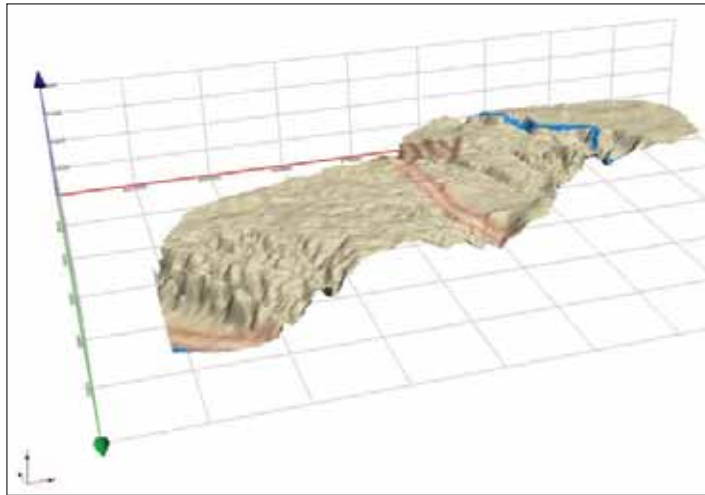


## Helicopter Scans Provide New Look At Geology

When the first Helicopter Electromagnetic (HEM) system took flight over the South Platte NRD in June of 2008, it was a relatively new concept in exploring Nebraska's water formations. Test flights had been performed in the eastern part of the state, but in the west, with widely varying formations at vastly different depths – capabilities were still an unknown.

Since then, a number of additional flights, both contracted and flown as free demonstrations of companies' capabilities, have traversed parts of the District.

Using a sensor underneath a helicopter flying 200 feet above the ground, very high and very low frequency magnetic impulses are used to read



**In a preliminary report to the board, scientists showed a 3-D example of surface features of an area block.**

underground features, similar to MRI or CT scans used by doctors. Like doctor's scans, the electromagnetic signals differentiate between different materials through signal reactions. Those differences allow scientists to determine the makeup, size and other aquifer variables. The area's wide range of geologic water holding formations has resulted in varying readings – depending on which system is used

See **NEW LOOK** page 3

### *District Becomes Test Area For New Technology Trials*

The unique properties of geology in the South Platte NRD have made it a desirable area to test new technologies that could tell scientists throughout the state and region more about the makeup of aquifers.

The differences in area geological formations, and how different equipment reads them, brought forth interest from companies specializing in the technologies.

Following the initial survey, a second company approached USGS officials and proposed a demonstration flight to highlight their capabilities.

See **TEST AREA** page 2

## Platte Basin-Wide Water Management Progress Reviewed

Officials from Platte Basin Natural Resources Districts (NRDs) and the Nebraska Department of Natural Resources (DNR) met at the Monsanto Water Utilization Center near Gothenburg on Tuesday, July 27 for the first review of the Basin-wide Plan for Joint Integrated Water Resources Management of the Overappropriated Portion of the Platte River Basin, Nebraska.

This is the first year of implementation of the joint plan, which went into effect September 11, 2009 and will protect the water resources for current and future generations. Districts involved include the North Platte NRD, the South Platte NRD, the Twin Platte NRD, the Central

Platte NRD, and the Tri-Basin NRD.

During the meeting, the DNR and the NRDs presented information on progress being made on individual integrated management plans (IMPs) including a number of programs that range from those designed to reduce consumptive use of water within the basin to various methods of tracking progress. In total the NRDs have returned over 3,500 acre feet annually to the river. All basin members, as well as the DNR, have or participate in various programs to provide funding for agricultural producers that make it easier to reduce consumptive use and maintain the economic viability of the area.

