

State Specific Training Module for Nebraska



Purpose of this Module

- This module will provide some general information for TSPs in conservation planning and practice planning, implementation, and checkout in Nebraska.
- This information is general in nature so the TSP may need to follow up with additional reading or training to make sure they have the knowledge, skill, licenses and certifications to conduct conservation planning in Nebraska.





FIVE INTERESTING FACTS ABOUT NEBRASKA

- Nebraska has badlands and sandhills in the west, Great Plains in the center, and low hills in the east.
- Nebraska was once called "The Great American Desert." Which is ironic because Nebraska has more miles of river than any other state.
- Nebraska is both the nation's largest producer and user of center pivot irrigation.
- The world's largest hand-planted forest is Halsey National Forest near Thedford, which covers over 90,000 acres.
- Nebraska's Chimney Rock was the landmark most often mentioned in journal entries by travelers on the Oregon Trail.

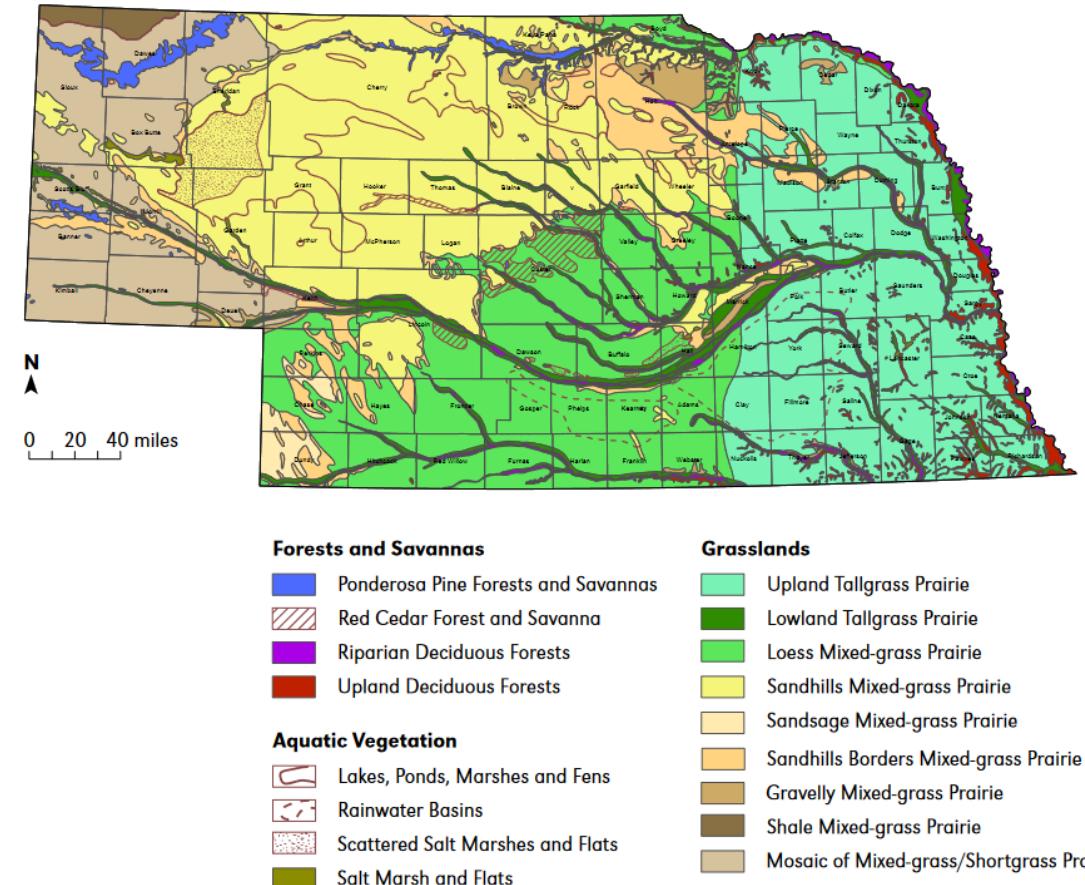
Weather and Climate

- Nebraskans are fortunate to enjoy all four seasons: spring, hot summers, fall and cold winters.
- While these seasonal changes can bring challenging weather at times, including thunderstorms and snowfall, it also opens the door for diverse and sustainable agriculture.
- Meanwhile Nebraska's climatic conditions vary greatly from one end of the state to the other due to a significant drop in elevation from west to east. For instance:
 - In northwest Nebraska, where the elevation reaches over 3,400 feet above sea level, the humidity levels are relatively low, and the annual average rainfall is 18 inches.
 - In the southeast corner of the state where elevation is only 840 feet above sea level, the average annual rainfall is much higher at over 30 inches.



Native Vegetation of Nebraska

- Much of Nebraska was historically Native Prairie with great diversity ranging from Tallgrass Prairie in the east to Shortgrass Prairie in the west.
- Large portions of the Tallgrass and Mixed Grass Prairie have been converted to crop production, but large expanses of prairie remain in western Nebraska and localized areas elsewhere in the state.
- Areas of Woodland and Forest are small and scattered but also contain broad diversity ranging from ponderosa pine communities in the north and west to oak and mixed hardwoods in the east.
- Nebraska's Rivers and Streams also support important areas of wooded corridors dominated by cottonwood and other riparian trees and shrubs.
- https://museum.unl.edu/collections/botany/nebraska_vegetation.html#:~:text=They%20include%20the%20Sandhills%20and,growing%20in%20the%20moister%20sites.



This map depicts the vegetation as it was before European settlement, in the 1860s. It was developed mostly from field observations of remnants of native vegetation.

GEOGRAPHY

From picturesque rolling hills, to fertile valleys, to expansive plains, to the awe-inspiring Sandhills, the geography of Nebraska is one of the most unique in the United States.

