreme heat in the summer. Makes it harder to breath	[redacted]
34	I live where there are high winds--no shelter--Live in modular homes and am an elder. Would like an outside toilet and cellar.	[redacted]
35	Brutal Weatheras I'm arthritic	[redacted]
36	Good	[redacted]
37	Weather changes	[redacted]
38	I am worried about my property. I cannot afford to make the kind of changes that I am going to need to make my house more sustainable, as an elderly. But, I will keep plugging away and making as many small changes as I can.	[redacted]
39	Waterfowl don’t migrate like they used to. There are much fewer to hunt now.	[redacted]
40	Heatwaves,Droughts,Blizzards	[redacted]
41	Keeping household comfortable with different climate changes	[redacted]
42	Covid	[redacted]
43	Struggle with finding housing when I work a full time job ON the reservation but I have to live elsewhere. That and heating and cooling the house we currently live in.	[redacted]
44	Weather- As I drive out of town for work and am noticing how bad the winters are affecting the roads and the upkeep	[redacted]
45	Na	[redacted]
46	Same as the rest of the world.	[redacted]
47	Reliable transportation	[redacted]
48	NA	[redacted]
49	Fear of the cost of food going up, it’s already expensive	[redacted]
50	Flooding	[redacted]
51	Increased heat waves	[redacted]
52	None that I'm aware of right now.	[redacted]
53	n/a	[redacted]
54	NA	[redacted]
55	Housing - not adequate to withstand the heat and cold.	[redacted]
56	None	[redacted]
57	All of them	[redacted]
58	water quality	[redacted]
59	None	[redacted]
60	Rising temperatures, more intense, and prolonged droughts, and are driving up household costs and shorter, warmer winters have led to a rise in vector-borne diseases like Lyme and West Nile.	[redacted]
61	All extreme wheather.	[redacted]
62	None	[redacted]
63	Winter gear for youth and teaching them about driving in the winter.	[redacted]
64	DAMAGES ON MY HOME AND KEEPING MY PETS SAFE	[redacted]

65	weatherization of our home.	[redacted]
66	None at the moment.	[redacted]
67	SEASONS ARE COMBING LONG WINTERS SHORT SUMMERS/SHORT WINTERS LONG SUMMER/SHORT GROWING SEASON	[redacted]
68	Plant changes in our environment (weather change has brought invasive plant life into my yard), the extreme cold weather and moisture has affected the remodel work we recently finished in our home, our homesite is in a flood zone causing us to have to relevel our trailer house every year, the erosion on the banks of the river are getting closer and closer to our homesite	[redacted]
69	N/A	[redacted]
70	Housing. Most houses here in LB have very bad insulation. Heating and cool. Important to think about homeless people or ppl that can't afford cars when extreme heat or cold for rides to get help	[redacted]
71	Keep house warm	[redacted]
72	Home isn't insulated well. Summer time, especially during extreme heat the central air gives out	[redacted]
73	Our outside homes, keeping cool during the summer, keeping warm during the winter.	[redacted]
74	The tribe loosing job and income to outside entities	[redacted]
75	The foundation in our house is terrible. Heavy rains make water seep into our basement and our plumbing is impacted by trees and wet weather	[redacted]
76	I just go with what mother nature dishes out because you can't change it and have to be aware of what is going on.	[redacted]
77	I love south Dakota but it has really snowed like it used too.	[redacted]

Q18 Where would you like to see emergency notifications and information for how the Tribe is preparing for impacts from climate change?

