

Partnering on Lower Missouri River Flood Risk Management Solutions

By Jennifer Salak,
Lower Missouri River PAS Study
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Record Runoff

March 2019, and the months that followed, proved to be a challenging time for communities along the lower Missouri River due to record flooding. Many factors contributed to the flooding: (1) a wet fall in 2018 that saturated soils and filled tributaries throughout the Missouri River Basin, (2) an extremely cold and wet winter, that resulted in deeply frozen ground, above-average snowfall and thick river ice, and the (3) the “Bomb Cyclone”, which dumped rain and snow on frozen ground in Nebraska, Iowa, and South Dakota, and included a rapid warm-up that caused snow to quickly melt over frozen, fully saturated soils.

The near-historic runoff that resulted from the conditions in 2019 entered the river both upstream and downstream of the Missouri Mainstem Reservoir System (System). The runoff in the upper basin (above Sioux City, Iowa) was 60.9 million acre-feet (MAF), just 0.1 MAF less than the 2011 record runoff of 61.0 MAF (1898-2019). The runoff in the lower basin (Sioux City, Iowa, to the mouth) was 91.6 MAF, more than two times average and exceeded only in



Levee breaches along the Missouri River, like the one pictured above at L-575 near Hamburg, IA, caused extensive damage to property and critical infrastructure such as Interstate-29. Photo taken March 2019, U.S. Army Corps of Engineers Omaha District.

1973 and 1993. Total runoff in the Missouri Basin was 152.5 MAF, more than two times the average and 0.1 MAF less than the highest runoff of record, which was observed in 1993.

Between March 13, and March 23, 2019, per preliminary analysis by the **National Weather Service**, over 50 gages on the Missouri River and its tributaries in the region set new stage records. Nearly all of these new records were on unregulated areas of the Missouri Basin -- tributaries and the Missouri River downstream of Gavins Point Dam. This severely limited the ability of the U.S. Army Corps of Engineers (Corps) to regulate the flows on the Missouri River downstream of Gavins Point. For example, the USGS estimated that the Platte River peak flow at Louisville, Nebraska, its most downstream gaging location, was a record 250,000 cubic feet per second (cfs). The average annual peak flow at this location is approximately 50,000 cfs. This unprecedented amount of runoff

resulted in the lower Missouri River being above flood stage at multiple locations for nearly nine months and caused billions of dollars of damage to homes, businesses, agricultural production, levees, and natural resources across five states, including Nebraska.

Solutions for Change

The historic nature of the 2019 flood, in addition to severe flooding that has occurred over the past decade, served as a catalyst for the governors of Nebraska, Iowa, Kansas and Missouri to come together to discuss solutions for improving the resiliency of the lower Missouri River Basin.

One of the solutions was to partner with the Corps on a Planning Assistance to States (PAS) Study. A PAS study is a technical assistance study cost-shared 50-50 between the Corps and a non-federal sponsor that includes developing a plan that can

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help states and local entities make informed floodplain management decisions.

In November 2019, the Nebraska Department of Natural Resources (NeDNR) and Iowa Department of Natural Resources signed a PAS agreement with the Corps' Omaha District to cost share a study that includes: (1) working with stakeholders to identify problem areas and flood impacts along the lower Missouri River, (2) using existing data and hydraulic models, along with stakeholder input, to define existing conditions and develop conceptual-level solutions for identified problem areas, and (3) developing a flood risk management plan.

The Missouri Department of Natural Resources and Kansas Water Office signed a similar agreement with the Corps' Kansas City District. Since the study kickoff in February, the four states and two Corps Districts have been working as one integrated team in developing a plan that will provide a system-wide view of the problems and potential solutions.

Study Steps

The first step in the Lower Missouri River PAS study is to identify problem areas along the lower Missouri River, below Gavins Point Dam. These may be areas where: (1) there are known pinch points (bottlenecks in the river that could cause water to back up and worsen flooding), (2) recurring flooding causes repeat damages to property, crops, businesses, etc., and (3) flooding severely impacts critical infrastructure such as roads, bridges, water and wastewater treatment plants.

Once problem areas have been identified by the state partners and stakeholders, a set of criteria will be developed to rank and prioritize them. That prioritized list, along with any other relevant background information such as the indirect impacts of

flooding (e.g., impeded access, loss of revenue, high groundwater or underseepage issues), and ideas for potential solutions will be provided to the Corps for further analysis.

