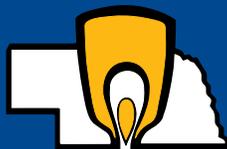


NEBRASKA CORN

2005 - 2006



NEBRASKA CORN BOARD

QUALITY REPORT



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2005-2006 NEBRASKA CORN QUALITY REPORT

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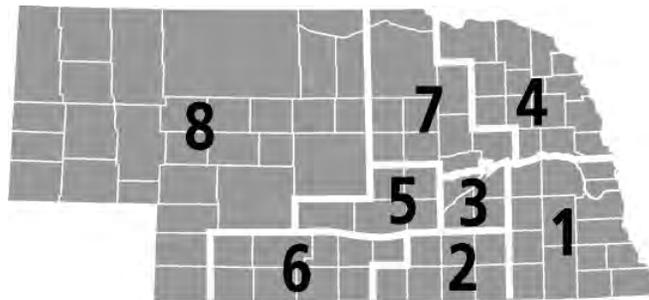
Nebraska Corn Board  
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**N E B R A S K A C O R N B O A R D**

The Nebraska Corn Board is responsible for developing and carrying out programs that enhance profit opportunities for corn producers through market promotion, research and education. Its members represent the eight districts indicated on the map and are appointed by the Governor.

One at-large member is elected by other board members.



**District 1**  
Bernie Heier  
Walton



**District 2**  
Mark Jagels  
Davenport



**District 3**  
Stan Boehr  
Henderson



**District 4**  
Bob Dickey  
Laurel



**District 5**  
Bart Beattie  
Sumner



**District 6**  
Doug Boisen  
Minden



**District 7**  
Jerry Childers  
Chambers



**District 8**  
Jon Holzfaster  
Paxton



**At-Large**  
Alan Tiemann  
Seward



**Don Hutchens**  
Executive  
Director



**Randy Klein**  
Market  
Development  
Director



**Kelly Brunckhorst**  
Ag Promotion  
Coordinator



**Janet Miller**  
Administrative  
Assistant



**Susan Zabel**  
Staff Assistant



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## T A B L E O F C O N T E N T S

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6	2005 Nebraska Food Grade Corn Study
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High quality, reliable supply and abundant production. These words best describe Nebraska corn.

The Nebraska Corn Quality Study shows the 2005 corn crop was possibly the highest quality crop in history—with 97 percent of the corn grading #1 and three percent grading #2. Average test weight was 59.7 pounds/bushel (76.8 kilograms/hectoliter).

Separate samples of food grade corn were collected for the Nebraska Food Grade Corn section on pages 6 and 7. This provides food grade corn buyers with more complete information about the quality of Nebraska corn grown for food use. These samples include both white and yellow corn.

Nebraska, known as the “Cornhusker State”, is the third largest corn-producing state in the United States. Nebraska farmers annually harvest one billion bushels (nearly 30 mmt) of corn! Climate, soil type, ample irrigation, and progressive farming techniques are a few reasons why Nebraska farmers consistently produce a high quality, extremely reliable and abundant supply of corn for the world market.

The Nebraska Corn Board is a state agency financed by Nebraska corn producers to improve corn marketing opportunities. Nebraska corn producers are represented in the world marketplace by the U.S. Grains Council, a non-profit organization with 10 international offices. The Nebraska Corn Board also works closely with the Nebraska Department of Agriculture in generating and responding to corn export marketing opportunities.

We hope you find the 2005 Nebraska Corn Quality Study useful. If you have any questions about Nebraska corn, please call 402-471-CORN (2676), 800-NECORN1 (632-6761) or fax 402-471-3345. You can contact us at our email address: [r.klein@necorn.state.ne.us](mailto:r.klein@necorn.state.ne.us) or visit us at our internet home page: <http://www.nebraskacorn.org>

Thank you for your interest in Nebraska corn!

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**Year in and year out, Nebraska farmers produce some of the best corn in the world. The 2005 Nebraska Corn Quality Study shows the 2005 corn crop was outstanding.**

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**97% of the yellow corn graded #1 and 3% graded #2 .**

Hastings Grain Inspection, official grain inspection agency designated by the Federal Grain Inspection Service (FGIS), performed the testing for the 2005 Nebraska Corn Quality Study. The Nebraska Grain And Feed Association and the Nebraska Cooperative Council arranged the collection of random samples from throughout the state’s corn production areas. Each elevator location provided three samples on which testing was performed. Included in the testing were the standard tests conducted on corn as offered under the U.S. Grain Standards Act which include test weight, moisture, damage and foreign material. Additional analysis of aflatoxin, stress cracks, protein, starch and oil were also performed.

