

Recording the Flood: 2019 High Water Mark Collection

By Jamie Reinke, PE, CFM

High water marks are an essential tool in the floodplain management community. This data is an important for historical record that can be used to create post-event inundation maps, for hydraulic model calibration, and as community planning and education tools, allowing them to rebuild in a resilient manner. Collecting high water marks for an event of the magnitude that occurred in March 2019 required a collaborative effort between many state and federal agencies.

In the midst of record flooding in March, NeDNR quickly prioritized sites where high water marks would be valuable. We initially focused on communities reporting significant flooding, locations where NeDNR has active and planned floodplain mapping projects, gage locations, and areas of complex hydrologic and hydraulic scenarios where high water marks would be valuable long term.

By March 15th NeDNR survey staff members began visiting sites to mark the high water and by March 25th the U.S. Army Corps of Engineers (USACE) began coordinating data collection through Silver Jackets, in hopes of getting more teams involved in collection efforts. On March 27th, NeDNR, the USACE, and the U.S. Geological Survey (USGS) met to discuss a collaborative effort for a large-scale high water mark collection campaign. After this meeting, NeDNR and the USACE reached out to the Nebraska Department of Transportation (NDOT), local Natural Resources Districts (NRDs), and the Natural Resources Conservation Service (NRCS) to see if any of these agencies had staff available to contribute to the effort.



Discoloration on the siding and windows of this home in Waterloo provides an easily-recordable high water mark. | Photo by NeDNR Staff

As high water marking continued, NeDNR, USACE, and the Federal Emergency Management Agency (FEMA) met on April 10th to discuss potential funding sources, as none of the agencies involved had funding specifically for high water mark collection. FEMA indicated that a mission assignment to collect this data may be the best source of funding. NeDNR coordinated with FEMA to pursue the mission assignment and on May 2nd the mission assignment was assigned to the USGS for completion. On May 8th NeDNR, USACE, FEMA, and USGS met to discuss the requirements and schedule of the mission assignment and USGS deployed teams to begin collecting this data on May 13th.

As is detailed in the timeline above, funding high water marks is a time consuming process. The quality of high water marks relies on people marking these sites before the evidence is destroyed by weather and time. Fortunately, for this event, teams

were able to visit a number of sites prior to USGS beginning their high water mark campaign in May, so a number of sites only required survey as part of the mission assignment. The USGS was tasked with completing high water marks in locations that had not been visited or needed a more robust set of high water marks. They were also responsible for surveying the marks that had been placed by other agencies and, finally, they were tasked with collecting river cross section surveys at selected locations along the Elkhorn River and lower Platte River. The USGS teams were in the field from May 13th through early August.

In total, NeDNR, the USACE, the USGS, the NRCS, the Lower Loup NRD, and several local communities collaborated to collect over 700 high water marks in 97 communities or target locations as part of the mission assignment. The high water mark information is available to view or download

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Why Your Community Should Participate in a Local Hazard Mitigation Plan, and Join the National Flood Insurance Program

By Ryan Kelly, CFM

It's no secret that Nebraska is susceptible to extreme weather events and natural disasters throughout the state. According to the Federal Emergency Management Agency's (FEMA's) federal disaster declarations database, Nebraska has had 65 federally declared disasters since 1953. These declarations include natural disasters including severe storms, floods, fires, tornados, severe ice storms, drought, and heavy snow. Every county in Nebraska has at least two declared disasters from 1953 to the present, and at least one federally declared disaster has occurred in each month of the year. A whopping 50 of these 65 federally declared disasters, or more than 75%, have involved severe storms or flooding events! Of course not every severe weather event results in a federal disaster declaration, but this information indicates that detrimental and impactful weather can strike in many forms and at virtually any time of the year throughout Nebraska!