Analysis will include using existing hydraulic modeling to investigate conceptual-level solutions proposed by the states and stakeholders. Solutions for a particular area might be structural (e.g., levee raise, levee setback, channel widening) or non-structural (e.g., elevating or relocating buildings) or could include off-channel detention or road grade raises. Advantages and challenges associated with each potential solution will also be considered.

All of the information gathered and analysis completed will be documented in a flood risk management plan which can be used at the state and local level to help inform flood risk management decisions moving forward.

Stakeholder Meetings

To kick off the first phase of the study, the NeDNR has hosted a series of virtual stakeholder meetings to introduce the PAS study in further

detail, discuss one example problem area that has been identified by the study team (Platte River confluence) and seek stakeholder input on additional problem areas that should be considered for further analysis in the PAS study.

After gathering stakeholder input for several weeks, NeDNR plans to schedule another series of meetings in August to gather and review the identified problem areas, the proposed solutions for each area, and the advantages and potential challenges associated with the solution. A qualitative solution matrix will be completed for each problem area. After the study team prioritizes the problem areas, stakeholders will be invited to review the final report of alternatives from all four states. A list of the highest priority system options will be advanced to a feasibility (general investigation) study for comprehensive analyses.

For more information about this PAS study and the upcoming stakeholder meetings, please contact Shuhai Zheng, NeDNR Engineering & Technical Services Division Head, at (402) 471-3936 Shuhai.Zheng@nebraska.gov. ■

NeDNR Receives Honorable Mention in the 4th Annual CTP Recognition Program

Every year, FEMA reaches out to contractors, CTPs, and FEMA staff across the county to select those CTPs most deserving of recognition for program goals. This year, the NeDNR Floodplain Management Section was nominated by our peers for our response to the 2019 Spring Flooding and on June 3, 2020, we were selected to receive the Honorable Mention award. The award is typically awarded at the Association of State Floodplain Managers (ASFPM) National Conference, however, due to the conference being held virtually this year, the award presentation has been delayed. ■

Katie Ringland Named 2019 NFIP State Coordinator of the Year

Katie Ringland, Chief of the Floodplain Management Section, was recognized by FEMA's Federal Insurance and Mitigation Administration (FIMA) as the 2019 NFIP State Coordinator of the Year. She was selected, based on peer nominations, for her contributions to floodplain management and flood loss reduction measures in Nebraska following the 2019 Spring Flooding. She was formally recognized at the virtual CAP-SSSE meeting at the ASFPM National Conference on Thursday, June 11, 2020. ■



Small White Lady's Slippers, *Cypripedium candidum*, is listed as Threatened in Nebraska. It is found in wet meadows and moist prairies. Photo courtesy Nebraska Game and Parks Commission.

Nebraska Game and Parks Commission's Online Environmental Review Resources

By Adele Phillips

Much of Nebraska's critical habitat for threatened and endangered species lies within our floodplains. Floodplain development can easily cause negative impacts on these species through the destruction or modification of critical habitat. Therefore, it is important that project proponents coordinate with the Nebraska Game and Parks Commission (NGPC) for adherence to state law as it pertains to our state-recognized endangered and threatened species.

The NGPC has responsibility for protecting endangered and threatened species under authority of the Nongame and Endangered Species Conservation Act (NESCA) (Neb. Rev. Stat. § 37-801 to 37-811). Under NESCA, it is unlawful (except as provided in law) to export, take, possess, process, sell or offer for sale, deliver, carry, transport, or ship any species listed as endangered or threatened. NGPC reviews projects pursuant to NESCA and offers technical assistance and coordination to avoid and minimize impacts to state-listed endangered and threatened species.

To help project proponents both evaluate the threat development may pose and request project review, NGPC has developed an Environmental Review website, located [here](#). At this site, project proponents will find several resources, such as:

- Project impact evaluation checklists

- Sensitive habitat maps
- Guidelines for avoiding, minimizing, and mitigating impacts, and
- Environmental review request information.

NGPC has created an automated review tool called the Conservation and Environmental Review Tool (CERT). This tool allows project proponents to create a project map and submit information to help project proponents determine if they need further consultation with NGPC. The tool may be found here: cert.outdoornebraska.gov

It should be pointed out that this review from the NGPC only covers state-listed species. For an assessment of potential impacts to habitats and species protected under federal wildlife laws, including federally listed, candidate, or proposed endangered or threatened species, please contact Eliza Hines, eliza_hines@fws.gov, Nebraska Field Office, U.S. Fish and Wildlife Service, 9325 South Alda Road, Wood River, NE 68883.