This is the fourteenth year the study has been completed, documenting Nebraska as a consistent supplier of high quality corn. On average over the 14 years of the study, 73.3% of the samples have tested U.S. #1 and 22.1% have tested #2.

The following table summarizes the corn quality of 2005:

**TABLE 1**

2005 Nebraska Corn Quality Study U.S. Grade Results		
Yellow Corn		
U.S. Grade	# of Samples	Percent
1	213	97
2	6	3
3	-	-
4 and below	-	-
Total	219	100%

Of the samples provided to the inspection agency, 97% graded #1 and 3% graded #2.

---

Test weights in the 2005 crop averaged 59.7 pounds/bushel (76.8 kg/hl), which was above the average of the 2004 crop of 58.7 pounds/bushel. The minimum test weight for #2 yellow corn is 54.0 pounds/bushel, which is required for export shipping.

The total damage limit for #2 corn is 5 percent maximum. The average for the study was 0.76 percent.

3.0 percent is the maximum limit of broken corn and foreign material (BCFM) for #2 corn. The average for the study was 0.65 percent.

Moisture levels ranged from a low of 11.8 percent to a high of 17.8 percent. The average for all of the samples brought into the agency was 14.26 percent.

---

**Test weights  
for yellow corn  
averaged 59.7  
pounds/bushel,  
well above  
the minimum  
required for  
export.**

---

The following were the ranges and averages of protein, oil and starch content:

TABLE 2

2005 Nebraska Corn Quality Study Protein, Oil and Starch Results <i>based on dry matter basis</i>			
Yellow Corn			
	Low	High	Average
Protein	7.6%	11.1 %	9.1%
Oil	3.5%	5.0%	4.5%
Starch	70.4%	73.8%	72.3%

Aflatoxin testing was conducted on one sample per location. Twenty parts per billion (ppb) is the acceptable maximum for human consumption and up to 300 ppb is acceptable for finishing cattle. All samples tested negative for aflatoxin.

The average stress crack level was 4.5 percent, compared to 14.46 percent last year.

The following parameters are generally accepted for yellow corn exports. The second column is the average of the 2005 crop.

TABLE 3

2005 Nebraska Corn Crop		
	General Export Parameters	2005 Corn Crop
U.S. Grade	No. 2 or better	No. 1
Test Weight	54.0 lbs.	59.7 lbs
Total Damage	5.0%	0.76%
BCFM	3.0%	0.65%
Moisture	15.5%	14.3%
Aflatoxin	20 ppb	None

The 2005 crop easily exceeded quality standards for shipment of corn to international destinations.

**Nebraska Corn Quality Study  
Results from 2002, 2003 and 2004**

**TABLE 4**

	2002	2003	2004
<b>U.S. Grade</b>			
1	65.1%	84.1%	92.3%
2	20.8%	11.0%	5.9%
3	8.1%	2.4%	2.5%
4 or below	6.0%	2.4%	0%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

In 12 of the 14 years in which this study has been completed, no samples were even close to exceeding the 20 ppb allowed for all uses, including human consumption. The two years that showed small incidences of aflatoxin were marked by one of the most severe droughts on record, yet only a small number of samples tested negative. Because we irrigate 70% of our corn, stress is controlled and aflatoxin is rarely, if ever, a problem.

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**Scientist for the**  
**Cereal Science**  
**and Technology**  
**Laboratory,**  
**Department of**  
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**Technology,**  
**University of**  
**Nebraska-Lincoln,**  
**supervised the**  
**testing for the**  
**2005 Nebraska**  
**Food Corn**  
**Quality Study.**

Corn best suited for food use will have specific quality characteristics uniquely suited for its intended end use. Corn ideally suited for dry milling will generally be harder in character than corn intended for feed or wet milling. When corn flours are used as ingredients in other products, flour behavior during cooking is of particular importance. Some corn flours have a tendency to absorb water more quickly than others when hydrated, and flours can also differ in the viscosity and “cook-up/pasting” behavior they exhibit when thermally processed.

No particular cook-up/pasting behavior is necessarily more desirable, but it is essential that processors have access to corn whose cook-up characteristics are compatible with their processing operation. Corn most suitable for alkaline processing (*Nixtamalization* for tortillas, corn chips and tortilla chips), will generally also be harder, but in addition be relatively slow to take up water during cooking and not lose solids to the cook-steep water. Many processors also prefer that corn lose much of its pericarp (outer bran layer) during cooking.

