

Nebraska Resources

Newsletter



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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>.



Update on INSIGHT

By Nathan Morris

As temperatures soared this summer and with much of the Midwest under severe or extreme drought conditions, available water supplies have diminished as irrigators try to keep up with crop water needs and other water uses place demands on the resource. Such conditions are a drastic departure from spring and summer last year when parts of Nebraska and the Midwest faced flood conditions. To help water managers better understand, plan for, and manage the challenges and opportunities that exist in the state regarding water availability, the Nebraska Department of Natural Resources (DNR) is currently developing a tool called INSIGHT—an Integrated Network of Scientific Information and GeoHydrologic Tools.

As discussed in previous newsletters (see the October 2011 and January 2012 *Nebraska Resources Newsletters* and the September 2011 *Water Matters* No. 6), the tool will consolidate water supply and demand data, as well as information from groundwater modeling and other modeling efforts, from a variety of sources and provide a single location of access through a series of web-based interactive maps. INSIGHT is to help water managers better understand current and future demands, evaluate the effectiveness of water management strategies, and assess the most critical areas of water shortage. INSIGHT will also be available to the public through the DNR website and is intended to improve public understanding of water availability condi-

Continued on p. 2

Missouri River Flood Related Meetings and Reports Improve Collaboration and Examine River Management

By Steve Gaul

Missouri Basin 2011 runoff above Sioux City totaled 61.0 million acre-feet, or 246 percent of normal and the highest amount in the U.S. Army Corps of Engineers' (Corps) 114 years of detailed record keeping. In contrast, the Corps' August 1 forecast for 2012 annual runoff from the Missouri Basin above Sioux City was 21 million acre-feet, or 85% of normal (which is about 24.8 million acre-feet of water). While runoff is forecast to be below normal in 2012, efforts to address potential future flood conditions remain a priority. In addition to physical recovery activities, the unprecedented 2011 flood conditions did help lead to a variety of efforts to improve communication and collaboration for recovery and reexamine flood control and river management. A few of the major analysis and coordination activities included:

1. A series of Governors' Missouri River Flood Control meetings,
2. Formation of a Missouri River Flood Task Force and completion and transitioning of the group's activities;

Continued on p. 3

Celebration for Duncan Gage Highlights Value of Nebraska Streamgages

By Steve Gaul

On June 4, 1895, streamgage operations began at a site on the Platte River near Duncan, just upstream from the confluence with the Loup River. For over 100 years the Duncan gage has provided data to irrigators, water resource managers, scientists, public officials and others as the state around the gage grew and the uses of water upstream of the gage evolved. On June 5, 2012, the U.S. Geological Survey (USGS), which operates the gage, held a brief ceremony to celebrate and rededicate the gage's operation.

The USGS operates about 120 stream and canal gages in Nebraska and DNR currently operates continuous streamgages at 100 locations, including three gages operated cooperatively with the USGS. The DNR also operates a large number of canal or seasonal gages. Interestingly, four of the streamgages currently operated by the Department of Natural Resources began operating at least 100 years ago. These include: the Blue River at Seward (1910), the North Platte River at Mitchell (1901), North Platte River at Bridgeport (1896), and the North Platte River at North Platte (1895).

Nebraska's streamgages provide invaluable information that allows comparison of current flow levels with those in the distant past and times in-between. That data is used to help administer water rights, for compliance with interstate compacts and decrees, for flood forecasting and floodplain management planning, for emergency management, for determination of long-term quantity and availability of water supply, for safe infrastructure design, and for integrated water man-



Pictured from left to right: Phil Johansen (Ben Nelson's office), Ken Rahjes (Adrian Smith's office), Kelly Bergman (Corps of Engineers), Betty Krapatsch (Chairman of the Duncan Village Board), Bob Swanson (USGS), Frank Albrecht (NGPC), Jim Schneider (NDNR), Dave Pearson (National Weather Service), and Phil Erdman (Mike Johann's office).

agement planning, among other benefits. The Duncan gage represents a long-term commitment to seeing those needs are met. Long-term gages, for instance those with more than 30 years of record, are especially important investments.

Because long-term data is important, fluctuations in funding for the federally operated gages have been of concern; and, during the 1990s, many federal gages were discontinued due to lack of funding. However, the data from both state and federal gages continues to provide important base data vital to effective water resource decision-making.

