FLOODPLAIN MANAGEMENT TODAY

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Floodplain Management Section
March 2018

Silver Jackets: Lower Platte River Hydrology Study

By Tom Gorman, PE, CFM, U.S. Army Corps of Engineers

Development pressure along the Lower Platte River is recognized as a significant source of future flood risk. Studies such as the October 2016 Papio-Missouri River Natural Resources District (NRD) South Sarpy County Watershed Study, August 2015 Offutt Air Force Base Joint Land Use Study, Fremont Comprehensive Revitalization Strategy, and 2004 Saunders County Comprehensive Plan all identify the expectation of development within the Platte River corridor as well as the need to establish zoning regulations that protect the natural environment and public safety. Relevant and recent flood risk data is the basis for many of the decisions about flood risk for future development.

Also Inside This Issue

In recognition of this expected development and the need for updated data that is consistent throughout this river reach, the Nebraska Silver Jackets Team has initiated a hydrology study for the Lower Platte River, from Columbus to the Missouri River. This study will develop updated flow-frequency relationships expressed as annual peak flows (in cubic feet per second) developed for various flood frequencies such as the flood having a 1-percent annual chance of being equaled or exceeded. (The 1 in 100 annual chance flood is commonly referred to as the "100-year flood".)

The current hydrology values along the Platte River downstream from Columbus were developed in March 1998 by the U.S. Army Corps of Engineers (USACE) in coordination with the Federal Emergency Management Agency (FEMA) for the Lower Platte River Flood Insurance Study (FIS). The Lower Platte River FIS was used by FEMA as the source of flood profiles and floodplain boundaries for the most recent Flood Insurance Rate Maps along the river. The 1998 hydrology study used stream gage data available through 1994. Since that study, several Letters of Map Revision and other efforts have been conducted updating the 1998 peak flow data. The updated studies have shown a general decrease in the peak flows. These individual studies have not been coordinated and have resulted in inconsistent methodologies being used at various locations along the river.

Since the 1998 study there have been significant improvements in the statistical analysis and data management processes used for hydrology studies and it was desired to apply these to the Lower Platte River. A Silver Jackets interagency project proposal was developed to use the

more than 20 years of additional gage data since 1998, apply the most up-to-date statistical methods and reestablish a consistent methodology and results along the Lower Platte River. The project was approved in late 2017, with a kickoff meeting/conference call amongst the project partners held on December 13, 2017.

The project will update the peak flow frequency along the Lower Platte River to include the longer period of record. In addition, the analysis will use the statistical methods given in "*Bulletin 17C, Guidelines for Determining Flood Flow Frequency"* recently issued by the Advisory Committee on Water Information (ACWI). The ACWI and its members represent the interests of water oriented organizations including federal, state and other government agencies; professional, technical and environmental organizations; academia and the private sector.

As in the 1998 study, ice-affected season (December 15 through March 31) and open water season (April 1 through December 14) peak flows will be developed, to allow future ice jam analyses. While this study will not develop any new hydraulics, floodplain mapping or risk evaluations, those types of efforts will be enabled by this hydrologic analysis. With consistent methods for flow values, these follow-on efforts can be conducted independently but result in products with some overall alignment upstream and downstream. It is expected that the study effort and reviews will take 18 to 20 months, with study results available in late 2019.

The project is a collaborative effort between the Nebraska Silver Jackets team members and cooperating agencies, including the Nebraska Department of Natural Resources, FEMA, U.S. Geological Survey, USACE, and Lower Platte North, Lower Platte South and Papio-Missouri River NRDs.

For more information on this effort please contact Mr. Tony D. Krause with the USACE Omaha District at tony.d.krause@usace.army.mil.

What's Up with Drones?

By LeRoy Sievers, Legal Counsel at NeDNR

The recent Violations and Enforcement course held in Fairbury on February 28, 2018 was well received. After discussing the importance of taking pictures from the public street or sidewalk, the question of drone usage was posed to Mr. Sievers, Legal Counsel at NeDNR. The following article reflects his research into the subject. The next offering of the Violations and Enforcement course will be held in Blair later this spring.

Photo courtesy of TheDroneGirl.com

Drones or Unmanned Aircraft Systems (UAS) have become very popular with the public and with various government entities. Beyond their use in a recreational sense, drones provide an opportunity to complete work more quickly and effectively in a manner that is unmatched by people attempting to perform the same work on foot. However, there are limitations on the use of drones based upon a variety concerns. In this article a few of those issues will be raised.