Unfortunately, loss of life and damage to property is a real possibility during extreme weather and natural disasters. Hazard mitigation helps to reduce damages from natural disasters. Mitigating, or reducing the risk of loss of life and property through sustained active measures, works best using a multi-faceted and procedural approach. The approach includes recognizing risk and hazards, long-term planning strategies for currently developed land and areas of future development, identifying problem areas, finding solutions that will benefit those areas, and moving forward with an effective game plan. Two effective efforts exist to aid in any community's ability to protect the health and safety of its citizens. These efforts include participating in a **Hazard Mitigation Plan** (HMP) and participating in the **National Flood Insurance Program** (NFIP). These allow for effective planning to provide avenues of protection,

reduce economic hardships created by natural disasters, create resiliency, protect current investments, reduce harm in future development, and break the cyclical nature of communities experiencing damage, rebuilding, and having damage repeated.

Benefits of Having a Hazard Mitigation Plan

So where did the basis for communities to adopt HMPs come from and what are the benefits when a community has adopted an HMP?

The Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by the Disaster Mitigation Act of 2000, serves as the legal footing for State, Tribal, and local governments to undertake risk-based approaches to reducing natural hazard risks through mitigation planning. The Stafford Act requires local governmental entities and territorial governments to create and adopt FEMA-approved HMPs as a requirement for select types of non-emergency disaster assistance. This provides the most direct benefits and serves as one of the driving incentives for communities to participate in the planning effort and ultimately adopt an HMP, either at a local or multi-jurisdictional level. Without a current FEMA-approved HMP, communities are ineligible to pursue pre-disaster and post-disaster hazard mitigation grant funding opportunities for mitigation projects.

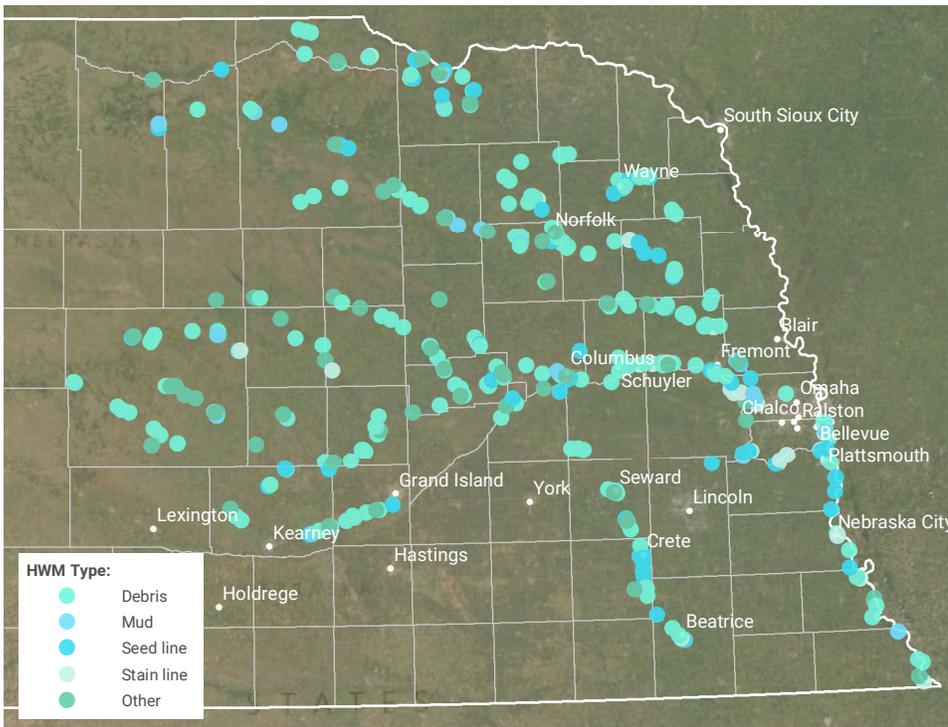
A complete listing of Hazard Mitigation Planning Laws, Regulations, & Policies can be found [here](#) and a comprehensive view of what grants require an HMP with additional links to grant information can be found [here](#). A general overview with links to additional information on HMPs can be found [here](#).

HMPs must be updated and submitted to FEMA for approval every 5 years in order to retain eligibility for access to the non-emergency funds. This allows for a reassessment of evaluation of risk and hazards and allows communities to make updates to the plan accordingly. A comprehensive guide authored by FEMA for communities or governments to complete or update an HMP, including important considerations to be included in the document can be found [here](#).