The South Platte NRD's proactive steps put the district almost 20 years ahead of schedule in meeting its IMP mark and should not have depletions to the stream until 2028. Since the IMP went into effect, the NRD has further advanced progress in reaching its IMP benchmark by using a number of voluntary incentive programs to permanently retire certified irrigated acres and accrue an additional 398 acre-feet of water consumption credit. Additionally, the District has tightened its water use regulations, lowering the total amount of ground water allocated in the overappropriated area of Lodgepole Creek. A

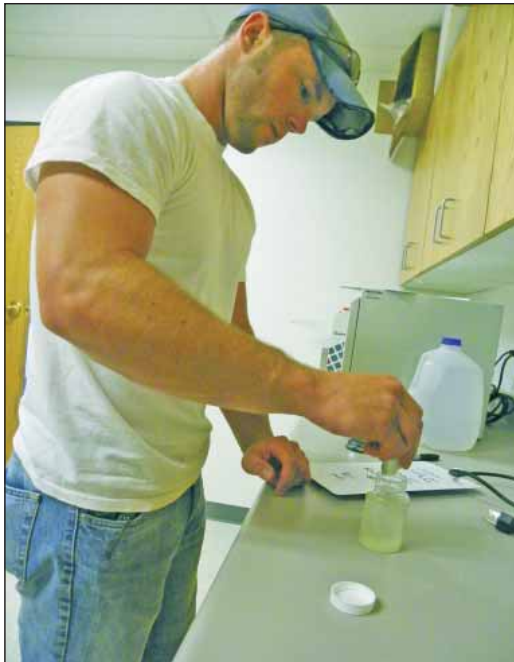
See **BASIN-WIDE** page 6

# SPNRD Water Well Testing Provides Protection

After severe flooding affected portions of the District, one important service the South Platte NRD offers to private well owners are tests for pollutants to protect and insure a safe water supply.

Pollutants may impact both surface and groundwater, including domestic drinking water. Flood waters made an impact in several parts of Nebraska this year and as the water recedes it is uncertain what has been left behind. Run-off from roof tops, parking lots and fields can carry sediment and different pollutants.

Cities and villages are required to



**Chris Kaiser prepares a water sample for testing as one of the NRD's services to protect rural residents from ground water bacteria.**

test well water on a regular basis and more often if there are concerns of contamination. There are no requirements for private wells.

The NRD encourages private well owners affected by flooding to test for harmful bacteria that may have contaminated the well with the increased runoff. If your well was in the area of flash flooding, or particularly if your well or water holding areas were under water, a test should be considered. A

limited number of test kits are available and preference will be given to those severely impacted in the Lodgepole and Chap-

pell areas.

The test provides an analysis that determines the presence or absence of total coliform and E. coli bacterias. The presence of total coliform bacteria will indicate there is a high likelihood the well has been impacted.

Sample bottles can be picked up from the SPNRD office. Samples must be returned directly and not mailed. Results are available 24 hours after submitting the sample. Should the results be positive, information and guidance can be provided to address the problem. Usually, contamination can be fixed with shock chlorination of the well using household bleach.

For more information contact Chris Kaiser at SPNRD, 254-2377.

## TEST AREA *A Good Representation*

Continued from Page 1

Using similar equipment, but a different method of sending and receiving signals, the team took readings of a test block chosen by scientists north of Sidney. The two mile wide block is more than 30 miles long, stretching into the North Platte River Valley.

Since then, two additional flights have flown the block. The most recent, this spring, was by a Danish team.

The scientists involved in the projects say the variations in the test block's geologic formations are what make it desirable for checking the capability to image water bearing geologic features. From shallow Brule, to deep fingers in the massive High Plains (Ogallala) Aquifers, equipment

is put through extensive tests from the surface to hundreds of feet deep.

Scientists say the variations in depth and geology are representative of a wide range of formations throughout the west, allowing them to see how the systems could work in many areas. For the companies providing the readings, it provides a chance to demonstrate their capabilities.

The result? Mounds of new information the geologists say would have taken many years and millions of dollars to obtain through previous methods. And for the District, a better understanding of the aquifers and how to manage and protect them for future uses.



