



## Background/Purpose

Stretching from western Texas to South Dakota, the Ogallala Aquifer supports nearly one-fifth of the wheat, corn, cotton and cattle produced in the United States. Underlying approximately 225,000 square miles of the Great Plains, water from the aquifer is vital to agricultural, municipal and industrial development. Approximately 30 percent of all groundwater used for irrigation in America is drawn from the Ogallala Aquifer.

Current use of groundwater from the Ogallala Aquifer exceeds the amount of recharge through natural processes, leading to substantially decreased water levels in many areas of the aquifer. Additionally, intensive agricultural and industrial practices in some areas threaten the water quality of this important resource.

The USDA Natural Resources Conservation Service (NRCS) is committed to improving water conservation efforts through the Ogallala Aquifer Initiative (OAI). The Ogallala Aquifer Initiative offers a combination of technical and financial assistance to landowners and land managers in Colorado, Kansas, Oklahoma, Nebraska, New Mexico, Texas, South Dakota and Wyoming to install a comprehensive set of conservation practices designed to reduce the quantity of water removed from the aquifer, improve water quality, and enhance the economic viability of farming and ranching.

The OAI is a partnership effort. NRCS collaborates with local conservation districts, state agencies and land grant universities to complete inventories and determine high priority resource concerns within the OAI area.

For more information about the Ogallala Aquifer Initiative, visit [www.nrcs.usda.gov](http://www.nrcs.usda.gov).

## Did You Know?

- The Ogallala Aquifer was named in 1898 by N.H. Darton due to its locality near the town of Ogallala, Nebraska.
- About 27 percent of the irrigated land in the United States overlies this aquifer system. It yields about 30 percent of the nation's groundwater used for irrigation.
- The aquifer system provides drinking water to 82 percent of the people who live within the aquifer boundary.

## Goals/Objectives

The OAI is designed to reduce the quantity of water removed from the aquifer, improve water quality using conservation practices and enhance the economic viability of OAI-area farms and ranches.

The initiative will:

- Improve irrigation efficiency by a minimum of 20 percent on 3.7 million acres;
- Apply nutrient management and conservation cropping system practices on a minimum of 3.4 million acres;
- Assist agriculture producers in maintaining water quality;
- Help agricultural producers save billions of gallons of water from the Ogallala Aquifer; and
- Assist agricultural producers in developing conservation plans and prescribed voluntary conservation alternatives specific to water quality and quantity resource concerns.

## Conservation Funding/Practices

Ongoing conservation activities include:

- Converting irrigated land to dry land farming;
- Planting non-irrigated permanent vegetation;
- Implementing nutrient and pest management;
- Adjusting cropping rotations and perennial vegetation for haying, grazing, and wildlife habitat; and
- Replacing inefficient, flood-irrigated systems with more efficient center pivot and Sub-surface Drip Irrigation (SDI) systems.

Conservation activities are carried out using NRCS's Environmental Quality Incentives Program (EQIP) and funding provided by state and local agencies.

Socially disadvantaged and limited resource farmers and ranchers in the project area have access to dedicated funding sources within the Ogallala Aquifer Initiative.

## Benefits

The Ogallala Aquifer Initiative will benefit:

- **Water Conservation** - Efficient irrigation systems and water management practices conserve water helping to maintain a clean and abundant water supply.
- **Water Quality** - Improved water management can minimize off-site water quality impacts from irrigation, such as; higher chemical use rates, increased field salinity and erosion due to applied water.
- **Farm Returns** - Water savings can help offset the effect of rising water costs and restricted water supplies. Improved water management may also reduce expenditures for energy, chemicals, and labor inputs, while enhancing revenues through higher crop yields and improved crop quality.
- **Wildlife Protection** - Increased river flow in the OAI region as a result of conservation measures will benefit the endangered interior least tern, whooping crane, pallid sturgeon, and the threatened piping plover.

## Fiscal Year 2011 Ogallala Aquifer Initiative

### NRCS - Financial Assistance (FA) and Active and Completed Contracts/Agreements

#### All Completed Through the Environmental Quality Incentives Program (EQIP)

State	Number of Contracts	FA Contract Obligations
Colorado	57	\$ 700,000
Kansas	35	\$ 2,004,608
Nebraska	66	\$ 2,532,479
New Mexico	14	\$ 1,780,331
Oklahoma	9	\$ 472,233
South Dakota	4	\$ 46,934
Texas	236	\$ 7,633,997
Wyoming	2	\$ 175,114
<b>TOTALS</b>	<b>423</b>	<b>\$15,345,696</b>

Source: NRCS ProTracts

In the OAI priority area, over \$15.3 million in Financial Assistance helped treat over 77,000 acres on 423 contracts through the USDA's NRCS Environmental Quality Incentives Program (EQIP) during fiscal year 2011.