In addition to the financial incentives offered by adopting an HMP, other benefits which are also realized by communities include:

- Elevating awareness and understanding of unique community-based hazards and risks which threaten life or property.
- Assessing community capacity, or lack thereof, to address specific hazards or risks.
- Prioritizing mitigation opportunities and alternatives.
- Engaging with the public and stakeholders, including community leaders on known risks, thus spreading knowledge and building partnerships.
- Assessing current and future land use data.
- Aligning disaster and mitigation planning with other community objectives.
- Communicating risk with state and federal officials.
- Creating resiliency, which allows for increased speed in response and decreased recovery costs resulting from disasters.
- Identifying projects that can be funded by hazard mitigation grant programs and leveraging support from multi-objective projects.

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Locations of the 712 high water marks collected in the state of Nebraska as part of the March 2019 flood. | Map by NeDNR Staff

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through the **USGS Flood Event Viewer**. The information displayed for the “Central US Spring 2019” flood shows points in other states that can be filtered out if you’re interested in downloading only the data in Nebraska.

After completion of the mission assignment, the Silver Jackets team prepared training on high water mark collection. The goal of this training was to have staff trained in accurately completing high water marks so if these staff members are available after future flood events they can get on site immediately, without waiting for a mission assignment. The more teams available immediately after an event the more accurate and helpful the data will be. ■

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Challenges exist when trying to compose and utilize an HMP. These obstacles include meeting all requirements at a state and federal level, sustaining momentum throughout the life of the plan, technical expertise and data requirements, and obtaining community-wide buy in. To combat these hurdles, many communities adopt a multi-jurisdictional HMP, or contract out the work with partial FEMA funding. A list of current HMPs in Nebraska can be found by contacting the Nebraska Emergency Management Agency (NEMA). The State of Nebraska Hazard Mitigation Plan can also be obtained from NEMA. It is currently going through an update to include lessons learned from the March 2019 flood.

Benefits of NFIP Participation

The NFIP was established by the National Flood Insurance Act of 1968 (NFIA, 42 U.S.C. §4001 et seq.) The NFIP aims to reduce the impact of flooding on private and public structures. The NFIP provides affordable insurance to property owners, rent-

ers, and businesses in NFIP participating communities. By joining the NFIP communities agree to adopt and enforce floodplain management regulations. These regulations help mitigate the effects of flooding on new and substantially improved structures. Overall, the program reduces the socio-economic impact of flood disasters by promoting the purchase and retention of flood insurance and ensuring new buildings in the floodplain are built according to floodplain standards. An overview of the NFIP participation, facts, and resources can be found [here](#).

FEMA creates Flood Insurance Rate Maps (FIRMs) for implementing the NFIP. The FIRMs delineate the regulatory floodplain known as the 1% annual chance flood boundary or the Special Flood Hazard Area (SFHA). Communities use the SFHA to enforce their floodplain management ordinances and FEMA uses SFHAs to rate flood insurance policies. Enforcing Floodplain Management ordinances ensures that new and substantially improved structures in SFHAs are protected from future damages. Participation in the NFIP is voluntary and free. To join, the community must:

- Complete an application;
- Adopt a resolution of intent to participate and cooperate with FEMA;
- Appoint a local official as the Floodplain Administrator;
- Adopt and enforce a floodplain management ordinance that meets or exceeds the NFIP regulations and that meets or exceeds the State of Nebraska minimum standards.

Communities and its citizens that participate in the NFIP enjoy the following benefits:

- Access to NFIP flood insurance for all members of the community whether within the SFHA or not.
- Flood insurance claims are paid even if there is not a federal disaster declaration for your particular area.
- Access to federal grants and loans from federal agencies such as the Environmental Protection Agency (EPA), Housing and Urban Development (HUD), and the Small Business Administration (SBA) for properties located in identified SFHA.

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- Access to financial assistance from federal agencies such as the Federal Housing Authority (FHA), Veteran’s Assistance (VA), Farmer’s Home Administration, Small Business Administration (SBA), Fannie Mae and Freddie Mac for properties located in the SFHA.

A community and its citizens in non-participating communities that have had SFHAs identified are sanctioned from the list above, and the following:

- No federal disaster assistance may be provided to repair insurable buildings located in identified SFHAs for damage caused by a flood.

