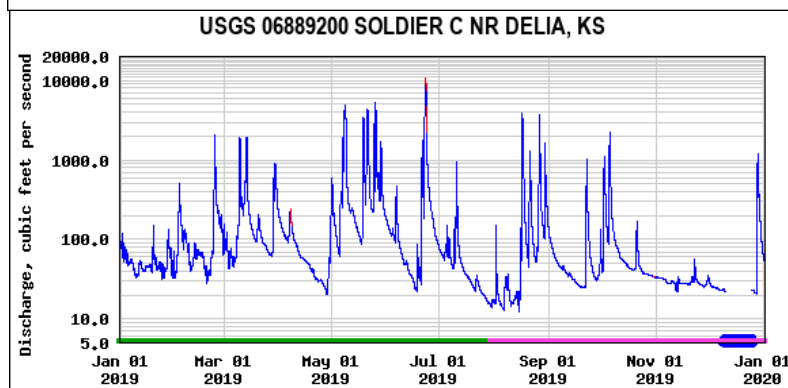
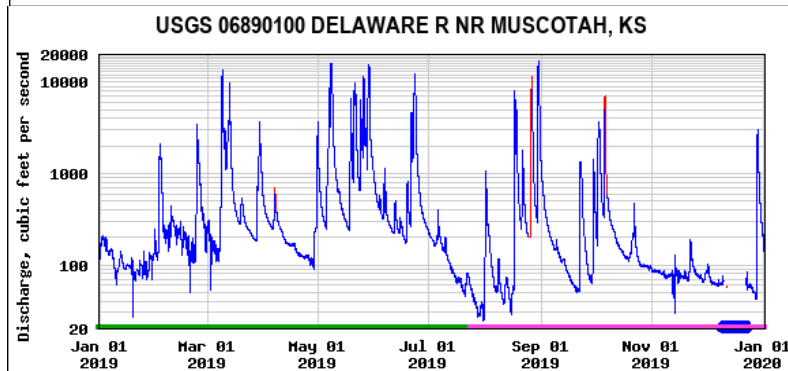
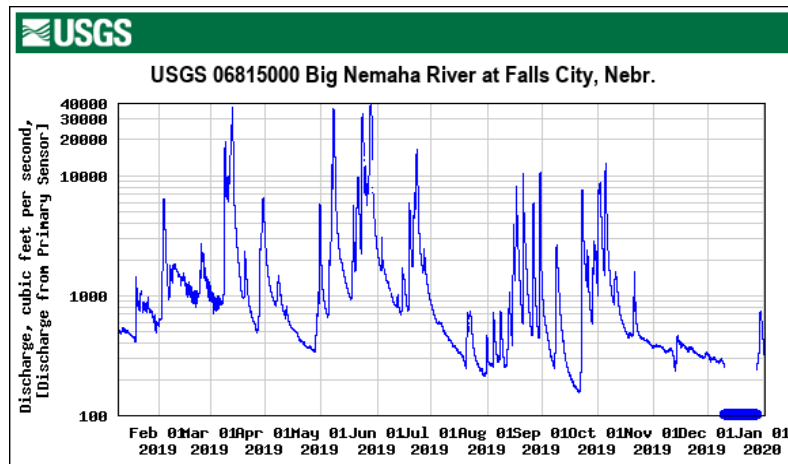


Rivers and Streams

There was a great deal of variability in the major streams on the reservations. High water events occurred on the Nemaha three times as discharge ran 40,000 ft³/sec in March, May and again in June. Currently, the river is discharging at about a 300 CFS which is about three times the normal for this time of year. The Delaware is also at times more than normal while the Big Soldier is discharging at four times its normal rate for January.



Data Generated Jan. 17, 2020 at <https://waterdata.usgs.gov/>



Gavin's Point Dam was a major contributor to the flooding experienced throughout the region. The releases from the dam are controlled by the US Army Corps of Engineers and because of torrential rains in the upper Missouri River Basin the Corps was forced to increase releases from the dam. In March of 2019 the dam was discharging nearly 300,00 CFS. During peak flooding the rate was still between 100,000 – 200,000 CFS. However, the dam is now releasing just 34,000 CFS and on December 17, 2019, the Missouri River at Rulo finally dipped below flood stage for the first time in nine months.

