



# Nebraska Irrigation Fact Sheet

by

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Irrigation is a vital component of Nebraska’s productive agricultural economy. Its significance continues to grow. The following is information primarily drawn from the 2007 Census of Agriculture and the USDA 2008 Farm and Ranch Irrigation Survey which provides additional informational detail and analysis from a representative sample of production units. Together, these sources provide a rich perspective of the state’s irrigation-based agriculture.

## It begins with the High Plains Aquifer

Also known as the Ogallala Aquifer, it is one of the world’s largest aquifers. It covers about 174,000 square miles.

While it stretches across eight states, from South Dakota into Texas, a major portion lies in Nebraska.

The water-permented thickness of the Ogallala Aquifer ranges from a few feet to more than a 1,000 feet with two thirds of the aquifer’s total water storage capacity underlying Nebraska.

## Groundwater is Important to Nebraska

About 80% of the state’s public drinking water and nearly all of its private water supply are from ground water sources.

Nebraska is the fourth largest user of groundwater in the nation behind California, Texas, and Arkansas.

Nebraska has more than 100,000 registered irrigation wells and an additional 16,000 registered water wells.

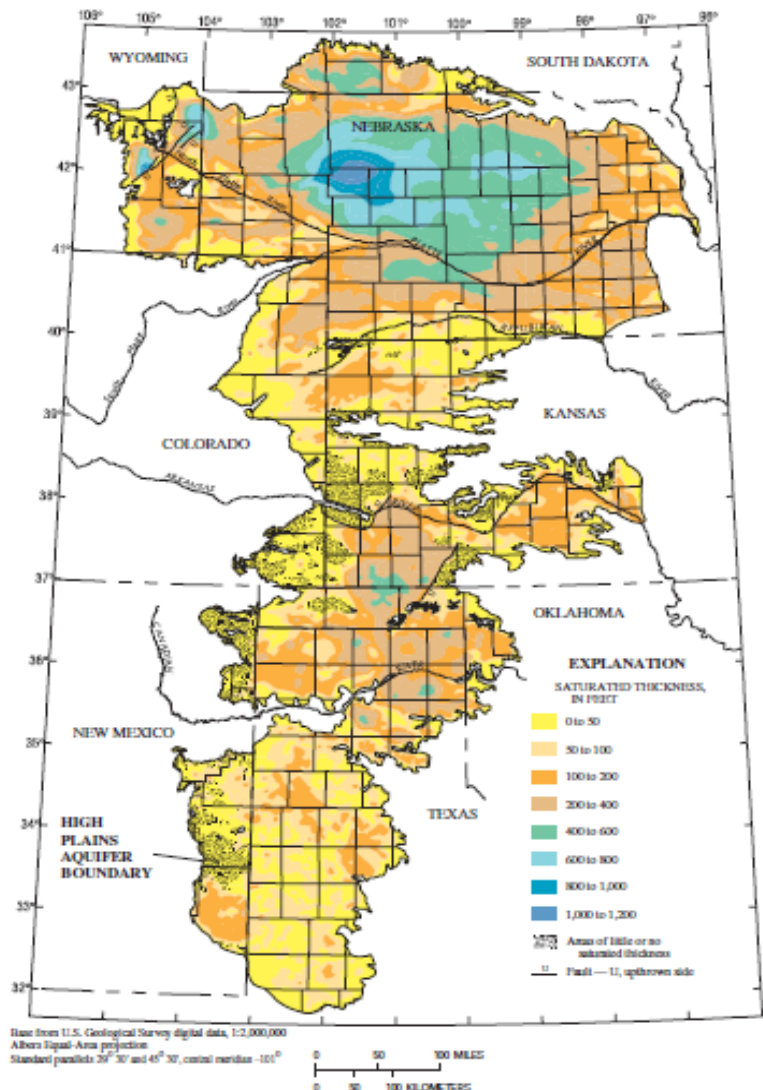


Figure 14. Saturated thickness of the High Plains aquifer, 2000. (Modified from Weeks and Gutentag, 1981.)