#### FOOD QUALITY TESTS

- **TADD (Tangential Abrasive Dehulling Device) % Removal**  
An indication of corn hardness (lower numbers, harder corn)
- **Nixtamal Moisture (%)**  
An indication of water uptake during a defined cooking period (lower numbers, more predictable cooking/steeping behavior) and the final corn moisture after cooking and steeping.
- **Pericarp Remaining (%) and Pericarp Score**  
The percentage of pericarp remaining on the corn kernels after alkaline cooking (nixtamalization); the Pericarp score is a broad 1-5 ranking for representing pericarp removal (1= no pericarp remaining, 5 = all pericarp remaining).
- **Dry Matter Loss**  
The percentage of dry corn solids lost during alkaline cooking (nixtamalization). The more dry matter lost, the less final product a processor can produce and the higher their waste-water treatment charges.
- **Rapid Visco-Analysis Data(Cp, Minutes, or Degrees Celsius)**  
The viscosity of a corn-flour/water paste at various temperatures prior to and after cooking the starch and subsequent cooling. The temperature of initial cook (pasting temperature), the time to reach maximum cooked viscosity (peak time), at the temperature at maximum cooked viscosity (peak temperature) is also reported.

## SAMPLES ANALYZED

Forty Nebraska food corn samples were analyzed, representing 20 white corn samples and 20 yellow corn samples. Random samples were provided by Crete Mills (Bunge Milling) and Frito-Lay, Inc.

### Food Quality Test Results

	TADD	Nixtamal Moisture	Pericarp Score	Pericarp Remaining	Dry Matter Loss	Kernel Moisture	Water Uptake
<b>OVERALL</b>							
Average	0.63	50.78	2.80	44.88	5.05	11.85	38.93
Median	0.64	50.43	2.55	38.75	5.30	12.64	38.20
High	0.73	53.90	4.40	85.00	9.81	15.50	44.92
Low	0.47	47.32	2.00	25.00	0.79	8.64	33.43
<b>YELLOW</b>							
Average	0.66	51.73	2.65	41.25	5.05	11.76	39.96
Median	0.66	51.58	2.50	37.50	5.19	12.32	39.88
High	0.73	53.90	3.50	62.50	6.55	14.03	44.92
Low	0.60	49.76	2.00	25.00	1.97	8.64	37.15
<b>WHITE</b>							
Average	0.60	49.83	2.94	48.50	5.04	11.93	37.90
Median	0.60	49.98	2.70	42.50	5.30	12.95	37.25
High	0.67	52.65	4.40	85.00	9.81	15.50	43.64
Low	0.47	47.32	2.00	25.00	0.79	8.67	33.43

**TABLE 1**

Corn Hardness (TADD), Cook Resistance/Hardness (Water Content of Cooked Corn) and Nixtamalization Properties (Pericarp, Dry Matter Loss) of Analyzed Nebraska Corn.

### Rapid Visco-Analysis Data\*

Run Profiles: 10 min at 50°C, heat to 95°C in 4 min 42 sec, hold at 95°C for 3 min 10 sec, cool to 50°C in 4 min 28 sec (160 RPM).  
Corn ground using a UDY Mill.

	Peak Viscosity	Trough Viscosity	Breakown	Final Peak	Setback	Peak Time	Pasting Temperature	Final Viscosity	Peak Temperature
<b>OVERALL</b>									
Average	2211	1336	875	3668	2332	9.53	73.06	3638	87.23
Median	2237	1416	884	3571	2273	9.53	72.90	3563	92.00
High	3679	2018	1776	5007	2989	11.00	76.10	4969	95.10
Low	1061	965	79	3072	1916	9.20	71.60	3047	64.40
<b>YELLOW</b>									
Average	2328	1250	1078	3614	2364	9.45	73.03	3583	91.01
Median	2374	1195	976	3520	2318	9.40	72.93	3496	91.98
High	3197	1655	1776	4579	2924	9.73	74.30	4530	95.10
Low	1066	965	101	3072	1916	9.20	71.60	3047	65.35
<b>WHITE</b>									
Average	2095	1422	672	3722	2300	9.62	73.09	3692	83.45
Median	1994	1444	573	3674	2264	9.53	72.90	3647	93.15
High	3679	2018	1661	5007	2989	11.00	76.10	4969	93.95
Low	1061	982	79	3181	1982	9.33	71.65	3155	64.40

\* A representative sample of Rapid Visco-Analysis curves can be obtained by contacting the Nebraska Corn Board.