Super Gopher Bowl Sunday

Town	Observed High Temp	Normal High
Verdel, NE	54	40
Toledo, IA	51	35
Reserve, KS	64	46
Horton, KS	65	46
Holton, KS	66	45

A great day for Chiefs fans was made even nicer by well above temperatures throughout Region 7. Above is a chart showing recorded highs and average highs. Data for the counties around the Winnebago and Omaha Reservations was not available.

Created by the Sac and Fox Environmental Department
mark.junker@sacfoxenviro.org



Water Planning and Management

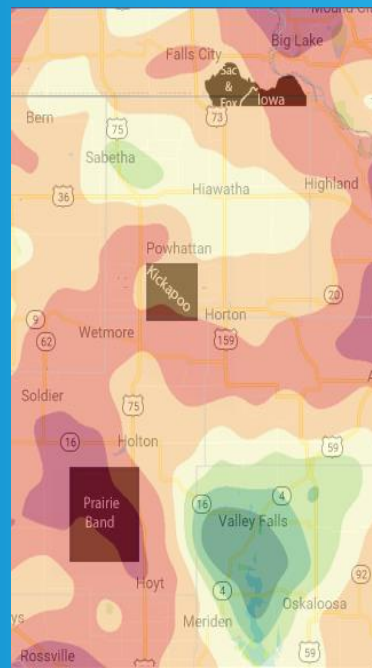
Understanding & using our resources

- Looking at our climate seasonally.
- Analyzing trends.
- Preparing for the future.
- Adapting to changes in the climate.
- Anticipating the future.
- Becoming Resilient

Inside this Issue

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Precipitation (inches) from Jan. 1, 2019 – Dec. 31, 2019