## Nebraska Leads the Nation in Total Irrigated Acres

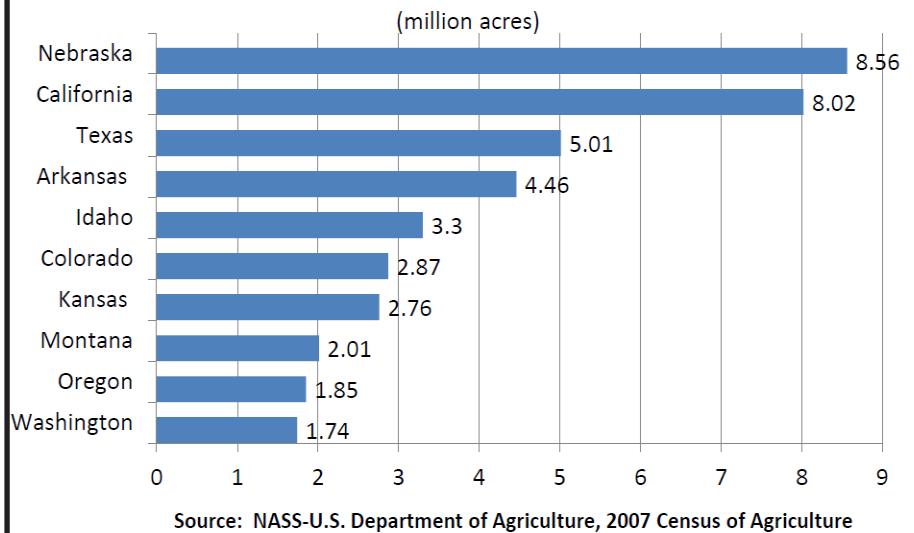
As of 2007, Nebraska had 8.56 million irrigated acres.

Between the 2002 and 2007 agricultural census years, Nebraska's irrigated base expanded by 934,000 acres, moving it ahead of California which experienced a decline of 693,000 acres.

Of approximately 55 million acres under irrigation nationally, about 15% are located in Nebraska.

About three out of eight cropland acres in Nebraska are under irrigation.

### Top Ten States in Total Irrigated Acres: 2007



| National Ranking | State      | Change in Irrigated Acres 2002-2007 |            |
|------------------|------------|-------------------------------------|------------|
|                  |            | Acreage                             | Percentage |
| 1.               | Nebraska   | +934,400                            | +12.2%     |
| 2.               | California | -693,000                            | -8.0%      |
| 3.               | Texas      | -65,000                             | -1.3%      |
| 4.               | Arkansas   | +312,000                            | +7.5%      |
| 5.               | Idaho      | +11,000                             | +0.3%      |
| 6.               | Colorado   | +277,000                            | +10.6%     |
| 7.               | Kansas     | +85,000                             | +3.2%      |
| 8.               | Montana    | -37,000                             | +1.9%      |
| 9.               | Oregon     | -63,000                             | -3.3%      |
| 10.              | Washington | -87,000                             | -4.8%      |

Source: NASS-U.S. Department of Agriculture: 2007 Census of Agriculture

### Major Irrigation Expansion in Recent Years

Between 2002 and 2007, Nebraska experienced the largest expansion of irrigation of the top-ten irrigated states in both acres and percentage change.

While Nebraska was adding about 934,000 acres, the remaining nine states experienced a net decrease in irrigated acres of 186,000 acres.

While six of the ten states experienced some growth in irrigated acreage, their combined acreage expansion was 722,000 acres or just 77% of the irrigated acreage growth in Nebraska.