### Board of Directors

- |                         |            |
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| Thad Kuntz       | Ground Water Modeler/Hydrogeologist |
| Jerry Spiker     | Farm Bill Technician                |

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Information & Education Coordinator.  
For the latest NRD news and program updates, visit our Website at [www.spnrd.org](http://www.spnrd.org)

and which areas are flown. Two types of systems, which send and receive the impulses in different ways, have been successful in distinctive situations. With one method, readings were exceptional at shallower depths and less so in deeper layers. The second was the opposite, gaining in clarity in deeper reaches. This year a third company flew the block with the hope its systems would read the formations through all layers.

Despite the difference, all the data gained so far has been useful to project scientists. Early on, as geologist Jim Cannia with the United States Geological Survey and geoscientist Steve Sibray with the Conservation and Survey Division reviewed information, it confirmed much of what their years of experience in the area had told them.

But as more information was gathered and interpreted Sibray, Cannia and others began to see geologic features no one knew were there.

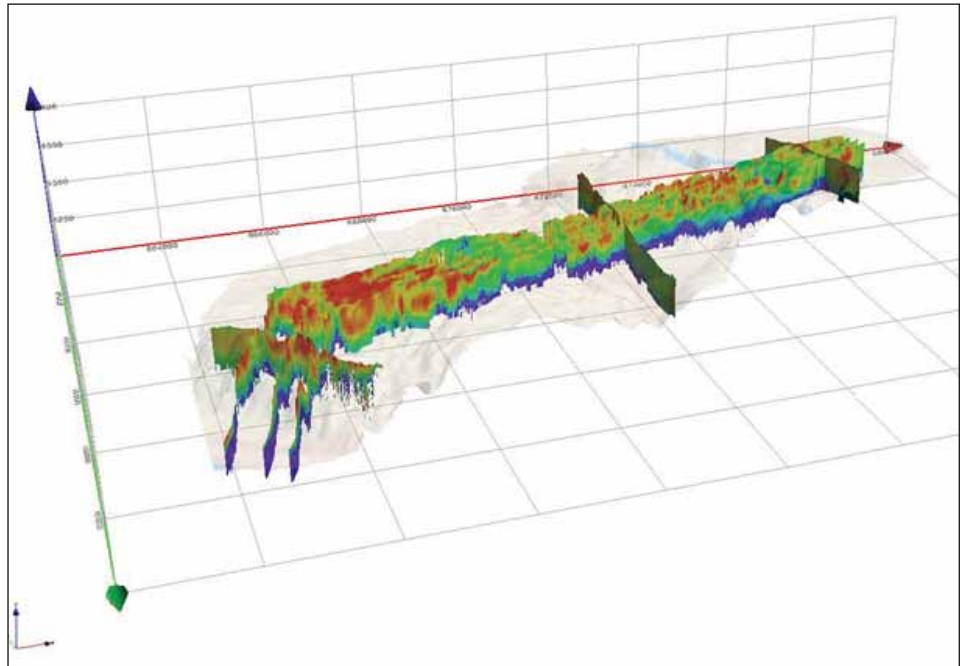
Cannia says in some places the information is changing the understanding of the aquifer. The new “look” is also providing a greater understanding of how the aquifers developed.

“But mostly, it gives us a knowledge of how things actually are,” Cannia says.

The original two-year, \$800,000 project, funded largely through a Nebraska Environmental Trust grant, was a joint effort between the South Platte and North Platte NRDs to fly over about 768 linear miles of ground. Of that, 220 were in the South Platte NRD in Kimball, Cheyenne and Deuel counties. Along the Lodgepole Creek portion the HEM made two passes 1,500 feet apart from near the Wyoming state line to just southeast of Chappell. The Sidney Draw survey involved multiple passes on a slanting line starting in Sidney draw southwest of Sidney and end northwest of town.

Last year, additional flights were made southeast of Big Springs and along additional areas of Lodgepole Creek across the District. A “test block” was also flown for the first time north of Sidney by another company demonstrating different technology.