Answered: 98 Skipped: 8



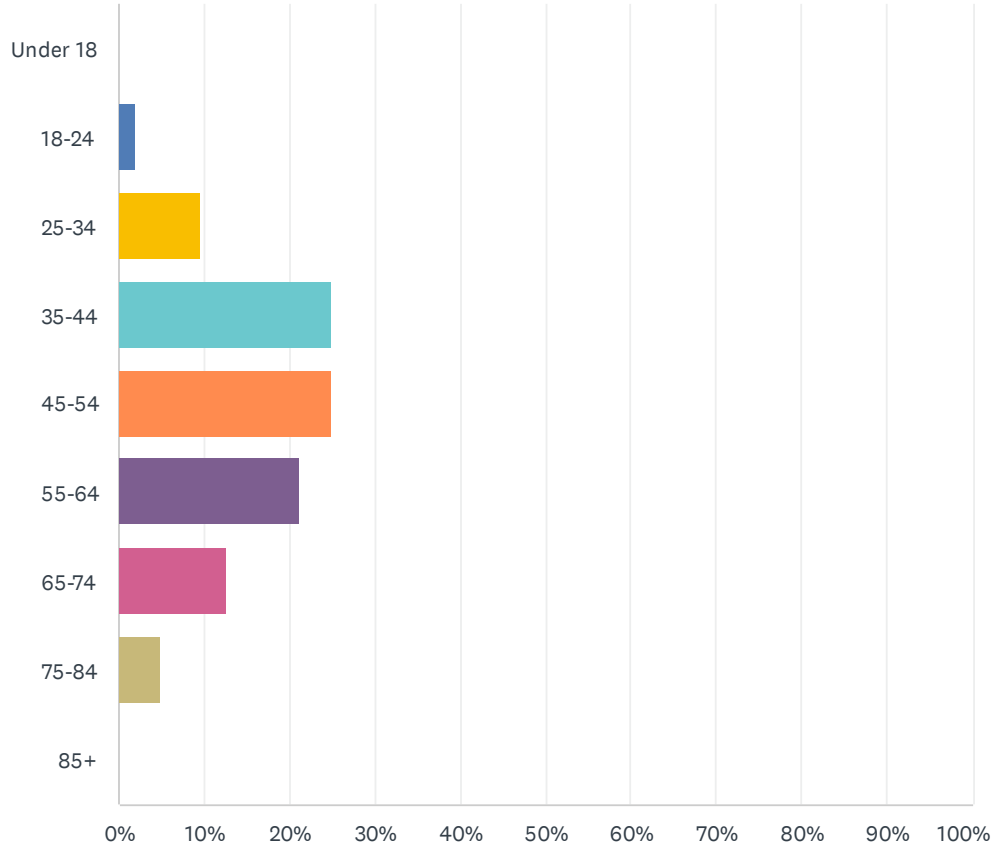
ANSWER CHOICES	RESPONSES	
Newspaper	33.67%	33
Facebook	70.41%	69
Tribal Website	78.57%	77
Radio	39.80%	39
Other (please specify)	25.51%	25
Total Respondents: 98		

#	OTHER (PLEASE SPECIFY)	DATE
1	All media and word of mouth resources.	[redacted]
2	Facebook, newspaper or radio, smoke signals?	[redacted]
3	Meeting-letters	[redacted]
4	Tribal newsletter	[redacted]
5	No answer given	[redacted]
6	No answer given	[redacted]
7	Everywhere	[redacted]
8	Signs	[redacted]
9	"Tribal Office Resource Area"; Designate an area at the tribal office for this information; currently, it seems to be Evelyn's desk.	[redacted]

10	put fliers where everyone can see them.	[redacted]
11	Post it in community and where meetings are held.	[redacted]
12	Subscribed to text messaging service	[redacted]
13	School website	[redacted]
14	TV Station for those without phones or internet.	[redacted]
15	cops go around like they used to	[redacted]
16	Tribal outlook	[redacted]
17	TV	[redacted]
18	All the above.	[redacted]
19	Waste of resources	[redacted]
20	Flyers	[redacted]
21	MAILINGS	[redacted]
22	Door to door	[redacted]
23	Storm alarms	[redacted]
24	Public notice in programs	[redacted]
25	In our homes starting with people who can't afford solar or wind energy. People who can;t afford anything right now.	[redacted]

Q19 What is your age?