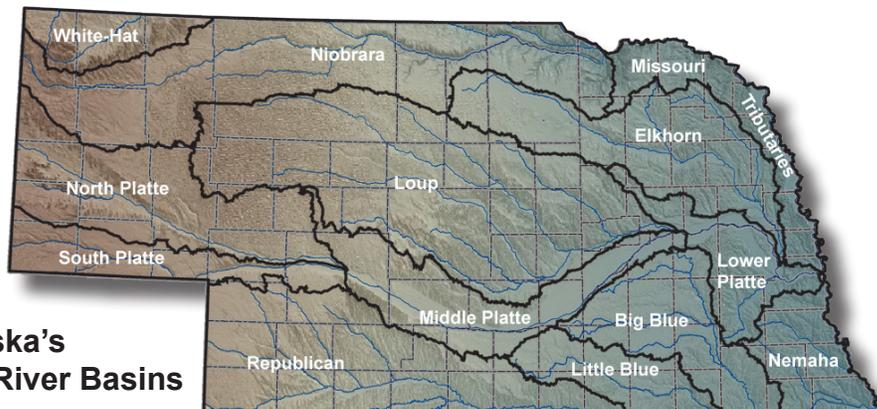
Update on INSIGHT continued from p. 1

tions in any given area in the state.

To help develop INSIGHT, DNR has contracted with Riverside Technology, Inc. Among other things, DNR and Riverside are currently developing a streamlined data entry and viewing process for ongoing and planned data collection efforts. In addition, although groundwater modeling efforts have been completed for most major river basins in Nebraska (see river basin map), modeling efforts for a few basins have not yet been completed. For that reason, DNR has contracted with HDR, Inc. to conduct modeling assessments for the Big Blue and Little Blue River basins and for the Lower Platte and Missouri Tributaries basins. The

data used to build these models, and the information gained from the completed models will be available in INSIGHT. The INSIGHT tool is expected to be released to the public in July 2013.

For more information on INSIGHT, please see *Water Matters* No. 6 on the Department's website at http://dnr.ne.gov/IWM/WaterMatters/WaterMatters_No6.pdf.



**Nebraska's
Major River Basins**

Missouri River continued from p. 1

3. Completion of an independent panel report on reservoir system regulation during the flood;
4. Completion of a Corps post 2011 flood event analysis/report on mainstem flood control storage during the flood;
5. Missouri River Basin Water Management meetings held throughout the Basin by the Corps; and
6. Completion and release of the Corps 2011-2012 Annual Operating Plan for the mainstem system.

The reports are now available, and it is worth noting the role of the coordinating groups.

The initial Governors' Missouri River Flood Control meetings were held August 19, 2011, and October 17, 2011, in Omaha followed by a December 15, 2011, conference call and a May 23, 2012, meeting in Bismarck, North Dakota. The Governors and their representatives from seven states reached a clear consensus that flood control must be the highest priority in the operation of the Missouri River mainstem reservoir system. It is anticipated the meetings will continue and they are expected to provide greater input and more flexibility in the Missouri River system's management.

The Missouri River Flood Task Force was a separate effort to improve communications, collaboration, and coordination for recovery activities on the 2011 Missouri River flood. That group completed its efforts with a May 24, 2012, meeting in Omaha. Federal agencies provided organizational support for the group, which included representatives from federal agencies, states, and tribes. Work was also performed in a collaborative way to allow others to participate in various parts of the effort as partners, observers, and contributors.

The task force produced or reviewed informational material such as a publication on flood recovery options for agricultural lands, listings of levee rehabilitation projects, and Corps presentations on runoff, river aggradation and degradation, and channel conveyance. Much of the group's accomplishment was via coordination in working group conference calls between federal agencies and those involved in flood recovery efforts. Department of Natural Resources staff provided state representation for Nebraska and participated in working groups on floodplain management and river management. Although the formal duties of the task force have ended, Corps and Task Force officials indicated that the task force effort would be transitioned into future coordination. The task force website can be found online at <http://www.nwd-mr.usace.army.mil/rcc/MRFTF/default.html>.

In addition to information on task force activities, the reports mentioned above are available online. These include:

"Missouri River Mainstem System 2011 – 2012 Annual Operating Plan" (January 2012) by the U.S. Army Corps of Engineers - <http://www.nwd-mr.usace.army.mil/rcc/reports/pdfs/finalAOP2011-2012.pdf>,

"Post 2011 Flood Event Analysis of Missouri River Mainstem Flood Control Storage" (April 2012) by the U.S. Army Corps of Engineers - <http://www.nwd-mr.usace.army.mil/rcc/reports/pdfs/Post2011FloodEventAnalysisofMainstem-FloodControlStorage.pdf>, and

"Review of the Regulation of the Missouri River Mainstem Reservoir System During the Flood of 2011 (December 2011) - <http://www.nwd-mr.usace.army.mil/rcc/MRFTF/docs/MRIIndependentReviewPanel.pdf>.