# Ogallala Aquifer Initiative in the States

## Colorado

OAI Helps Improve Water Quality and Quantity on 7,000 Acres.

Colorado dedicated \$718,249 for contracts in the Ogallala Aquifer Initiative to address the water quantity and water quality priority resource concerns within the state. With this funding, producers applied resource conservation plans on approximately 5,000 acres.

Land use conversion from irrigated land to non-irrigated cropland, and conversion to perennial vegetation managed for livestock are emphasized conservation practices.

Although this initiative is fairly new to Colorado, these plans impacted the Ogallala Aquifer by:

- Improving residue and reducing tillage on 1,218 acres of cropland;
- Employing better irrigation water management on approximately 4,042 acres; and
- Increasing irrigation efficiency of water delivery systems on 1,949 acres.

Implementation of nutrient management plans will positively impact water quality on 400 acres of cropland.



*The Ogallala Aquifer Initiative is helping farmers in Colorado improve the efficiency of their irrigation systems.*

## Kansas

Increasing Irrigation Efficiency Reduces Water Use.

More Kansas producers are now able to convert to efficient irrigation systems thanks to the financial assistance provided by the Ogallala Aquifer Initiative.

Dan Harms, a producer and the newest Finney County Conservation District board member, had applied for assistance to help convert his flood irrigation system to a center pivot. Funding for this project was not available until the Ogallala Aquifer Initiative was implemented.

Harms will use the Ogallala Aquifer Initiative funding to install two center pivots replacing the current flood irrigation system on 245 acres. Harms's 5-year average water use on this land has been 222 acre-feet with flood irrigation. By switching to a center pivot irrigation system, Harms can expect to reduce the amount of water he's applying to his fields by an average of 30 percent.



*Producers in Kansas are using the Ogallala Aquifer Initiative to replace flood irrigation systems.*



*Converting from flood irrigation to a center pivot can result in an average water savings of 30 percent.*

# Ogallala Aquifer Initiative in the States

## Nebraska

Irrigators Improve Water Quality and Quantity.

Anyone who has walked an irrigation ditch, gotten up at 4 a.m. to switch gates on irrigation pipe, or tried to untangle a center pivot after a wind storm knows that despite all the advancements in irrigation, there is still a long way to go. David Burr, a farmer in central Nebraska, thinks he has found an irrigation solution that suits his operation through sub-surface drip irrigation.

Sub-surface drip irrigation – commonly referred to as SDI – is a fairly new method of irrigation. Instead of providing irrigation water on the surface, an SDI system is buried underground. SDI has proven to be one of the most efficient methods of irrigation since it provides water directly to the soil at the root zone. Less water is applied since no water is lost to evaporation or runoff.

Burr said, “A sub-surface drip irrigation system provides tremendous water savings. With gravity irrigation, producers often apply around 10-15 inches of water per acre. With SDI, irrigators are applying a third of that.”

SDI is just one example of the water saving conservation practices NRCS helps Nebraska irrigators install. NRCS works with producers to apply more efficient irrigation practices like SDI or center pivot irrigation. NRCS also assists landowners with converting their cropland from irrigated land to non-irrigated cropland.

In Nebraska NRCS has helped landowners permanently convert nearly 9,000 acres to non-irrigated cropland, and over 220,000 have been converted to dry land on a temporary basis for 3 to 5 years. Through irrigation water conservation practices, Nebraska has seen the amount of irrigation water applied to cropland decrease by nearly 37,000 acre-feet annually.

## New Mexico

Water Conservation Saves 4,000 acre-feet.

Located in a very arid and drought-prone region, New Mexico is committed to making the most of every drop of water it receives. Encouraging reduced water consumption for agricultural production is a top priority.

Since 2003, NRCS in New Mexico has helped agricultural producers save more than 4,000 acre-feet of water from the Ogallala Aquifer by voluntarily shutting down irrigation pumps for three years on contracted acres. NRCS provided incentive payments to producers to help offset foregone income for the three years the fields were not irrigated. In addition, some producers entered in to long term (10 year) contracts to include vegetative cover in their crop rotation, which also helped greatly reduce the amount of irrigation water being pumped. NRCS assisted producers with developing conservation plans to voluntarily implement additional water conservation practices. Through the Ogallala Aquifer Initiative, NRCS in New Mexico applied water saving conservation practices on 2,794 acres, saving approximately 340 acre-feet of water during 2011 alone.



