

Nebraska Resources Newsletter



Published Quarterly by the Nebraska Department of Natural Resources
301 Centennial Mall South / P.O. Box 94676 / Lincoln, NE 68509-4676

Inside this Issue:

Issue 46, Spring 2013

- Field Office Mobile Technology
- Lower Platte River Basin-Wide Planning Efforts
- The Bridgeport Field Office-Historical Perspective
- Draft Rules and Methods for the Department's Annual Evaluation
- Wilcox Hired as NRD-DNR Water Resources Specialist
- Drought, Flood, and the Missouri River
- The Dam Safety Section
- 2012 Water Well Registrations

Agency Numbers to Remember

Agency address:
Nebraska
Department of Natural Resources
301 Centennial Mall South
Fourth Floor
P.O. Box 94676
Lincoln, Nebraska 68509-4676
Agency phone number:
(402) 471-2363
Agency fax number:
(402) 471-2900
Agency homepage address:
<http://www.dnr.ne.gov>

Editor's Note:
A full color electronic version of this newsletter can be found on the Department's web site along with back issues at <http://www.dnr.ne.gov/dnrnews/newsarchive2.html>.

Field Office Mobile Technology

By Tom O'Connor

The Department of Natural Resources has extensive database and mapping resources and is working to develop and implement mobile technology that will allow staff to access and use this information while in the field and also allow for timely data entry as field work is completed. Field Office staff in seven separate locations assist in administration of surface water permits, collect streamflow measurements, support the maintenance and operation of the statewide network of streamgages, and provide support to the Dam Safety Division by inspecting hundreds of low hazard dams across the state each year. The Department is testing this new technology in an effort to provide a more efficient and effective means of carrying out those responsibilities.



Curt Inbody of the Lincoln Field Office with mobile technology.

Cambridge was the first field office to use mobile technology. ArcMap (GIS software) with aerial photography, surface water permit information, and reservoir locations were loaded onto an auxiliary hard drive attached to a laptop computer. A smartphone was used for real-time internet access to the Department database. A GPS tracking tool available on the smartphone was programmed into ArcMap, which allowed for on-screen tracking of location.

It soon became apparent that a major impediment to the statewide implementation of mobile technology was a lack of access to the Department databases via the internet. Across a state as varied in topography and population as Nebraska, the occasional loss of cell phone coverage is to be expected, even with the use of a supplemental booster antennae. Although satellite coverage is available, the cost was considered prohibitive.

Over the past two years, the Department's information technology staff have assisted with several upgrades to address this issue. Laptops with larger hard drive storage were ordered; ArcMap layers and applicable database information were loaded directly onto the laptops eliminating the need for auxiliary hard drives and constant cell phone connections. Data entry forms are being developed along with an update tool to synchronize the laptop and Department databases.

The Department currently has seven laptops ready for the 2013 season. Both the Cambridge and Lincoln field offices will use mobile technology on laptops to locate surface water permits and record water use amounts; locate small reservoirs and complete dam safety inspection forms; and where internet access is available, obtain and analyze real-time streamgage information. The Department expects use of mobile technology to increase staff efficiency and allow field offices to expand inspection and verification efforts. Depending upon the effectiveness of these efforts, use of the technology may be expanded into additional field offices.

Lower Platte River Basin-Wide Planning Efforts

By Brandi Flyr, Ph.D.

Water adherence to the laws of gravity, not to political boundaries. As such, management and use of water within an upstream area can affect the subsequent water supply for downstream users. Thus, water management that is beneficial for the greatest number of users relies upon cooperation of all water management entities that operate within a basin. This is why the Department of Natural Resources emphasizes inter-agency cooperation and collaboration in water planning. Recently the Department and multiple natural resources districts (NRDs) including: Lower Platte South NRD, Lower Platte North NRD, Upper Loup NRD, Lower Loup NRD, Upper Elkhorn NRD, Lower Elkhorn NRD, and Papio-Missouri River NRD signed an inter-local cooperative agreement (ILCA). The purpose of this ILCA is to develop a basin-wide plan for the Lower Platte River Basin. This plan will set the framework, i.e. basin-wide equitable goals and objectives, from which these various entities can design management options tailored to meet their local area needs.