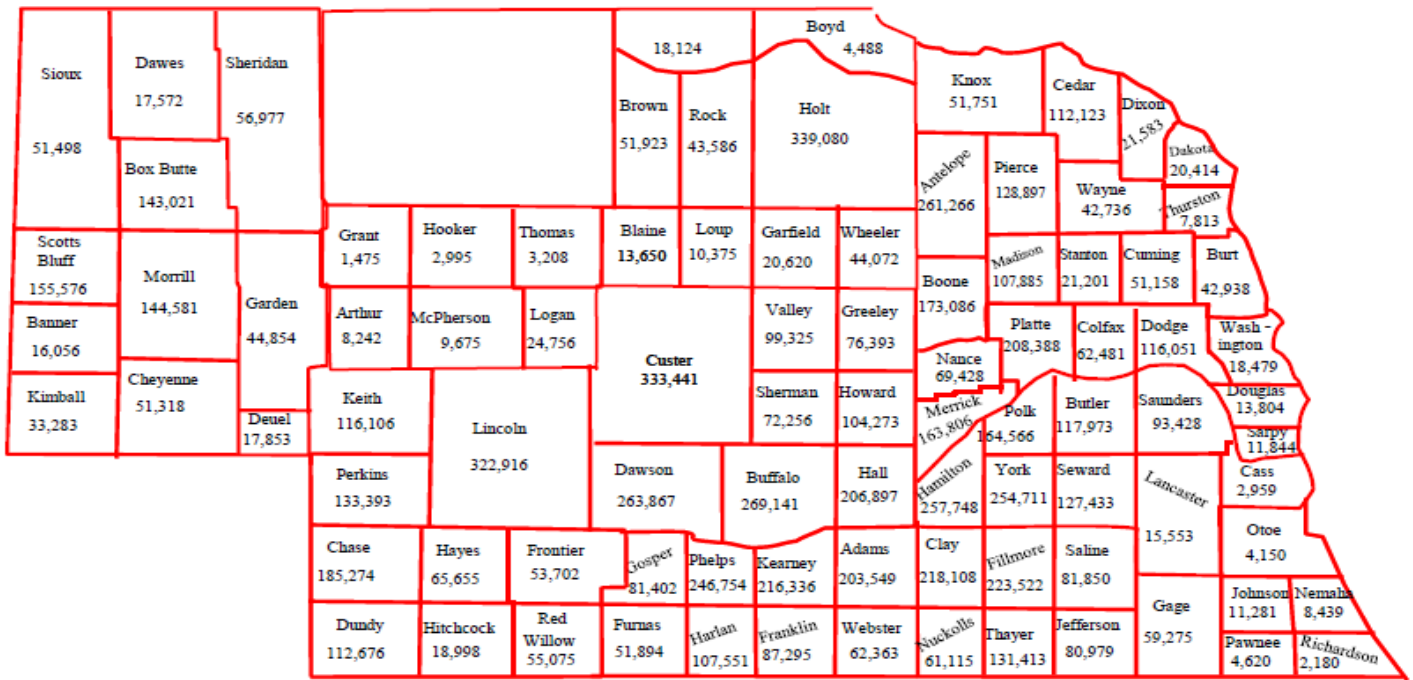
Bottom line: Nebraska's prominence in irrigation agriculture has expanded greatly over the past decade.

### State's Irrigation Concentrated in High-Production Areas

By county the state's irrigated acres correspond to those areas having both productive soils and water availability (primarily from High Plains Aquifer).