Some useful images may be available from publically available sources, such as Google Earth. The U. S. Supreme Court has allowed the use of images obtained by law enforcement from a helicopter flying at 400 feet (Florida v. Riley, 488 US 445 (1989)) in part because it was in authorized air space. Cases have said that publically navigable airspace can be used by governments to obtain information but those cases have dealt with aircraft and not drones. Thus there is uncertainty regarding the use of drones.

Case law does support the conclusion that drones can be operated over property that is open to the public, such as sidewalks and streets. Also if a landowner adjacent to the property in question gave permission to use a drone over that property, images of the adjacent property would likely be allowed to be used by the government. To what extent use elsewhere would pass legal challenges has not been resolved. Some scholars have suggested that if local ordinances authorize the use of drones in prescribed airspace above private property, use by government entities would be permitted. However, until case law is developed or until new laws are adopted on the use of drones, their use is most clearly authorized in the air space above publically accessible property such as streets, sidewalks and the like.

Leveraging Statewide LiDAR

By Ryan Werner, CFM

Light **D**etection **A**nd **R**anging, or LiDAR, is the main source of elevation data for the State of Nebraska. LiDAR produces accurate topographic information which is used by many government agencies, public entities, and private individuals.

An airborne system, typically an airplane or helicopter, uses a pulsed laser to record the range (distance) from the aircraft to the Earth. When these ranges are combined with GPS information and calibrated, a dense grouping of elevation points is created, generating three dimensional data about the Earth's surface.

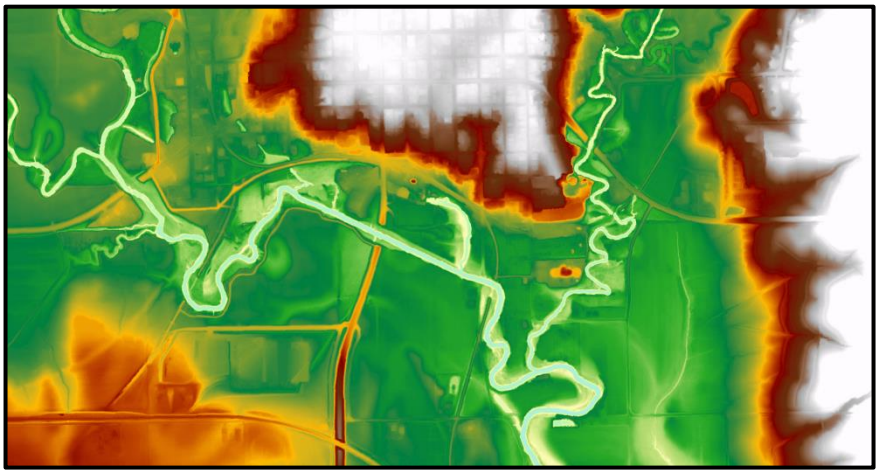

Figure 1: 2m x 2m resolution bare earth DEM in Seward, Nebraska.

This three dimensional data is used in a variety of ways, including creating digital elevation models (DEMs). NeDNR uses LiDAR and DEMs for many applications. For example, LiDAR information is used to locate and measure dam characteristics, as well as provide elevation information for inundation mapping and hazard classification in the Dam Safety division.

A Bare Earth DEM is a LiDAR classification with vegetation, buildings, and other man-made structures removed. FEMA requires all elevation data to be processed to the bare earth terrain before it can be used for floodplain mapping. In the Floodplain Management Section at NeDNR, Bare Earth DEMs are used to delineate stream channels, conduct hydrologic and hydraulic

analyses, perform floodplain mapping, create water surface elevation and flood depth rasters, determine base flood elevations, and produce flood risk products.

The U.S. Geological Survey National Geospatial Program (USGS-NGP) established the 3D Elevation Program (3DEP) in 2013 with the primary goal of systematically collecting enhanced elevation data in the form of high-quality LiDAR data over the conterminous United States, Hawaii, and the U.S. territories. To do this, the 3DEP gathered input from a broad coalition of Federal, state, and industry LiDAR interests to develop Base LiDAR Specification Version 1.2, which categorize LiDAR Datasets by Quality Level (QL).