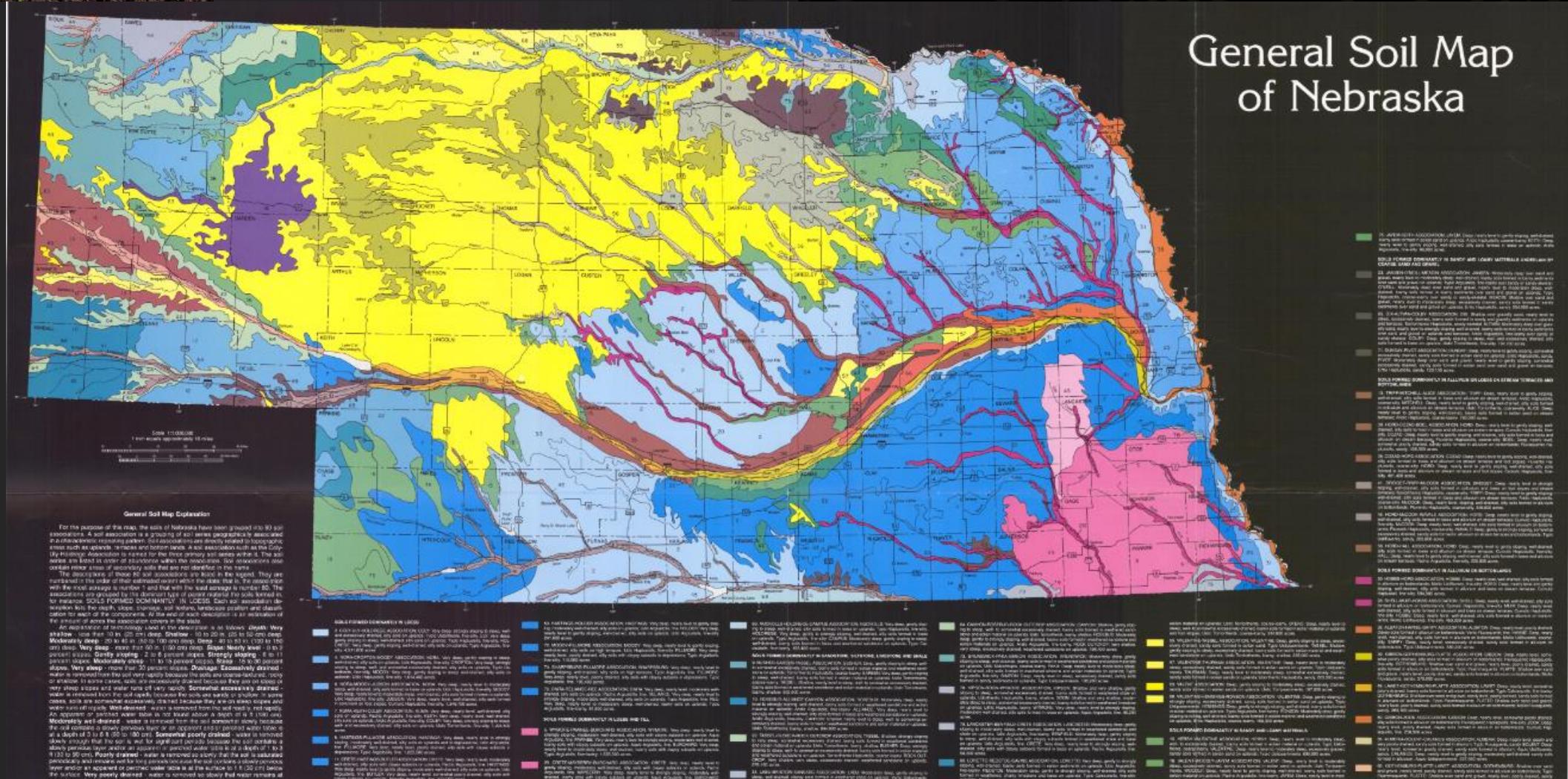
The landscape changes dramatically, especially traveling from west to east. There is an elevation drop of 4,584 feet in the 430-mile distance from Panorama.



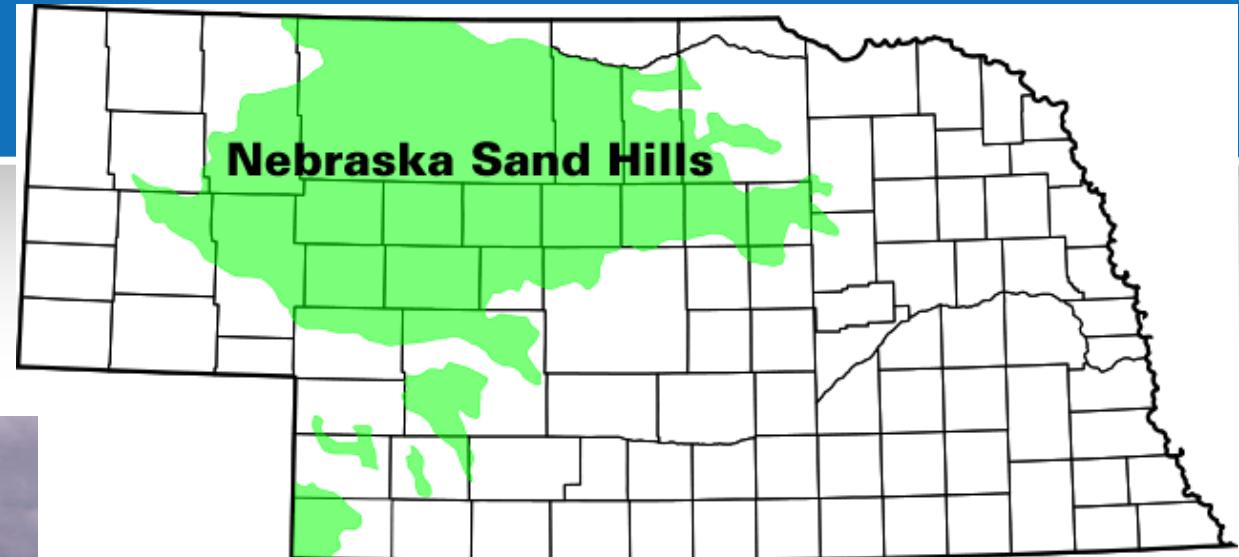
Soils In Nebraska



- Nebraska's topsoil is primarily loam, which is a combination of clay, silt and sand. However, the proportions of those components can vary in different areas of the state, which will often dictate whether crops or livestock are primarily produced in those regions.
- Western and northwest Nebraska are predominantly sand, while eastern Nebraska has more clay. All areas in between are a combination of sand, clay and silt