*NRCS Technician Kevin Hurt (red shirt) worked with (L-R) Darin, Damon and David Burr to install an energy and water-saving sub-surface drip irrigation system.*



*Switching from gravity irrigation to a sub-surface drip irrigation can reduce the amount of water applied to fields by one third.*



*In an arid region like New Mexico the Ogallala Aquifer Initiative is helping producers conserve precious groundwater by implementing water conservation practices.*

## Oklahoma

### Improving Irrigation Efficiency Saves 793 acre-feet Annually.

Oklahoma producers are reducing pressure on the Ogallala Aquifer by improving irrigation water application efficiency and converting to dryland crop production systems.

The conservation practices available to producers to accomplish the improved efficiencies and water savings include:

- Converting furrow irrigation to center pivot or subsurface drip irrigation
- Reconfiguring existing center pivot systems with lower pressure efficient nozzle packages
- Replacing outdated and structurally unsound pivot systems with new higher efficiency pivots
- Implementing dryland crop rotations, irrigation water management and conservation tillage systems
- Upgrading center pivots with higher efficiency nozzle packages. Irrigation systems were modified by adding additional outlets to allow for installation of Low Energy Spray Application (LESA) nozzle packages.

These voluntary conservation practices available through the Ogallala Aquifer Initiative have helped Oklahoma producers save 793 acre-feet of water during 2011.



*Center pivot irrigation using a LESA (Low Elevation Spray Application) system uses less water and reduces evaporation.*

## South Dakota

### Improving Reliable Water for Range Results in Water Savings.

In 2011, conservation plans created through the Ogallala Aquifer Initiative were developed on more than 1,100 acres to address water quantity and quality as the primary resource concerns.

The conservation plans impact the aquifer by:

- Implementing irrigation water management on 486 acres of cropland,
- Improving irrigation efficiency for irrigation sprinkler systems, and
- Providing a reliable water supply for 670 acres of rangeland resulting in improved water quality within the aquifer and reducing the likelihood of conversion to cropland.

Even with less than three percent of the Ogallala Aquifer within South Dakota, conservation practices available through the Ogallala Aquifer Initiative will make an impact on water quality and quantity across the entire Aquifer.



*Providing a reliable water source for rangeland has resulted in improved water quality in the Ogallala Aquifer. This has also reduced the likelihood that rangeland would be converted to cropland, potentially placing more pressure on the Aquifer.*

## Texas

### Implementing Strategic and Innovative Irrigation Management.

The Ogallala Aquifer is a major source of water for agricultural, municipal and industrial development for the High Plains, including the Texas Panhandle. With the Texas High Plains being one of the most productive agricultural regions in the world, the sustainability of rural economies is dependent upon this water supply.

The North Plains Groundwater Conservation District, in partnership with the Texas Alliance for Water Conservation and Texas Tech University, recently received a \$499,848 Conservation Innovation Grant from NRCS for their Texas High Plains Initiative for Strategic and Innovative Irrigation Management and Conservation. Their project will demonstrate strategic irrigation and crop system management technologies and practices that will result in water savings across the region; which is an objective of the NRCS' Ogallala Aquifer Initiative. The partnership's primary objective is to quantify water savings that can be realized from strategic irrigation management, and will ultimately contribute to the area's economic sustainability.

"We are pleased to partner in this initiative to demonstrate the possibilities and importance of agricultural water conservation for the future of Texas," said Bob Zimmer, president of the North Plains Board of Directors.



*NRCS funding is sponsoring a project in partnership with Texas Tech and others that will demonstrate how irrigation and crop system management can result in significant water savings.*

## Wyoming

### Converting to No-Till and Dryland Conserves Water.

Wyoming funded two contracts under the Ogallala Aquifer Initiative in fiscal year 2011. Both resulted in converting 169 acres of irrigated cropland to dryland, no-till crops. Switching to no-till will help conserve water by helping keep water from evaporating out of the soil.