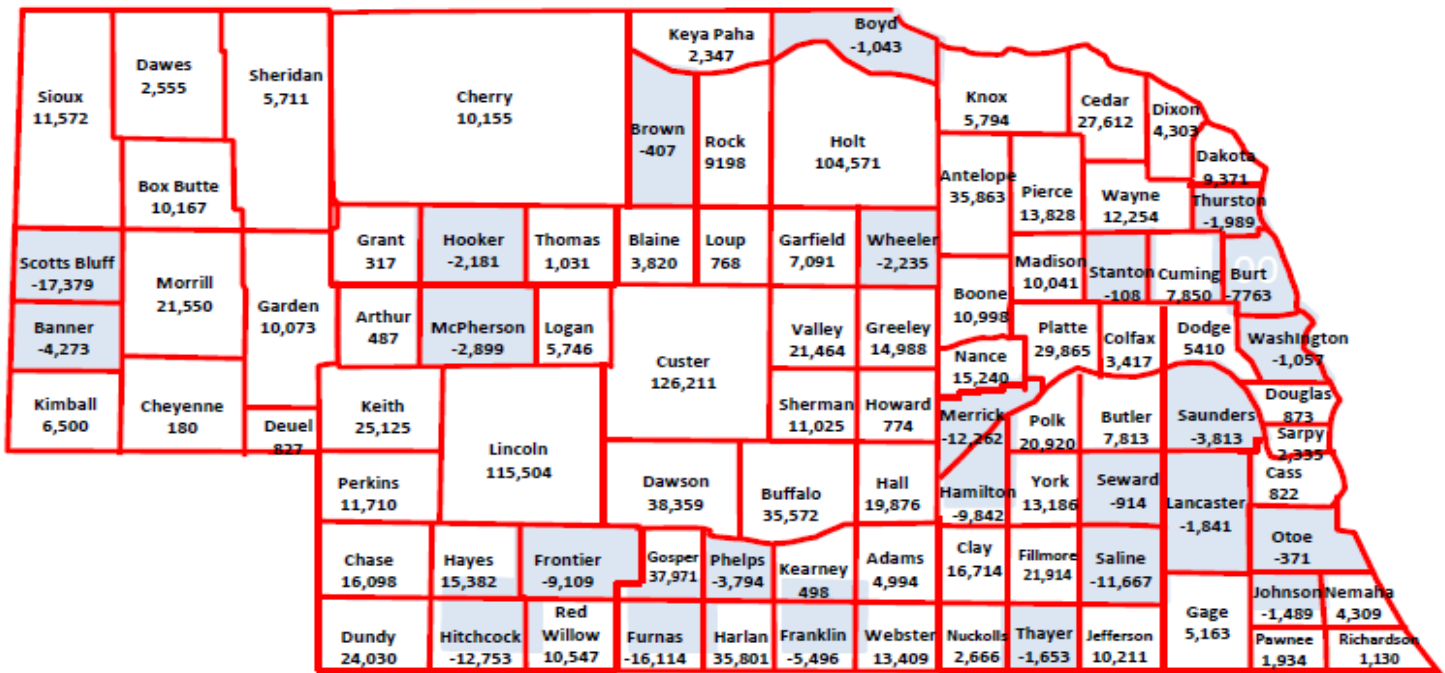
A heavy predominance of irrigation follows the Platte Valley. However, substantial irrigated acreage concentrations appear in Holt and Custer Counties which rim the sandhills area of Nebraska, where water availability from shallow depths is abundant.

## Total Irrigated Acres by County for 2007



Source: NASS-U.S. Department of Agriculture, 2007 Census of Agriculture

## Change in Actual Irrigated Acres by County 2002-2007



Source: NASS-U.S. Department of Agriculture, 2007 Census of Agriculture

## Dramatic Increases in Some Counties

Between 2002 and 2007, 69 of Nebraska's 93 counties saw expansion of the irrigation acreage.

However, sizable differences occurred reflecting not only physical limits of irrigation expansion, but also mandated moratoriums limiting further irrigation development.