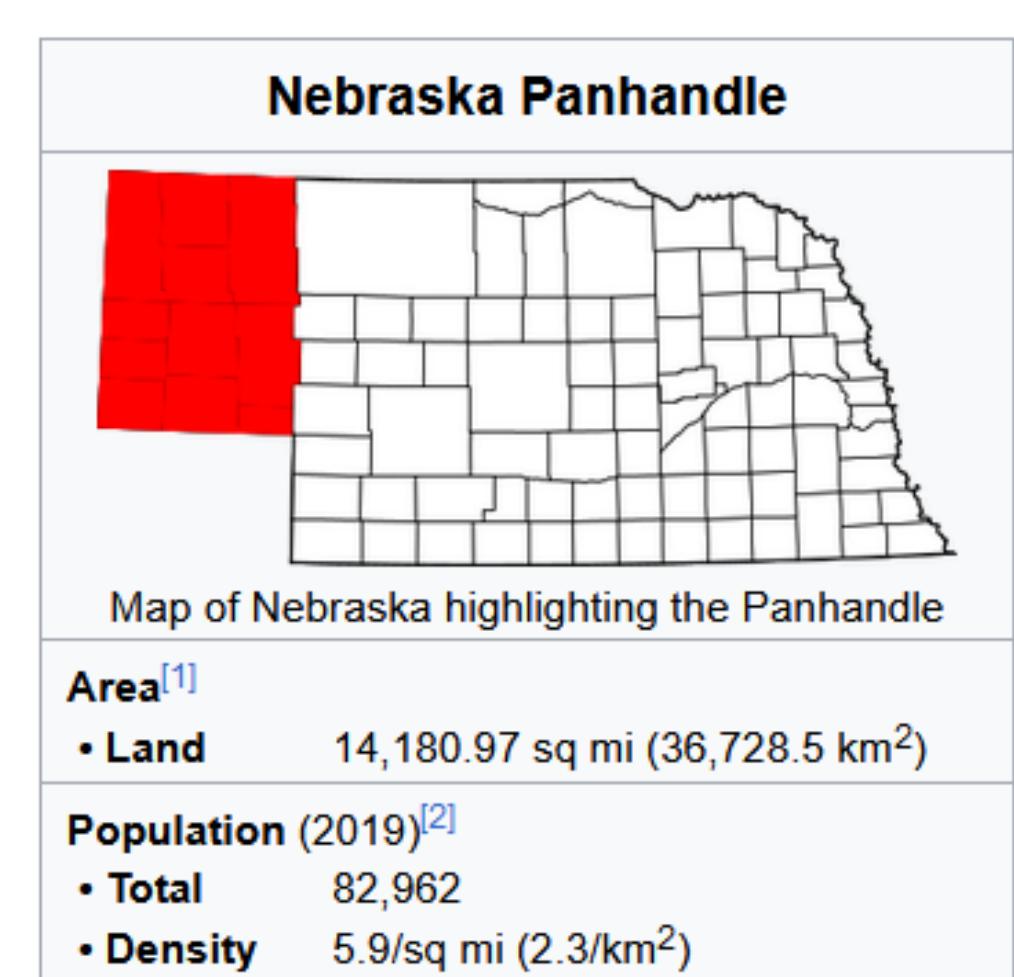
Sandhills of Nebraska



- In the north-central part of the Cornhusker State lies one of the most incredible regions in the U.S.
- The Nebraska Sandhills are grass-stabilized sand dunes that stretch across a large portion of the state, covering just over one quarter of the state. (approximately 19,600 sq. miles)
- Once thought to be just a worthless desert in Nebraska, the Sandhills are now an important part of our state's economy.

Nebraska Panhandle

- An area in the Western Part of the state.
- Has a great deal of Geographical and Geological Diversity; the region itself is made up of several smaller areas.
- Areas, Features, and Sites of interest include:
 - Agate Fossil Beds National Monument
 - Chadron State Park
 - Sandhills
 - Chimney Rock
 - Fort Robinson
 - Pine Ridge
 - Toadstool Geologic Park
 - Scotts Bluff National Monument
 - Wildcat Hills
 - North Platte River



Nebraska National Forest

This Forest includes 2 hand-planted national forests within the Nebraska Sandhills.

- Samuel R. McKelvie National Forest to the north, and
- Bessey Ranger District near the town of Halsey.

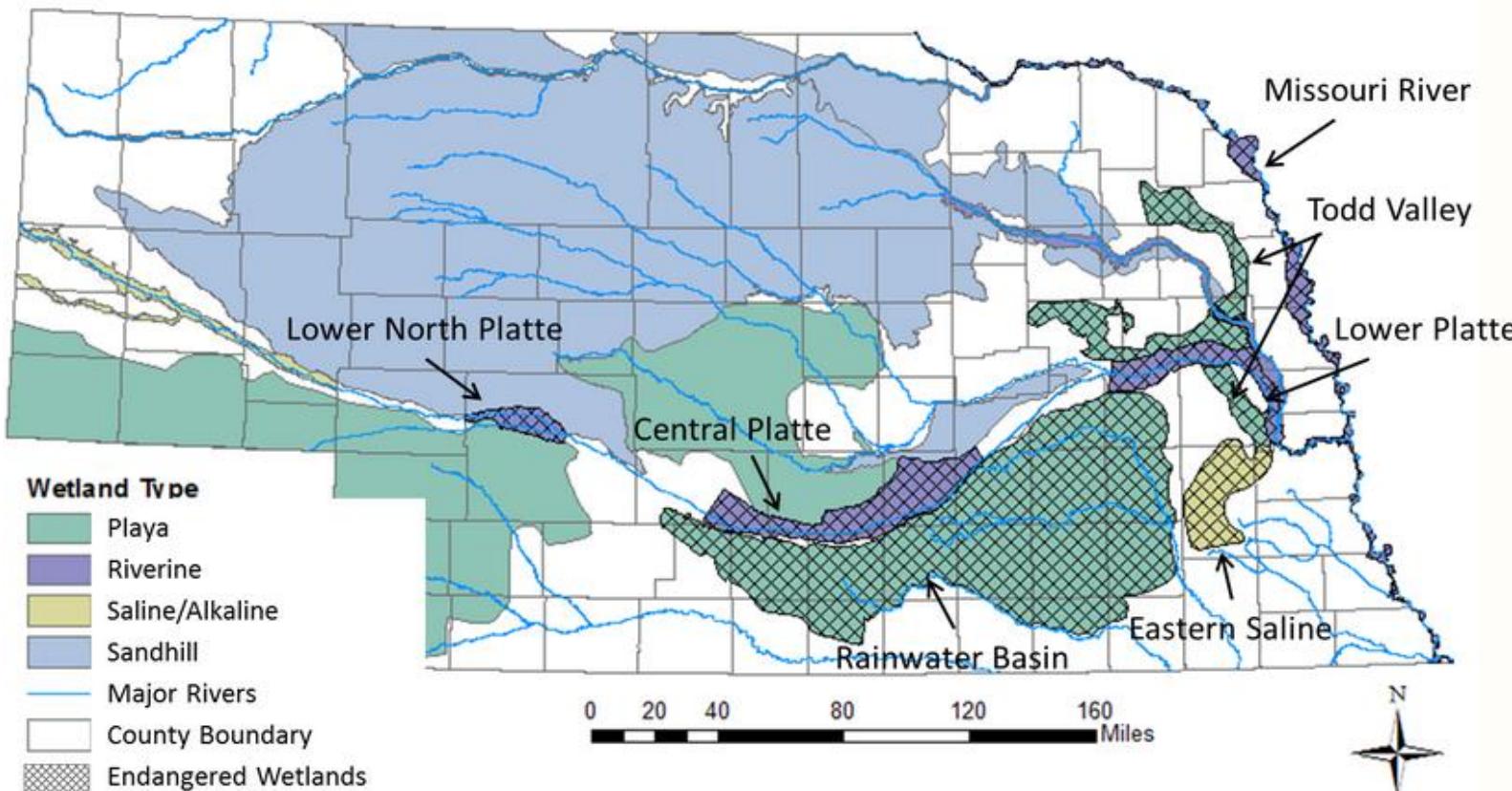
Their combined grassland and forest are unique to the National Forest System.



*Amid the sandhills of Nebraska, an improbable forest stands. Planted by hand in the early 1900's, it covers 90,000 acres of gently rolling sandhills interspersed with 20,000 acres of trees. Ponderosa pine, Eastern redcedar, and jack pine are the three major tree species, with the sandhills dominated by grasses-primarily sand bluestem (*Andropogon hallii*), *Calamovilfa longifolia*, and needle-and-thread (*Stipa comata*).*

In the late 1880's, Dr. Charles E. Bessey of the University of Nebraska envisioned planting a forest in the sandhills of Nebraska. His botanical surveys in the region had convinced him that the area had been previously forested and could be again. By 1902 much of the country's eastern forests had been harvested or burned, so the need for timber provided an impetus. Eventually Dr. Bessey wrote to President Theodore Roosevelt detailing his plans, and on April 16, 1902, the Dismal River Forest Reserve and the Niobrara Forest Reserve were established by Presidential Proclamation. The 90,000-acre Dismal River Forest Reserve became the Nebraska National Forest in 1908.

