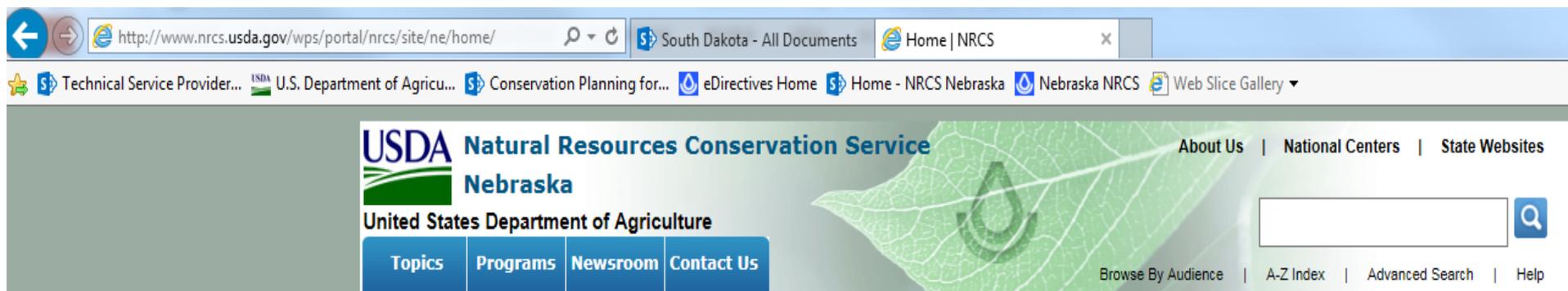


State Specific Training Module for Nebraska

This module will provide some general information that TSPs need to conduct conservation planning in our state. 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 this state.



State Requirements:

*General Manual State Supplements,
NE Title 180 - Conservation Planning,
Part 409 - Conservation Planning Policy*

NEBRASKA NRCS CERTIFICATION REQUIREMENTS

Nebraska Certification Requirements

Nutrient Management Certification

- Certified Planner.
- Completion of Aglearn “Nutrient and Pesticide Management Considerations in Conservation Planning, Part 1 – Nutrient Management”.
- Knowledge/Experience with:
 - Nebraska Phosphorus Index,
 - Nitrogen Leaching Index.
- Submittal of one Nutrient MGT plan.

Pest Management Certification

- Certified Planner.
- Completion of Aglearn “Nutrient and Pesticide Management Considerations in Conservation Planning, Part 2 – Pesticide Management”.
- Knowledge/Experience WIN-PST.
- Submittal of one Integrated Pest Management (IPM) plan.

Comprehensive Nutrient MGT Planner

- Certified Planner;
- Aglearn Classes:
 - Agriculture Waste Management Systems, Level I – Primer,
 - Agriculture Waste Management Systems, Level II;
- Knowledge/Experience with NRCS Tools (NE Phosphorus Index, Nitrogen Leaching Index, UNL Land Estimator, MMP, etc.);
- Submittal of one Comprehensive Nutrient Management Plan (CNMP).

Recertification (for Current Certification)

- Six hours of continuing education classes every three years. Classes must enhance / pertain to current certification.
 - Where one day of class equals one hour of continuing education; ½ day of training equals 0.5 hours of continuing education.
- One Resource Management Systems plan (RMS) for which the certificate is held. Plan can be no older than 2 years.

**Individual is responsible for recording attendance of continuing education classed.*

Wetlands Identification & Delineation Certification for NE NRCS includes:

1. NFSAM Wetlands Identification & Delineation:

- Complete Corps of Engineering Regulatory IV Training OR NEDC training “Wetland Identification & Delineation for NRCS”.
- Complete at least one wetlands determination every five years

2. Functional Assessment

- Submit initial functional assessment to the NE State Office Wildlife Biologist for review/approval.
 - Must include: NE-CPA-FSA-9 and NE-CPA-FSA-10.
- Complete at least one functional assessment every five years after

3. Mitigation Planning

- Complete all requirements under list #2 (above)
- Submit initial mitigation plan to NE State Office Wildlife Biologist for review/approval
- Complete at least one mitigation plan every 5 years after.

Nebraska Laws

WHAT TYPE OF WORK REQUIRES ENGINEER LICENSURE?

Nebraska Laws Define when an Engineering License is Required

- Nebraska Board of Engineers and Architect Regulation Act (November 2013)
 - *§§81-3421 - Practice of engineering, defined;*
 - *§§81-3453 (13) - Practices of Engineering; exempted activities.*
 - Rules and Regulations Title 110, NE Administrative Code Board of Engineers and Architects, Chapter 10.5.7 (*Exemptions*)
- Based on the above definition, Nebraska NRCS has developed a list of Conservation Practices that require a P.E. licensure.
 - In some cases, a state / nation-wide certification may be allowed.

P.E. License is Required for the following Conservation Practices

- Agrichemical Handling Facility (309)
- Irrigation Canal or Lateral (320)
- Dam, Diversion (348)
- Anaerobic Digester (366)
- Pond (378)
- Fish Passage (396)
- Aquaculture Ponds (397)
- Fish Raceway or Tank (398)
- Dam (402)
- Grade Stabilization Structure (410)
- Irrigation Reservoir (436)
- Land Reclamation, Landside Treatment (453)
- Land Reclamation, Toxic Discharge Control (455)
- Mine Shaft and Audit Closing (457)
- Land Reconstruction, Abandoned Mined Land (543)
- Land Reconstruction, Currently Mined Land (544)
- Recreation Land Grading and Shaping (566)
- Trails and Walkways (568)
- Stream Crossing (578)
- Streambank and Shoreline Protection (580)
- Channel Stabilization (584)
- Waterspreading (640)
- Constructed Wetland (656)
- Conservation Activity Plan 128

- Nebraska Engineering Law Exempts a P.E. license for the following practices if the Animal Feeding Operation (AFO) is 999 Animal Units or Less.
- National NRCS said we can not differentiate between TSP certification requirements (in TechReg) based on the size of the livestock operation.
- Therefore, a P.E. license is required for all the following, regardless of size of animal feeding operation.
 - Waste Storage Facility (313)
 - Animal Mortality Facility (316)
 - Composting Facility (317)
 - Waste Treatment Lagoon (359)
 - Closure of Waste Impoundment (360)
 - Waste Facility Cover (367)
 - Pond Sealing (flexible liner) 521-A
 - Pond Sealing (Soil Dispersant) 521-B
 - Pond Sealing (Bentonite) 521-C
 - Pond Sealing (Compacted Clay) 521-D
 - Roof Runoff Structures (558)
 - Amendments for Treatment of Agriculture Waste (591)
 - Waste Treatment (bio-filter) (629)
 - Solid/Liquid Waste Separation Facility (632)
 - Waste Transfer (634)
 - Vegetative Treatment Area (635)

P.E. License or Certified Irrigation Designer (CID) Certification is Required for the following Conservation Practices

- Irrigation Field Ditch (388)
- Irrigation Ditch Lining (428)
- Irrigation Pipeline (430)
- Irrigation System, Microirrigation (441)
- Irrigation System, Sprinkler (442)
- Irrigation System, Surface and Subsurface (443)
- Irrigation System, Tail Water Recovery (447)
- Pumping Plant (533)
- Water Well (642)

*P.E. License or State of Nebraska License
for Water Well Contractor is Required for
the following Conservation Practices*

- Well Decommissioning (361)
- Monitoring Well (353)
- Water Well Testing (355)
- Water Well (642)

Farmstead Improvement (374) & Conservation Activity Plan for Ag Energy Management (CAP128 AgEMP)

Requirement:

- Professional Engineer,
- Association of Energy Engineers (AEE)—Certified,
- Energy Managers (CEM), the Association of Energy Engineers—Certified, or
- Energy Auditor (CEA), or state certified/licensed farm energy auditors.

NRCS (and TSPs) Responsibilities to comply with:

- National Environmental Policy Act (NEPA);
- National Historic Preservation Act of 1966 (NHPA);
- Highly Erodible Land and Wetland Conservation provisions of the Food Security Act of 1985, as amended;
- Endangered and Threatened Species Act (E&T);



Conservation Plans must comply with all applicable Federal, state, and local laws and regulations.