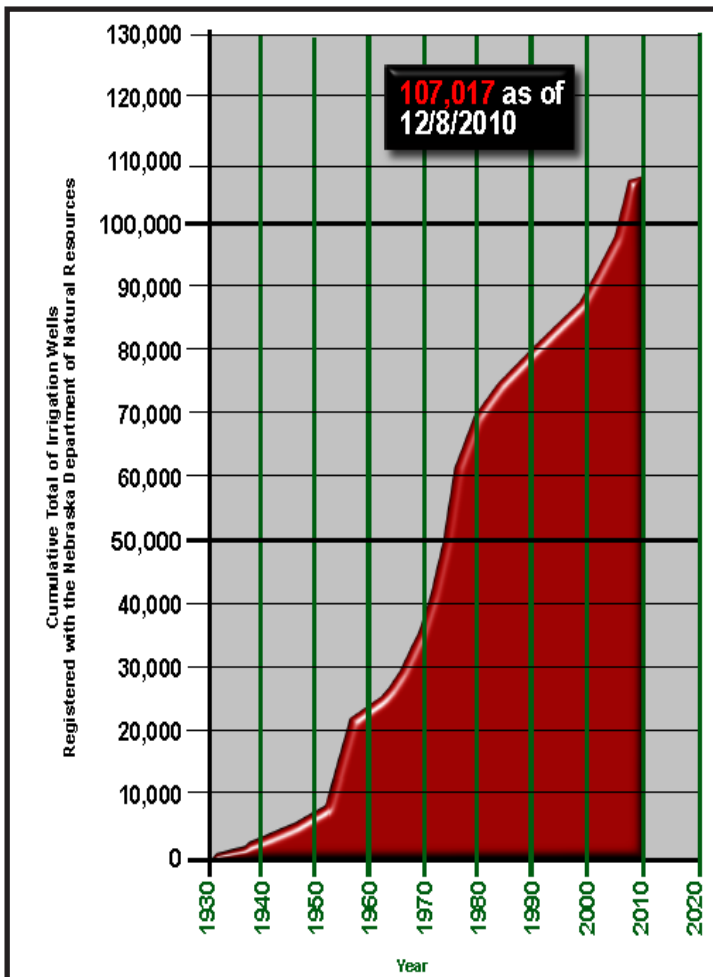
The major irrigation expansion between 2002 and 2007 occurred in areas of the state which already were heavily invested in irrigation.

Holt, Custer, and Lincoln counties experienced a combined increase of 347,000 irrigated acres – a 54% increase over the five-year period.

Together, these top three counties had nearly one million acres under irrigation in 2007.

Top 25 Nebraska Counties in Terms of 2007 Total Irrigated Acres

| County and District | Irrigated Acres |         | 2002-2007 Change in Irrigated Acres |        |
|---------------------|-----------------|---------|-------------------------------------|--------|
|                     | 2007            | 2002    | Acres                               | %      |
| Holt                | 339,080         | 234,509 | 104,571                             | 44.6%  |
| Custer              | 333,441         | 207,230 | 126,211                             | 60.9%  |
| Lincoln             | 322,916         | 207,412 | 115,504                             | 55.7%  |
| Buffalo             | 269,141         | 233,569 | 35,572                              | 15.2%  |
| Dawson              | 263,867         | 225,508 | 38,359                              | 17.0%  |
| Antelope            | 261,266         | 225,403 | 35,863                              | 15.9%  |
| Hamilton            | 257,748         | 267,590 | -9,842                              | -3.7%  |
| York                | 254,711         | 241,525 | 13,186                              | 5.5%   |
| Phelps              | 246,754         | 250,548 | -3,794                              | -1.5%  |
| Fillmore            | 223,522         | 201,608 | 21,914                              | 10.9%  |
| Clay                | 218,108         | 201,394 | 16,714                              | 8.3%   |
| Kearney             | 216,336         | 215,838 | 498                                 | 0.2%   |
| Platte              | 208,388         | 178,523 | 29,865                              | 16.7%  |
| Hall                | 206,897         | 187,021 | 19,876                              | 10.6%  |
| Adams               | 203,549         | 198,555 | 4,994                               | 2.5%   |
| Chase               | 185,274         | 169,176 | 16,098                              | 9.5%   |
| Boone               | 173,086         | 162,088 | 10,998                              | 6.8%   |
| Polk                | 164,566         | 143,646 | 20,920                              | 14.6%  |
| Merrick             | 163,806         | 176,068 | -12,262                             | -7.0%  |
| Scotts Bluff        | 155,576         | 172,955 | -17,379                             | -10.0% |
| Morrill             | 144,581         | 123,031 | 21,550                              | 17.5%  |
| Box Butte           | 143,021         | 132,854 | 10,167                              | 7.7%   |
| Perkins             | 133,393         | 121,683 | 11,710                              | 9.6%   |
| Thayer              | 131,413         | 133,066 | -1,653                              | -1.2%  |
| Pierce              | 128,897         | 115,069 | 13,828                              | 12.0%  |