Nebraska Natural Resources Commission Projects Funding Update

By Kent Zimmerman

The Nebraska Natural Resources Commission (Commission) obligated funding to ongoing projects from both the Resources Development Fund (RDF) and the Interrelated Water Management Plan Program (IWMPP) fund effective July 1, 2012, during its meeting in Grand Island on June 20, 2012. The Department of Natural Resources (DNR) administers both funds and works with project sponsors from the initial planning stages through completion and on later follow-up inspections of completed projects.

This year, Commission obligations to RDF projects included fully funding the remainder of the Little Sandy Creek project (\$472,845) and committing about \$666,870 apiece to each of the following projects: Lower Turkey Creek Watershed, Sand Creek Environmental Restoration (Lake Wanahoo), Upper Prairie/Silver/Moores Creek Flood Detention, and the Western Sarpy/Clear Creek Levee. This past year, the Commission also completed its funding obligation to another RDF project, the Maple Creek Recreation Project near Leigh, Nebraska.

The Commission granted a combined total of \$500,000 to ten IWMPP projects sponsored by the Lower Platte South Natural Resources District (NRD), Lower Loup NRD, Lower Elkhorn NRD, Central Platte NRD, North Platte NRD, and South Platte NRD. Most projects have multiple NRD participants as water management-related work is shared up and down the basin, often with participation by DNR. In dividing the funds, the Commission placed priority on projects located in areas not designated as fully appropriated or over appropriated since the remaining sponsors have additional funding opportunities through the use of special taxing authorities.

As a means to help assure that previously approved projects can be funded in a timelier manner, the Commission has suspended acceptance of new applications and project proposals for assistance from either RDF or IWMPP until allocation and/or cost-share commitments to ongoing projects are met.



Basics of Streamgaging – Determining River Stage and Discharge

By Tom O'Connor

Knowing the depth and volume of water in a river or stream can be very important. However, developing that data can be complex. Stage and discharge data from a statewide network of gaging stations are used for water administration, floodplain analysis, flood warning and emergency response, dam safety, and integrated water management planning. **The Department of Natural Resources (DNR) collects and maintains stage and discharge records for approximately 100 permanent gaging stations**, primarily located on streams and rivers, and maintains seasonal gages on numerous canals and reservoirs. The U.S. Geological Survey also operates a network of gages, some in cooperation with the Department.

Stage

One of the most important pieces of information obtained from gaging stations is stage. The stage or gage height of a lake or stream is the height of the water surface above an established gage “datum” point, usually measured using a wire weight attached to a bridge or structure. (The gage datum is established below the level of the bed so that stage never reaches zero with bed scour.)

Gaging stations are designed and installed to measure and collect continuous stage readings. Several different devices are used including stilling wells, transducers, and radar gages. These devices are connected to encoders, strip chart recorders, or directly connected to data loggers that record the stage measurements. Stage readings recorded on strip chart recorders and data loggers can be retrieved by removal of the chart or by downloading to a computer at the gaging station. Stations equipped with satellite data collection platforms relay the stage data via satellite every hour (approximately 50 DNR gages have satellite connections). The data is then distributed



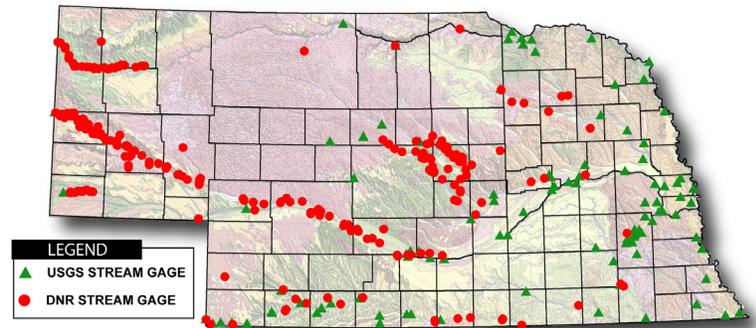
Gaging station with satellite antenna, tipping bucket rain gage, and solar panel for charging batteries

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Interior of gaging station with data logger, bubbler system, and transducer

Gaging Stations



over the internet to DNR and all outside agencies that have use of the data (for example the National Weather Service). Other gaging stations have telephone download capabilities. These stations are called on a daily basis to retrieve the stored data.