Environmental Evaluation

The Environmental Evaluation (EE) is “the part of planning that inventories and estimates the potential effects on the human environment of alternative solutions to resource problems”. (7 CFR 650.4 and GM 190 Part 410.4(D).)

The EE applies to all assistance provided by NRCS (7 CFR 650.5 and GM 190, Part 410.5).

The NE-CPA-52 is the form that provides for the documentation of the EE.

A copy of the NRCS-CPA-52 must be included in the administrative file for all planning activities

Environmental Evaluation

The NRCS-CPA-52 form is divided into four general sections:

- Resource Concerns (soil, water, air, plants, animals, energy, and human/economic and social)
- Special Environmental Concerns (laws, rules, Executive Orders, and policy)
- Other agency and broad public concerns
- Determining Significance or Extraordinary Circumstances and making NEPA Findings

TSPs are not required to complete the NE-CPA-52 since NRCS as the federal agency must do so. However, TSPs should be familiar with it and plan accordingly to address potential concerns dealing with alternatives and implementation of them.

NRCS Policy/Guidance

Planning Process

- National Planning Procedures Handbook

Environmental Compliance in Planning

- National Environmental Compliance Handbook (March 2011)
- General Manual Title 190, Part 410;

Short and Long-Term Effects must be analyzed

Short-term:

- Refers to the installation or establishment period of the alternative(s) being evaluated
- Often critical when reviewing effects relative to Special Environmental Concerns such as endangered species

Long-term:

- Installed or established practices are fully functional (does not extend beyond the life-span of these practices)

NE-CPA-52 and associated Special Environmental Concerns

- Listed on the NE-CPA-52 are 18 various Federal laws, regulations, Executive Orders, and agency policies.



Evaluation Procedure Guide Sheets

- For each of the Special Environmental Concerns listed on the CPA-52 there is an Evaluation Procedure Guide Sheet to assist planners in following the proper procedures.
- Guide Sheets provide a step by step process of “Yes/No” questions that leads the planner through the thought process to determine compliance AND if additional analysis or consultations are needed/required.



Consultations May be Required

Under certain conditions, the responsible federal official (RFO) may be required to consult or coordinate with another Federal agency.

- Clean Water Act/ Waters of the U.S.
- Clean Air Act
- Coastal Zone Management Areas
- Cultural Resources
- Migratory Birds/ Bald and Golden Eagles
- Endangered & Threatened Species
- Essential Fish Habitat
- Wetlands
- Wild & Scenic Rivers



Environmental Compliance

- The remaining “Special Environmental Concerns” relate to specific procedures that need to be followed for compliance with laws, acts, executive orders, or agency policy.
- Environmental Compliance Can be a project stopper – legal responsibilities



Migratory Birds - Migratory Bird Treaty Act

- Projects which result in the destruction of suitable nesting habitat while a nest may be occupied by the bird, eggs, or young are prohibited by the act
- **Primary nesting period in Nebraska is April 1 – July 15 – and, in addition:**
- **Other bird species may nest outside of this period (i.e. great horned owls in March or sedge wrens in August)**
- Design projects to avoid impacts or implement outside of nesting period



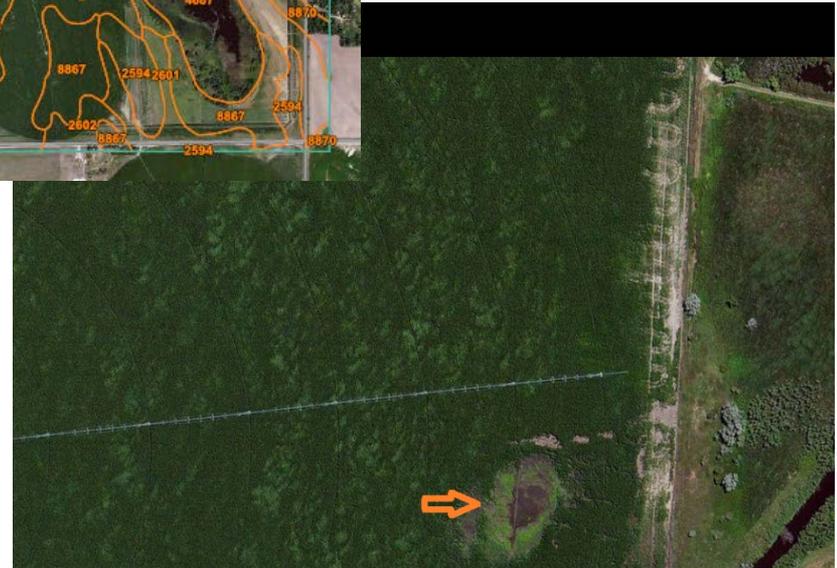
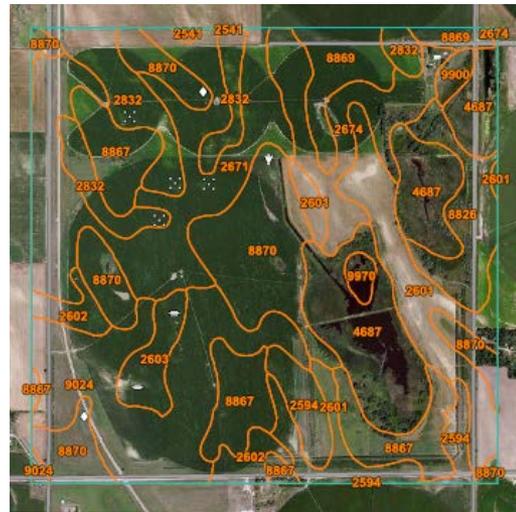
Wetland Protection

- Several laws and regulations exist that prevent projects from negatively impacting or draining wetlands
- Those include the Food Security Act, Clean Water Act, Executive Order 11990, and policies within the NRCS General Manual as well as state laws
- Wetlands are defined as areas that are saturated at or near the surface or ponded/flooded for long enough during the growing season to reach anaerobic conditions and influence the plant community



Methods to Identify Possible Wetlands

- Web Soil Survey provides information on hydric soils and inclusions found in map units
- On-site indicators of wetlands based on plant community or evidence of hydrology
- Aerial images that indicate an area may be saturated or inundated resulting in “signatures” on the landscape



Endangered and Threatened Species

- There are several federally listed and state listed endangered or threatened species in Nebraska including both plants and animals
- Species Range Maps and Habitat Evaluation Parameters are used to help screen which species may be of concern on a given site



Target Wildlife Species for Nebraska

- Wildlife species, as well as plants, that are considered “at-risk” are identified in the Nebraska Natural Legacy Project document
- This is the State Wildlife Action Plan that all states use to guide conservation toward those species and their habitats where it is needed
- The list includes all endangered and threatened species as well as those which have a noted decline or have other threats to populations and habitat

<http://outdoornebraska.ne.gov/wildlife/programs/legacy/>



The Nebraska Natural Legacy Project State Wildlife Action Plan

“to refine and implement a blueprint for conserving Nebraska’s flora, fauna and natural habitats through the proactive, voluntary conservation actions of partners, communities and individuals”

CULTURAL RESOURCES

- NRCS recognizes that cultural resources, including historic properties, are an integral part of our national heritage and recognizes its responsibilities for historic preservation, particularly for properties listed on or eligible for listing on the National Register of Historic Places. **Further, the National Historic Preservation Act of 1966, as amended, mandates that all Federal agencies must take into account the effects of their undertakings on these historic properties.**
- NRCS shall identify cultural resources and historic properties early in the NRCS planning and environmental review processes for all assistance activities classified as undertakings that have the potential to affect historic properties.
- **Technical Service Providers who are to carry out cultural resources compliance studies or the cultural resources portions of conservation planning, will complete the same training as NRCS employees.**

Cultural Resources continued . . .