## Groundwater: The Primary Water Source

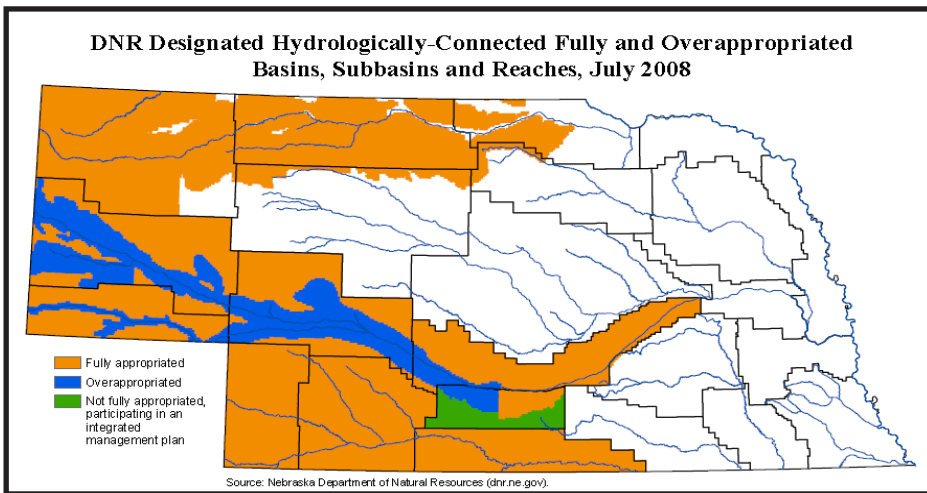
The bulk of irrigation in Nebraska (and essentially all of the more recent expansion) is pumped from wells.

As of December 2010, there were more than 107,000 registered irrigation wells in the state, which represented about a 20% increase over the decade.

## Water Policy Oversight

Nebraska policy makers, at both the state and Natural Resource District levels have provided valuable oversight and direction of both ground and surface water resources, including identifying the hydrological limits to expanded water development.

A large share of Nebraska is presently designated fully and/or over-appropriated, thereby limiting further water development.



For those areas designated over-appropriated, policy measures are being taken to reduce irrigated acreage for long-term resource sustainability, including the wellbeing of surface and groundwater interaction.

Some areas of the state will likely continue to expand irrigation acreage, but the state's rate of growth experienced over the past decade will certainly subside.