Discharge

Discharge is the volume of water flowing past a particular point in the stream over a set time period, usually expressed in cubic feet per second. To obtain a discharge record, staff physically waded the stream with a current meter to make a discharge measurement at the location of a gaging station. This measurement is compared to the stage reading at the time of the measurement, and imported to water information software maintained by DNR. After a series of stream discharge measurements are collected at different flow levels, the relationship between stage and discharge can be established. This relationship is then used to develop a rating curve, which converts continuous stage readings to a continuous discharge record.

The stage-discharge record is considered preliminary until checked and reviewed. When the review process is complete, an annual hydrographic report is produced showing the official mean daily flow in cubic feet per second for each station for each water year (October 1 – September 30). The annual hydrographic reports can be found on-line at <http://dnr.ne.gov/docs/hydrologic.html>.

Republican River Basin Water Sustainability Task Force Approves Final Report



By Steve Gaul

On April 24, 2012, in McCook, the Republican River Basin Water Sustainability Task Force met for the last time and approved its final report to the Governor and Legislature. The 27 member task force was created by LB 1057 in 2010 with a mission of defining water sustainability for the basin, developing and recommending a plan to help reach water sustainability, and developing and recommending a plan to help avoid a water short year in the basin. Through 12 full task force meetings and separate educational and subcommittee activities over nearly two years, the task force members donated their time and provided their perspectives on sustainable water management options for the basin. The Task Force was chaired by Tom Terryberry of Imperial. Nebraska Department of Natural Resources (DNR) Director Brian Dunnigan served on the Task Force and the DNR provided administrative and budgetary support. Anthony Schutz and Nicole Wall, representing the University of Nebraska Public Policy Center, provided facilitation services.

The Task Force defined water sustainability with the following wording:

“Management for water sustainability allows the beneficial use of water, in an effective and efficient manner, to satisfy our socio-economic needs and obligations while minimizing the risk that water resources will be insufficient for future generations to meet their socio-economic needs and obligations.”

The report provides findings and recommendations for both achieving water sustainability in the basin and avoiding a water short-year and can be found on DNR’s website at <http://dnr.ne.gov/LB1057/> .

Task Force members were appointed from a variety of statutory categories and included:



- Upper Republican NRD
- Upper Republican NRD
- Middle Republican NRD
- Middle Republican NRD
- Lower Republican NRD
- Lower Republican NRD
- Tri-Basin NRD
- Tri-Basin NRD
- Frenchman Valley & H&RW Irrigation Districts
- Frenchman - Cambridge Irrigation District
- Nebraska Bostwick Irrigation District
- Frenchman Valley Irrigation District
- NU Institute of Agriculture and Natural Resources
- Nebraska Game & Parks Commission
- Nebraska Dept. of Agriculture
- Nebraska Dept. of Natural Resources
- School Districts
- City
- County
- Public Power District
- Agriculture Related Business
- Agriculture Related Business
- ex officio Legislator

- Dean Large
- Tom Terryberry (Chair)
- Joseph Anderjaska
- Kevin Fornoff
- Marlin Murdoch (Vice-Chair)
- Brad Wulf
- Phyllis Johnson
- Ray Winz
- Kenneth Albert
- Dale Cramer
- Rod Ely
- Jerry Kotschwar
- Charles Burr
- Jerrod Burke
- Greg Ibach
- Brian Dunnigan
- Shad Stamm
- Chad Yaw
- Scott Olson
- James Dietz
- Jim Chism
- Ralph Scott
- Senator Tom Carlson
- Senator Mark Christensen
- Senator Tom Hansen
- Senator Chris Langemeier
- Senator Galen Hadley

Task Force Members

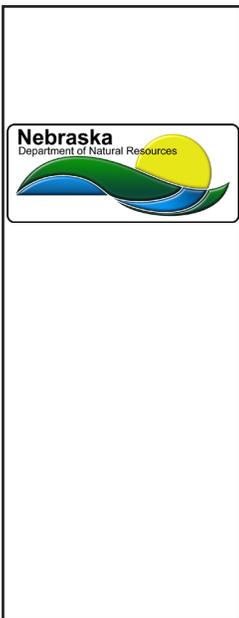
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301 Centennial Mall South, 4th Floor
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Brian P. Dunnigan P.E., Director

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

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Nebraska Department of Natural Resources....

....dedicated to the sustainable use and proper management of the State's natural resources.