While readings from the 60-foot-wide



**After entering the electromagnetic readings into programs, the data can be used to show electriconic resistivity, which can indicate underground geologic features, laying it over the surface representation.**

passes don't look like much area on a map, they represent a mountain of information that would take almost insurmountable amounts of time and money to accumulate through older methods.

Geologists traditionally used bore holes to collect subsurface information. Cannia says to get the information garnered by flights in the South Platte and North Platte NRDs, it would take about 5,600 bore holes, costing more than \$8.5 million and “who knows how much time.”

Even so, bore holes are still a significant part of the equation. As Sibray explains, bore holes allow for comparisons between actual rock types. He says that data, combined with readings from the electromagnetic studies, help provide a complete picture.

Sibray says part of the significance of having helicopter studies in the mix is that for studying larger areas, “it will make things much more cost effective.”

Once enough information is gathered within an area, the scientists may be able to determine the size of aquifers, determine their holding capacities and the affects of water withdrawal. Understanding the different formations should also provide a better understanding of how water flows toward and through

aquifers, calculate how much water is there, and gives a feel for the sustainability of the aquifer.

But not all the information has been as expected. Cannia says one of the biggest surprises was the discovery of a palaeochannel in the area of the Western Canal near Big Springs. A palaeochannel is a remnant of an ancient, currently inactive river or stream cut in older rock and filled by the sediments of younger overlying rock.

The discovery or expansion of knowledge about such geological formations provides scientists a better understanding about the area's history and as a result, gives them a better understanding of past climate changes, historical erosion and other factors.

As the knowledge continues to grow, Cannia and Sibray agree the new information should provide useful to the NRD boards of directors as an additional tool for ground water management.

The USGS report from the first flights is currently in the agency's review process, after which it will be published and released. In the process, the data, information and conclusions are peer-reviewed by specialists in the pertaining fields to ensure the quality and integrity of its science.

# New Program Seeks To Preserve Area's Grassland Cover

With the potential expiration of contracts protecting more than 260,000 acres of Conservation Reserve Program (CRP) land in the Panhandle by 2013, Panhandle natural resources districts and the Natural Resources Conservation Service have teamed together to preserve regional grassland cover.

Preserving CRP Benefits in Western Nebraska, a three year program funded by the NRDs and a grant from the Nebraska Environmental Trust (NET), seeks to ensure highly erodible land remains in cover, yet continues to produce income for landowners.

Originally focusing on lands at high risk for erosion, CRP removed them from agricultural production and established native or alternative vegetative cover in an effort to stop soil erosion. Since then, the CRP program has expanded to protect land and water resources, wetlands, and wildlife habitat.

With the large amount of acres that could potentially

be returned to production due to expiring contracts, officials have been concerned over the possible loss of CRP's benefits to air, water, soil and wildlife resources. With that in mind the NRDs, with the South Platte as lead agency, joined the Nebraska Game and Parks Commission and NRCS for a NET grant to help landowners with CRP contracts maintain their grasslands.

Funding to build perimeter fences around CRP ground is one of the program's main benefits. While NRCS programs such as the Environmental Quality Incentive Program (EQIP) provide for assistance with other components to implement a livestock grazing system, perimeter fences are not.

To round out grazing practices, producers can use EQIP assistance for livestock water wells, pipelines, cross fencing, inter-seeding and re-seeding of land, and more.

For those who wish to maintain the benefits of the



**New funding can be used for perimeter fencing around CRP grassland converted for grazing.**

grassland, but do not want a grazing system, other options are also available through NRCS. Their specialists can help form a plan that could include windbreaks, wildlife habitat or enhancements, or other options.

The three-year program is ready to take initial applications, which will be accepted

year-around. Those applications should be ranked and recommended for award approximately once every quarter.

Farm Bill Technician Jerry Spiker is available at NRCS to assist with cost share applications and other program needs. He can be reached at 308-254-4507, ext. 3.

## Abandoned Wells Pose Personal And Environmental Risks

If you have an old unused water well on your property, now is the time to get it properly sealed and decommissioned.