**TABLE 2**

Rapid Visco-Analysis Data (Viscosity data in Cp, Temperatures in Deg. C, Time in Minutes).

Data reported are generally typical of that available in Nebraska, although harder corn (on average depending on crop year) is often available. The corn analyzed will make excellent food products, especially if individual lots are selected for particular end uses.

# NEBRASKA CORN PRODUCTION

TABLE 5

Nebraska – Corn for Grain in English units			
Year	Harvested Corn 000 Acres	Yield bushels/acre	Production million bushels
1996	8,250	143	1,179.8
1997	8,600	132	1,135.2
1998	8,550	145	1,239.8
1999	8,300	139	1,153.7
2000	8,050	126	1,014.3
2001	7,750	147	1,139.2
2002	7,350	128	940.8
2003	7,700	146	1,124
2004	7,950	166	1,320
2005*	8,200	157	1,287

*\* projected as of Nov. 2005*

Source: Nebraska Agricultural Statistics Service

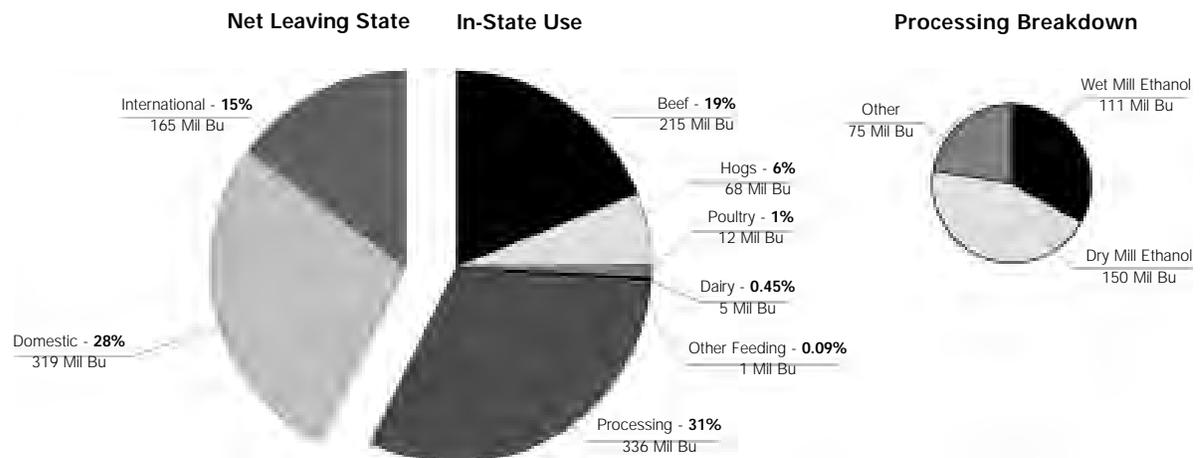
TABLE 6

Nebraska – Corn for Grain in Metric units			
Year	Harvested Corn 000 Hectares	Yield mt/hectare	Production million metric tons (mmt)
1996	3,336	8.97	30.0
1997	3,482	8.28	28.8
1998	3,462	9.10	31.5
1999	3,360	8.72	29.3
2000	3,258	7.90	25.8
2001	3,138	9.22	28.9
2002	2,975	8.03	23.9
2003	3,117	9.16	28.5
2004	3,219	10.41	33.5
2005*	3,320	9.76	32.7

*\* projected as of Nov. 2005*

Source: Nebraska Agricultural Statistics Service

## Total Nebraska Corn Use 05-06 Projected



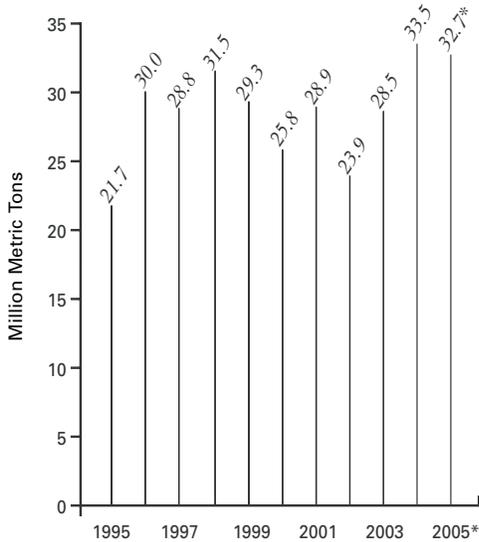
# NEBRASKA & U.S. CORN PRODUCTION AND EXPORTS

U.S. corn farmers annually produce 10 billion bushels (approximately 250 mmt) of corn. This is a remarkable feat and a testament to the continued efficiency and productivity of the American farmer.