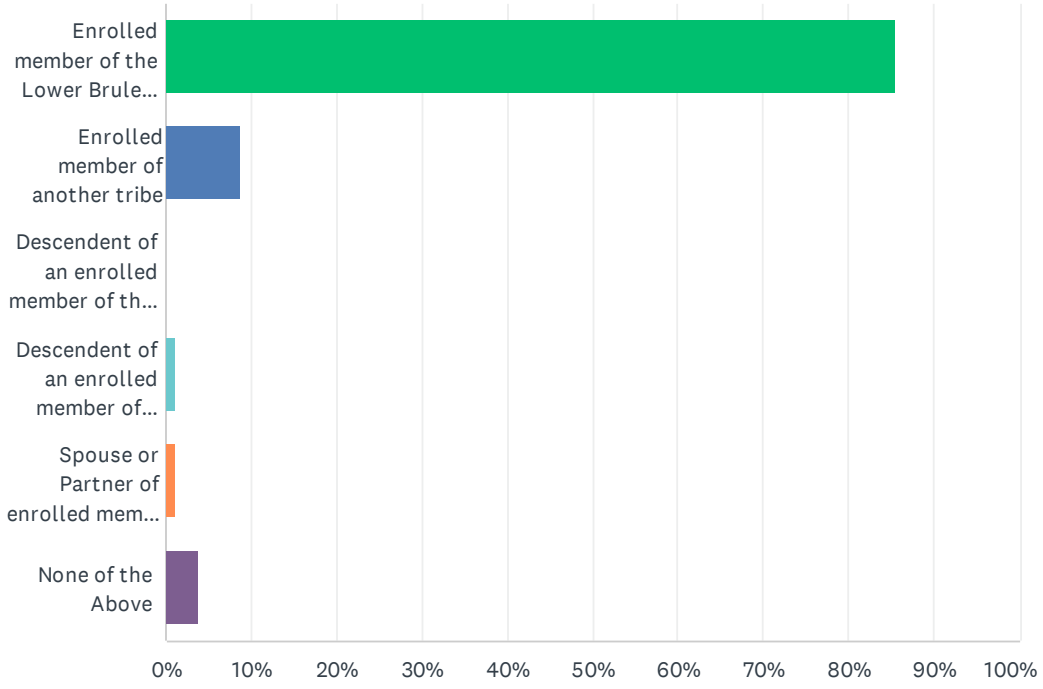
Answered: 104 Skipped: 2



ANSWER CHOICES	RESPONSES	
Under 18	0.00%	0
18-24	1.92%	2
25-34	9.62%	10
35-44	25.00%	26
45-54	25.00%	26
55-64	21.15%	22
65-74	12.50%	13
75-84	4.81%	5
85+	0.00%	0
TOTAL		104

Q20 What is your Tribal Affiliation?

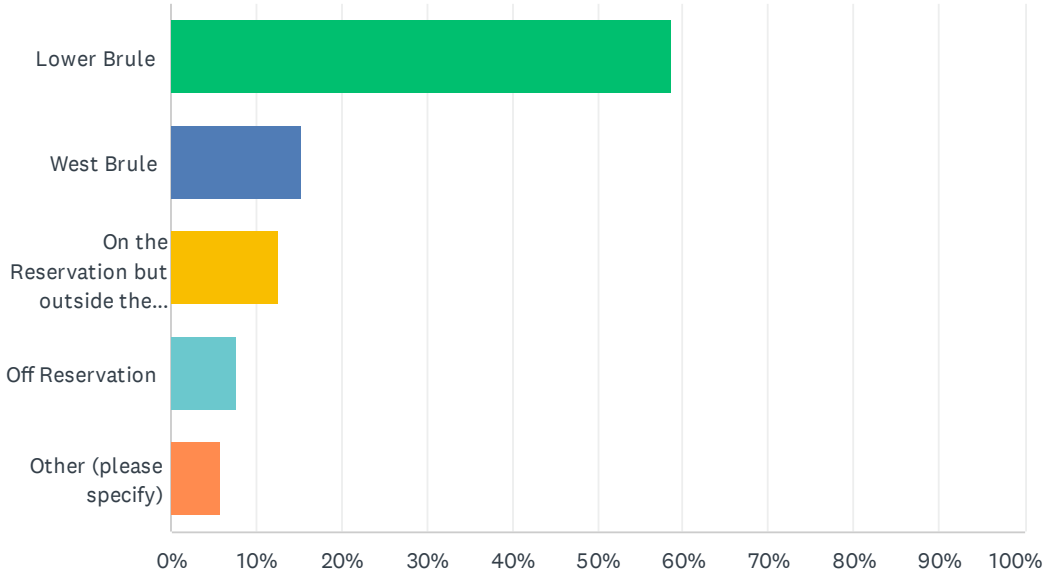
Answered: 104 Skipped: 2



ANSWER CHOICES	RESPONSES	
Enrolled member of the Lower Brule Sioux Tribe	85.58%	89
Enrolled member of another tribe	8.65%	9
Descendent of an enrolled member of the Lower Brule Sioux Tribe	0.00%	0
Descendent of an enrolled member of another tribe	0.96%	1
Spouse or Partner of enrolled member of the Lower Brule Sioux Tribe	0.96%	1
None of the Above	3.85%	4
TOTAL		104

Q21 Where do you currently reside?

Answered: 104 Skipped: 2



ANSWER CHOICES	RESPONSES	
Lower Brule	58.65%	61
West Brule	15.38%	16
On the Reservation but outside the communities	12.50%	13
Off Reservation	7.69%	8
Other (please specify)	5.77%	6
TOTAL		104

Kul Wicasa Oyate Lower Brule Sioux Tribe

2025

Climate Resilience Plan