
Floodplain Management *Today*



NEBRASKA DEPARTMENT OF NATURAL RESOURCES FLOODPLAIN SECTION

SEPTEMBER 2015

Cass County Flood Risk Project

By Mitch Paine, CFM

In early 2013, NDNR and the US Army Corps of Engineers (USACE) approached the Village of Cedar Creek and the City of Louisville about digging deeper into flood risk information for properties in their communities. Both towns in Cass County were extremely interested and so set off the 2 year Cass County Mitigation project that yielded tremendous results for all partners.

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Cedar Creek and Louisville wanted to build upon previous flood mitigation conducted in 2006. Those plans included individual structure elevations, but were based on LiDAR estimates, not field surveys. While the prior plans offered a lot of data and mitigation alternatives, the communities wanted enhanced surveys and property-level analysis along with more public participation, and NDNR and USACE were interested in this effort too. The Cass County project was part of an ongoing effort, called the Nebraska Silver Jackets



Figure 1. Mitch Paine from NDNR presents to a full room of attendees.

partnership, by state and federal agencies to collaborate on flood-related projects.

The goal of the project was to encourage mitigation actions with the best and most up-to-date flood risk information.

The largest effort in the project was the data collection phase. Surveyors from NDNR worked in Cedar Creek and surveyors from USACE worked in Louisville. At each structure, the surveyors shot the elevation of the observed first floor. Because they did not have access to go inside homes, they did not measure the elevation of the basement floor. Over 500 structures were examined throughout both communities.

After collecting elevation information for the structures in the communities, the data was compared to Cass County Assessor data and other building characteristics. Then, all of the building data was put into the context of flood risk and buildings were compared against multiple floodplains (10-year, 25-year, 100-year, etc.). Flood elevations were calculated for each building, and based upon average damage costs, an expected annual damage estimate was given. Expected annual damage gives us a way to think about how often a building may get flooded and the average extent and cost of the damage while forcing us to think of those total costs split up year by year.

Using the data collected for each structure, USACE was able to figure out which properties



Figure 2. Homes like this one in Cedar Creek have their first floor 4 or 5 feet below the base flood elevation. Elevating this home would reduce flood risk, reduce flood insurance, and make the family safer.

were most at risk and determine appropriate mitigation alternatives for each structure. Both communities stressed doing outreach and meeting with property owners as part of the project, so the agencies sought to make the data useful to homeowners and business owners. Maps were created, flood information by address was assembled, and flood insurance scenarios were developed, all to help the average homeowner understand how they could reduce risk for their property.

The public was invited to attend an open house in Louisville on February 24th, 2015 to learn more about the data collected and mitigation actions they can take. Over 75 community members attended, many of whom were from Cedar Creek and were concerned with flood insurance rates. Randy Behm and Tony Krause from USACE, Shandi Teltschik from FEMA, and Mitch Paine from NDNR presented at the open house. The presentations consisted of an overview of home mitigation and floodproofing techniques, an overview of flood insurance changes, specific mitigation scenarios and benefits, and how homeowners can start their own risk reduction projects.

The message that NDNR, USACE, and FEMA were trying to get across is that while home elevation projects, for example, are expensive, they can drastically reduce the amount a homeowner pays in flood insurance and actually improve the value of their building. Elevation also provides an effective way to reduce a family's risk from flooding.

After the presentations, various staff from USACE, NDNR, and FEMA sat with residents to help them understand their own property conditions. The one-on-one conversations helped bring the complex world of floodplain management and flood insurance down to an understandable level. Most of the audience members stayed to discuss their own property with the agency representatives. They left with a much better understanding of their property risk and their options to reduce it. The feedback showed that residents found the project incredibly helpful and useful.



Figure 3. John Callen from NDNR helps a homeowner understand the flood risk information at his house.

While the open house was a very successful event, Dee Arias and Chuck Paukert, CFM, the floodplain administrators for Louisville and Cedar Creek, respectively, have taken all of the information about properties and used it to enhance their own outreach to citizens. When people call their offices to inquire about properties, they now have a wealth of information to give to their callers. With all of the additional flood risk data, better decisions can be made about improving buildings, home sales, buying flood insurance, building on adjacent lots, and doing mitigation projects to reduce flood risk.

In the coming years, hopefully this work will inspire flood mitigation projects like community-led buyouts and individual home elevations. Already, some homeowners have expressed a serious interest in elevating their home. NDNR and USACE hope to find financial resources to help both Cedar Creek and Louisville continue to reduce their flood risk and make their communities even better places to live.

If your community is interested in doing a similar project, contact Mitch Paine or John Callen.

For more information about the Nebraska Silver Jackets program, visit the website: <http://floods.dnr.nebraska.gov/>

NDNR Receives Funds for Additional Flood Study Projects

By Katie Ringland, PE, CFM

The Floodplain Section at the NDNR has received additional funds from FEMA to deploy two Risk MAP (Mapping, Assessment and Planning) Projects in the West Fork Big Blue and Upper Big Blue Watersheds. The Risk MAP project goal is to deliver quality data that increases public awareness and leads to action that reduces risk to life and property. The funded Risk MAP project will include conducting workshops for the communities throughout the watersheds to enhance awareness of flood risk and how communities, homeowners, and building owners can reduce their own flood risk.