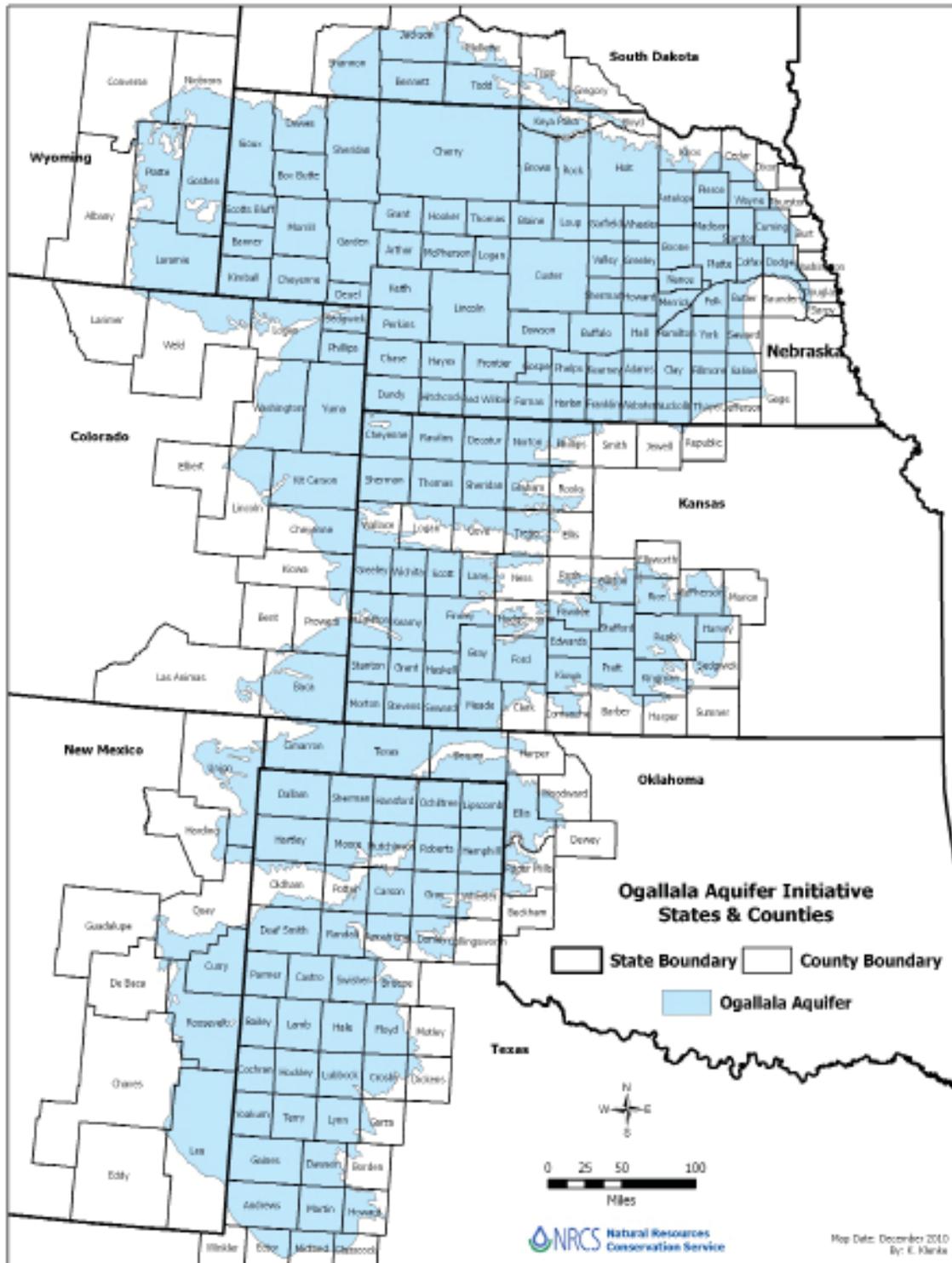
Tillage destroys the residue cover that reduces soil water evaporation from soil. One tillage event can result in the evaporation loss of 0.5" to 0.75" of soil water from that single pass. In season, soils covered 100 percent by residue can decrease soil water evaporation losses by 30 percent. A conventionally tilled soil can have a surface temperature from 15 to 40 degrees Fahrenheit higher than a residue covered soil, which increases the rate of water evaporating from the soil.

In addition to reducing impacts on the Ogallala Aquifer levels, these producers are interested in the benefit they will see from cost-savings and reduced energy consumption. They will no longer use diesel or gasoline engines to pump water for irrigation, and they will use their tractor less since they are no longer tilling their fields.



*Converting cropland to dryland and no-till has a significant impact on improving water quantity and quality, and also greatly reduces energy consumption.*

# The Ogallala Aquifer



*The Ogallala Aquifer Initiative assisted agriculture producers in Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming improve recharge and reduce the actual water draw down by saving more than 17.3 billion gallons, or over 53,237 acre-feet of water, from the Ogallala Aquifer in fiscal years 2010 and 2011 combined.*