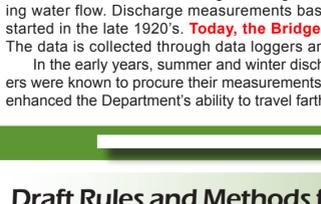
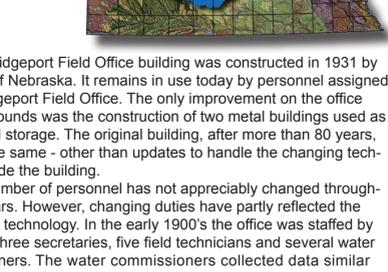
The Bridgeport Field Office – Historical Perspectives

By Tom Hayden

Irrigation started in the North Platte Valley in the mid 1800's. It was not until the passage of the Nebraska Irrigation Code in 1895 that the State Board of Irrigation, a forerunner of today's Department of Natural Resources, was created. At that time, Robert Willis, who was living close to Bridgeport, was appointed as Water Commissioner for Banner, Cheyenne and Scotts Bluff Counties. He went on to serve successively as Water Superintendent, Assistant State Engineer, and Chief of the Bureau of Irrigation, all in the Bridgeport Field Office.

The Bridgeport Field Office has the responsibility of administering five water divisions (see map at right) created in 1898.

- 1-A North, South, & Platte River
- 1-E Lodgepole Creek
- 2-C Niobrara River (Bridgeport administers from the Sheridan County line west)
- 2-D White River
- 2-E Hat Creek



The Bridgeport Field Office building was constructed in 1931 by the State of Nebraska. It remains in use today by personnel assigned to the Bridgeport Field Office. The only improvement on the office building grounds was the construction of two metal buildings used as a shop and storage. The original building, after more than 80 years, remains the same - other than updates to handle the changing technology inside the building.

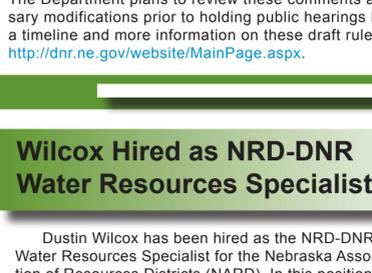
The number of personnel has not appreciably changed throughout the years. However, changing duties have partly reflected the changes in technology. In the early 1900's the office was staffed by the Chief, three secretaries, five field technicians and several water commissioners. The water commissioners collected data similar to that currently collected through automated data loggers. Today the Bridgeport Field Office is staffed by nine people in Bridgeport, and two located outside the office in North Platte and Crawford.

In addition to administering water rights and other duties, the Bridgeport Office is responsible for measuring water flow. Discharge measurements basically started in the mid to late 1800's. Use of monitoring equipment started in the late 1920's. Today, the Bridgeport Field Office operates 49 streamgages and 70 canal gages. The data is collected through data loggers and transmitted remotely to the office.

In the early years, summer and winter discharge measurements were extremely difficult and water commissioners were known to procure their measurements via horseback. The advent of the car, better roads, and equipment enhanced the Department's ability to travel farther & faster to better carry out its duties.

Draft Rules and Methods for the Department's Annual Evaluation

By Jesse Bradley, P.G.



The Nebraska Department of Natural Resources has recently released new draft rules and methods that it proposes to utilize in its annual evaluation of availability of hydrologically connected water supplies. This annual evaluation is aimed at ensuring that streamflow water supplies for existing groundwater and surface water uses are protected into the future. The results of this evaluation will be highly valuable in supporting proactive planning efforts conducted by the state and local natural resources districts.

These proposed rules and methods are aimed at providing greater clarity on the water supplies and water uses across the state to facilitate more effective water planning efforts. Director Brian Dunnigan said, "These new rules and methods which have been developed over the last four years will serve to provide foundational information on Nebraska's water supplies and uses, thus allowing for more effective coordinated planning efforts across the state."

In an effort to address questions or comments related to the new draft rules and methods the Department set up a sixty-day public comment period which ran through June 7, 2013. During this public comment period, the Department held several public forums across the state. These forums served to answer questions related to the new rules and methods. These public forums were held in Norfolk, Valentine, Scotts-bluff, Kearney, Beatrice, and Lincoln. The Department also set up a web-portal to receive public comments related to the draft rules and methods. The Department plans to review these comments and make any necessary modifications prior to holding public hearings later this year. For a timeline and more information on these draft rules and methods, please visit the Department's website at <http://dnr.ne.gov/website/MainPage.aspx>.

The annual evaluation is aimed at ensuring that streamflow water supplies for existing groundwater and surface water uses are protected into the future.

