
Floodplain Management *Today*



NEBRASKA DEPARTMENT OF NATURAL RESOURCES FLOODPLAIN SECTION

JUNE 2015

Southeast Nebraska Deluged by Rain and Flooding

By Mitch Paine, CFM

As the rainfall records come in, May 2015 stands as the wettest month in history for the United States. Many communities in Nebraska saw record levels of rain and accompanying flooding. Levees and other flood defenses were tested and hundreds, if not thousands, of basements and first floors were flooded throughout the southeastern part of the state. The flooding also gave floodplain administrators a challenge in responding to post-flood responsibilities.

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DeWitt was hit hardest by flooding from Turkey Creek, with nearly 4 feet of water throughout town and almost every house was affected. The streamgage nearby registered a historic crest of 30.27 feet, more than 4 feet above the previous record, and a peak flow of 28,300 cfs. Dozens of homeowners pumped water out of their basements the weekend after



Figure 1. DeWitt inundated on May 7th. Photo by Bryce Doeschot

the flooding and many basement foundation walls collapsed. Some homes moved on their foundations entirely, leaving a hefty bill for repairs. Damage to homes also meant that community officials in DeWitt had to review substantial damage, one of those not-often used parts of every community's ordinance. As building owners in the village came in seeking a permit for their rebuild, some inevitably will have to elevate their building above the base flood elevation. While a headache for those property owners, they will be safer from flooding in the future.

Other communities near DeWitt saw substantial impacts from flooding. A nursing home on the edge of the floodplain had to be evacuated at 3 am. Many industrial facilities were very close to major releases of hazardous materials. And flooding forced a number of wastewater treatment plants to bypass the treatment systems and let raw sewage flow into the streams. All of this shows the need for critical facilities planning. A levee stopgate wasn't put in place fast enough to protect a neighborhood along the Little Blue River, and that same levee was nearly overtopped. Many properties that are shown in an X zone protected by a levee saw floodwaters in and around their buildings. It was a lesson in the imperfect protection from flooding that levees provide; even though levees can have value in reducing flooding risk they do not eliminate the risk.

Lincoln also saw significant flooding effects. The early May storm system poured rain almost directly over the Salt Creek watershed and sent staggering amounts of water rushing through the city. 5 of the 9 streamgages in Lincoln, on Salt Creek or its tributaries, saw record high crests on May 7th. As the water came flowing in to Lincoln from the south, Wilderness Park provided the first flood reduction buffer. The park acted like a huge sponge, slowing the flow and letting the creek overflow its banks out into the riparian area. The levees that start at Calvert Street and run through town provided flood protection, but just barely. In some areas, the water was less than a foot from the top of the levee. South Bottoms neighborhood, which lies behind the

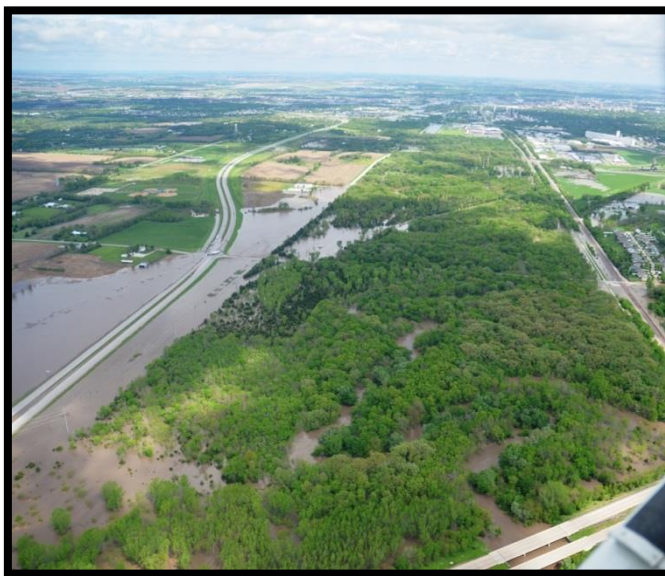


Figure 2. Wilderness Park providing flood storage.
Photo courtesy of LPSNRD

levees, also saw significant water in the streets and basements because drainage was blocked up by the high water in Salt Creek. For the first time in at least 50 years, the Lancaster Emergency Management called for voluntary evacuation of South Bottoms and North Bottoms neighborhoods for fear that the levees may be overtopped.