Nebraska's Wetland Complexes



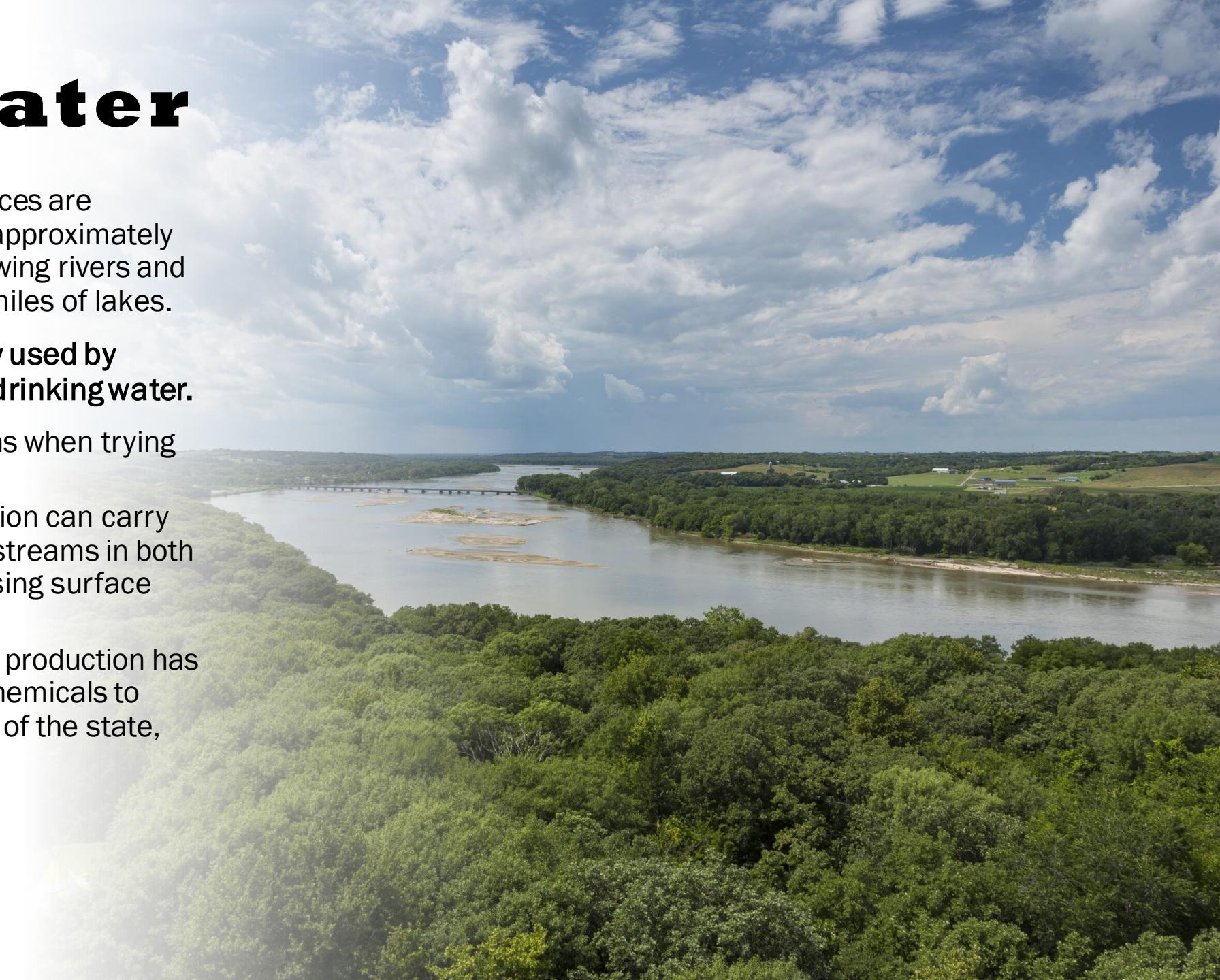
In the Guide to Nebraska's Wetland Nebraska's Wetland Complexes and Their Conservation Needs, four regional wetland categories and seven endangered wetland complexes were identified (LaGrange 2005).

A complex is considered a geographically definable concentration of wetlands that are similar in form and function. In Nebraska, the four wetland categories are Playa, Riverine, Saline/Alkaline, and Sandhill.

Seven of the complexes were ranked in the Nebraska Wetlands Priority Plan as endangered based on wetland functions, losses, and threats. The complexes are Central Platte, Eastern Saline, Lower North Platte, Lower Platte, Missouri River, Rainwater Basin, and Todd Valley.