- In addition, all work must comply with State, tribal, and local laws that cover the lands on which you work:
 - **Nebraska Revised Statute 12-1203; Unmarked Human Burial Sites and Skeletal Remains Protection Act prohibits disturbance of unmarked human burial sites except as expressly permitted by the act.**
 - Any person who encounters or discovers human skeletal remains or burial goods associated with an unmarked human burial in or on the ground shall immediately cease any activity which may cause further disturbance of the unmarked human burial and shall within forty-eight hours report the presence and location of such remains or goods to a local law enforcement officer in the county in which the remains or goods are found. Any person who knowingly fails to make such a report shall be guilty of a Class III misdemeanor.
- For additional information see http://uniweb.legislature.ne.gov/laws/search_keyword.php?keyword=unmarked+human+burial&search_by

Making NEPA Findings

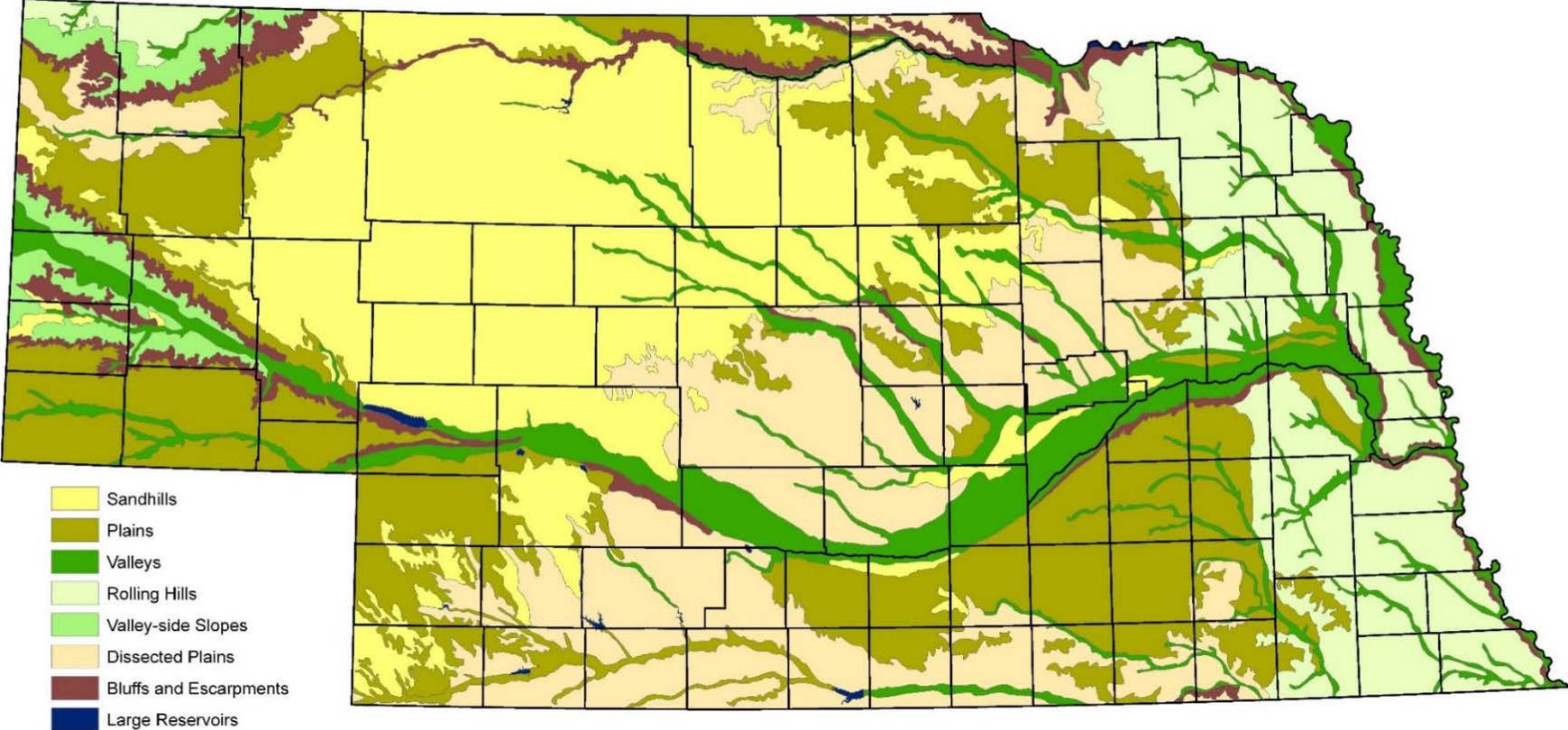
- Completed by a Federal Agency employee (Responsible Federal Official)
- NEPA Decision
 - 5 Options
 - Not a Federal action
 - Categorically excluded with no extraordinary circumstances
 - Sufficiently analyzed in existing NRCS NEPA document
 - Has been formally adopted by NRCS
 - May require preparation of EA or EIS

Topographic Image of Nebraska

Nebraska varies greatly in climate, soils and topography. We range from table lands to dissected till plains, to deep loess hills, to Sandhills, to eroded bedrock.



Topographic Regions

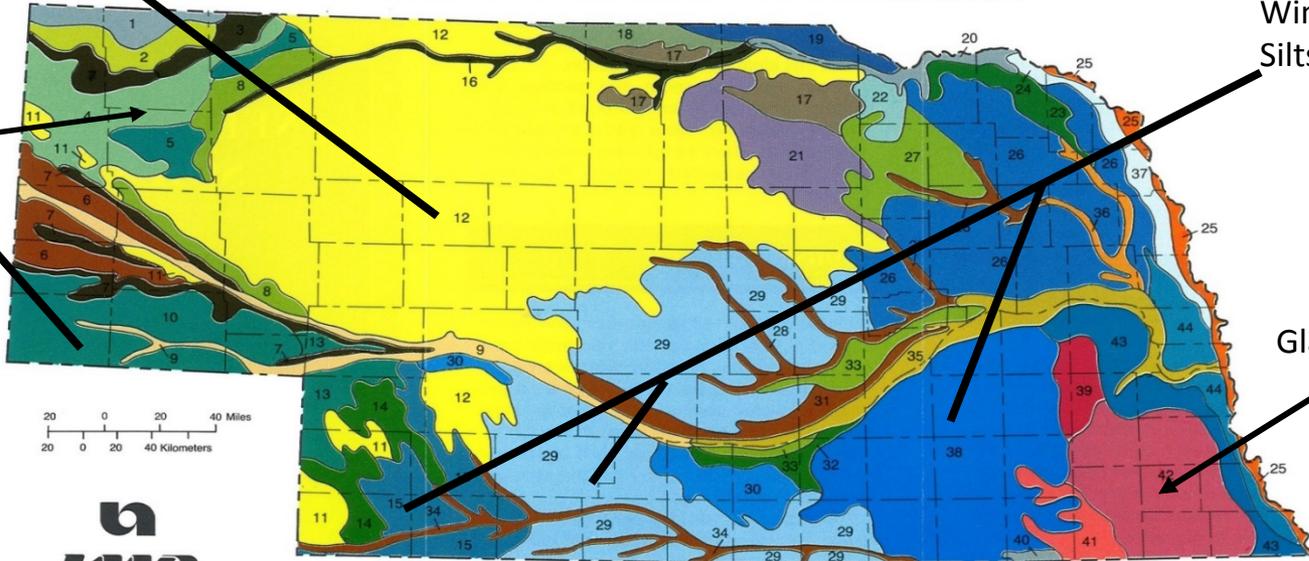


Wind Blown Sand

GENERAL SOIL MAP OF NEBRASKA

Wind Blown Silts (loess)

Bedrock Controlled



Glacial Till

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
JAMES R. CULVER - STATE SOIL SCIENTIST
STEVEN J. SCHAEFER - CARTOGRAPHER
JANUARY 1985

CONSERVATION AND SURVEY DIVISION
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
UNIVERSITY OF NEBRASKA-LINCOLN
MARK S. KUZILA - RESEARCH SOIL SCIENTIST
ANN M. MACK - CARTOGRAPHER

SOIL

Among these changing landscapes, the soil type also differs.

The top soil is a determining factor for the success of agricultural enterprises across the state.

Loess soil, composed of silt-sized particles carried by the wind, covers most of the state.

This soil is the foundation for productive cropland and is suitable for growing corn and soybeans.

The soil becomes sandy in the central part of Nebraska and is well suited for pasture grasses and hay operations.

Loamy and black soils in the Southwest and Panhandle regions make these areas prime ground for wheat production.