Forty-three percent of the world's corn was produced in the United States in 2004-05. The United States claimed 66 percent of world corn exports. Exports are an integral part of American agriculture. 15.4% of the 2004 U.S. corn crop went to exports.

## Nebraska Corn Production

Source: USDA National Agricultural Statistics Service

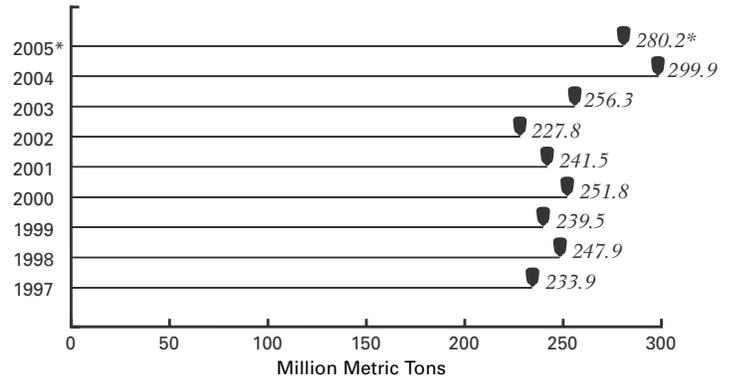


\*projected as of Nov. 2005 (converted at 56 lbs./bu.)

Nebraska's plentiful water supply also helps make it a reliable producer of high quality corn. On average, 70 percent of the corn produced in Nebraska is irrigated.

## U.S. Corn Production

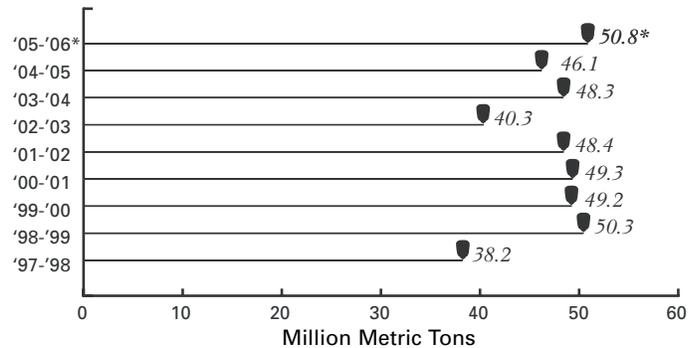
Source: USDA



\*projected as of Nov. 2005 (converted at 56 lbs./bu.)

## U.S. Corn Exports

Source: USDA, World Agricultural Outlook Board



Marketing year beginning September 1  
\*projected as of Nov. 2005 (converted at 56 lbs./bu.)

Nebraska is a leader in the production of specialty corn, including white corn. Nebraska led the nation, raising nearly 20 million bushels (508,000 mt) of white corn in 2005. Nebraska is also a leader in the research and promotion of identity-preserved corn.

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Types of  
Specialty  
Corn

**Flint Corn:** Known for a thick, hard endosperm, flint kernels are smooth and rounded with no denting. Flint corn is excellent for breakfast cereals and some snack foods. Only a small amount of flint corn is grown in the United States.

**Hard Endosperm/Food Grade Corn:** Food grade corn hybrids are typically high yielding corn hybrids with special quality traits that are desirable for certain uses such as dry milling or alkaline cooking. Used for snack foods, breakfast cereals, tortillas, etc.

**High Amylose Corn:** High amylose corn produces a larger volume of amylose starch. It is used primarily for special starch needs, such as quick-setting confectionery gums (jelly beans), and in certain glues.

**High Oil Corn:** As the name implies, high oil corn contains as much as 100 percent increased oil concentration. Used for livestock feed because of its high energy and protein content.

**High Starch Corn:** Although limited hybrids are currently available, high starch corn would be a boon for industrial applications such as ethanol and biodegradable plastics.

**Improved High-Lysine Corn:** Ideal for livestock because of its excellent nutritional value. Lysine, an essential amino acid, is low in normal yellow corn.

**Waxy Corn:** Called waxy corn for its appearance, the starch in this corn is ideal for a variety of special needs. It is used for thickening foods, cherry pie filling, for example, and for bonding in paper and other applications. Waxy corn is high in amylopectin and low in amylose starch.