We advise you, our floodplain administrators, to require project applicants to utilize the above resources and provide you with the documentation as part of your floodplain management practice. The resources are easy to use, quick, and they will help you cover your bases when it comes to protecting our natural resources. ■

New Floodplain Administration Resources Available

By Adele Phillips

NeDNR has recently produced two new resources for floodplain administration. Both are now available online:

NeDNR's Model Floodplain Development Permit Application

Looking to refresh your community's Floodplain Development Permit? NeDNR has developed a new model Floodplain Development Permit, applicable for all communities (except those with cumulative substantial damage/substantial improvement rules) and available to download via the link above. Much of the form may be completed by applicants electronically, then printed and signed by the applicant. Space is available in the upper left corner in which to place your community's seal or logo.

NeDNR's Procedures for "No-Rise" Certification for Proposed Developments in the Regulatory Floodway

Prior to issuing any building, grading, or development permits involving activities in a regulatory floodway, the community must obtain a certification stating the proposed development will not impact the pre-project base flood elevations, floodway elevations, or floodway data widths. The certification should be obtained from the applicant and be signed and sealed by a Nebraska professional engineer.

Available via the above link, NeDNR has compiled guidance on how to complete the necessary hydraulic analysis, a list of requisite supporting data, and a certification form for engineers to complete. ■

Permitting Tips: Pipelines in the Floodplain

By Adele Phillips

Recently at NeDNR we have received inquiries regarding the permitting of pipelines that cross Special Flood Hazard Areas. We've compiled the following considerations and recommendations to help you, our floodplain administrators, review floodplain development permit applications. This guidance is applicable to both new development and repairs to existing equipment.

First Things First: Permitting Hierarchy and Sequence

It is a duty of the floodplain administrator to review an application or development proposal "to assure that all necessary permits have been obtained from those federal, state, or local government agencies from which prior approval is required." A number of different permits may be required for any given development proposal.

Depending on the nature of the project and the type of the jurisdiction issuing the permit (such as Federal, State, or local jurisdictions), a hierarchy of permits is developed. Overarching 'umbrella' permits need to be in place prior to approval or issuance of local jurisdiction permits. For example, at the local jurisdiction level, a conditional use permit would take precedence over a floodplain development permit, and a floodplain development permit takes precedence over a building permit. You do not want to be in a position of approving a project which has not yet passed the vetting of higher tiers of approval. Neither should you approve a permit application on the *condition* that the project acquire other necessary permits *in the future*.

Pipelines are subject to permitting by the U.S. Army Corps of Engineers (USACE) for compliance with Section 404 of the Clean Water Act. A project may have a Nationwide Permit (NWP) from the USACE; check to ensure

that it is valid. The *Keystone XL* pipeline project, for example, does not currently have a valid NWP¹, however other pipeline projects may have valid NWPs.

The Pipeline and Hazardous Materials Safety Administration (PHMSA), under the U.S. Department of Transportation, is responsible for regulating and ensuring the safe transportation of hazardous materials by all modes of transportation, including pipelines. The role of PHMSA's Office of Pipeline Safety is to ensure safety in the design, construction, operation, maintenance, and spill response planning of hazardous liquid transportation pipelines. Pipelines are subject to Pipeline Safety Regulations found in **Title 49 Code of Federal Regulations Parts 190-199**. Additional pipeline-related safety laws and regulations administered by the PHMSA may be found here. It is not a floodplain administrator's responsibility to know and administer these regulations; it is, however, the project proponent's responsibility to adhere to them.

A Floodplain Development Permit for Each Project Site

Given the unique characteristics of any proposed development site, a separate floodplain development permit needs to be submitted for each site. A 'site' is the discreet area of proposed impact: it includes not only the construction area, but also

staging grounds and access routes. Each development site has unique topography, soils, and vegetation. Property owners and BFEs will likely also vary from site to site.

Incomplete Applications

How will the pipeline be built? Will there be open trenching, jack and boring, directional drilling, or some other process involved?

For the floodplain administrator to approve an application, the nature or scope of the proposed development must be clearly defined and there must be no ambiguity as to the conditions which must be met for that development to be safely and lawfully conducted. It is incumbent on the project proponent to provide a complete 'picture' of the proposed development, as well as all supporting evidence as to its safety and feasibility. It is not the responsibility of the floodplain administrator to 'fill in the gaps'. A floodplain administrator must have all evidence *prior* to signing approval to the application, and should never approve an application under a project proponent's promise of providing information later.

Supporting documentation needs to be provided for each proposed development site:

- Method of construction
- Grading plans
- Development time frames
- Siting and storage of equipment and materials, as well as duration

- See [Permitting](#) cont. on page 5.