WEB SOIL SURVEY (WSS)

Through WWS You Can Develop Conservation Plan Maps, Soil Maps and non-technical descriptions, Topo Maps, etc.

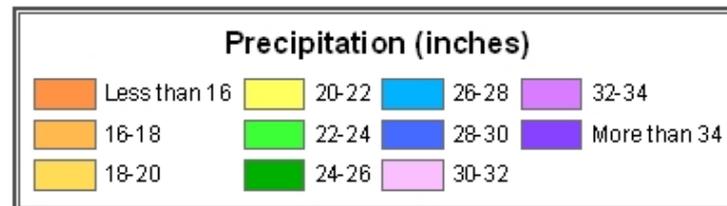
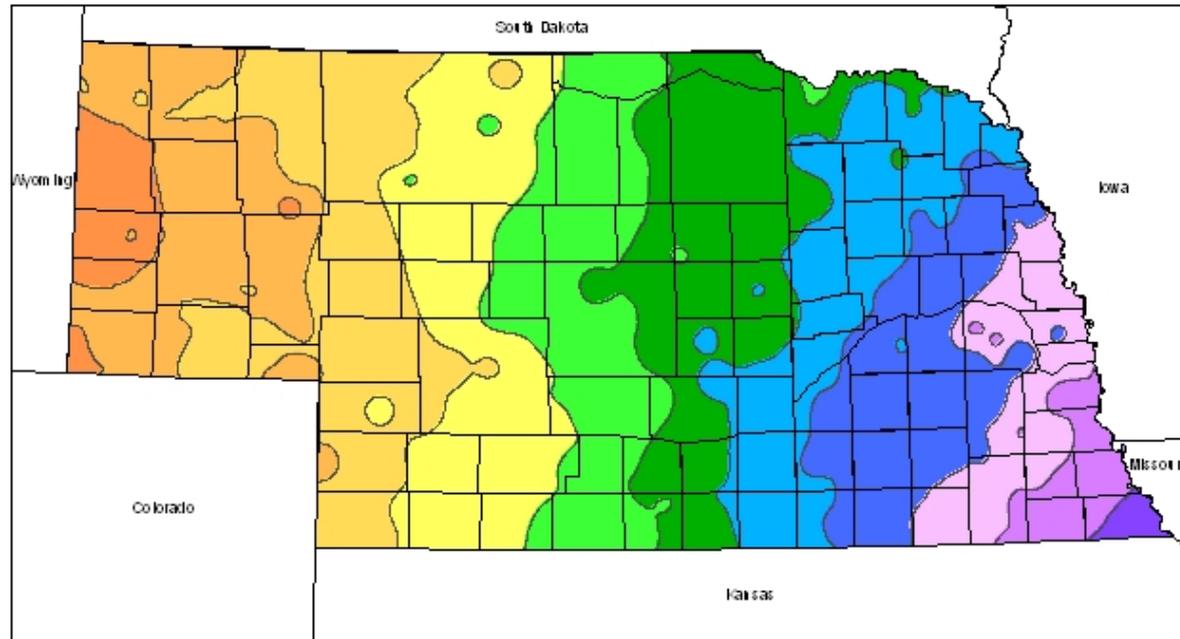


- Define area of interest (AOI) – must specifically set the AOI before you can view any maps or reports
 - AOI can be set for a user defined area, Soil Survey area OR Map Units within a Soil Survey Area
- Go to Soil Data Explorer
 - Pathway to Interpretations and Reports
 - Generate thematic maps
- Build custom soil resource report in Shopping Cart
- Print/download the selected map or report

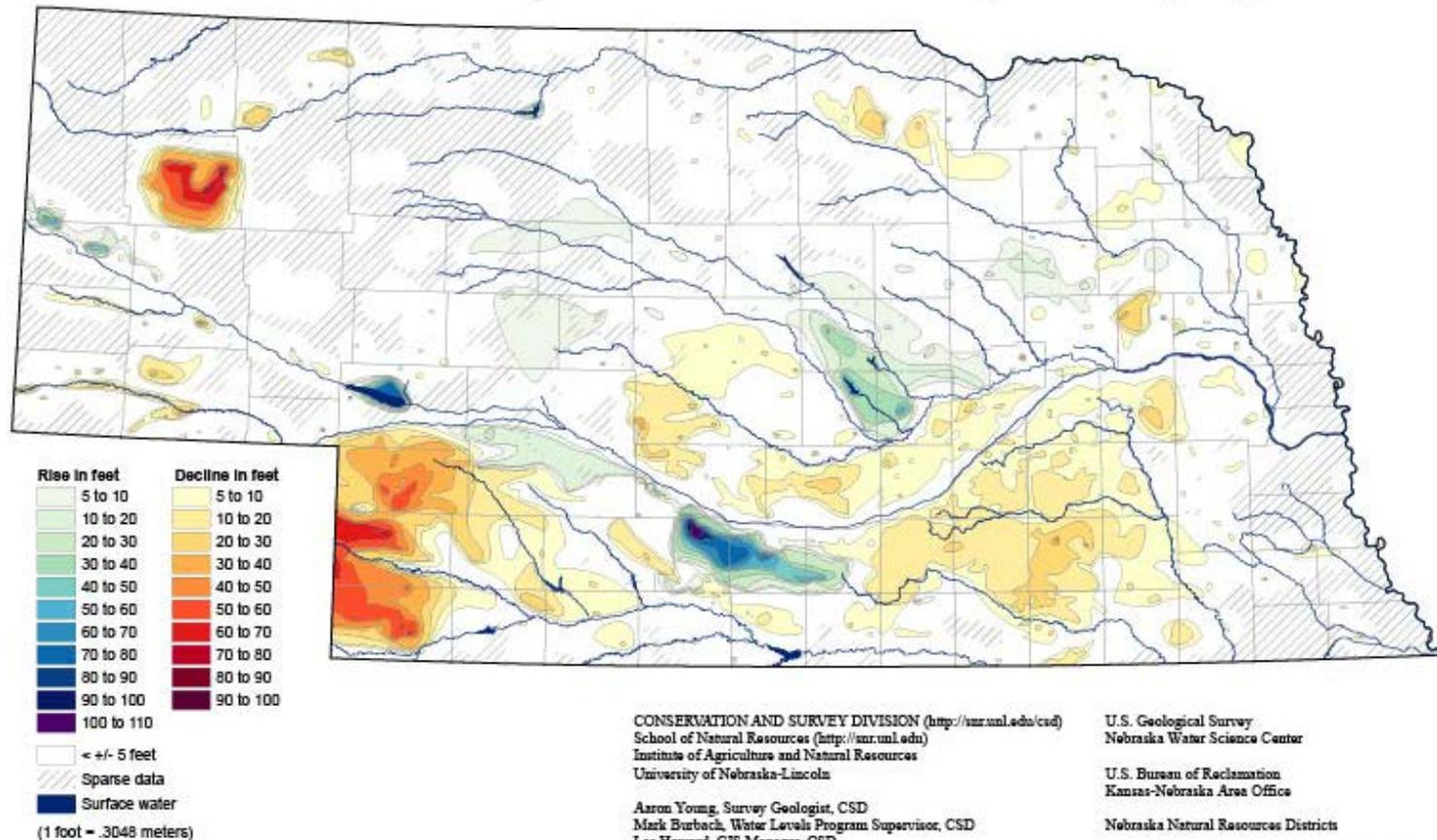
Average Annual Precipitation, 1971-2000 Nebraska

*Diverse Rainfall
from East to West*

*Ranging from 28-
34" in the east &
southeast to less
than 16" in the
western part of
the state.*