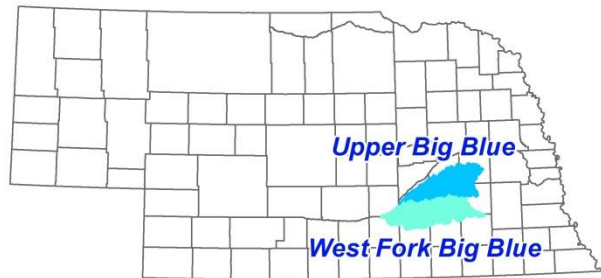


Figure 4. Watershed overview

The project will also complete a new basic study for streams that drain one square mile or more in Hamilton, York, and Seward Counties and provide new enhanced flood studies for streams in the cities of Aurora and York. Enhanced studies for the cities of Seward and Milford are planned for future federal funding years.

Basic studies produce FEMA’s Special Flood Hazard Area, Zone A. Basic study analysis uses simple hydrology and hydraulics methods that generally use bare earth topography without the consideration of structures (bridge, culverts, dams, etc.). Regression equations will be used to complete the hydrologic analysis, while the normal depth equation will be used for the hydraulic analysis. This is the most common analysis and zone throughout Nebraska. It was developed as a cost effective way to provide flood risk information for low population areas.

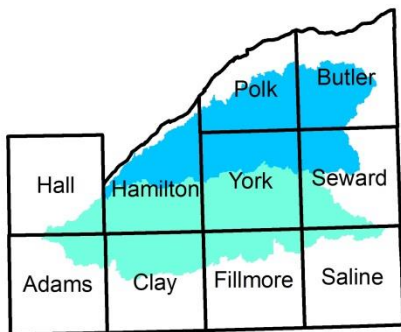


Figure 5. Basic study locations

1%, and 0.2% annual chance storms.

Enhanced studies produce FEMA’s Special Flood Hazard Area: Zone AE (with base flood elevations determined) with floodway. Enhanced studies include detailed hydrology and hydraulics. For this project the hydrologic analysis will be determined using HEC-HMS 4.0, and hydraulic analysis will be modeled using HEC-RAS 4.1. The studies will utilize survey data currently being collected, and the 2009 Light Detection and Ranging (LiDAR) elevation data. Enhanced studies will be completed for some of the streams in the cities of Aurora and York. These studies will include models for the 10%, 4%, 2%,

It is important to note that FEMA has only provided funding through the tasks listed above. NDNR hopes to receive funding to create preliminary maps during the next federal funding cycle (starts in October 2016).

Flood Openings: Resources for Floodplain Managers

By John Callen, PE, CFM

Under the ordinance provisions governing floodplain management in communities that participate in the NFIP, certain types of construction are required to have flood openings (sometimes called flood vents) in order to comply with regulatory requirements. For local floodplain managers, there are several key considerations to keep in mind when processing floodplain permit and certification requirements for buildings with openings.

Requirements and Purpose

Flood openings are used as a technique to reduce potential damage to buildings elevated on crawlspaces and are intended to allow the automatic entry and exit of floodwaters into the crawlspace. This approach provides relief from pressure exerted by floodwater on building foundations with openings, which minimizes and sometimes prevents significant damage to the structure's foundation.



Figure 6. Flood vents on a rebuilt home in Pilger

Ordinances specify several criteria for the design and permitting of structures built with flood openings. First, fully enclosed areas below the lowest floor of a building in an area other than a basement may have openings, but only if they are used solely for the parking of vehicles, building access, or storage. This means that the fully enclosed area below lowest floor can't be subgrade on all four sides (which is a basement). The system of flood openings must be designed to allow the automatic entry and exit of floodwaters and should either be designed for the specific structure and certified by a registered professional engineer or architect or meet or exceed the minimum criteria for non-engineered openings. For non-engineered openings, there must be a minimum of two openings having a total *net* area of not less than one square inch for every square foot of enclosed area, and the bottom of the opening shouldn't be higher than one foot above grade. Covers or screens for the openings are allowed, but must be taken into account when determining the *net* area of the opening and whether or not floodwaters will automatically enter and exit. It is highly encouraged to have enough openings to allow floodwaters to enter and exit sufficiently around the entire perimeter of the building; for some buildings two openings may meet the minimum standards but not perform as well as desired in the event of a flood.

Certain special situations exist related to the installation of openings including appurtenant structures and below grade crawlspaces under FEMA Technical Bulletin 11. Both of these situations typically require changes to local ordinances before they can be implemented; if you believe these may apply to your community and aren't sure if your local ordinance allows their use please contact NDNR before allowing any structures that fall into these categories to be constructed.