Out-of-service wells, especially those in disrepair or that don't meet current construction standards, are a major threat to groundwater, according to NRD Natural Resources Coordinator Chris Kaiser.

Abandoned wells, if not properly decommissioned, are dangerous because they are an easy way for contaminants from surface runoff to enter the groundwater below, Kaiser explains. These contaminants can include organic wastes, fertilizers and other chemical residues such as pesticides and pe-

troleum products. Small animals can also fall into the wells and add to the contamination.

"Another obvious threat is the hazard that an open well poses for children," Kaiser says.

Years ago, most homes and businesses had their own water supply wells. Most in town were replaced by community water supply systems, and some rural wells have been updated as well. In many cases, Kaiser said, officials identified and properly decommissioned the old wells. However, once in a while one is found that was not decommissioned.

According to state law, the well must be decommissioned by a licensed wa-

ter well contractor or pump installer. This includes removal of well equipment, including the pump and piping; disinfection, filling and sealing, capping, and reporting.

The NRD will cost share 65 percent of the actual cost of decommissioning an abandoned well, up to \$600. The maximum allowable cost share for hand-dug wells is \$700.

In areas of the South Platte NRD where a wellhead protection area has been designated, cost share assistance may be as high as 100 percent. For the locations of local wellhead protection areas, call the NRD at (308) 254-2377 or toll-free at (877) 800-1030 or see the NRD website at [www.spnrd.org](http://www.spnrd.org).

# Everyone Can Help Protect Ground Water Supplies

Virtually all of the water we use in the southern Panhandle is ground water. Even as we've emerged from an eight-year drought, we've come out with a new appreciation for that water source and the losses to what at one time many considered "infinite" reserves.

Rains throughout the region have decreased the burden on our aquifers the past two years, but it's still important for all of us to use water wisely and efficiently to protect our supplies for both short and long-term use.

In the agricultural community, many irrigators have made steps to use less water. Their steps have ranged from the use of equipment and methods to use water more efficiently, to the halt of some irrigated practices altogether.

While the average household doesn't use water on the same scale, better habits and practices can still make a big difference.

According to the American Water Works Association, the average household in America uses 127,400 gallons of water each year, with each person using about 100 gallons each day. The organization estimates that if all U.S. households installed water-saving features, water use would decrease by 30 percent, saving an estimated 5.4 billion gallons per day.

And, the savings isn't only in the aquifer. The organization says the lower water use could result in dollar-volume savings of \$11.3 million per day or more than \$4 billion per year.

The biggest use of water in the average household is watering lawns and landscapes. Indoors, the toilet, washing machine and showers/baths are where we use the most water.

There are a number of things we can do to use water more efficiently each day, protecting both our ground water supplies and pocketbooks.

## Outdoors

- Maintain a lawn height of 2 1/2 to 3 inches to help protect the roots from heat stress and reduce the loss of moisture to evaporation.

- Water landscapes and lawns thoroughly and deeply once every 5 to 7 days to promote the growth of deeper root systems which are more drought tolerant. Light and shallow watering results in shallow root systems that are dependant on more frequent watering.

And, the savings isn't only in the aquifer. The organization says the lower water use could result in dollar-volume savings of \$11.3 million per day or more than \$4 billion per year.

- Avoid runoff onto sidewalks, driveways, compacted soil or other impermeable surface to decrease unnecessary water waste.

- Water from 4 a.m. to 10 a.m. for the most efficiency. Avoid watering when

temperatures and wind speeds are high for less evaporation.

- Use organic mulches such as wood chips, shredded bark and similar materials in landscape beds to retain soil moisture and reduce evaporation.

## Indoors

- Toilets use the most water inside the home, using up to 5 gallons of water per flush. Older toilets use more than twice as much water as those produced for home use beginning in 1994. If possible, install newer, low flush toilets, which use 1.6 gallons of water or less. In older toilets, you can use less water by inserting plastic containers (such as milk jugs) filled with water or pebbles in a toilet tank to reduce water used.