Generally, LiDAR collected in Nebraska prior to 2017 meets QL3 standards, providing a DEM with 2 meter by 2 meter cell spacing and vertical accuracy of at least 24.5 cm, or approximately 9.7 inches. Recently, FEMA Standard 40 was introduced which requires new elevation data funded by FEMA to be compliant with USGS-NGP Base LiDAR Specification Version 1.2 and established the minimum acceptable Quality Level as QL2. To comply with this standard, LiDAR datasets collected in Nebraska in 2017 or later will meet QL2 standards, providing a DEM with 1 meter by 1 meter cell spacing with vertical accuracy of at least 19.6 cm, or 7.7 inches.

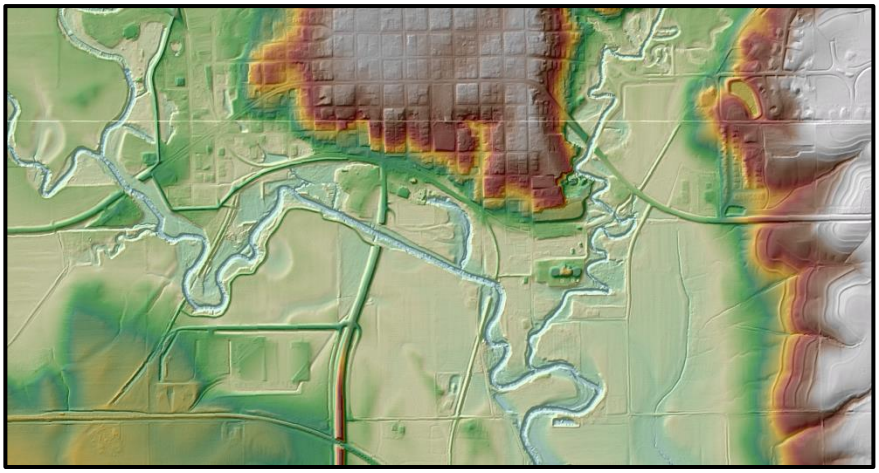

Figure 2: Bare earth DEM with hillshade in Seward, Nebraska.

Currently, NeDNR is using a mosaic of several different LiDAR datasets ranging from 2009 to 2018. In early 2017, NeDNR received the South Platte NE QL2 LiDAR, covering Banner, Kimball, Cheyenne, Deuel, and parts of Sioux, Keith, and Lincoln counties.

The final two pieces of the LiDAR puzzle for Nebraska are undergoing the final quality control measures before being finalized. The White River and Hat Creek LiDAR dataset, covering the north and northwestern areas of the state, is scheduled to be delivered early in 2018. The Sandhills LiDAR project covers a large area in the central portion of the state. Completion of this dataset in 2018 will allow for the creation of a QL3 statewide DEM, providing accurate topographic information for even the most remote regions in the state. A statewide elevation dataset will provide instantaneous access to accurate elevation data.

Due to the cost of LiDAR acquisition, the South Platte QL2 LiDAR dataset cost an estimated $1.3 million for a 4,500 square mile area ($289 per square mile), the completion of a statewide LiDAR dataset was contingent upon the involvement of many collaborating partners, including the Natural Resources Conservation Service, U.S. National Forest Service, the U.S. Geological Survey, the Nebraska Department of Natural Resources, Nebraska Department of Transportation, Nebraska Department of Environmental Quality, the Office of the Chief Information Officer, and many of the state's Natural Resources Districts.