46 48 50 52 54 56 58

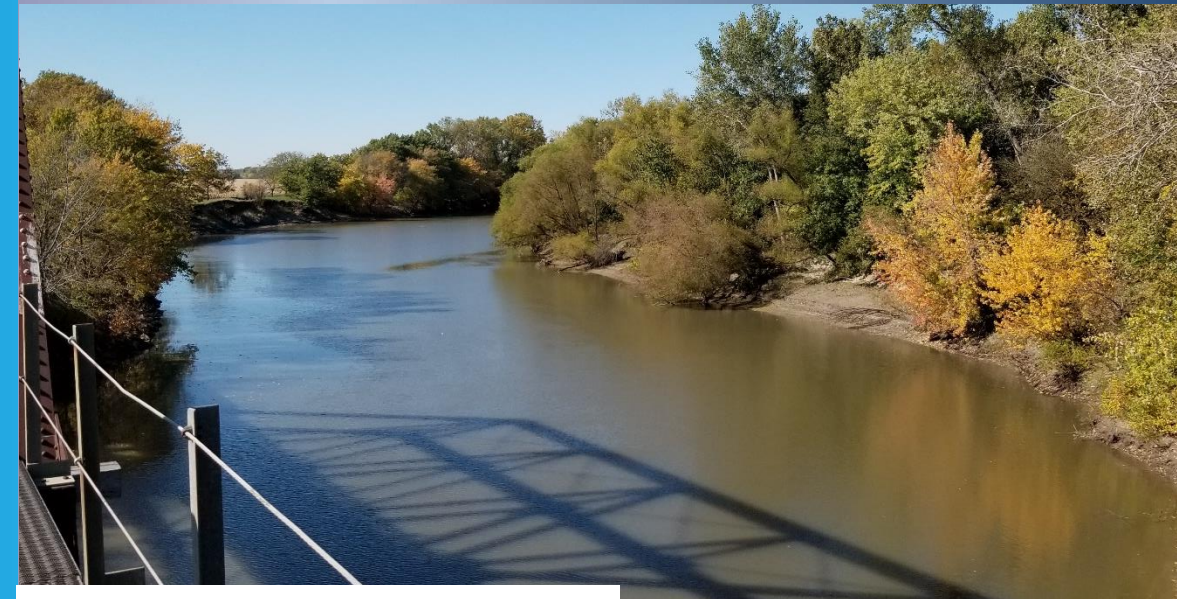
<http://scacis.rcc-acis.org/>

4 Kansas Tribes Climate Summary

Volume 2, Issue 2

Winter/Spring

Flood Recovery and Preparation



The Nemaha River at the Preston, NE trestle – October 2019

The floodwaters of 2019 have largely receded and the rivers and streams of Kansas and Nebraska were running a little above normal during most of the fall and winter. However, along the Missouri River where levees were breached, the water has not returned to the main channel. This has the potential to create problems once the ground freezes. Additionally, in the Dakotas soils are both saturated and frozen. This will greatly increase runoff and could lead to problems even worse than those encountered last year with ices jams.

We are the Connection...

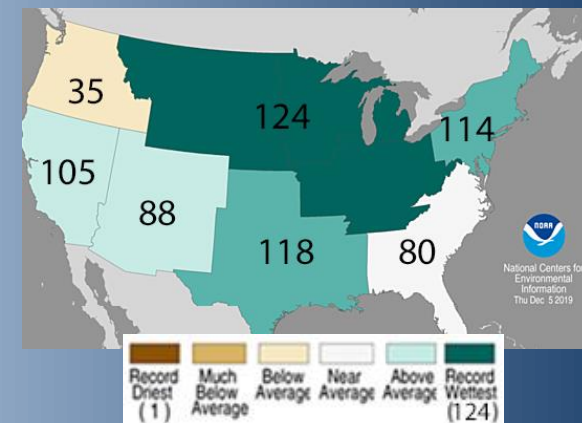
Humankind has not woven the web of life. We are but one thread within it. Whatever we do to the web, we do to ourselves. All things are bound together. All things connect.

– Chief Seattle, Duwamish

Climate Highlights

“The rainiest year on record” will be the words used to describe the Missouri River Basin for the calendar year 2019. The Southern Plains came close to setting records as well. In many places in Northeast Kansas the standing water in fields allowed the corn crop to develop without rooting deeply. As a result of this, when the region did experience a prolonged stretch without rain, there was a great deal of concern about whether or not unirrigated crops would yield anything worth harvesting in the fall. The rains did come but the situation was eye-opening for the farmers in the region.

Regional Precipitation Ranks Jan-Nov 2019 1895-2019

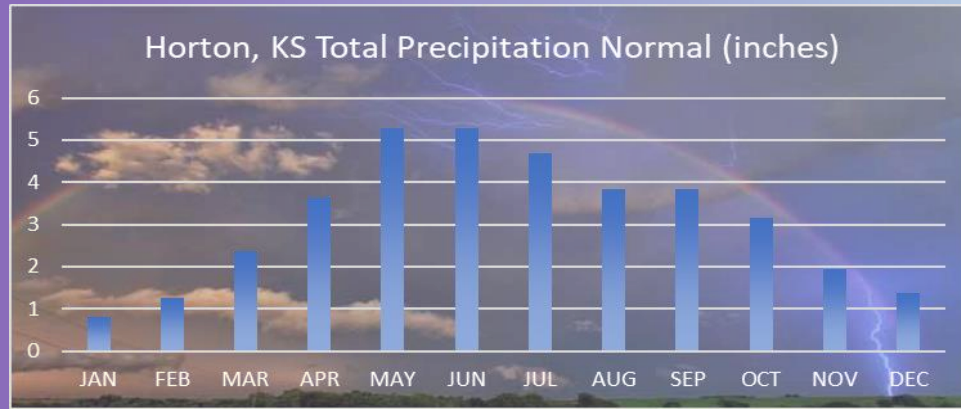


Precipitation Summary

Every station in the Four Tribe area is reporting precipitation below their average for the past 90 days (Oct 15-Jan 15.)