- Clothes washers are the second largest water user in the home. If you do not have a new high-efficiency washing machine, take care to use your machine wisely. Wash full loads when possible to use less water than partial loads. If you must wash smaller loads, take care to adjust the water level to the appropriate load size.

- A quick shower usually uses less water than a bath. Low-flow showerheads are also available to reduce water use. Old showerheads can use 6-8 gallons a minute, while low-flow heads use no more than 2.5 gallons per minute.

- Fix drips or leaks. A slow drip or leak can waste more than 100 gallons of water a week.

- When washing dishes by hand, use two basins - one for washing and one for rinsing rather than let the water run.



## District Tree Programs Provide Nearly 100,000 Trees For Planting

Galen Wittrock, SPNRD assistant manager, reports that through the District's Conservation Tree Program, 97,717 seedlings were planted throughout the District in 2010. Of those, more than 60,000 were planted in Kimball County. The county's numbers were boosted in part, Wittrock said, by 17 new projects in the Continuous Conservation Reserve Program.

Cooperators in Cheyenne County

planted 25,680 seedlings and those in Deuel County added 5,503 more.

In addition to the trees sold through the Conservation Tree Program, the District donated 1,000 trees for giveaways, replacements and other uses.

The increasingly popular Community Forestry Program provides cost-share dollars for removal, replacement and planting of trees in the District's towns and villages.

This year, the District had requests for about twice the amount it could budget for the program. Even so, community groups were able to remove 59 dead or diseased trees and plant 180 new ones.

As part of the program, the District holds tree giveaways in different towns each year. Residents in Big Springs and Lodgepole helped provide for future protection of their properties by planting a total of 45 trees.

# Ground Water Modeling Adds To Management Tools

Staff hydrogeologist Thad Kuntz recently updated the SPNRD board of directors on the development of the Western Water Use Management Model, a ground water model specific to the South Platte and North Platte NRDs.

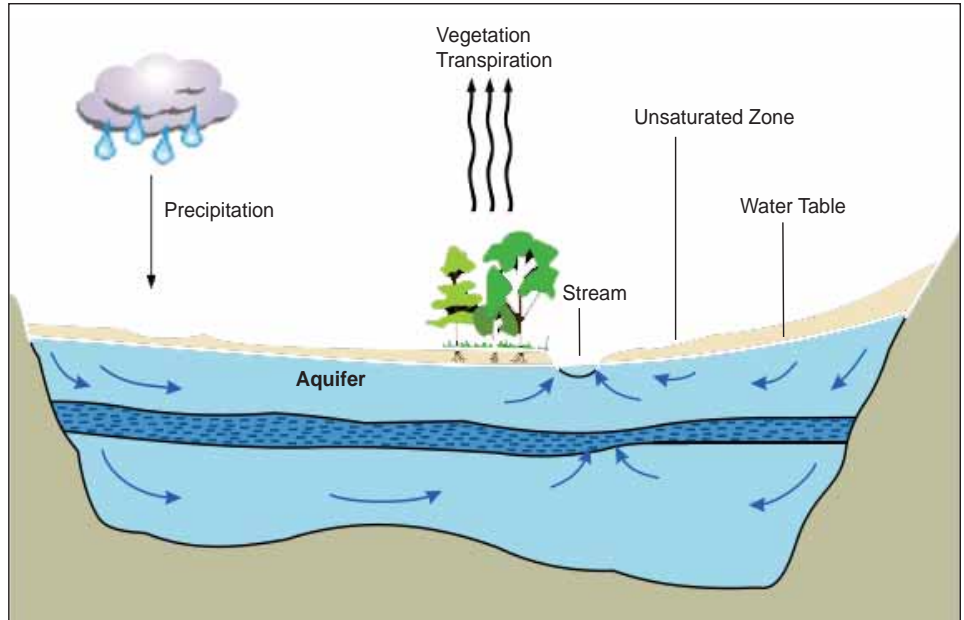
Ground water models are computer models of ground water flow systems, used to simulate and estimate future aquifer conditions. Working to manage and protect area water resources, NRD board members use information from such models as one of the tools for decision making.