If you are interested in learning more about your local HMP effort or about participating in your area’s update, please contact the Nebraska Emergency Management Agency’s Hazard Mitigation Section at 402.471.7421. To learn about the benefits of NFIP, please contact the NeDNR’s Floodplain Management Section at 402.471.2363. ■

NeDNR Releases Story Map Covering the March 2019 Flood

NeDNR has developed a story map describing the conditions that led to the devastating March 2019 flood the various efforts involved in the flood response. The story map provides information related to the meteorological conditional leading up to the event, water levels that were recorded at stream gage sites, the high water mark collection after the flood, the impacts on the agricultural community and Nebraska as a whole. For those interested in viewing the story map please visit this [link](#). 

Mark Your Calendar:

02.05 ■ Disaster Recovery in Rural Communities

Location:
Mason City, IA, 8:00 am – 5:00 pm

The Iowa Homeland Security & Emergency Management Department will host a course teaching community leaders and emergency managers in rural communities how to plan for and execute disaster recovery efforts. The training will also assist rural communities with expediting disaster recovery efforts and facilitating the long-term economic success of the communities. To learn more, visit this [link](#). 

02.12 ■ Post-Flood Responsibilities

Location:
Herington, KS, 8:30 am – 12:30 pm

The Kansas Department of Agriculture-Division of Water Resources team will host a free class designed for community officials responsible for administering floodplain management regulations and focuses on what to do before, during and after a disaster event. Topics covered include substantial damage, permitting, increased cost of compliance, and violations. CFMs will early 3.5 CECs for their attendance. Please contact Steve Samuelson at steve.samuelson@ks.gov or 785.296.4622 with questions or to register for the training.

03.18 & 03.19 ■ Tools of Floodplain Management Workshop

Location:
March 18, 2020 (1:00 pm – 5:00 pm) & March 19, 2020 (8:00 am – 3:00 pm), Jefferson City, MO

The Missouri State Emergency Management Agency will host the 2020 Tools of Floodplain Management workshop. This workshop is a 2-day course designed for local floodplain administrators. It covers various important issues as well as day-to-day activities, incorporating updated NFIP information and forms. This course is designed to provide basic knowledge of the National Flood Insurance Program. SEMA recommends completing the Tools of Floodplain Management workshop prior to taking the CFM exam.

03.25 - 03.27 ■ MfSMA 2020 Annual Conference

Location:
Tan-Tara Conference Center, Osage Beach, MO

The Missouri Floodplain and Stormwater Managers Association, Inc. is hosting their annual conference from 1:00 pm on March 25, through 12:00 pm on March 27. There will be opportunities for floodplain management training, CFM credits, and networking with other professional in floodplain management. To register, visit this [link](#). 

February

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March

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Mark Your Calendar continued:**NE & IA Spring Flood Meetings** ■

Meetings will provide updates on the spring flood threat across eastern Nebraska and western Iowa. For questions concerning these meetings offered by the National Weather Service, please email David Pearson, Service Hydrologist, david.pearson@noaa.gov. Additional locations and dates may be added, but meetings are not planned in all areas.

02.04	7:00 pm; Fremont, NE
02.13	6:30 pm; Columbus, NE
02.27	6:30 pm; Norfolk, NE
03.05	6:30 pm; Fremont County, IA
03.11	7:00 pm; Bellevue, NE

Strategic Alliance for Risk Reduction (STARR) Webinars □

02.13	11:00 am - 1:30 pm 2 CECs for CFMs	This session will train participants on how to complete the FEMA Elevation Certificate (EC) and best practices for using the EC in the floodplain development review process.
02.27	11:00 am - 12:00 pm	This beginner training session is the first in a two-part series and will highlight eight basic steps to reviewing development inside the Special Flood Hazard Area (SFHA). It is intended for those new to the role of floodplain administrator.
02.27	12:40 pm - 2:00 pm	This is the second part of the two-part series, and will immediately follow the training on Floodplain Development Permit Review. It will highlight special considerations for plan reviewers and building inspectors when evaluating and inspecting development inside the SFHA.

Want More Information?

Visit Our Floodplain Website at: <https://dnr.nebraska.gov/floodplain>

Or, Contact:

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