Wilcox Hired as NRD-DNR Water Resources Specialist

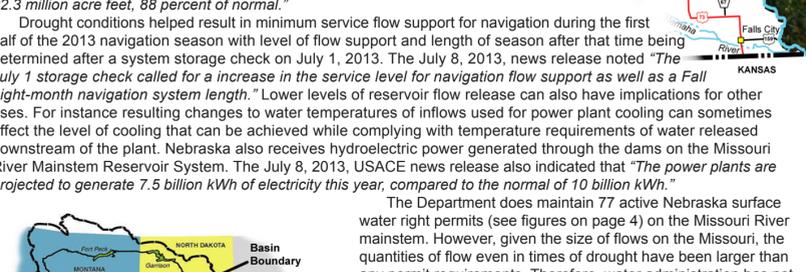
Dustin Wilcox has been hired as the NRD-DNR Water Resources Specialist for the Nebraska Association of Resources Districts (NARD). In this position, Wilcox will be working with natural resources districts and the Department on groundwater and integrated water management plans. He began his duties on June 3, 2013.

Wilcox worked for the Lower Big Blue Natural Resources District as the Water Resources Specialist from March 2009 to August 2011. In this position, he worked on the district's water management programs,

chemigation, nutrient management, and training programs. He also worked the rural water systems in the district. More recently, Wilcox worked for Valmont Industries as the Irrigation Application Specialist. He also interned at the Lower Platte North Natural Resources District in the summer of 2008 working on the groundwater quality/quantity monitoring programs. Dustin is a native of Arlington, Nebraska, and holds a B.S. from UNL in Natural Resources and Environmental Economics, with an emphasis in Agriculture and Natural Resources Systems.

Drought, Flood, and the Missouri River

By Steve Gaul



River is a giant among Nebraska's rivers. Missouri River outflows from Fort Randall Dam, South Dakota, just north of the Nebraska border, averaged over 18 million acre-feet (MAF) per year during a 1967 to 2012 period of record and gaged flows at Rulo (near Nebraska's southern boundary) averaged almost 31 MAF per year between 1953 and 2012. Contrast that with average annual gaged streamflows entering the state during an earlier period from all other sources (about 1.8 MAF) or the combined volume of Nebraska flows emptying into the Missouri as well as those leaving the state by rivers other than the Missouri mainstem (about 8.2 MAF).

The Missouri flows are impressive figures, even given that the center of the Missouri River channel generally forms the state border and therefore not all Missouri River flows would necessarily be deemed Nebraska waters. Nonetheless, average annual figures can mask the diversity of annual flow levels found in the period of record. For instance, while the average annual reservoir outflows at Fort Randall Dam have been over 18 MAF, they have ranged from about 8.5 MAF in 1993 to nearly 45 MAF in 2011. While average annual Missouri River flow at Rulo has averaged nearly 31 MAF, it has ranged from 19.6 MAF in 1956, to 70.9 MAF in 2011. Providing monthly or daily flows or calculation of what those flows might be without the reservoirs would show even greater variability.

Given the magnitude of water involved in the Missouri River, it is not surprising that major concerns in times of drought would differ somewhat from those experienced along other rivers in the state. The U.S. Army Corps of Engineers (USACE) manages the Missouri River Mainstem Reservoir System for eight authorized purposes including flood control, navigation, irrigation, hydropower, water quality control, water supply, recreation and fish and wildlife. The last several years have been a study in contrasts in balancing among purposes. In 2011 the river experienced record inflow, runoff and flooding and governors and their representatives from seven basin states reached a clear consensus that flood control must be the highest priority in the operation of the Missouri River mainstem reservoir system.

The Department does maintain 77 active Nebraska surface water right permits (see figures on page 4) on the Missouri River mainstem. However, given the size of flows on the Missouri, the quantities of flow even in times of drought have been larger than any permit requirements. Therefore, water administration has not been an issue for the Missouri River. Those permits are based on water quantity rather than water temperature or other water quality factors. Of the direct flow permits, the individual permits for the largest amounts tend to be for cooling.

By mid to late 2012, conditions had substantially reversed as much of the basin was dealing with major drought. As of early July 2013 varying levels of drought remained in parts of the basin, while other areas had experienced high water. In a July 8 news release the USACE indicated that "Despite two consecutive months of higher-than-normal runoff, drought conditions persist across much of the Missouri River basin and the mainstem reservoir levels remain below normal." The release also indicated that: "The July forecast for annual runoff in the upper basin is 22.3 million acre feet, 88 percent of normal."