For a number of years, districts in the Platte Basin have depended on a ground water model developed through the Co-operative Hydrology Study (COHYST). The COHYST study originally covered more than 29,000 square miles of the Platte, Republican, and Loup River basins.

What the Western Water Use Management Model does is to take a more focused look at the southern and central Panhandle and the elements that affect the area ground water model.

Some of the things taken into account to build ground water models include geology, hydrogeology, hydrology, types and methods of water uses, crop types, ground water recharge, certified irrigated acres, weather data, and other factors.

The resulting ground water model is then measured against known information such as ground water levels and stream flow. Once the model estimates this information reasonably the model is considered calibrated. This calibrated model is then used to estimate what will happen into the future to an aquifer sys-



**This cross section of a ground water system is the simplest form of modeling, showing water from rain, movement in the aquifer and transpiration. More detailed models show how water is affected by a host of variables.**

tem when a stress is applied. Examples of stresses are increased or decreased pumping, change in irrigation method, decreased rainfall (drought conditions), etc. This will allow resource managers to understand how their management policies may affect the aquifer system.

Kuntz explained there are several purposes for modeling:

- To understand the entire water system, which includes the physical (ground water and surface water) system and the legal (surface water rights) system.

- To understand water use and how water use has changed over time.

- To understand how changes from drought, conservation, pumping, and management will affect the system.

- It allows for evaluation and defense of management decisions.

- It provides a tool to determine if Integrated Management Plan goals are being met.

Those working on the project have accumulated a large amount of data in the needed areas. In an example of showing the type of data being collected, Kuntz displayed a small portion of the study area showing irrigated acres. Kuntz showed how some of the historical data used in previous efforts generalized some areas as to which portion was irrigated or not, as well as crop types. He explained how the Western Water Use Management Model hopes to correct the generalizations using historical aerial photography back through the 1950's, making the model more accurate.

At this point, the effort is on track to meet its projected completion by mid-2012.

## **BASIN-WIDE** *Protecting District And Basin Water Resources*

moratorium on large capacity wells and new or expanded uses is in place.

The NRDs and the State of Nebraska have worked together to develop plans to protect the future of all Nebraska water users, including municipal, industrial, domestic, livestock and irrigation to protect everyone -- not just one organization or group.

In general the plans' goals include protecting and increasing flows in the Platte River, working with all water users to resolve disputes, increase water use efficiency and reduce consumptive use.

Nebraska's Natural Resources Districts (NRDs) protect the future of the Platte Basin through a wide range of stewardship, management and educa-

tion programs—from flood control to groundwater monitoring, from irrigation management to outdoor recreation and more. Activities and projects of NRD's are reviewed and approved by a locally elected board of directors. There are 23 natural resources districts across the state. For more information, visit [www.nrdnet.org](http://www.nrdnet.org).

Continued from Page 1

# Scholarships Provide For Resources Education Opportunities

Several students from the District took advantage of scholarships this summer to join others from across the state in camps featuring natural resources education.

Zane and Freeman Lineback of Dalton were among students who attended the Adventure Camp about the Environment (ACE) at the State 4-H Youth Camp near Halsey June 20-23.

Sponsored and organized by Nebraska Natural Resources Districts (NRDs) and the Nebraska Association of Resources Districts (NARD), the ACE was open to all sixth through eighth graders interested in learning more about science and the environment.

The four day adventure drew 55 campers from across the state, and many of the campers received scholarships from their local NRD. The camp focused on water resources, soil and land, forestry, range and grassland and wildlife.

During the ACE, campers had the opportunity to form a new understanding of the environment through interactive participation. Campers also learned about possible careers in the area of natural resources from the professionals who work there every day. In addition to the learning opportunities, campers experienced nature through activities such as canoeing, zip line, water rockets, the water slide and other adventures.