One community in the path of the flooding not as worried about flood damage was Beatrice.



Figure 3. Image from drone video shows large open space areas underwater. Video by Gage County Historical Society

In the last edition of *Floodplain Management Today*, we explored the benefits of open space and property acquisition and included examples from Beatrice. The city saw its 3rd highest crest on the Big Blue River in May, but had virtually no flood damage. The parks in the floodplain had to be cleared of debris and a few roads needed repairs, but no neighborhoods were underwater. It was a firsthand demonstration of the power of preserving floodplain as open space.

Lincoln Achieves Class 5 CRS Rating

On May 1st, the city of Lincoln officially became a Class 5 CRS community; the highest rated in the state! Flood insurance policyholders in the city now save nearly \$500,000 in premiums every year due to the 25% discount. The city's rating recognizes the outstanding floodplain management program in place. From conducting outreach projects to adopting higher regulatory standards, Lincoln is well deserving of its rating.

The city's extensive use of GIS systems earns credits in multiple areas. Simply having a detailed set of flood data garners points in Activity 440 (Flood Data Maintenance). City staff also manage the city's extensive drainage system using an integrated GIS-maintenance platform, which gives them an important tool in keeping track of debris and other problems in the channels and streams. The GIS platform also allowed the city to submit an outstanding map documenting the drainage system for Activity 540 (Drainage System Maintenance).

Lincoln receives its largest number of points for having 61% of the Special Flood Hazard Area preserved as open space. Many areas like Wilderness Park, Oak Lake Park, and the various wetland preserves north of the city provide natural floodplain functions including flood storage. Lincoln also has a setback rule that requires new buildings to be at least a specified distance away from the stream, which helps keep more floodplain out of development.

The city receives points for its good work in communicating about flood risk to citizens and businesses. Lincoln hosts a robust website about flooding and floodplain management. City staff respond to inquiries from homeowners looking to reduce their risk.

Lincoln also stands as the only community in the country to receive credits for its levees. Keeping people that live behind levees informed and safe are key pieces to getting this credit. The partnership between the city and the Lower Platte South Natural Resources District accomplishes this by conducting regular levee maintenance, developing multiple inundation maps, hosting an annual exercise, and engaging the public in the risk of living near levees.

Being a Class 5 community puts Lincoln in the top 10% of communities in the country. It has participated in CRS since the beginning of the program and deserves this new recognition. While Lincoln may have a larger staff than most communities in the state, their floodplain management program provides many lessons for other communities that want to improve their CRS score and become more flood resilient.

New NDNR Staff

Over the past year, NDNR has seen quite a few staff changes. We congratulated Bill Jones on a successful career last September. This June, we also wished Andrew Christenson and Rebecca Groshens well as they pursue new opportunities; Andrew is joining the Nebraska State Patrol as their GIS Program Coordinator and Becky is joining the Scott County, Minnesota government.

Four new faces have joined us over the past few months and they look forward to helping all of our Nebraska communities with their floodplain management programs.

Chuck Chase



Chuck is our new NFIP Specialist and Outreach Coordinator and will be working with communities on their local ordinances and participating in CAVs and CACs. He'll also be conducting training across the state for floodplain administrators and other community officials. Chuck came from the Nebraska Emergency Management Agency where he was an Exercise Training Officer for over three years. He was the NIMS Liaison to FEMA and Liaison to NDA. Chuck has facilitated multiple exercises including the 'Governors' Exercise for Governor Ricketts. Chuck's strengths are in the interaction with local and state partners. His master's degree in Quality Systems Management gives him a customer focus with those with whom he interacts. Chuck loves camping, eclectic music, stupid jokes, his six kids, two grandkids, and his wife of 30+ years. He is an Admiral in the Nebraska Navy and a retired Chief Boatswain's Mate in the US Coast Guard. This world is not his home, but he does live in Malcolm, NE. The high point of his career, thus far: being invited to pet penguins after facilitating the Avian Influenza exercise at the Henry Doorly Zoo. He is hoping to top that here at NDNR.