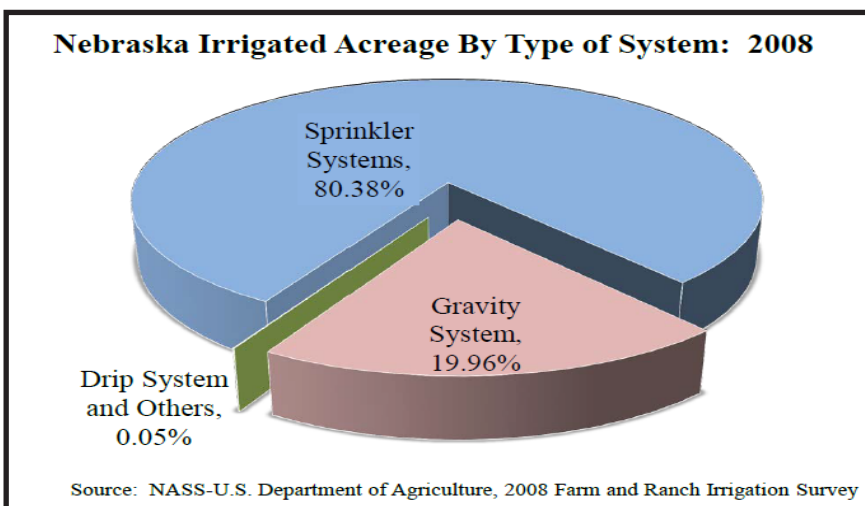
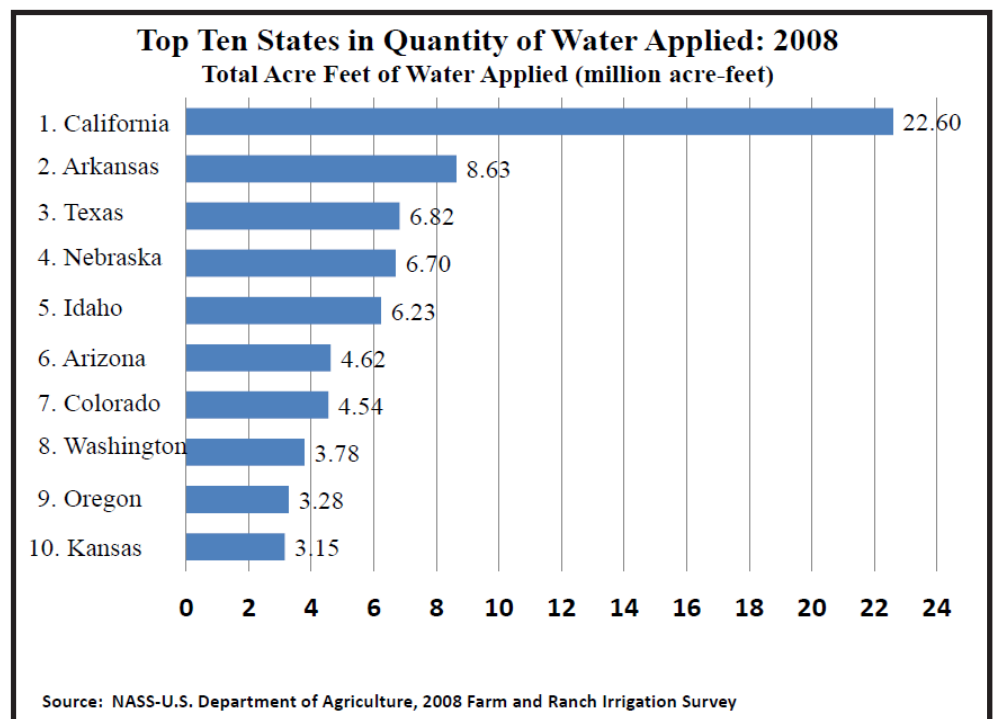
## Water Allocation Rates Vary by State

While Nebraska leads the nation in acres under irrigation, the state ranks fourth in the volume of water applied.

Total water applied in 2008 to Nebraska irrigated acres was less than 7 million acre feet

On an average per-irrigated acre basis, the rate of application in Nebraska in 2008 was less than 10 inches – in contrast to about 34 inches in California, 23 inches in Arkansas, and 16 inches in Texas.

Rate of application per acre is a function of relative rainfall-deficit levels, intensity of cropping patterns, and water restrictions as well as conservation patterns.



## Sprinkler Application the Norm

Four out of five acres under irrigation in Nebraska are irrigated with sprinkler systems.

Sprinkler application provides considerably greater water efficiency than gravity/flood irrigation systems.