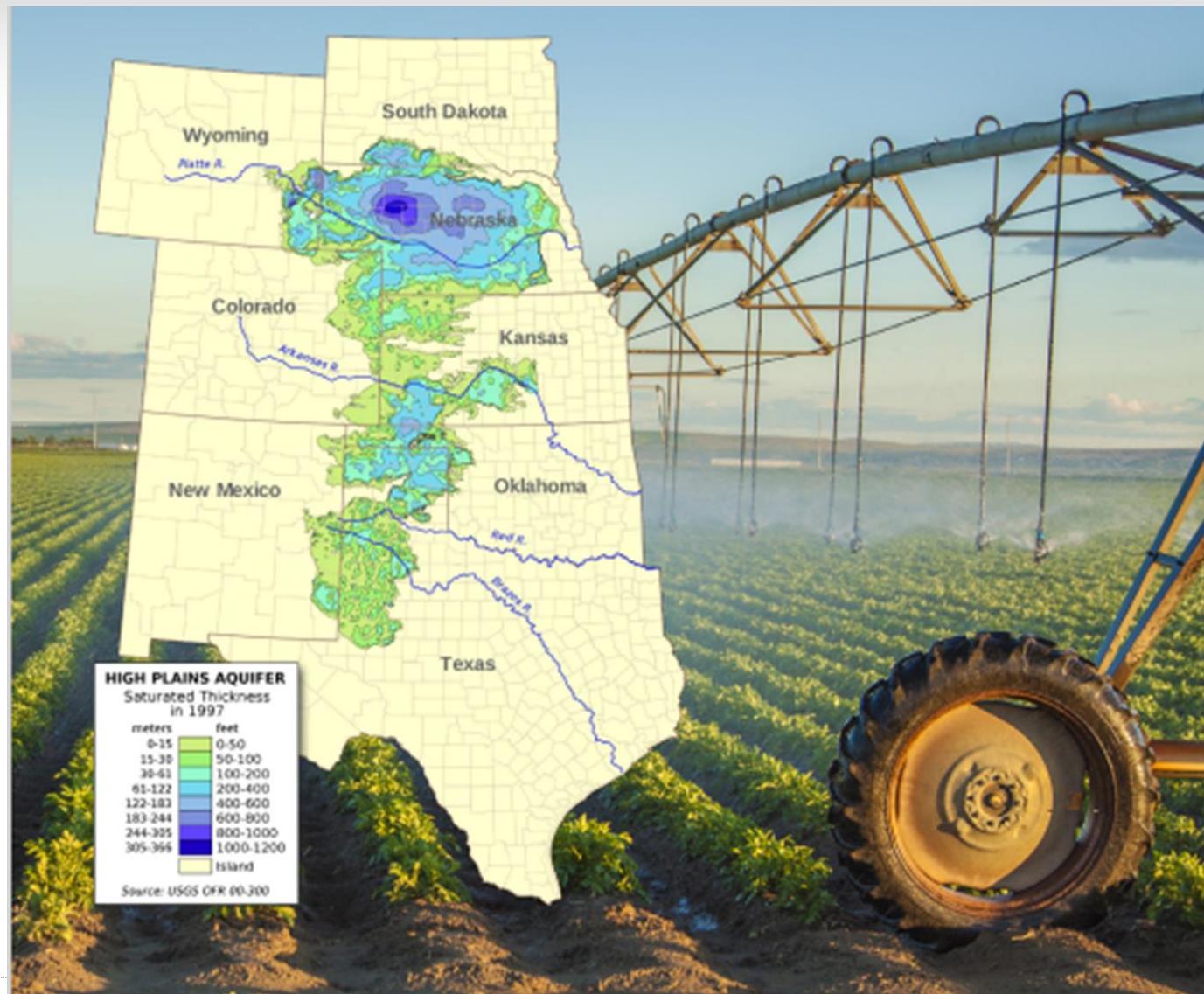
Surface Water

- Nebraska's surface water resources are surprisingly extensive, including approximately 18,000 miles of continuously flowing rivers and streams and about 430 square miles of lakes.
- **Surface water is predominantly used by grazing livestock as its source drinking water.**
- Many challenges face Nebraskans when trying to protect this valuable resource.
 - Runoff from rain and irrigation can carry chemicals and topsoil into streams in both urban and rural areas, causing surface water contamination.
 - More than 50 years of crop production has allowed fertilizers and ag chemicals to reach groundwater in parts of the state, causing contamination.

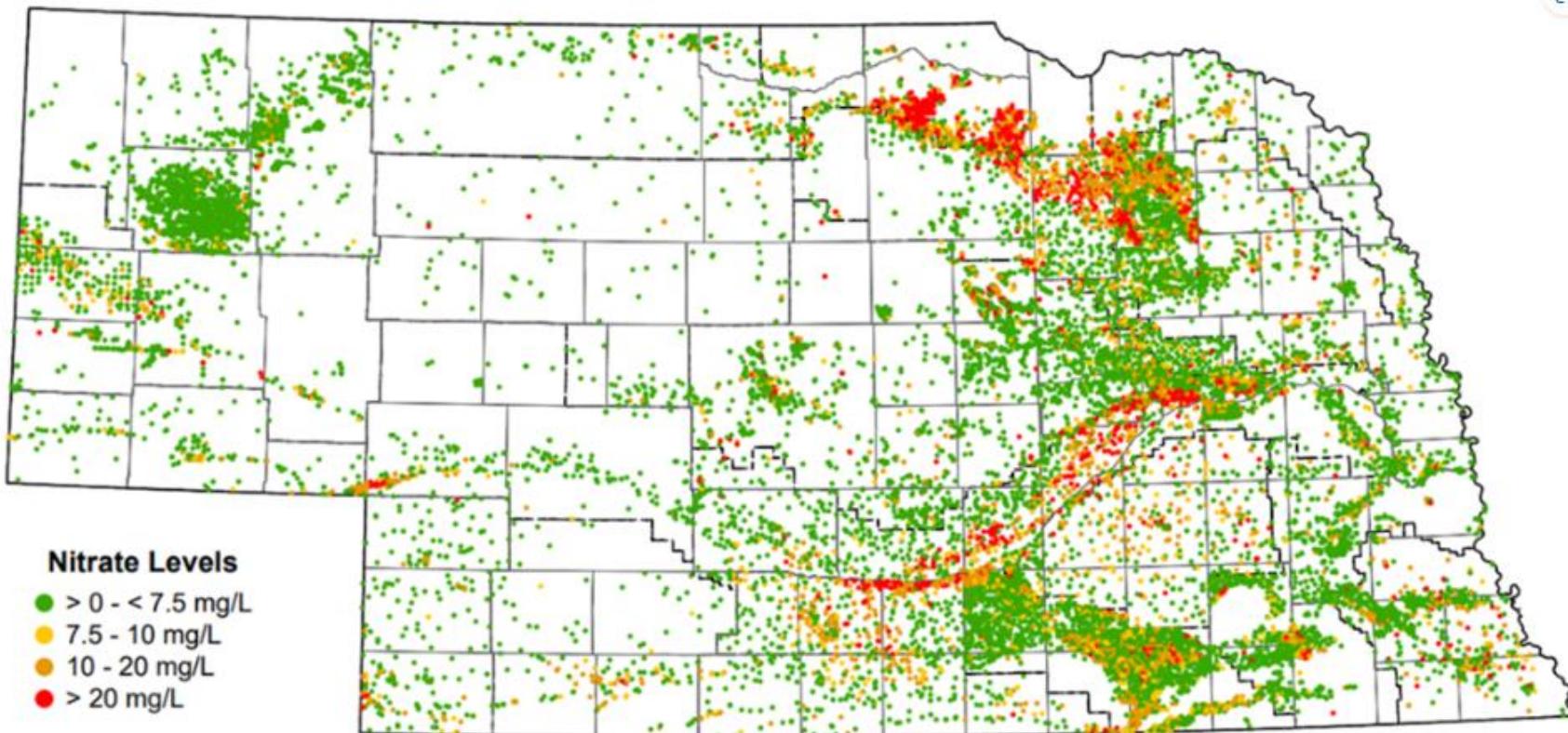


Groundwater

- **One of Nebraska's most vital natural resources is its massive supply of groundwater.** The High Plains Aquifer, also commonly referred to as the Ogallala Aquifer, stretches through parts of eight states, but its most abundant water resource is in nearly two-thirds of Nebraska. This groundwater availability has been essential to the success of agriculture in the state.
- **About 85% of the state's public drinking water and nearly all its private water supply are from ground water sources.**
- Nebraska has more than 100,000 registered irrigation wells and an additional 16,000 registered water wells.
- Center pivot irrigation is the most common method of providing water to row crops in the state, and as a result, four of the largest manufacturers of center pivot systems in the world are in Nebraska.
- An accessible water supply also is vital to Nebraska's livestock and dairy production.



Groundwater Resource Concerns



Groundwater Nitrate, most recent sample 18,247 wells from 2000-2019. NDEE 2020

Nitrogen Sources and Trends

Fertilizers, animal waste, waste lagoon sludge, septic systems, and nitrogen-bearing minerals in the soil may all potentially contribute anthropogenic sources of nitrate.

Between 1962 and 2017 the tonnage of commercial fertilizer sold in Nebraska rose 359% (NASS, various years) with the bulk of the increase occurring in the first decade and peak usage occurring in the 1980s.

Nitrate as a Rural Vitality Liability 80% of Nebraskans rely on groundwater for drinking water and nearly 100% of rural residents utilize domestic (private) drinking water wells.