**White Corn:** Typically used for food, examples include tortillas, corn chips and other snack foods. Nebraska is one of the leading white corn producing states in the nation.

Nebraska provides major highway and rail corridors to both the Pacific and Atlantic coasts, Mexico and Canada, plus access to the Gulf of Mexico from ports on the Missouri River. Nebraska companies ship everything from bulk grains and food products to auto parts throughout the world using railroads, highways, motor freight, air and water.

There are 1,660 million bushels of grain storage capacity in Nebraska. Commercial storage facilities hold 690 million bushels, and on-farm storage capacity is 970 million bushels. The high volume of on-farm storage is ideal for isolating specialty corn.

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**Storage**

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Nebraska has excellent rail service from some of the nation's largest railroads, including Union Pacific and Burlington Northern/Santa Fe. The state is covered by approximately 3,800 miles (6,114 kilometers) of rail. The Union Pacific Railroad headquarters are in Omaha, Nebraska. North Platte, Nebraska, is the site of Union Pacific's Bailey Yard, the largest rail complex in the United States.

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**Railroads**

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Nebraska's railroad system provides access to Mexico and Canada, ports along the Atlantic and Pacific coasts, the Gulf of Mexico and the St. Lawrence Seaway, and destinations throughout the United States. The most direct mid-continent route to the West Coast passes through Nebraska, with branches terminating in Portland, Spokane and Seattle and a southern branch terminating in Los Angeles. Unit trains moving south out of Nebraska can reach Laredo or other Mexican border crossings within 3 days.

The Missouri River, Nebraska's eastern border, provides a water link to the Gulf of Mexico via the Mississippi River. Eight Nebraska ports, encompassing 19 terminals on the Missouri River (most with rail connections), are available for service by approximately 35 barge owners and towing companies. Eleven additional terminal facilities are available to shippers in Sioux City and Council Bluffs, Iowa.

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**Water Ways**

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The U.S. Army Corps of Engineers maintains a channel for 735 navigable miles from Sioux City to the mouth of the Missouri River near St. Louis. The river is navigable approximately eight months of the year (April through November). It is free flowing with no locks or dams.

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## **Highways & Motor Freight**

All of Nebraska's communities are connected by a good system of all-weather roads. The system contains approximately 96,000 miles (154,000 kilometers) of hard-surfaced roads, which helps maintain the quality of Nebraska's corn crop as it is harvested and transported to storage efficiently. Interstate 80, which is the only coast-to-coast (New York to San Francisco) segment of the U.S. interstate highway system, is included in the system. North-south interstate highways which add to Nebraska's market access are I-29 passing along Nebraska's eastern border and I-25 in close proximity to the state's western border. There are currently 575 motor freight carriers with authority to operate within Nebraska and to and from other states.

## **U.S. GRAINS COUNCIL INTERNATIONAL OFFICES**

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The United States Grains Council represents Nebraska corn farmers in the world marketplace. The Council is a private, nonprofit organization that develops and expands export markets for U.S. corn through a network of 10 international offices with active market development programs in more than 80 countries. The Council receives substantial funding from the Nebraska Corn Board.

Council programs include market education seminars, demonstration farms and projects, feeding trials, model feedmills and feedmilling practices, and foreign team travel in the United States, including Nebraska.

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---

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Fax: 011-216-71-847-165  
e-mail: [tunis@grains.org](mailto:tunis@grains.org)

### Representatives in:

Brazil  
Colombia  
India  
Indonesia  
Jordan  
Morocco  
Venezuela  
Vietnam

011 is the international operator when dialing from the U.S.

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## NEBRASKA GRAIN INSPECTION SERVICE

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(FGIS supervised-official)

The following grain inspection companies provide Federal Grain Inspection Service (FGIS) certified inspection and can test grain for numerous specifications as required by grain buyers or sellers. They are private businesses that can conduct grain testing to meet the industry's needs.