Nebraska NRDs and NARD partnered with several organizations to help make the camp a success, including University of Nebraska Extension Services, Nebraska Natural Resources Conservation Service, University of Nebraska – School of Natural Resources, Nebraska National Forest, Nebraska State 4-H



**At ACE campers had the opportunity to test water for E-coli and bacteria. This was one of many hands on learning activities campers experienced while learning about natural resources.**

Camp, University of Nebraska Conservation & Survey Division, and Nebraska Pheasants Forever.

In early June, Lodgepole's Forest Hendrickson became the latest high school student from the District to attend the Nebraska Youth Range Camp, also held at the State 4-H Youth Camp.

The Nebraska Youth Range Camp is sponsored by the Nebraska Section of the Society for Range Management, USDA Natural Resources Conservation Service, University of Nebraska-Lincoln, IANR and the University of Nebraska Extension.

The program emphasizes plant-soil-animal relationships, range livestock management, ranching, economics, and wildlife habitat management. Field and classroom activities are used to provide the students with multiple learning en-

vironments that are designed to provide management education. Field activities include a forest tour, a ranch visit, and numerous hands-on exercises designed to introduce and/or develop skills important for range management. Many skills learned also transfer well to range judging competitions.

"We're very happy to be able to offer these types of opportunities to students in the District," says Don Ogle, district information and education coordinator. "The scholarships provided for these programs are just one of the examples showing how our board of directors is looking to protect the future of natural resources. These students represent some of tomorrow's stewardship leaders and our board members are glad to assist them."

## District Teachers Receive Additional Help For Classroom, Themselves

Several teachers from the District attended a conservation education workshop hosted by the SPNRD this summer, obtaining natural resources related information they can use in the classroom, while at the same time obtaining needed continuing education credit.

The workshop was part of the District's dedication to assist teachers with natural

resources related materials and information for their classrooms. The course used materials from Project Food, Land & People (FLP). Established in 1988, FLP helps pre-K-12th grade educators and students better understand the interrelationships among agriculture, the environment and people through lessons in math, science, health, consumer edu-

cation, social studies and geography.

Working in conjunction with ESU 14 in Sidney, the District obtained approval for one Continuing Education Credit hour through Chadron State College. The SPNRD Board of Directors approved full scholarships for the cost of the materials and the CEU to assist teachers within the District.

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## **Preliminary Work Begins To Study Options For Protection Of Southeast Sidney**

Preliminary work has begun to study possible remedies to protect areas in southeastern Sidney affected by flooding from runoff during heavy rain events.

South Platte NRD Manager Rod Horn has met with engineers to discuss a preliminary engineering study approved by the SPNRD board of Directors in April.

Board members agreed to commit up to \$10,000 in a contract with J.M. Neil & Associates for engineering services to plan possible options to deal with runoff between the east Sidney interchange and areas along Fort Sidney Road.

Runoff from Sidney's East Drainage/Watershed has adversely impacted some homes and businesses in the area the past two summers.

In 2009, SPNRD, city, and local Natural Resources and Conservation Service (NRCS) officials began working with



**Water runs through drainage area**

Nebraska NRCS regarding engineering services to keep costs down for local entities.

NRCS State Conservationist Steve Chick suggested the use of J.M. Neil & Associates, which contracts engineering services to assist NRCS. Company personnel are familiar with land treatment

applications that may fit local needs. Land treatment options can include diversions, dams, waterways and other methods of controlling runoff.

Horn met recently with NRCS Engineer Chris Jensen and Norm Koester, a former NRCS engineer now contracted with J.M. Neil & Associates, to take a preliminary look at the project.

Reviewing previous studies of the watershed has generated some early conceptual ideas that "are very encouraging," Horn says.

As treatment alternatives come forth, SPNRD will inform city officials and landowners of the recommendations to help determine the best course of action.

"While we don't know what might be suggested, we want to help provide the best options possible to help protect the area's people and property," Horn says.