Ninety-nine of the nearly 550 public water systems in Nebraska perform quarterly nitrate sampling due to elevated nitrate concentrations (NDEE 2020).

Review of Nebraska Resources

(2022 Census of Agriculture Report)

- Nebraska's farms and ranches utilize approximately 44.8 million acres (92% of the state's total land area).
- Nebraska is fortunate to have aquifers below it. If poured over the surface of the state, the water in those aquifers would have a depth of 37.9 feet (11.6 meters).
- Nearly 80,000 miles of rivers and streams add to Nebraska's bountiful natural resources.
- There are 22 million acres (8,915,803 ha) of rangeland and pastureland in Nebraska, half of which are in the Sandhills.





NEBRASKA: DEFINED BY AGRICULTURE

Nebraska Farm Facts

Nebraska Livestock Production

BEEF



Beef production is the largest sector of agriculture in Nebraska

National leader in every aspect of beef production:

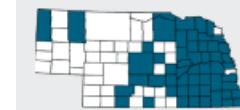
- #1 Commercial Slaughter,
- #1 Cattle Feeding,
- #2 All Cattle and Calves,
- #4 Beef Cows.

With 6.8 million head of cattle, cattle outnumber people in Nebraska more than 3:1.



Nationally #2 with 28,047 head in 2017.

BISON

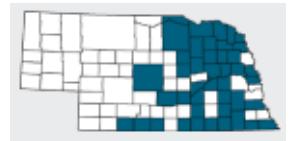


PORK



- Nebraska's pork industry plays an important role in the state's agricultural economy.
- Swine Operations vary in size & how pigs are raised.
- In Nebraska there are more than 3.8 million pigs.
- Nebraska has the 6th largest swine herd in the country.

DAIRY



- Predominantly family owned / operated.
- Nebraska ranks 25th in total milk production.

SHEEP & GOATS



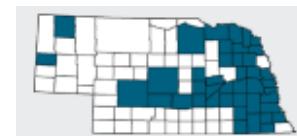
Annual Nebraska production:

- 78,000 sheep and lambs,
- 24,000 meat goats,
- 3,500 dairy goats,
- 440,000 pounds of wool.



One sheep will produce 8 pounds of wool each year. That is enough to make a three-piece suit.

POULTRY & EGGS



9.1 million Poultry raised in Nebraska include:

- Hens that produce eggs,
- Chickens raised for meat (broilers),
- Chicken hatcheries and turkeys – for breeding stock.

Produce more than 2.6 billion eggs each year.

Rank 14th nationally in egg production.

Crops Grown in Nebraska

CORN



“Cornhusker State”

- Most widely grown crop that varies in use: livestock feed, ethanol & distillers' grain, bioplastics.
- 21,500 farmers raise corn.
- 9.81 million of acres are used for corn production.
- #4 largest corn producing state. (2022)



SOYBEANS



- Nebraska's 2nd largest crop.
- Nebraska ranks 4th in the nation with 283 million bushels in 2022.
- 278 million bushels is used for feed for livestock & poultry.
- 1 bushel of soybean can make 1.5 gallons of biodiesel.

WHEAT



- 14th largest wheat producer. (2022)
- Producing both hard red winter wheat & hard white winter wheat.



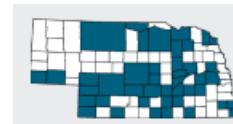
ALFALFA HAY



- More than 2.5 million tons of hay & alfalfa grown (2022).
- Nebraska is the nation's 7th largest producer. (2022)
- Top five producing counties are: Cherry, Holt, Custer, Knox and Scottsbluff.
- NE also is producer of dehydrated alfalfa pellets.
- Nearly 60% of all hay tonnage is alfalfa (2019)



POPCORN



- Top producer in nation due to our rich soils, irrigation, and climate.
- Yields from one acre range from 50 to 100 bushels, depending on irrigation availability.
- Produce more than 368 million pounds annually.



SUN- FLOWER

- #5 largest state in Sunflower Production.
- Producing 46 million pounds (2022).

Other Crops Grown in Nebraska

DRY EDIBLE BEANS



Predominately grown in western NE due to the arid climate in that region.

Usually is grown under irrigation.

Nationally (2022) - Nebraska ranks:

- 1st in Great Northern bean production;
- 2nd in light red kidney beans;
- 2nd for pinto bean production; and
- 4th for all dry edible bean production.

Several varieties are grown in Nebraska including Great Northern beans, pinto beans, black beans, light red kidney beans, navy beans, pink beans and garbanzo beans.

SUGAR BEETS



90% of the sugar beets grown in the state are produced in the Panhandle.

2022, Nationally ranked 6th for production of sugar beets and averages more than 958 thousand pounds of production.

The sugar beet is a root crop that's used for sugar production.

More than half of U.S. sugar production comes from sugar beets.

When fully grown, a sugar beet is about a foot long and weighs between 2 and 5 pounds.

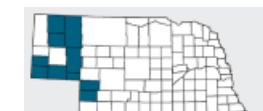


POTATOES



- NE's water resources, sandy soils and favorable climate promote great potato yields.
- Nationally ranked as high as 11th for potato production at 9.5 million hundredweight.
- One-third of the states' potatoes are processed into potato chips.
- The rest are table potatoes for grocery stores and seed potatoes.

GRAIN SORGHUM

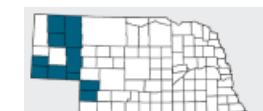


Grain sorghum (milo) is one of the four primary grain crops grown in Nebraska.

National ranks 5th with more than 6.8 thousand bushels produced annually. (2022)

Ethanol is made from sorghum. Sorghum is gluten free.

PROSO MILLET



A warm season grass capable of producing grain between 60-90 days after planting.

Primarily grown in western Nebraska, with 1.7 million bushels on appr. 106,000 acres harvested (2022).

Additional NE Crops & Insects

- Organic Cropland (2019): 146,803 acres
- Wine and Grapes:
 - More than 30 wineries and tasting rooms.
- Fruits and Vegetables - Nebraska has approximately:
 - 100 farmers markets,
 - 167 roadside stands, and
 - 33 U-pick operations.
- Christmas Trees
- Hemp
- Hops:
 - Nebraska has 39 producing acres in hops.
- Bees:
 - Nebraska has around 39,000 bee colonies.
 - Nebraska honeybee colonies produce more than 2 million pounds of honey annually.
 - One honeybee will produce 1/12 of a teaspoon of honey in its lifetime (about three weeks).