Fremont  
Dave Reeder, Chief Inspector  
Fremont Grain Inspection  
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Grand Island  
Greg Hoelck, General Manager  
Hastings Grain Inspection Inc.  
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Fax: (308) 384-4750

Hastings  
Greg Hoelck, General Manager  
Hastings Grain Inspection Inc.  
306 East Park Street  
Hastings, NE 68901  
Phone: (402) 462-4254  
Fax: (402) 462-4100

Lincoln  
Mark Fulmer, Manager  
Lincoln Inspection Service  
505 Garfield, P.O. Box 22724  
Lincoln, NE 68542  
Phone: (402) 435-4386  
Fax: (402) 435-4389

Omaha  
R.G. Probst, Chief Inspector  
Omaha Grain Inspection  
Service Inc.  
2525 So. 13th Street  
Omaha, NE 68108-1521  
Phone: (402) 341-6733  
Fax: (402) 341-3662

Sidney  
Terry Osborn,  
Field Office Manager  
Kansas Grain Inspection Service  
517 13th Ave.  
P.O. Box 721  
Sidney, NE 69162  
Phone: (308) 254-3975

Sioux City, Iowa  
Tom Dahl, Chief Inspector  
Sioux City Inspection &  
Weighing Agency  
840 Clark Street  
Sioux City, IA 51101  
Phone: (712) 255-8073  
Fax: (712) 255-0959

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## CONTACTS FOR ADDITIONAL INFORMATION

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Nebraska Corn  
Growers Association  
1327 H Street #305  
Lincoln, NE 68508  
Phone: (402) 438-6459  
Fax: (402) 438-7241

Nebraska Department of  
Agriculture  
Ag Promotion and  
Development  
P.O. Box 94947  
Lincoln, NE 68509  
Phone: (402) 471-4876  
Fax: (402) 471-2759

University of Nebraska-  
Lincoln Department of Food  
Science and Technology  
256 Food Industry Complex  
University of Nebraska  
Lincoln, NE 68583  
Phone: (402) 472-2814  
Fax: (402) 472-1693

Nebraska Cooperative  
Council  
314 Lincoln Benefit Life  
Building  
Lincoln, NE 68508  
Phone: (402) 475-6555

Nebraska Grain and Feed  
Association  
1233 Lincoln Mall  
Lincoln, NE 68508  
Phone: (402) 476-6174  
Fax: (402) 476-3401

U.S. Grains Council  
1400 K Street  
Suite 1200  
Washington, DC 20005  
Phone: (202) 789-0789  
Fax: (202) 898-0522  
e-mail: [grains@grains.org](mailto:grains@grains.org)

Population: 1,739,291

Geography:

Land mass: 77,227 square miles (200,017 square kilometers)

Acres: 49.2 million acres (19.9 million hectares)

Tillable acres: 21 million acres (8.5 million hectares)

Temperature: (average for growing season: May through September)

East: 72.6 degrees Fahrenheit or 22.5 degrees Celsius

West: 68.7 degrees Fahrenheit or 20.4 degrees Celsius

Average Annual Rainfall:

East: 30 inches or 76.2 centimeters

West: 18 inches or 45.7 centimeters

Irrigation:

Nebraska's plentiful water supply helps make the state a reliable producer of high quality corn:

- On average, 70 percent of the corn produced in Nebraska is irrigated.
- Approximately 84,000 registered wells and a network of surface water canals and rivers supply 8.2 million acres (3.3 million hectares) of irrigated crops and pasture land.
- An estimated two billion acre-feet (more than five times the water of Lake Erie) of easily accessible ground water from the Ogallala Aquifer lies below 59 percent of Nebraska's land surface.

Planting and Harvest Dates:

Average planting dates in Nebraska range from April 15 to June 5, but the majority of Nebraska's corn acres are planted between April 25 and May 20. Average harvesting dates range from September 10 to November 25, but the majority of acres are harvested between September 30 and October 30.

## CONVERSIONS

TABLE 7

Conversions		
To Convert:	Into:	Multiply By:
kilometers	miles	0.621
miles	kilometers	1.609
meters	feet	3.281
meters	inches	39.37
inches	meters	0.0254
hectare	acre	2.47
acre	hectare	0.40486
kilogram	pound	2.205
pound	kilogram	0.454
liter	gallon	2.64
gallon	liter	3.785
U.S. tons	metric tons	0.909
metric tons	U.S. tons	1.1
metric tons	bushels(U.S. #1)	39.368
metric tons	bushels(U.S. #2)	40.826
bushels(U.S. #1)	metric tons	0.0254
bushels(U.S. #2)	metric tons	0.0245
pounds/bushel	kilograms/hectoliter	1.287
kilograms/hectoliter	pounds/bushel	0.777
temperature:	°F = 9/5 (°C) + 32    °C = 5/9 (°F - 32)	

## U.S. GRADING STANDARDS

TABLE 8

Grade	Minimum Test Weight		Maximum Limits		
	lbs/bu	kg.hl	Damaged Kernels		Broken Corn & Foreign Material (%)
			Heat Damaged Kernels (%)	Total (%)	
U.S. #1	56.0	72.1	0.1	3.0	2.0
U.S. #2	54.0	69.5	0.2	5.0	3.0
U.S. #3	52.0	66.9	0.5	7.0	4.0
U.S. #4	49.0	63.1	1.0	10.0	5.0
U.S. #5	46.0	59.2	3.0	15.0	7.0

## CARGO COMPARISONS

Developed by Nebraska Department of Agriculture Agricultural Promotion and Development Division. For more information call 402.471.4876.