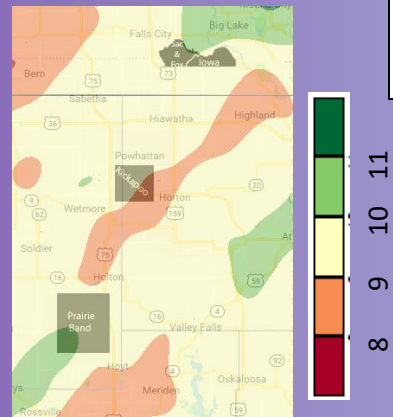
- Going from north to south:
- Salem, NE -1.60
 - Falls City, NE -1.98
 - Horton, KS -2.08
 - Holton, KS -0.43
 - Valley Falls, KS -0.55

Most of the region received 8 – 11 inches during this time period. Horton, KS which is centrally located and has the longest period of record averages 10.3 inches of precipitation for the period. December and January are some of the drier months in the region. Valley Falls, KS averages 11.06 inches of precipitation for this period.

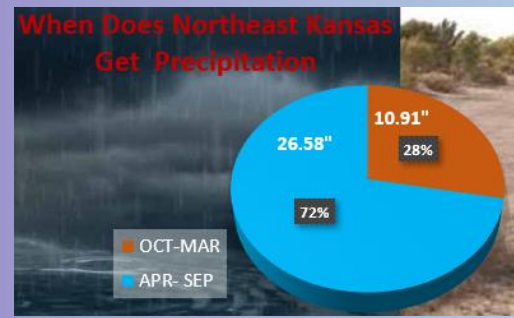


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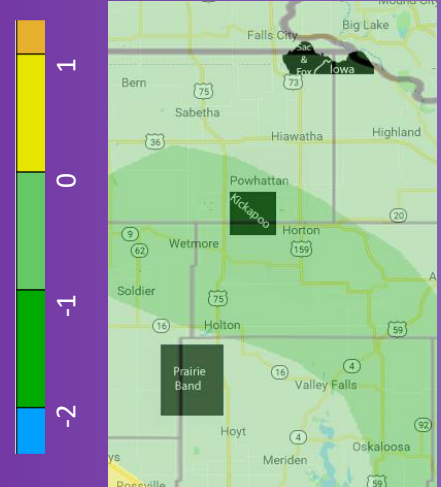
Total Precipitation Sep. 21, 2019 -Jan. 15, 2020



The chart above shows when we tend to receive most of our precipitation over the course of the year. Winters are typically dry and the springs are usually wet. The pie chart below illustrates that we get nearly 2.5 times as much precipitation from Apr-Sep as we do from Oct-Mar.



Variation from Normal Temperatures Oct 1 – Dec 31 2019 in Degrees

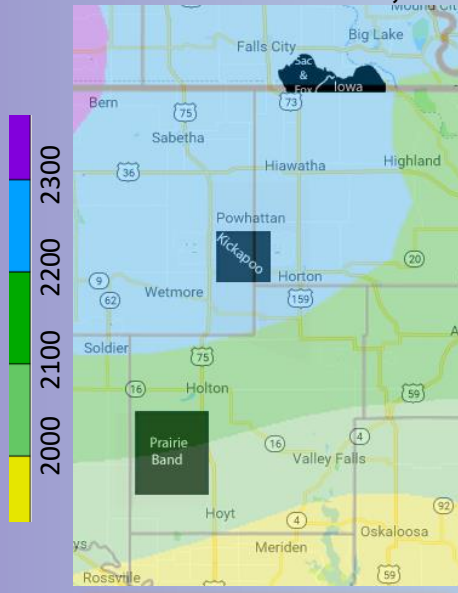


<http://hprcc.org> Archive

Temperature

Temperatures from October 1, – December 31, 2019 were generally about 1-2° cooler than normal for the three-month period. There were some unseasonably warm days, with highs nearing 60°, around the holidays that kept the average from being even colder. Degree heating days for the period ranged from 2200 in the north to 2000 in the south. The number represents how often a person would have to run their heating unit to keep their home or office at 65 degrees. The historical average for the past 10 years is about 2600.