Amanda Hlavac

Amanda Hlavac graduated from the University of Nebraska-Lincoln in May of 2013. Her degree is in Environmental Engineering with an emphasis in Water Resources. She started working in the Department with the NDNR field office inspecting low hazard potential dams. In November of 2013, Amanda started assisting the Dam Safety Section inspecting high hazard potential dams and conducting hazard classification studies, and eventually moved into the Floodplain section of the Department in August of last year. She is an engineer and is currently working on modeling for floodplain studies in Hastings and Juniata while also determining base flood elevations as requested.



Stefan Schaepe



Stefan Schaepe joined the NDNR in September of 2014 as a temporary employee with Integrated Water Management. Late this January Stefan joined the Floodplain Management team as an Engineer. Stefan completed his Bachelor of Science in Civil Engineering in May of 2013 at the University of Nebraska – Lincoln, and more recently completed his Master of Science in Civil Engineering with an emphasis in water resources in May of 2015 at UNL. Stefan primarily works to conduct hydrologic and hydraulic models for the department, as well as Base Flood Elevation (BFE) determinations as requested by Federal, State and Local authorities.

Josh Philson

Josh joined DNR four years ago with the Dam Safety section - working on dam and construction inspections, maintaining dam database information, conducting reconnaissance for unregistered jurisdictional dams, and emergency action plan maintenance. As an engineering associate, he has experience in hydrologic and hydraulic analyses, primarily for creating inundation and other guidance maps. Over time the idea, purpose, and work involved in floodplain management became more intriguing. He joined the Floodplain section in February of this year. He will help with mapping and the basic flood studies as well as submissions to FEMA and technical support for staff in the section. Josh has a Bachelor of Science in Physics from UNL and hopes to enroll in a masters degree focused on hydraulics or natural resources.



Western Nebraska Sees Flooding and Mitigates with Groundwater Recharge

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

Heavy May rainfall and snow (5 to 10 inches) in eastern Colorado have increased South Platte River flows and caused flooding across Colorado and Nebraska this spring. The river was estimated to peak at about 16,500 cfs at the Nebraska-Colorado stateline, which produced minor to moderate flooding along the river. With high flows from the South Platte River, the Platte River reached flooding stage between Brady and Grand Island.

Unusual spring snow and rain (5 to 10 inches) throughout much of eastern Wyoming and Western Nebraska pushed Grayrocks Reservoir and Glendo reservoir levels into their flood pools, which has required increased releases of water. Both of these reservoirs are in the North Platte River basin. With the reservoirs' releases and high rainfall, the North Platte River rose to flood stage from the Wyoming-Nebraska state line all the way to Lewellen. The crest of the river was estimated to be around 6,000 cfs near the state border which produced minor to moderate flooding along the river.

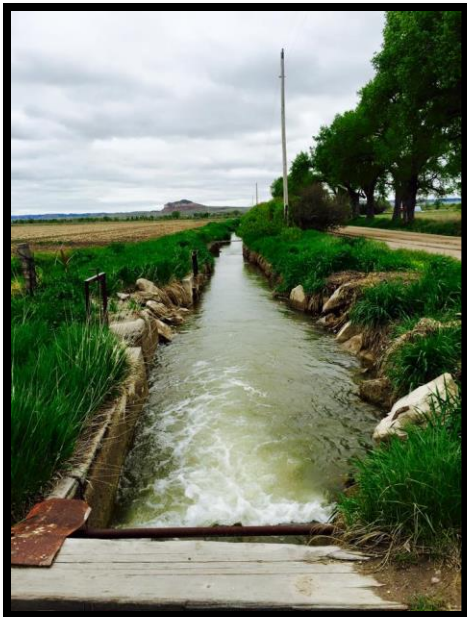


Figure 4. Ninemile Canal taking in floodwaters from the North Platte River. Photo by NDNR

In anticipating floodwaters coming from Colorado, Nebraska DNR worked with various irrigation and natural resources districts to divert floodwater into their canals for groundwater recharge. NDNR also coordinated with Central Nebraska Public Power and Irrigation District for storing water in Lake McConaughy and minimizing releases from the lake to reduce downstream flooding. Many partners including the U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, and Basin Electric Power help coordinate their reservoirs' releases for reducing downstream flooding. All of these efforts accomplish multiple goals: flood damage reduction, groundwater recharge, recreation enhancement, and more water for irrigation.