				Container Capacities
				
Panamax Ship 55,000 Ton 50,000 MT 1.96 Million Bu.	River Barge 1500 Ton 1364 MT 53,700 Bu.	100 Car Unit Train 10,000 Ton 9,091 MT 357,900 Bu.	Large Semi Truck 26 Ton 23.64 MT 930 Bu.	

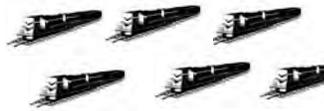
1 Panamax Ship  
Equals:



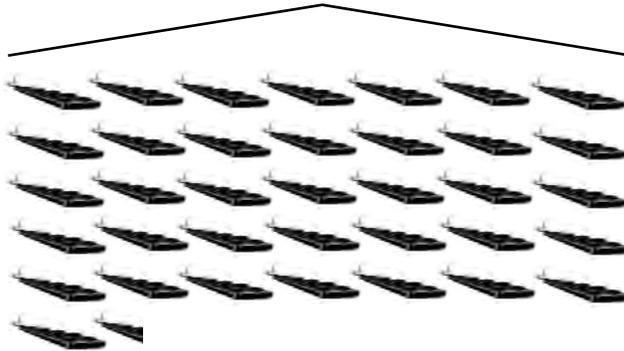
### Equivalent Units

Note: 1 full Panamax Ship would equal 10,185 acres of grain, yielding 200 Bu. per acre. @ 56 lbs. TW.

5.48 Unit Trains  
(548 Rail Cars) or;



36.5 Barge Loads or;



2,108 Truckloads



## CORN QUALITY STUDY HISTORICAL DATA

TABLE 9

Corn Quality Study Historical Data										
	U.S. Grade #1	U.S. Grade #2	U.S. Grade #3	U.S. Grade #4 or below	Avg. Test Weight	Avg. Moisture	Avg. Aflatoxin below 20 ppb	Avg. Protein	Avg. Oil	Avg. Starch
1991	78.05%	19.51%	0.00%	2.44%	57.89	13.60%	100.00%	-	-	-
1992	46.00%	38.00%	11.00%	5.00%	56.84	14.86%	100.00%	-	-	-
1994	88.00%	12.00%	0.00%	0.00%	57.15	14.91%	100.00%	9.65%	4.10%	75.97%
1995	47.00%	49.00%	4.00%	0.00%	56.00	14.80%	100.00%	8.03%	3.24%	60.18%
1996	34.00%	56.00%	7.00%	3.00%	56.40	15.20%	100.00%	7.94%	3.80%	59.62%
1997	62.00%	33.00%	5.00%	0.00%	57.80	14.70%	100.00%	8.73%	4.14%	71.97%
1998	84.60%	15.40%	0.00%	0.00%	58.01	14.92%	100.00%	9.28%	4.36%	72.26%
1999	82.00%	15.50%	2.00%	0.50%	58.50	14.50%	100.00%	9.50%	4.30%	72.10%
2000	82.00%	15.00%	3.00%	0.00%	58.10	13.70%	100.00%	9.50%	4.30%	72.10%
2001	84.10%	15.30%	0.00%	0.50%	58.30	14.60%	100.00%	9.30%	4.30%	72.20%
2002	65.10%	20.80%	8.10%	6.00%	57.85	15.44%	83.00%	9.50%	4.20%	72.70%
2003	84.20%	11.00%	2.40%	2.40%	57.84	14.85%	93.20%	9.50%	4.30%	72.30%
2004	92.30%	5.90%	2.50%	0.00%	58.70	15.28%	100.00%	9.20%	4.57%	72.10%
2005	97.00%	3.00%	0.00%	0.00%	59.73	14.26%	100.00%	9.09%	4.47%	72.29%
AVG.	73.31%	22.10%	3.21%	1.42%	57.79	14.69%	98.30%	9.10%	4.17%	70.48%

Note: There was no Corn Quality Study done in 1993. All samples were yellow corn only.