Certification and Compliance

In order for a building with openings to be compliant with local ordinances, the elevations of the crawlspace enclosure and next higher floor must be certified by a licensed surveyor or

engineer using the elevation certificate and Diagrams 7 or 8. The square footage of the crawl space, number of openings no more than a foot above grade, and net area of the openings is provided in section A of the elevation certificate. The openings must be checked to ensure they will allow the automatic entry and exit of floodwaters and also to ensure they have enough net opening area to meet the requirements. Since determining net opening area is challenging with certain types of vents, a company has developed a guide for floodplain managers called the 'Non-Engineered Opening Guide' that provides the net opening area of many common opening types. It can be found by going to www.floodvent.com and clicking on 'Resources'. There are a number of other guidance documents and resources on this website related to openings.* It is also possible to use engineered flood vents that have a certified net opening area per vent; in these cases direct measurement is not required but documentation of the number of vents and the certified opening area should be provided.

It should also be noted that in order to maintain compliance, the openings must stay in place and continue to allow the automatic entry and exit of floodwaters. It is not uncommon for property owners to either knowingly or inadvertently close off one or more openings over time. Floodplain managers can consider executing a non-engineered opening agreement with property owners in order to obtain acknowledgement that the openings should not be closed off. A sample agreement can be found in the 'Non-Engineered Opening Guide.'

Flood Insurance

When flood insurance is rated for buildings elevated above grade crawlspaces with openings installed, it is rated on the next higher floor as shown in Diagrams 7 and 8 of the elevation certificate. If the openings aren't installed properly, then the insurance rating level moves back to the lowest floor which is the bottom of the crawlspace. This may result in significantly higher flood insurance premiums for the structure until the deficiency in the openings is corrected.

It should also be noted that a building built with openings that has a crawlspace level below BFE will not be eligible for a LOMR-F because the base flood elevation (BFE) still 'touches' the building envelope, even if the next higher floor is one foot above BFE. If that is the desired outcome, the property owner will need to elevate on fill for compliance purposes rather than the crawlspace.

Real World Implementation and Performance

In real world performance, most louvered or screened openings may get clogged with debris fairly quickly depending on the duration of flooding and source of the floodwater. This will likely inhibit performance of the openings. Therefore it is highly encouraged to use openings that will remain open adequately during a flood event.

Resources

NDNR Desk Reference - <http://dnr.nebraska.gov/fpm/digital-desk-reference> – FEMA Technical Bulletins 1 and 7 located under Tab 10

www.floodvent.com* - 'Non-Engineered Opening Guide' and other resources

*Note: the website www.floodvent.com and the 'Non-Engineered Opening Guide' were developed by a private company. While this information is deemed to be reliable it has not been reviewed vs. FEMA guidance by NDNR. NDNR does not promote any specific product or company.

Mark Your Calendar

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

The NeFSMA Fall Meeting will be held on **November 19th** at the SAC Museum in Ashland from 9:00 – 3:00. Meeting is free for NeFSMA members and CECs will be available for CFMs and P.E.'s. Register here: <http://nefsma.com/event-2054449>

NDNR will be hosting a Floodplain Management Workshop on **October 29th** from **1:00pm to 5:00pm** at the Mid-Plains Community College (North Campus, 1101 Halligan Drive) in North Platte. The workshop will discuss basic floodplain management topics, accessory structures, substantial damage/improvement, extra-territorial jurisdictions, and various tools and resources for local floodplain managers.

To register, contact Chuck Chase at chuck.chase@nebraska.gov or (402) 471-9422.

Region VII Training

- **Substantial Damage Estimator 2.1** will be presented by Todd Tucker of Region VII on October 14 at 10 a.m. CT. This training covers FEMA's excellent software tool - SDE 2.1 - to assist State and local officials in determining substantial damage for residential and non-residential structures. SDE 2.0 helps communities provide timely substantial damage determinations so that reconstruction can begin following a disaster. To register, go to: <https://atkinglobalna.webex.com/atkinglobalna/k2/j.php?MTID=t26bdc18ac5b94c3f7330623b4ae5bdf7>

Hazards Planning & Resilience: The Elected Officials Perspective, a webinar offered on October 19th from 12:00 – 1:00pm. This webinar will help floodplain managers understand the elected official perspective on floodplain management and flood mitigation. Register for free here: <https://www.planning.org/nationalcenters/hazards/planninginformationexchange/>

Safe Room Workshop: FEMA Region VII will be hosting a free 1-day workshop on the Design and Construction Guidance for Safe Rooms. It will be held on October 27th at the Embassy Suites in Kansas City, MO. Contact info@nssa.cc for registration forms.

CRS Training Webinars

A schedule and registration information for the remainder of calendar year 2015 is posted under the Training & Videos tab at www.crsresources.org and select Training & Videos. The following one hour topical webinars are on the calendar. All webinars begin at 1:00 p.m. EST.

- Introduction to the CRS –October 20, & December 15
- Drainage System Maintenance (Activity 540) – October 21
- Preparing for a Verification Visit - November 17 & January 16
- Outreach Projects (Activity 330) - December 16
- Floodplain Management Planning (Activity 510) - November 18 & January 20



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WANT MORE INFORMATION?



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

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This newsletter is produced by the NDNR Floodplain Section and is partially supported by funding under a Cooperative Agreement with the Federal Emergency Management Agency. The contents do not necessarily reflect the view and policies of the federal government.