Ethanol Production in Nebraska

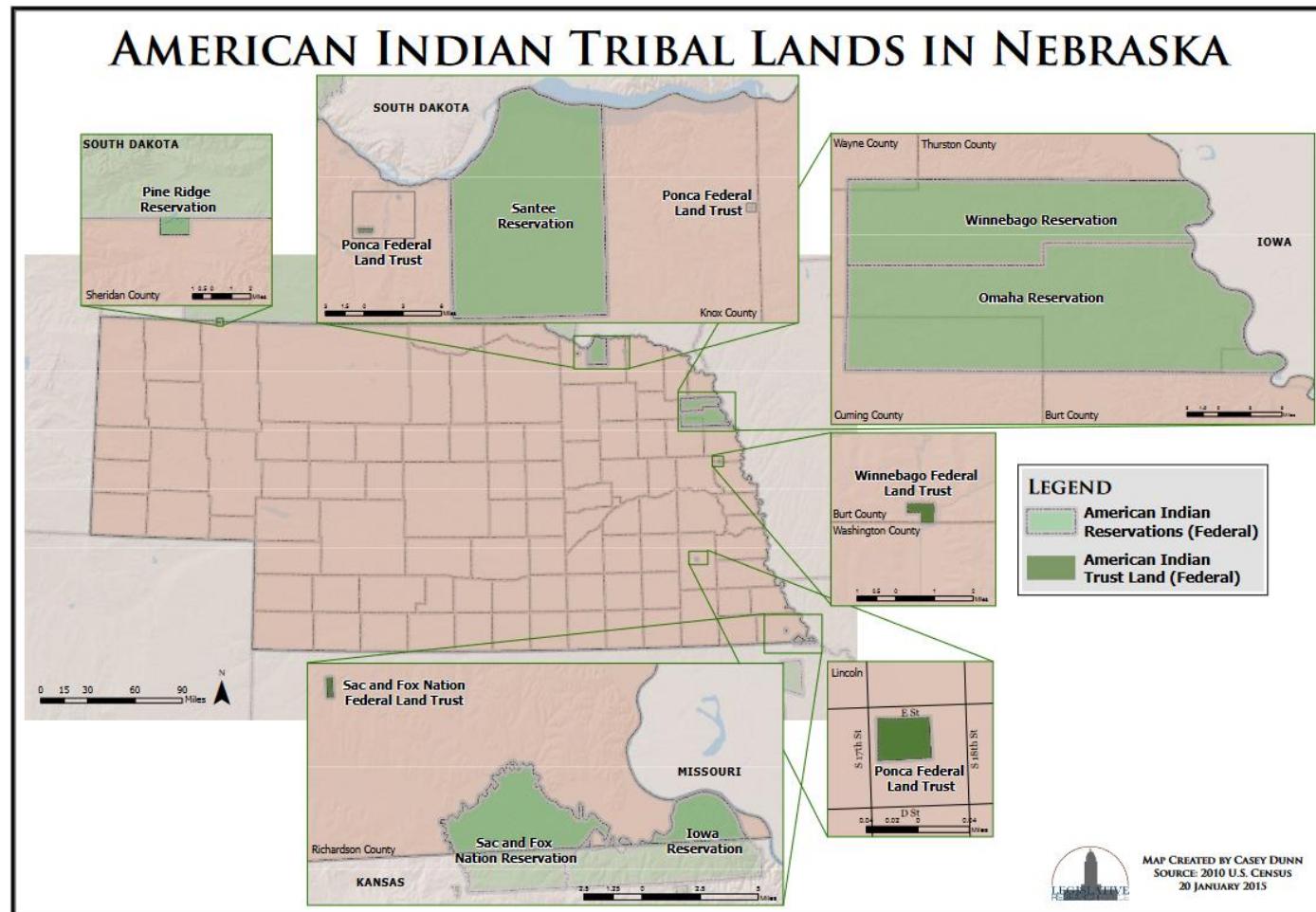


- Nebraska is the second largest ethanol producing state in the nation.
- With approximately 24 operating ethanol plants utilizing the state's abundance of corn as the main feedstock, Nebraska produces more than 2.5 billion gallons of renewable fuel annually. (2022)
- Distillers' grains, a co-product of ethanol production, is important as both a domestic livestock feed ingredient and as a foreign export product.
- The linkage between corn, ethanol and livestock production has become known as Nebraska's "Golden Triangle"

Nebraska Ag Landownership Characteristics

- *Agricultural land covers approximately 45.2 million acres across farms and ranches. Major land uses on these operations include irrigated and dryland cropland, grazing, and hayland.
 - In 2021, the average farm size was 1,000 acres.
 - Livestock or poultry operations are found on 48% of Farms. (2021)
 - 22 Million acres of rangeland and pastureland, half of which are in the Sandhills. (2021)
- *Farmers and ranchers own almost 56%, or 25.3 million acres, across the state while absentee landowners own the remaining 44%, or 19.9 million acres. These acres are typically leased out by the absentee landowners referred to as landlords.
 - Operator landlords account for 9% of leased acres and nonoperator landlords the other 35% of acreage rented out (Bigelow et al., 2016).
 - Operator landlords may materially participate in lease agreements such as crop shares. Non-operator landlords include those who cash rent their land to operators.

TRIBAL LAND



Today the U.S. government recognizes several tribes in Nebraska. They include the Iowa Tribe of Kansas and Nebraska, the Omaha Tribe of Nebraska, the Ponca Tribe of Nebraska, the Sac & Fox Nation of Missouri in Kansas and Nebraska, the Santee Sioux Tribe of the Santee Reservation of Nebraska, and the Winnebago Tribe of Nebraska

Indian reservations in Nebraska currently include land of the Ioway, Santee Sioux, Omaha, Sac and Fox, Winnebago, and Ponca.

In 2006 American Indian and Alaska Native persons comprised one percent of the state's population.

Specific Nebraska NRCS FOTG Requirements

- See complete list at State Field Office Technical Guide at www.nrcs.usda.gov
- Nutrient Management (Code 590): Follow the University of Nebraska-Lincoln (UNL) guidelines, requirements and recommendations for N-P-K, or industry practice when recognized by UNL.
- The planting/seeding of non-native plants in areas which are intact native ecosystems may cause concern with invasive species – examples include non-native clovers/grasses in Sandhills hay meadows or native prairies, planting trees in large open grassland/prairie habitat, etc.

Nebraska Specific Cultural Resources Laws

Unmarked Human Burial Sites and Skeletal Remains Protection Act (Nebraska State Statutes 12-1201 through 12-1212) [1989]

- In the event unmarked human remains are uncovered at any point; work shall halt, and local law enforcement should be contacted within 48 hours of the discovery.
- When a project is an NRCS undertaking, NRCS will take lead to comply with the above law as well as the Native American Graves Protection and Repatriation Act – NAGPRA (25 U.S.C. 3001 et seq.) [November 16, 1990].



*Nebraska State Laws & Agencies

- The **Nebraska Engineers and Architects Regulation Act** governs the practice of engineering and architecture in the state of Nebraska. For additional guidance see Rules and Regulations Title 110, NAC.
- The **Nebraska Department of Environment and Energy (NDEE)** governs:
 - Livestock Waste, the Construction of Livestock Waste Control Facilities; and Issuance of State Operating and NPDES Permits. For additional guidance see NE Title 130 Livestock Waste Control Regulations,
 - Subsurface Drip Irrigation (SDI) systems. SDI is classified as a Class V injection well by the NDEE and requires a permit from NDEE be issued prior to installation,
 - NE Titles 126, 128, 153, 198, & 200 contain regulations for Spills of Hazardous Waste; Fertilizer & Pesticide Secondary Containment; State Fire Marshal; and Petroleum Storage Tanks Installation,
 - NE Title 124 provides regulation for Onsite Wastewater Treatment Systems.
- Nebraska is “close” to assuming control over the **404 permitting** from the Corps of Engineers with NDEE taking that responsibility.
- The **Nebraska Department of Water Resources (NeDNR)** is a State agency with responsibilities in the areas of: Surface Water; Groundwater; Floodplain Management; Dam Safety; Natural Resources Planning; Water Planning and Integrated Management; Storage of Natural Resources and Related Data Administration of State Funds.