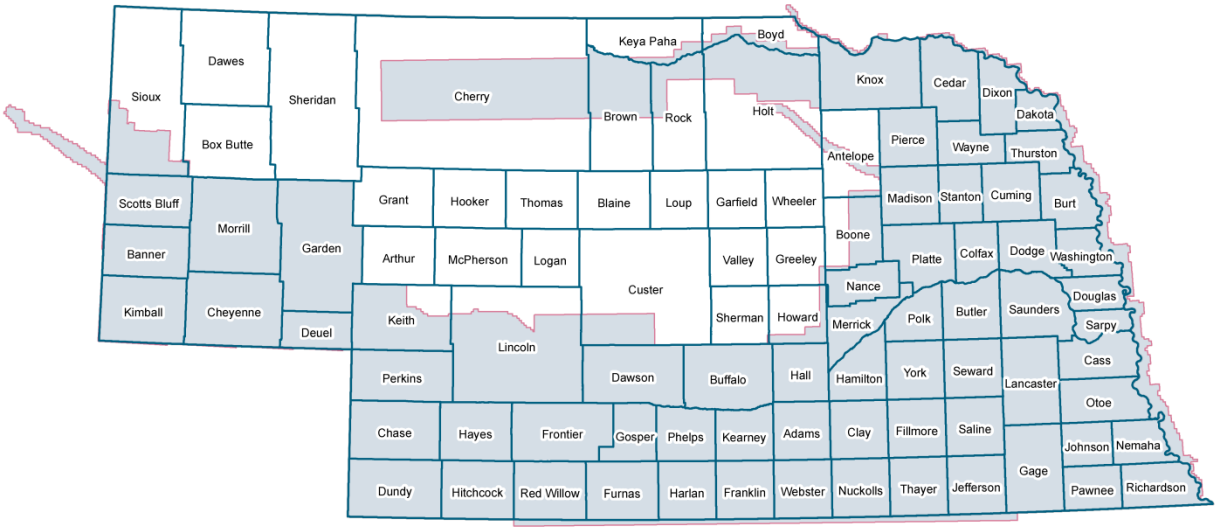

Figure 3: Current LiDAR coverage in Nebraska, as of March, 2018.

Plans for Nebraska's future elevation information do not stop here. The cooperating agencies will continue to replace QL3 LiDAR datasets with QL2 LiDAR datasets where funding is available. Because of the new Federal standards set forth by FEMA in agreement with USGS LiDAR Base Specification 1.2, a premium will be placed on transitioning regions to QL2 LiDAR data, so that new mapping projects will comply with the federal goal of using QL2 elevation data.

In Nebraska, some effective Flood Insurance Rate Maps (FIRMs) date back to the 1970s. FEMA and NeDNR have recognized the need for new floodplain mapping projects in these areas and continue to phase out Paper FIRMs in favor of Digital FIRMs. Several of these Paper Inventory Reduction (PIR) projects are leveraging new QL2 LiDAR information to be incorporated into the suite of products to meet new FEMA elevation standards. Cheyenne, Deuel, and Custer Counties are currently receiving FEMA funding due to the recent addition of QL2 LiDAR data. Other counties such as Antelope, Box Butte, and Sheridan are being analyzed for future funding with the addition of QL2 LiDAR data in their respective regions.

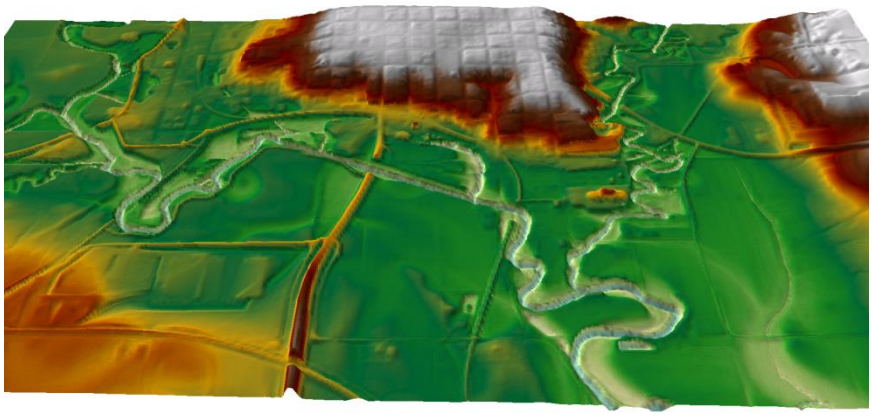

Figure 4: 3D scene of bare earth DEM with vertical exaggeration in Seward, Nebraska.

The ongoing development of a statewide LiDAR dataset will allow agencies, such as the Department of Natural Resources, to continue providing precise elevation data to the public in the future. As technology increases in the LiDAR industry, the State of Nebraska and its cooperating partners will continue to move forward with providing LiDAR data with increasing levels of accuracy for use in developing effective elevation-driven products for the citizens of Nebraska.

NeFSMA Call for Abstracts

NeFSMA is seeking professional and student abstracts for oral presentations that are applicable to one of the three conference topic areas listed below. **Presentations in collaboration with local community official will be given priority in abstract selection.**

- **Floodplain: Risk Management, Mapping and Flood Risk Mitigation**: All aspects of floodplain management and mapping relevant to the local floodplain manager, planner, or engineer including, but not limited to: minimum floodplain compliance standards, higher standards such as no adverse impact, floodplain mapping and related activities such as LOMCs, flood insurance, hydrologic and hydraulic modeling, NFIP reform, activities or projects related to flood risk mitigation either pre- or post- flood event, or the NFIP's Community Rating System.