Groundwater-level Changes in Nebraska - Predevelopment to Spring 2014



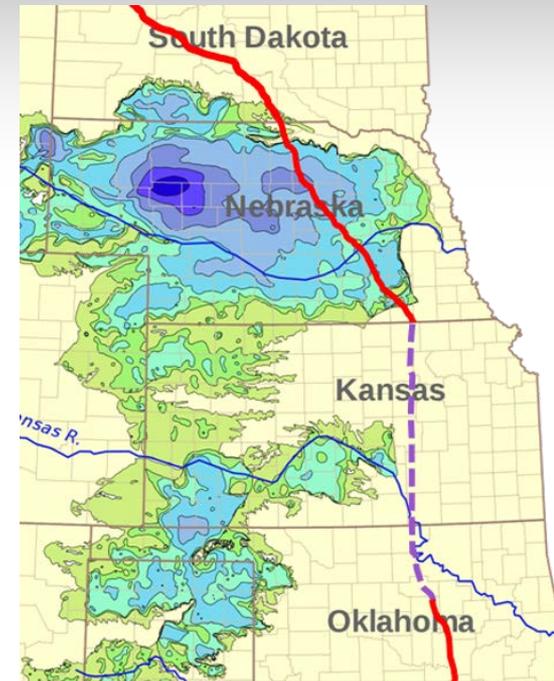
N School of Natural Resources
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln

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Nebraska's Natural Resources



- Nebraska's Farm & Ranches utilize **45.5 million acres** (93% of state's total land base).
 - 22.5 million acres in crops
 - 23 millions acres in pasture/rangeland
- **Ogallala Aquifer** - One of the world's largest aquifer resides below Nebraska. If poured over the surface of the state, the water from the aquifer would have a depth of 37.9 feet.
- Nearly **24,000 miles of rivers and streams**



Nebraska has a unique mix of natural resources

NEBRASKA AG FACTS

2012-2013

The “Cornhusker State”

- *National Ranked 3rd in corn grain production.*
- Most *widely* grown crop in Nebraska.
- In 2012, *9.1 million acres* were planted to corn.
- Uses include feed for livestock & poultry; ethanol production; and bioplastic production.
- In 2012, over *40% of states corn production was utilized in ethanol production.*

Nebraska's Ethanol Plants

- Ranked *second* in Ethanol Production with *23 Operating Plants* having *production capacity of 1.96 billion gallons* annually.
- Ethanol demand has increased the demand for corn, and consequently increased corn prices; production of distillers grain and gluten feed have also increased.
- Distiller grain plus soluble (WDGS) a commonly produced by-product used in cattle feeding operations.
- Regionally, 19% of feeders are using WDGS in their rations. Most likely it's higher in Nebraska where availability is higher and by-product prices are cheaper (pound per dry basis) than grain corn.

Soybeans

- ***Ranked 5th Nationally*** in soybean production.
- **Uses include livestock & poultry feed, human consumption, soy ink, biodiesel fuel, biodegradable plastic, and cooking oil.**
- **Widely grown in Nebraska, usually *rotated with corn*.**

Wheat

- *Ranked 12th Nationally* in wheat production.
- Approximately *1.5 million acres*.
- 50% of Nebraska's Wheat is Exported.
- Predominately, two types of wheat are produced in Nebraska: Red & Hard White Winter Wheat.
 - Both are popular for use in Asian noodles and Middle Eastern flat breads.
 - Hard Red Winter wheat is also used for pan and yeast breads.

Grain Sorghum (Milo)

- *Ranked 8th Nationally* in sorghum production.
- Average of *150,000 acres planted* annually.
- One of Nebraska's top four grain crops grown.
- Widely used for livestock & poultry feed.
- All sorghum is gluten-free and is used as alternative to wheat.
- High-drought tolerance.
- *Primarily grown in Southeastern Nebraska.*

Dry Edible Beans

- *Predominately grown in Western Nebraska.*
- **1st in Great Northern Bean production.**
- **2nd in Pinto production.**
- **3rd in all dry edible bean production** including light red kidney, navy, pink and garbanzo.
- **125,000 acres** are planted to beans.

Alfalfa & Hay

- *Grown in every county totaling two to three million acres.*
- Fed to livestock here in Nebraska or exported.
- Alfalfa is also dehydrated into pellets for livestock feed.



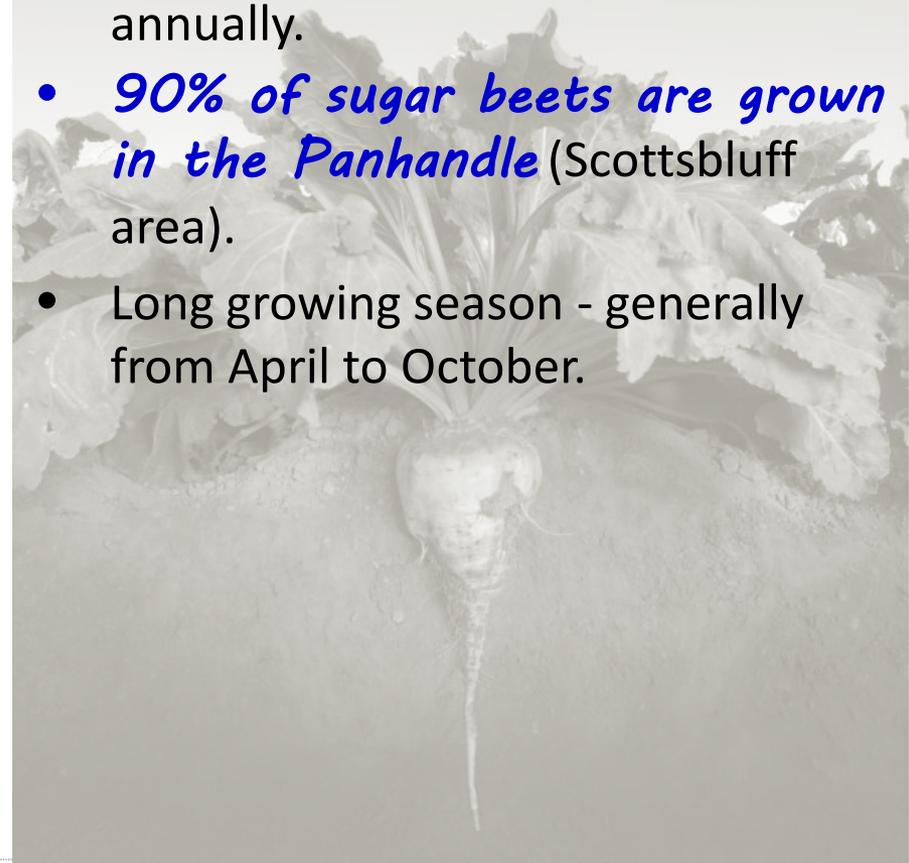


POTATOES

- **17th** in Nation's production.
 - Nebraska's water resources, sandy soils and favorable climate promote great yields.
- Planted in Eastern NE in early April for a summer harvest; while Central and Western areas plant in early May for a fall crop.
- About 1/3 of state's potatoes are processed into chips; remaining potatoes goes to grocery stores or seed stock.