*Nebraska State Laws

- The **Nebraska Department of Agriculture (NDA)** regulates Animal and Plant Health Protection including:
 - The Pesticide Program with the responsibility of regulating the distribution, storage, and use of all pesticides in the state of Nebraska.
 - Licensing Aerial Pesticide Business.
 - New or renewal commercial or non-commercial pesticide Applicator License.
 - Normal Animal Mortality Management.
 - Animal Disease and Emergency Animal Mortality Management.
- **Nebraska has an Endangered Species Law** (Nebraska Non-game and Endangered Species Conservation Act) that covers all federally-listed species as well as a several state-listed ones. Coordination regarding impacts occurs through the **Nebraska Game and Parks Commission**. Not every state has the same types of protections for endangered species at the “state” level.
- **Nebraska811 is a FREE service for anyone who is planning a digging project**, including homeowners and professional excavators. Nebraska State law requires anyone who digs to place a locate request at least two full business days before digging. Once your request is submitted, utilities will locate and mark their lines.

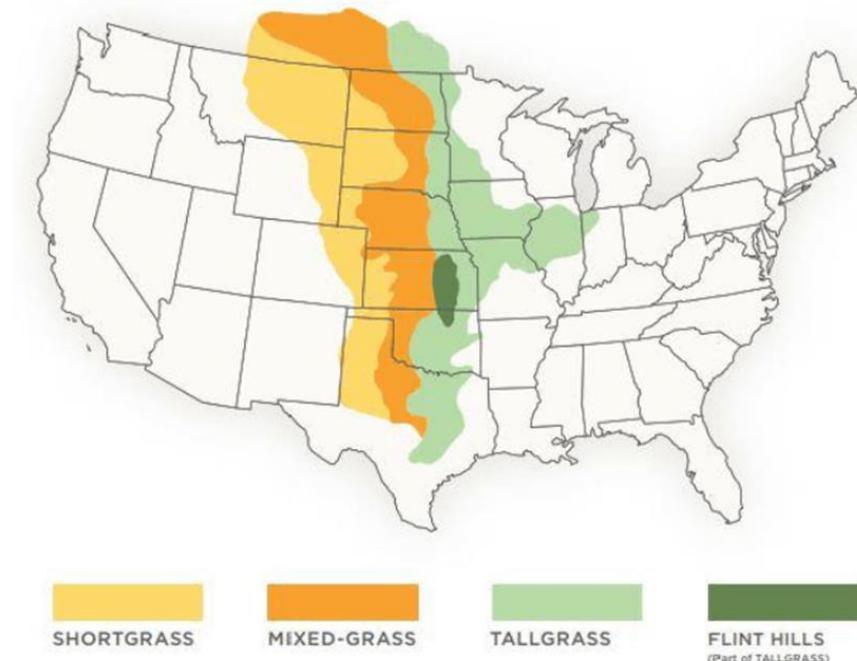
Prescribed Burning

Prescribed fire in Nebraska is regulated by the state legislature. You must file an application for a burn permit and a written burn plan that includes the items outlined in [Chapter 81 Section 520.05](#).

The local fire chief evaluates each plan and issues a burn permit if it complies with Nebraska's burn plan requirements and the fire chief determines that the controlled burn plan would be conducted with due regard for the safety of people and property.

The map below shows the original range of prairies in the central plains, including the Flint Hills region in Kansas and Oklahoma. The remaining tallgrass prairies in the Flint Hills comprise approximately 4% of the 170 million acres once covered by tallgrass prairie. It is primarily in this region where concentrated annual prescribed burning occurs.

HISTORIC **PRAIRIE REGIONS**



Source: <https://www.flinthillsdiscovery.org/594/What-are-the-Flint-Hills> *

*Local Regulations

- **County Planning and Zoning** may require additional setbacks or permits based on the project, etc. (see following examples). Contact the respective county(s) for additional information.
 - Burn permits (local fire chief),
 - Construction / Building Permits,
 - Setbacks for Irrigation Equipment & Wells,
 - Setbacks for new and/or expanding animal feeding operation, manure application, manure stockpiles, etc.
 - Permit for Application of manure from a livestock operation in a different county.
 - Requirements for manure incorporation if broadcasted,
 - Annual nutrient management plans for animal feeding operations, etc.
 - Permits / Requirements for manure transported via hose lines.
- Nebraska has **23 Natural Resource Districts (NRDs)**. NRDs were created to solve flood control, soil erosion, irrigation run-off, and groundwater quantity and quality issues. Nebraska's NRDs are involved in a wide variety of projects and programs to conserve and protect the state's natural resources. NRDs are charged under state law with 12 areas of responsibility including flood control, soil erosion, groundwater management (quality and quantity) and many others.
- Chemigation is defined as the application of any chemical, fertilizer or pesticide through an irrigation system. To legally chemigate in Nebraska, an operator must be certified to apply chemicals and obtain a chemigation permit from the local **Natural Resources District (NRD)**.

Expected NRCS flow of TSP Work

- **Nebraska NRCS State Specialist(s)** will be responsible for reviewing TSP samples plans submitted for initial certification. NRCS NE State Specialist will directly work with TSPs to reach the goal of approved sample plans.
- **NE NRCS State Specialist(s) and/or Field Office Staff at the local USDA Service Center** will be responsible for the review of the Producer Contract Deliverables (i.e., conservation activity plans, design and implementation activity plans, practice(s) specifications, design reports, quality assurance plans, as-built specifications, etc.) for administrative and technical completeness.
 - All EQIP Contract CPA and DIA Plans must be uploaded by the TSP into NRCS Registry. Hard copies must be provided to the local NRCS Field Offices and Producer by the TSP.
- **Local NRCS Field Offices** will complete proper Environmental Evaluations (NE-CPA-52) and consultant with TSPs on projects, as necessary.
 - TSPs should request a copy of the completed NE-CPA-52 at the start of the project using the NRCS –CPA-70 for “Permission to access Program Participant NRCS National Conservation Planning (NCP) Database information for TSPs”. The form must be signed by the producer and TSPs
 - TSPs are responsible for notifying local field offices on changes on planned project designs in order to update the NE-CPA-52.

Non-Discrimination Statement

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Certificate of Completion

After viewing the State Specific Training module, please print and sign the completion certificate on the following slide.

The certificate is your acknowledgement that based on the information provided in this module, you have the proper knowledge, skills and ability to conduct planning in this State.

Within your NRCS Registry profile, enter the training and upload the signed certificate to verify completion.

STATE SPECIFIC TRAINING MODULE COMPLETION CERTIFICATE

I, _____ hereby verify I have viewed and understand the content of *Nebraska State*
(TSP Name)

**Specific Training Module and affirm I have the knowledge, skills, and ability to conduct conservation planning
services in this state.**

TSP Signature

Date