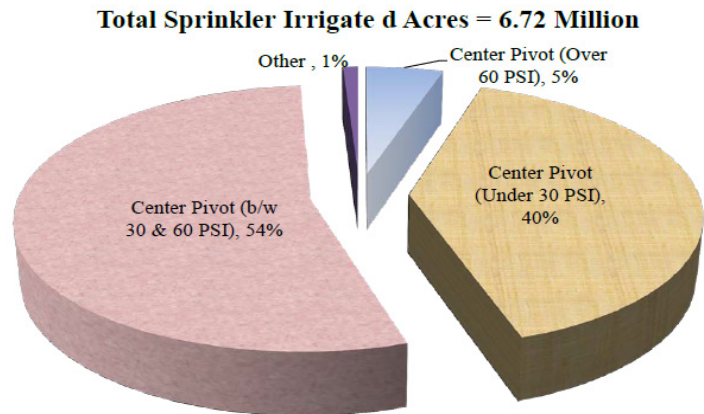
## Center Pivot Technology Provides Efficiency

Center pivot irrigation systems constitute nearly 98% of the acres under sprinkler irrigation in the state.

An estimated 55,000 center pivot systems are being used in Nebraska to irrigate about 6.7 million acres.

Over the five-year time frame of 2003 to 2008, the percentage of the state's irrigated acreage under center pivot increased 5 percentage points with a corresponding percentage decline in gravity systems.

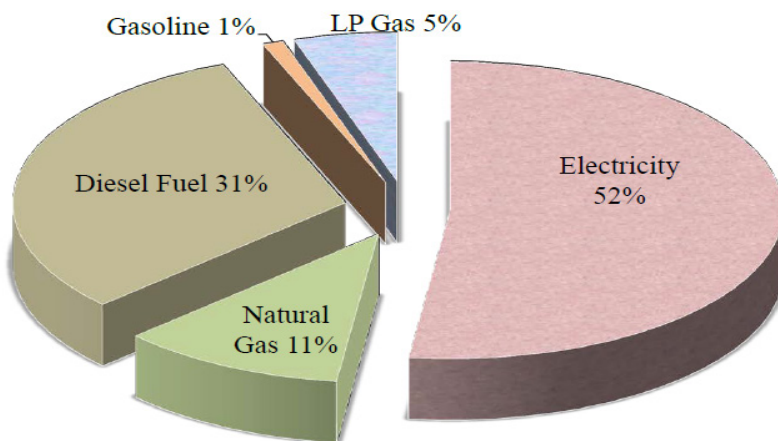
### Nebraska Irrigated Acreage by Type of Sprinkler System: 2008



Source: NASS-U.S. Department of Agriculture, 2008 Farm and Ranch Irrigation Survey

By using low pressure center pivot systems, both energy and water efficiency can be greatly enhanced. As of 2008, 40% of the center pivot systems in the state were classified as low-pressure (under 30 PSI) and accounted for 2.7 million irrigated acres.

### Nebraska Irrigated Acreage by Fuel Source of System (2008)



Source: NASS-U.S. Department of Agriculture, 2008 Farm and Ranch Irrigation Survey

By this extensive use of center pivot technology, particularly low-pressure systems, Nebraska is at the forefront of efficient water resource management.

### Electricity -- The Energy of Choice

As of 2008, over half of the irrigation in the state was being powered by electricity.

Under contracts with utility companies, irrigation scheduling is arranged around electric peak-load times of electricity usage (late afternoons); thereby reducing the rates and making electricity the most cost-effective energy source.

Where irrigation requires pumping from deeper wells, diesel power will often be required.

For Additional Information see:

- Nebraska Water Science Center, USGS at: <http://ne.water.usgs.gov>
- University of Nebraska Water Center at: <http://water.unl.edu/>
- U.S. Census of Agriculture at: <http://www.agcensus.usda.gov/publications>

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