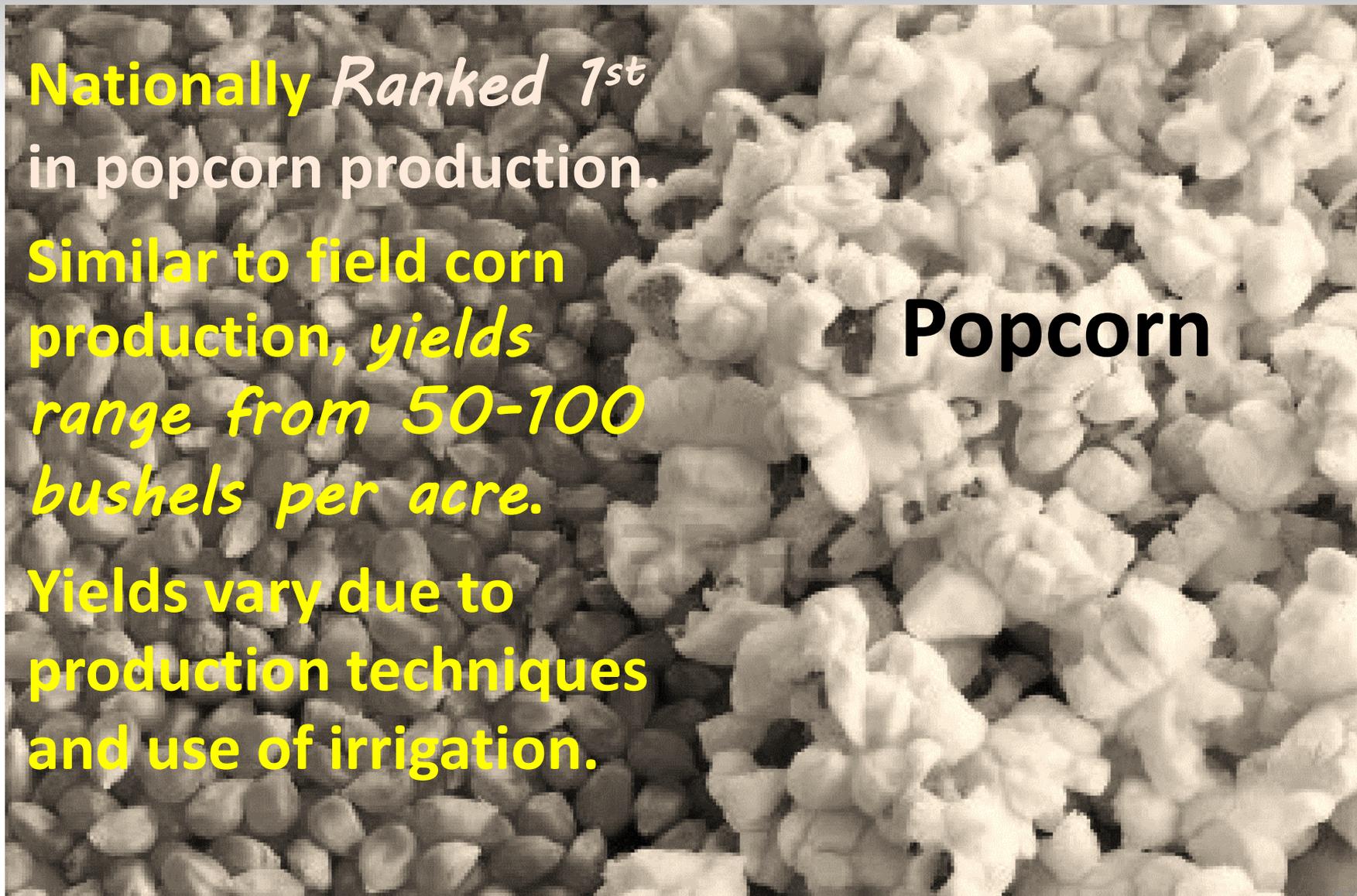
SUGAR BEETS

- Ranked **5th** in nation's production.
- Averaging **50,000 acres** planted annually.
- **90% of sugar beets are grown in the Panhandle** (Scottsbluff area).
- Long growing season - generally from April to October.



- **Nationally Ranked 7th** in popcorn production.
- **Similar to field corn production, yields range from 50-100 bushels per acre.**
- **Yields vary due to production techniques and use of irrigation.**

Popcorn



Irrigation

- *Water - Important and Very valuable Natural Resource for Nebraska Agriculture.*
 - Ground water (Ogallala Aquifer)
 - Surface water (24,000 miles of rivers/streams)
- *95,170 registered, active irrigation wells* supplying water *to 8.5 millions acres* of cropland and pastureland.
- Approximately *46% of cropland is irrigated.*
- Center pivots, gated pipe and sub-drip.
- Fertigation is often used to supply nutrients to the growing crops.
 - Chem-valves (anti-back flow devised) are used to protect ground water from contamination. NRDs conduct annual safety inspections.

Honey



- Nebraska is ranked *13th* in nation's honey production – over 2 million pounds annually.
- Sweet clover and alfalfa are two of Nebraska's main sources of nectar for honey bees.
- More than 40,000 bee colonies reside in state.
- Honeybees are transported to other states for pollination and returned to Nebraska for honey season (May-September).

Grapes and Wine

- Nebraska has *25 wineries* with 8 tasting rooms across the state.
- Nebraska's fertile soils, topography and humid continental & semiarid climates have been conducive to premium grapes.
- Grapes are grown by 114 individuals on *338 acres*.
- Over *88,000 gallons of wine produced annually* within Nebraska.

Producers find challenges in growing grapes with traditional cropland surrounding their fields. You will see signs posted "No Drift Zone".

Certified Organic Cropland

- In 2008, Nebraska was ranked 8th in certified organic cropland (129,585) and 8th in certified organic pasture acres (53,174).
- *Nebraska NRCS has one certified TSP for EQIP Conservation Activity Plans (CAP138) Transition to Organic Cropland.*

The “Beef” State

- From 1956 through 1965, Nebraska license plates bore the phrase “THE BEEF STATE”.
- *Ranked 1st in Cattle Feeding and Beef Exports* as “Grain-fed Nebraska Beef” is known world-wide.
 - Top Cattle Feeding Counties: Cuming (229,321); Dawson (142,097); Phelps (132,489); Custer (104,181); and Morrill (88,944).
 - 280,000 acres of silage chopped annually.
- Approximately *4,570 cattle feeding operations statewide*.
 - Only 770 operations are greater than 1000 head.

Cow/Calf



- Ranked *Nationally 2nd in Cow/calf* operations.
 - Operations range from 20 to 1000-head, averaging 90 pairs per operation.
 - Top Cow/Calf counties include: #1 Cherry (160,000), #2 Custer (100,000), #3 Holt (99,000).
 - Note: Generally these counties are located close to counties with some of the largest cattle feeding operation – not a surprise.
 - The availability of high quality feeder cattle and calves in Nebraska supports the state’s leading feeding industry.
- *23 million acres are pastures and rangelands* in Nebraska – *Half of which are in the Sandhills.*

Pork

- *Sixth ranked Nationally* in all hogs and pigs on farms.
- **Six Nebraska Counties are ranked nationally in America top hog producing counties:**
 1. Platte,
 2. Boone,
 3. Cuming,
 4. Antelope,
 5. Holt,
 6. Clay.

- Ranked **26th** nationally in total milk production.
- Approximately 200 licensed producers & 55,000 head of dairy cows.
- *Majority of dairy operations are located in Central and Eastern part of the state.*
- Many of these dairies use recycled bedding and recycled flush water for their operations.
- Several dairy processing plants within the state.
 - Brainard -Raymond
 - Hartington -Hallam
 - West Point -Lincoln
 - Omaha (2) -Norfolk (2)

Dairy Cattle



Poultry & Eggs

- *Leading state nationally in processed egg products.*
- Nebraska is ranked *12th nationally in egg production.*
- **Nebraska poultry is the number one consumer of soybean meal and the number two consumer of corn.**
- Two of the largest egg processing companies in the US reside in Nebraska:
 - Michael Foods also called Waldbaum farms is located in the **Northeast Nebraska** town of Wakefield.
 - Hemmingsen Foods located in David City, Nebraska (**East Central Nebraska**) is also an egg processing company.





TURKEYS

- After the closure of the turkey processing plant at Gibbon, Nebraska (Western Nebraska) in December 2012, production has decreased.
- 3,000,000 turkeys are raised annually.
- Nebraska's commercial turkey producers ship their birds to processors out of state.

SHEEP & GOATS

- Nebraska is *19th* in total numbers for sheep & lambs.
- Home to 17,000 meat goats and 2,800 dairy goats.
- Provide both food (meat) and fiber (wool).



- Of Nebraska's 22.5 million acres of cropland – approximately 9.1 million acres is planted to corn annually.
 - **Nitrogen** is the primary nutrient applied in corn production.
 - **Herbicides & Pesticides** are used to minimize weeds & pests.
- In addition, we have over 2.5 million head of cattle on feed along with 3.1 million head of swine along with poultry & dairy.
THAT'S A LOT OF MANURE NUTRIENTS BEING EXCRETED!!
 - Average amounts of **Nitrogen, Phosphorus and Potassium** in manure for various animal types.
 - Because of the imbalance of **Nitrogen and Phosphorus**, the use of manure as the sole source of nutrients for crop production can lead to excess application of nutrients (primarily phosphorus).

NRCS Conservation Practice & Programs



NRCS Conservation Practices & Management, such as Terraces, Manure Storage Structures, Cover Crops, & Nutrient Management; and NRCS Programs, such as EQIP & CSP; can enhance Nebraska Agriculture and protect the Environment.