Degree Heating Days (65) October 1 – December 31, 2019



<http://scacis.rcc-acis.org/archive>

Upcoming Events

- Brown County LEPC at Robinson, KS Feb 5 at 3:00 PM
- Climate Summary Workshop, Mar 17-18 at Winnebago (Sloan, IA)
- FEMA Mitigation Workshop, Apr 5-7, Kansas City, MO
- Earth Day, April 22th
- EPA Tribal Summit in Lenexa & RTOC, April 21-22

86% of heater deaths are caused by space heaters



- ✓ Never use an extension cord
- ✓ Keep 3 feet from flammable objects
- ✓ Never leave unattended

Health Impacts

This diagram illustrates the exposure pathways by which climate change affects human health. Key factors that influence vulnerability for individuals are shown in the right box and include health and behavioral choices. Factors that influence vulnerability at larger scales, such as natural and built environments are shown in the left box. Climate impacts depend on the magnitude of local climate change and individual and population vulnerability, exposure to changing weather patterns, and capacity to manage risks.

4th National Climate Assessment (2017)

Environmental Context

- Land use change
- Ecosystem change
- Geography
- Ag. Production
- Livestock use

- CLIMATE DRIVERS**
- Increased temperatures
 - Precipitation extremes
 - Extreme weather events
 - Sea level rise

- EXPOSURE PATHWAYS**
- Extreme heat
 - Poor air quality
 - Reduced food & water quality
 - Changes in infectious agents
 - Population displacement

- HEALTH OUTCOMES**
- Heat-related illness
 - Cardiopulmonary illness
 - Food-, water-, & vector-borne disease
 - Mental health consequences & stress

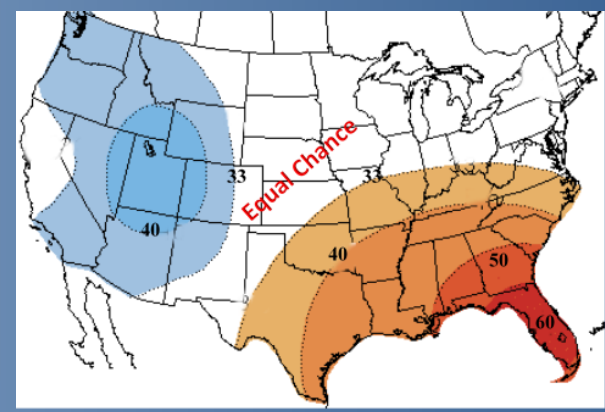
- Social Context**
- Age & Gender
 - Race & Ethnicity
 - Poverty
 - Housing
 - Infrastructure
 - Education
 - Access to healthcare
 - Preexisting Conditions

Social Context

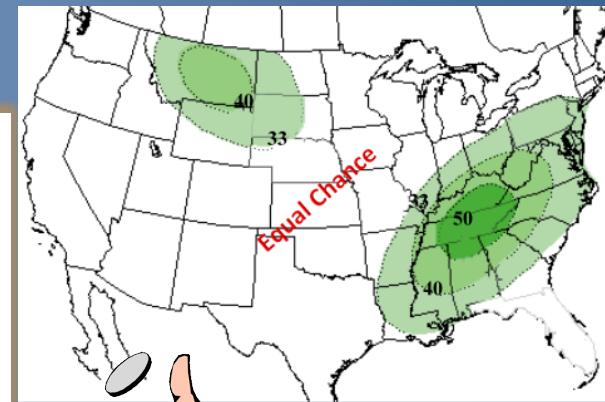
Spring Outlook

The two maps to the right look at potential temperature and precipitation trends for the next three months. “Equal Chance” means that there is 33 percent chance that temperatures will be above normal, normal or below normal. This is true for the precipitation map as well. There are areas where above normal temperatures are thought to have 40, 50 and 60% chances of occurring. We are in a region where it appears that there is equal chance of temperature and precipitation being below normal, normal or above normal. The chart below looks at a 30-year period from 1981-2019 and displays normal temperature and precipitation in Horton, KS for the months of February - June. This can help us anticipate what to expect in the upcoming months. Since we are no longer in an El Niño or La Niña weather pattern accurate predictions become more difficult.

One Month Temperature Outlook



One Month Precipitation Outlook



<http://scacis.rcc-acis.org/>



Sometimes it's a coin flip!

Monthly Winter-Spring Climate Outlook (1981-2010) Horton, KS