Comprehensive Plans and Flooding

By Mitch Paine, CFM

Over the past year, the Nebraska Department of Natural Resources reviewed over 50 comprehensive development plans from various communities throughout the state. Our goal was to examine the plans to see how well flood risk is addressed for the long-range plan for growth and development in communities. The basic floodplain management regulations often address development after the decision to build in a floodplain has already been made. These regulations only specify how that particular building may be built, but not whether or not the building *should* be built in that location in the first place. Comprehensive plans can be tools to examine development trends and steer development out of risky areas.

NDNR analyzed plans and created a resource guide for communities and planning consultants to use as they work on new and updated comprehensive plans. The research found that 3 out of 4 plans included flood hazard maps, but only 1 out of 4 imposed that flood hazard map on the future land use map. Only 20% of plans included a calculation of the area of the community in the floodplain and no plan had any analysis of population exposed to flood hazards. Only 1 plan discussed critical facilities at risk from flooding.

The research also found that nearly 50% of plans contain a goal or policy to preserve floodplains in new growth areas for open space or recreation. But very few plans had any goals to reduce flood risk in existing community areas. And very few plans had any proposed actions or policies to use land use tools to maintain open space in flood risk areas. Around 15% suggested using cluster development incentives to preserve floodplains in new subdivisions. And about 15% called for acquisition programs to remove floodprone structures.

Each plan was scored on how well it addressed flood risk and then compared with a number of community statistics. The quality of plans with respect to flood risk is somewhat correlated with population of the community as well as the amount of flood insurance in force. It appears that the larger the community, the better plans address flooding, in general. And the more insurance in force, the better plans address flooding. Interestingly, there seems to be no correlation between how much of a community is located in the floodplain and how well the plans address flood risk.

Our conclusion after this project is that comprehensive plans have a long way to go in helping communities address the long-term flood risks. Streams are probably the only permanent features of communities and comprehensive plans offer the best opportunity to discuss their impact. Adding better data, developing better goals, and suggesting more informed policy actions will help make communities across Nebraska more resilient and better prepared to deal with the inevitable future floods.

More information at: <http://dnr.nebraska.gov/fpm/planning-and-flood-risk>

Mark Your Calendar

If you have questions about any of these opportunities, please contact John Callen or Chuck Chase.

The Nebraska Floodplain and Stormwater Managers Association (NeFSMA) 7th Annual Conference will be held on July 30th, 2015 in Nebraska City. Be sure to book your hotel rooms by July 7th to get the group block rate.

Click here for more information or to register: <http://www.nefsma.com/event-1945857>

The day before, Nebraska Silver Jackets, the partnership among federal and state agencies on flood risk, will host a workshop entitled "Climate Change and Tools for Resilience in Flood Risk Management." The workshop will provide information on general topics of climate change, on how processes and regulations incorporate climate change, and a variety of technical tools from USACE, EPA, and the National Weather Service.

Click here for more information or to register: <http://www.nefsma.com/event-1948987>

FEMA Emergency Management Institute Courses

Multiple Emergency Management Institute courses will be offered at the Emmitsburg, MD campus (free course and transportation for community officials):

- July 27-30: E278 NFIP/Community Rating System
- August 3-6: E282 Advanced Floodplain Management Concepts II
- August 24-27: E284 Advanced Floodplain Management Concepts III
- August 24-27: E190 ArcGIS for Emergency Managers

Visit <http://training.fema.gov/EMICourses/> for more information.

Community Rating System Webinar Series

This series of trainings is targeted to new communities that are not yet participating in CRS, as well as to local government staff with some CRS experience. This series includes basic introductory sessions and more advanced topics. To register go to <http://atkinglobalna.webex.com/tc> and click the "upcoming" tab. Upcoming online trainings include:

- **Introduction to CRS** on July 21 and September 15
- **Preparing an Impact Adjustment Map** on July 22
- **Preparing for an Annual Recertification** on August 18 & 19 and September 16

Other

NFIPiService has trainings on flood insurance, primarily aimed at insurance agents. These webinars may be of value to community floodplain administrators as well. Find out more here: <http://www.nfipiservice.com/Training/index.html>



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WANT MORE INFORMATION?



Visit DNR's Floodplain Website at
<http://dnr.nebraska.gov/fpm>

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