NEBRASKA NRCS PRIORITIES

SOIL PRIORITIES



MINIMIZE EROSION

- Sheet and rill erosion
- Wind erosion
- Classic and Ephemeral gully erosion



REDUCE

QUALITY DEGRADATION

- Organic matter depletion
- Compaction
- Concentration of salts or other chemicals
- Subsidence: Loss of volume and depth of organic soils

Minimum Till & No-Till practices have cut erosion by 44% over the past 30 years.

Concentrated Flow Erosion on Nebraska's Grazing Land



Soil Erosion from Wind on
Nebraska Grazing Lands

Risk Assessment Tools for Soil Loss

- **Revised Universal Soil Loss Equation Tool Version 2 (RUSLE2) –**
 - Computer model containing both empirical and process-based science in a Windows environment that predicts rill and inter-rill erosion by rainfall and runoff.
 - Developed primarily to guide conservation planning, inventory erosion rates and estimate sediment delivery. Values computed by RUSLE2 are supported by accepted scientific knowledge and technical judgment, are consistent with sound principles of conservation planning, and result in good conservation plans.
- **Wind Erosion Prediction System (WEPS)**
 - Predicts the effects of management practices and crop rotations on wind erosion for an individual field.
 - Combines the latest in wind erosion science and technology with databases and computers, to develop what should be a significant advancement in wind erosion prediction technology.
 - Predicts many forms of soil erosion by wind such as saltation-creep and suspension including PM-10

Conservation Practices used to Minimize Soil Loss

- Conservation Crop Rotation (328)
- Contour Buffer Strips (332)
- **Contour Farming (330)**
- **Cover Crop (340)**
- Field Border (386)
- Filter Strip (393)
- **Grassed Waterway (412)**
- **Residue and Tillage MGT:**
 - No Till (329)
 - Mulch Till (345)
 - Ridge Till (344)
- Stream Crossing (578)
- Streambank & Shoreline Protection (580)
- **Terrace (600)**
- Windbreak/Shelterbelts
 - Renovation (650)
 - Establishment (380)

When applying Nebraska Conservation Practices - Use applicable Jobsheets, Practice Designs, Engineering Forms found in Nebraska eFOTG, Section IV.

WATER PRIORITIES

QUALITY

- Excessive sediment in surface water
- Salts in surface and ground water
- Pesticides & Nutrients in surface and ground water

EXCESS / INSUFFICIENT

- Inefficient use of irrigation water
- Inefficient moisture management
- Ponding, flooding, drifted snow

Because of Nebraska's large population of animal feeding operations AND 22.5 million acres of land in crop production; we have a higher risk of threats to surface and ground water contamination through: uncontrolled runoff from AFOs; lack of and/or poorly constructed manure storage structures; and improper and/or excess application of nutrients.

NE NRCS Risk Assessment Tools

- **Nitrogen Leaching Index** – See Nutrient Management Specifications (S-590) – Nitrogen Application (Focus on Source & Timing)
- **Nebraska Phosphorus Index** (Phosphorus Runoff)
- **UNL Manure Nutrient and Land Requirement Estimator** (for Animal Feeding Operations to determine land requirements for manure nutrients produced)
- **Purdue Manure Management Planner (MMP)** (for Animal Feeding Operations to help manage manure nutrients produced)
- **Windows Pesticide Tool (WIN-PST)** – (Pesticide losses)



Nutrient
MGT

Conservation Practices often used for Manure Storage, Transfer and Application in NE

- Nutrient Management -590
- Animal Mortality Composting -316
- Composting Facility - 317
- Critical Area Planting - 342
- Diversions - 362
- Manure Transfer 634
- Waste Storage Structure -313
- Obstruction Removal - 500
- Pond Sealing or Liners 521 A-D
- Pumping Plant 533
- Roofs and Covers -367
- Roof Runoff Structures - 558
- Sediment Basin -350
- Solid Separator -632
- Underground Outlet -620
- Vegetative Treatment Area -635
- Waste Structure Closure 360
- Waste Treatment - 629
- Waste Lagoon -359

See applicable Jobsheets, Practice Designs, Engineering Forms in the Nebraska eFOTG, Section IV



Bed-Packed Barns

- Traditionally cattle feeding has been in open lots with runoff collected in holding ponds. Solids and runoff being applied to cropland during the fall and summer, respectively.
 - Nebraska Department of Environmental Quality (NDEQ) permits these types of structures.
- Nebraska is seeing more monoslope & hoop structures for full-time animal feeding (even housing cow/calf operations full time).
 - NDEQ does not require a construction or operating permit for these types of operations.
- If land owner applies for NRCS EQIP 313 funding, an EQIP-Ready CNMP is required at time of sign up and prior to ranking, same as any other EQIP waste storage structure (313) or VTA (635) application.

Nutrient Management (590)

- **Follow University of Nebraska Lincoln (UNL) Recommendations for Nutrient Application Rates** (commercial fertilizer, manure, biosolids, compost, municipal sludge, etc. and includes all potential sources of nutrients:
 - Residual Soil N, *Organic Matter N credit*, Legumes, Prior Organic Nitrogen Applications from Manure, biosolids, compost, etc.), Irrigation Water, etc.
 - **Organic matter N credit is normally overlooked when budgeting for Soil N Credits.*
 - **Follow UNL Requirements for Testing Protocols** (See applicable NebGuides):
 - Soil testing:
 - Surface 0-8", Subsurface (deep) 8-24" at minimum (36" preferred).
 - Analysis - Surface: N, P, K, O.M., pH; Deep – N.
 - Surface Samples once every crop rotation, minimum every 5 years. Surface Sample for N prior to Nitrogen Application. Deep sample for Nitrogen when is applied consecutively two years or more.
 - Manure Analysis
 - Annual sampling of each type.
 - Nutrients Analysis: Total N, Total Ammonia-N, Total Organic-N, Total Phosphorus, Total Potassium, Moisture Content.
 - Irrigation Water Analysis
 - Plant Tissue Analysis.



Integrated Pest Management (IPM) 595; Brush Management 314; Herbaceous Weed Control 315:

- IPM strategies (**Prevention, Avoidance, Monitoring and Suppression** or “PAMS”).
- Desired control of weeds/pests can be achieved through **mechanical, chemical, burning, or biological methods either alone or in combination.**
- For identified water quality concerns related to pesticide leaching, solution runoff and adsorbed runoff, the current version of the USDA-NRCS **WIN-PST program will be used to evaluate potential risks to humans and/or fish, as appropriate, for each pesticide to be used.**
- The minimum level of mitigation required for each resource concern is based on the final risk ratings in the “**WIN-PST Soil/Pesticide Interaction Hazard Ratings**” Table – See 595 and Agronomy TechNote 110 for table and mitigation information.

IPM (595)

- ▶ Agronomy TechNote 110
- ▶ 595SOW (Statement of Work)
- ▶ NE-CPA-29 (Restricted Use)
- ▶ NE-CPA-39 (IPM)
- ▶ Planning Sheet 10 – IPM

Associated
Technotes,
SOWs,
Jobsheets,
Planning
Sheets, DPs

Brush MGT (314) & Herbaceous Weed Control (315)

- ▶ 314DP (Design Procedures)
- ▶ Brush Management Plan (NE-CPA-19)
- ▶ Brush Management Supplement

*Nebraska is home to 23 million acres of
pasture & rangeland;*

**STATE PRIORITIES INCLUDE: PLANT
DEGRADED CONDITION & LIVESTOCK
PRODUCTION LIMITATIONS**

The Most Common Resource Concerns on Grazing Lands are Plant Resource:

1) Undesirable Plant Productivity and

2) Health due to Degraded Plant Conditions.

- Eastern Red Cedar Encroachment
- Smooth Bromegrass and other non-native grasses invasion of native rangeland
- Reduced productivity of tame pastures.
- Loss of functional groups
 - Tall and Mid-Warm Seasonal Grasses replaced by other functional groups



Ecological Sites

Nebraska has a wide range of ecological sites. It is very important to be familiar with the sites occurring in the area in which you work. Full ecological site descriptions can be found at:
<https://esis.sc.egov.usda.gov/>

A wide, flat landscape covered in green grass under a clear blue sky.