Missouri River flows are likely to remain a topic of major interest well into the future. Nebraska is the only state located entirely within the Missouri River Basin. It is positioned immediately downstream of most of the Missouri River mainstem reservoirs and has a major interest in the benefits they help provide. In 2011 the reservoirs and levee systems along the river provided. In 2011 the reservoirs and levee systems along the river provided major flood prevention and flood control benefits. With lower reservoir levels and drought conditions in significant parts of the basin in early to mid-2013, flow maintenance in support of the authorized project purposes may receive relatively more attention.

*The State level figures were calculated from data previously compiled by the University of Nebraska-Lincoln Conservation and Survey Division in The Groundwater Atlas of Nebraska, Resource Atlas No. 4a/1998 Second (revised) edition. The period used was a mixed long term period of record that generally ended in 1996.

The Dam Safety Section

By Shuhai Zheng, Ph.D., P.E., CFM

The Department's Dam Safety Section is responsible for conducting safety inspections of all the dams in Nebraska that are greater than 25 feet in height, have a maximum storage capacity greater than 50 acre-feet, or are located in a high hazard potential location. After each inspection, an inspection report is prepared and recommendations are made to the owner concerning operation and maintenance of the dam. Dam Safety staff provide guidance to dam owners and conduct follow-up visits to assure serious deficiencies are addressed in a timely manner. The section is part of the Department's Floodplain, Dam Safety and Survey Division.

The section reviews plans and specifications for new dams to assure current design and safety criteria are met. During construction, the section tracks construction activities and performs periodic inspections. Other activities include reviewing emergency action plans which are required for all high hazard potential dams; maintaining an inventory of all dams in Nebraska for the National Inventory of Dams; and evaluating dams with respect to departmental jurisdiction, hazard classification, and storage capacity.

There are currently 2,379 jurisdictional dams in the State's inventory. Of this total, 141 are classified as high hazard potential; 189 are significant hazard potential, and 2,049 are low hazard potential. The hazard potential for each dam is based on the damage that could occur downstream if the dam were to fail; it is not a reflection of the condition of the dam. The standard safety inspection schedule is annually for high hazard potential dams, every three years for significant hazard potential dams, and every five years for low hazard potential dams.

Hazard Classification of Dams

- High hazard:** A dam located where failure may cause loss of life, or serious damage to homes, normally occupied industrial and commercial buildings, important public utilities, main highways, or major railroads.
- Significant hazard:** A dam located in areas where failure may damage isolated homes, occasionally occupied buildings, main highways, minor railroads or interrupt public utility use or service.
- Low hazard:** A dam located in areas where failure may damage normally unoccupied buildings, undeveloped land, or township and county roads.

2012 Water Well Registrations

During the past year, January 1, 2012-December 31, 2012) over 5,600 water wells were registered with the Nebraska Department of Natural Resources. These water wells are utilized for a variety of purposes ranging from livestock watering to municipal water needs. The chart lists the number of water wells and natural resources district they are registered in.

Nebraska Resources Districts	2012 Registered Irrigation Wells Including Wells	2012 Total Registered Wells All Types
1. Lower Platte	163	541
2. Central & Clark	149	217
3. Little Blue	150	274
4. Lower Big Blue	67	153
5. Lower Elkhorn	131	315
6. Lower Loup	163	533
7. Lower Niobrara	167	247
8. Lower Platte North	81	233
9. Lower Platte South	6	311
10. Lower Republican	25	78
11. Middle Niobrara	28	113
12. Middle Republican	10	105
13. Nemaha	33	166
14. North Platte	5	138
15. Papio-Missouri River	36	395
16. South Platte	4	65
17. Tri-Basin	71	145
18. Twin Platte	37	233
19. Upper Big Blue	202	402
20. Upper Elkhorn	85	214
21. Upper Loup	14	179
22. Upper Niobrara-White	13	610
23. Upper Republican	23	51
TOTALS	1,663	5,646

State of Nebraska
Dave Heineman, Governor

The Nebraska Resources is a quarterly publication of the Nebraska Department of Natural Resources. We welcome your comments and suggestions.

Nebraska Department of Natural Resources
Brian P. Dunnigan, P.E., Director

Nebraska Department of Natural Resources
301 Centennial Mall South,
4th Floor
P.O. Box 94676
Lincoln, Nebraska 68509-4676

An Equal Opportunity/Affirmative Action Employer