- **Stormwater: Quantity and Quality Management:** All aspects of stormwater management relevant to regulators, consultants, and developers. This includes discussion on policy, regulations, science, best practices and projects related to stormwater quantity, quality, and/or related infrastructure.

- **Local Success**: This year NeFSMA would like to highlight successes and lessons learned from local communities. What programs or projects have been implemented at the local level? Have partnerships among communities and other organizations been helpful to implement programs to address issues unique to your area? Higher consideration will be given to abstracts from community officials.

Abstracts must be submitted online by clicking here and filling out the form. Abstracts in other formats will not be considered. You will be asked to provide a short bio and contact information along with your abstract.

The majority of the presentations will be 30 minutes in length (25 minute presentation and 5 minutes for questions). However we may have the opportunity for some longer presentations. If you are interested in a 60 minute presentation (55 minute presentation, 5 minutes for questions) make sure to request that option on the form. Please note that all presentations may be posted to the NeFSMA website at www.nefsma.com following the conference.

Abstracts must be received by 5:00 P.M. Friday, April 13, 2018. Authors of abstracts accepted for presentation will be notified no later than April 26, 2018 and will receive further guidelines for preparation of presentations. The registration fees for presenters will be waived. No other expenses will be covered. If you have any questions please contact Committee Co-Chairs, Kellan Strauch at kstrauch@usgs.gov, Rocky Keehn at rocky.j.keehn@commonsensewre.com or NeFSMA Chair John Callen at jcallen@jeo.com.

Mark Your Calendar

If you have questions about any of these opportunities, please contact Chuck Chase at chuck.chase@nebraska.gov or 402.471.9422.

Basic Floodplain Management Workshop
April 26, 2018, Blair, Nebraska, 8:30 am – 12:00 pm.
The Nebraska Department of Natural Resources will be holding their Basic Floodplain Management Workshop from 8:30 am – 12:00 pm on April 26, 2018. It will be held at the Blair Public Library & Technology Center, 2233 Civic Drive. The Basic Floodplain Management course is designed to help local floodplain administrators who are new or need a refresher to sustain a basic understanding of their responsibilities as the floodplain administrator.

A free lunch is provided for attendees from 12:00-1:00. A speaker from the Nebraska Floodplain and Stormwater Association (NeFSMA) will discuss national and statewide organizations and the benefits they can provide the local jurisdictions.

Advanced Topics in Floodplain Management Workshop
April 26, 2018, Blair, Nebraska, 1:00 pm – 4:30 pm.
The Nebraska Department of Natural Resources will be holding their Advanced Topics in Floodplain Management Course from 1:00 pm - 4:30 pm. It will be held at the Blair Public Library & Technology Center, 2233 Civic Drive. The advanced workshop will cover violations and enforcement, one of NeDNR's most requested workshops.

To register for the Basic or Advanced course send your name, organization, phone, and e-mail address to: chuck.chase@nebraska.gov or call 402-471-9422.

Association of State Floodplain Managers' 42nd Annual Conference
June 17-21, 2018, Phoenix, Arizona

The ASFPM annual conference is recognized as the most important floodplain conference in the United States year after year. With more than 120 speakers and 1,200 participants, they are the national conferences all community, state and federal floodplain managers plan to attend. And because of that, many of the most important consulting firms and product vendors associated with floodplain management attend.

In recent years, the attendance has had about an equal number of private, local, state and federal participants from all over the U.S. and several foreign countries.

Nebraska Floodplain and Stormwater Managers Association 10th Annual Conference;
July 19, 2018, Kearney, Nebraska

NeFSMA will host their annual conference on Thursday, July 19, 2018 at the Younes Conference Center in Kearney, Nebraska. There will be an educational workshop and a tour prior to the conference on July 18, 2018. There will be opportunities for floodplain management training, CFM credits, and networking with other professionals in floodplain management. Please visit www.nefsma.com for more information.

WANT MORE INFORMATION?

Visit NeDNR's Floodplain Website at
https://dnr.nebraska.gov/floodplain

Or Contact

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Stefan Schaepe, EI, CFM	Engineer	402.471.0644
Deanna Ringenberg, EI	Engineer	402.471.2243
Ryan Johnson, CFM	Floodplain Mapping Specialist	402.471.1221
Ryan Kelly, CFM	Floodplain Mapping Specialist	402.471.8608
Jeehoon Kim	Floodplain Mapping Specialist	402.471.1223
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