Loamy Upland

A close-up view of soil and gravel with sparse green grass growing in it.

Very Shallow

A rolling landscape of green grass under a cloudy sky.

Sands

A landscape of green grass on a sandy, uneven terrain.

Choppy Sands

A steep, eroded bank of light-colored soil with small green shrubs growing on it.

Loess Breaks

Location of Nebraska Ecological Site Quick References

- Nebraska has developed quick references for ecological sites in each MLRA.
- These can be found at: eFOTG— Section IV - Tools

Limy Upland/Shallow
Limy/Loamy Lowland
Sites - – Hayes County



Know Your Resources

The endangered and threatened species present vary across the state. Check with the Field Office Technical Guide to determine species present in your planning area.



Nebraska has designated 11 species of plants as noxious weeds. Several Counties have designated additional noxious weeds.

- Canada Thistle
- Plumeless Thistle
- Musk Thistle
- Salt Cedar
- Phragmites
- Purple Loosestrife
- Leafy Spurge
- Spotted & Diffuse Knapweed
- Sericea Lespedeza
- Japanese Knotweed



Invasive Plant Species Considerations

- Invasive plants in Nebraska are classified as noxious under state law and there is also a “Watch List” that has been developed
- A link is provided at:
<http://www.newweed.org/Documents/Watchlist.pdf>
- Sites with existing populations of invasive plants may require different management practices to be applied



Invasive Plants Watch List: Shortgrass Prairie Ecoregion
(Banner, Box Butte, Chase, Cheyenne, Dawes, Deuel, Dundy, Keith, Kimball, Morrill, Perkins, Scotts Bluff, Sioux)

Scientific Name	Common Name
Category 1: Future Invasive Species	
<i>Arundo donax</i> L.	Giant reed
<i>Celastrus orbiculatus</i>	Oriental bittersweet
<i>Eichhornia crassipes</i>	Water hyacinth
<i>Hydrilla verticillata</i>	Hydrilla
<i>Najas minor</i>	Brittle naiad
<i>Salvinia molesta</i>	Giant salvinia
Category 2: Priority Species	
<i>Acroptilon repens</i>	Russian knapweed
<i>Cynoglossum officinale</i>	Houndstongue
<i>Galega officinalis</i>	Goat's-rue
<i>Halogeton glomeratus</i>	Saltlover



Poisonous Plants are not generally a large factor on Nebraska Grazinglands, but may cause issues for livestock during and following a drought or other severe disturbance.

The most common poisonous plants in Nebraska are:

- Woolly Locoweed
- Lambert's Crazyweed
- White Locoweed or Crazyweed
- Broom Snakeweed
- Riddell's Groundsel
- Common Cocklebur
- Lupines (Silver, Platte, Silky)
- Larkspur (Geyer's, Plains)
- Ponderosa Pine



- Conservation alternatives will include
 1. Prescribed Grazing and
 2. any facilitating and/or accelerating practices needed to meet the resource needs and objective of the client.
- The most common facilitating practices utilized in Nebraska are:
 - Water Developments
 - Wells, Tanks and Pipelines
 - Cross fences
 - Standard or Permanent Electric
 - Brush Management
 - Prescribed Burning
 - Range Seeding
 - Forage and Biomass Planting





COMMON NEBRASKA GRAZING SYSTEMS

Rest Rotation Grazing

- 1 or more pastures are ungrazed for 12 months (rested).
- The pasture(s) rested are rotated.
- Resting once every 5 years promotes drought resilience.
- Timing could be arranged so that nearly 2 years of rest is incorporated.
- Two approaches to stocking rates:
 - Keep numbers the same as before rest was incorporated.
 - Reduce numbers by 20% to ensure that remaining pastures are appropriately stocked.
- Two broad categories
 - Grazed pastures are grazed season long.
 - Grazed pastures managed as in deferred rotation.

DEFERRED GRAZING

- Four (4) or more pastures with moderate stocking rates
- One grazing period per pasture each year
 - Improves grazing distribution
 - Opportunity to fence based on ecological sites
- Summer grazed pastures – 50-75% of pastures are ungrazed during the rapid growth period of predominant forage grasses.
- Advance plant maturity in last pasture(s) may reduce animal performance late in the season

DEFERRED ROTATION: Example

- ▶ 180 Day Grazing Season (6 months)
- ▶ Grazed 1 month
- ▶ Rested 5 months during growing season (150 days)
- ▶ 83% rest

5/1 – 5/31	6/1 – 6/30	7/1 – 7/31
8/1 – 8/31	9/1 – 9/30	10/1 – 10/31

GrassSnap Monitoring App

- Available on iTunes and Google Play Store
- Developed by UN-L
- Good tool to use for photo monitoring, range trend and grazing response index.
- More information can be found at:
<http://centralsandhills.unl.edu/GrassSnap>

**Narrow leaf Penstemon
(Beardtongue) June 7, 2013**



Inadequate Habitat for Fish and Wildlife is often an additional resource concern on Nebraska grazing lands

- Habitat Degradation is a common resource concern on Nebraska's grazinglands. Some of the common resource issues include:
 - Conversion of grazingland to cropland
 - Invasion of grazingland by introduced species such as smooth brome and annual brome grasses.
 - Extensive eastern red cedar encroachment



Wildlife Habitat Assessments

- A variety of different habitat assessments can be used to evaluate wildlife habitat
 - Habitat Suitability Index models for individual species
 - Land Use based evaluation worksheets found in eFOTG for Nebraska (i.e. cropland, rangeland)
- These tools help identify “limiting factors” for wildlife habitat which can be addressed in the conservation plan



Common management options for Enhanced Wildlife Habitat on Nebraska Grazing Lands



- Manage for optimum species diversity.
- Patch grazing and/or patch burning
- Rest Rotation combined with Rotational Deferment
- Different utilization levels in different pastures

Other Nebraska Agencies

- Nebraska Department of Environmental Quality (Surface & Ground Water Regulations, Livestock Waste Regs, Secondary Containment Regs, NPDES Authority and Permits)
 - <http://www.nda.nebraska.gov/>
- Nebraska Department of Agriculture (Pesticide Applicator, Weed Control, Animal Health & Mortality – Normal & Catastrophic,)
 - <http://www.deq.state.ne.us/>
- Nebraska Natural Resource Districts (NRDs) (Flood Control, Irrigation Well Registration, Ground Water Management & Protection)
 - <http://www.nrdnet.org/>

TSP NEEDS for NEBRASKA

- Conservation Activity Plans (CAPs):
 - CNMPs (102), **Nutrient (104)** , **Forestry (106)**, **Grazing (110)**, **Prescribed Burn (112)**, **IPM (114)** , **IWM (118)** , **Energy (128)**, **Organic Transition (138)**, **Wildlife Habitat (142)**, and **Pollinators (148)**
- Conservation Practices Categories:
 - Nutrient Management (590)
 - Waste Storage (313) and associated practices (P.E.)
 - Pest Management (595)
 - Irrigation Water Management (499) & associated practices
 - Surface and Subsurface (i.e. Drip) (P.E. or CID)
 - Prescribed Grazing (528)
 - Prescribed Burn (338)
 - Farmstead Energy (374) – P.E., CEM, etc. to complete farm audits

Questions

Please direct questions to:

- *Renee Hancock, TSP Coordinator & State Water Quality Specialist*
 - *402.437.4064*
 - *renee.hancock@ne.usda.gov*

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.

Send the signed certificate to the State TSP Coordinator. Copy the below link to your browser for a list of State TSP Coordinators.

<https://techreg.sc.egov.usda.gov/RptStateContact4Admin.aspx>

STATE SPECIFIC TRAINING MODULE COMPLETION CERTIFICATE

I, _____, hereby verify I have viewed and understand the
TSP Name
content of the Nebraska State Specific Training Module and affirm I have the
knowledge, skills and ability to conduct conservation planning services in that
state.

TSP signature

Date

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Supplemental Nutrition Assistance Program

For any other information dealing with Supplemental Nutrition Assistance Program (SNAP) issues, persons should either contact the USDA SNAP Hotline Number at (800) 221-5689, which is also in Spanish, or call the State Information/Hotline Numbers.

All Other Inquiries

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