NOTE:

A floodplain administrator should not mark on any floodplain development permit application anywhere outside of the designated areas labeled "For Official Use." To do so jeopardizes the validity of the permit.

1. Tohan, Ankur K. et al. "The Nation Goes the Way Montana Goes? Nationwide Permit 12 Vacatur and Injunction." K&L Gates Global Power Law & Policy. Revised: July 6, 2020. <https://www.globalpowerlawandpolicy.com/2020/06/the-nation-goes-the-way-montana-goes-nationwide-permit-12-vacatur-and-injunction/>

Permitting continued from page 4.

- What best management practices will be used to avoid water pollution and wetland impacts
- Descriptions of how impacts to threatened and endangered species will be avoided, and
- Descriptions of how the site will be restored, etc.

The new model Floodplain Development Permit Application, recently released by NeDNR (see “[New Floodplain Administration Resources Available](#)”, page 3), includes a comprehensive list of submittal documents which may be required by the floodplain administrator. Additionally, see article, “[Nebraska Game and Parks Commission’s Online Environmental Review Resources](#),” (page 3) in this newsletter for resources to avoid species and habitat impacts.

Here are some items to be sure and check for:

- Valid lease agreement or easement documentation that allows for the proposed scope of work and access. Owner consent to development should be demonstrated by affidavit or similar documentation.
- Any floodplain maps or boundaries should show the best available data for any given project site. Maps *must* include the floodplain boundary.
- Photographs of the site showing existing conditions, and, potentially, land survey mapping should be provided at time of application. This documentation is to help ensure that site conditions are restored to the pre-development state.
- Any terminology should be defined or clarified such that there is no ambiguity in meaning or intent.
- Any references to regulatory documents—such as maps, ordinances and resolutions—should be to the documents *currently* in effect. Approving projects which reference prior regulatory instruments presents

enforcement issues for your jurisdiction.

- Site restoration specifics, such as re-seeding type, timeframe, and responsible parties.

Setting Conditions of Approval

Local jurisdictions have authority to ‘conditionally approve’ a permit application, provided certain terms are met during construction and for the life of the project. These terms are called ‘conditions of approval’. Conditions should be succinctly stated, measurable, linked to the responsible agency or jurisdiction, and tied to specific time thresholds, such as dates, distinct project phases, or time limits. Ramifications for failure to meet or satisfy the conditions in a timely manner should be included. An example ramification is invalidation of the approved permit, and the requirement to reapply for a new permit. For example, a condition might read, “Subject permit is valid for 180 days from time of approval. Failure to complete construction within 180 days requires application for new permit.”

The conditions should be compiled into a single document, endorsed by the project proponent with their signature. **The project proponent should retain a copy of the signed document, as well as the local floodplain administrator.**

As successive permits—such as building permits—are applied for, the conditions of approval should be included with the permit application.

Review [FEMA’s NFIP Interim Technical Guidance on Drilling Oil and Gas Wells in Special Flood Hazard Areas](#).

Although written for oil and gas well drilling, it contains guidance applicable to oil and gas pipelines and the construction thereof. Key considerations from this document include:

- Floodways must be left unobstructed to carry floodwaters.
- If the drilling site is in the floodway portion of the floodplain, the project proponent must demonstrate through an engineering study that there will be no increase in flood stages during the discharge of the 100-year flood caused by the development.
- Any buildings and other structures (including fuel storage tanks) in



A trench has been dug across Salt Creek in Kansas, to install a pipeline. Improper management of spoils has led to silt impoundment within the stream bed, and soil stockpiles sloughing into the stream. Photo courtesy Steve Samuelson, Kansas Department of Agriculture.

the floodplain will either have to be elevated to above the BFE or floodproofed (made watertight) to that elevation.

- Any storage tanks and any equipment at the site that could be damaged by floodwaters will have to be elevated above the BFE or made watertight and anchored to resist floatation, collapse and lateral movement
- Any material stored on the site that is highly volatile, flammable, explosive, toxic, or water reactive should be protected to at least the level of the 500-year flood.
- The project proponent needs to provide a **Spill Prevention and Counter Measure Plan**.
- If a drilling site is located in the floodplain, the developer should have an **Emergency Action Plan** in place to move all vehicles and movable equipment out of the floodplain and install any floodproofing measures in case of an imminent flood event. The plan should take into account the amount of warning time available prior to flood.

NeDNR advises floodplain administrators to include these additional conditions:

- Issued floodplain development permits are valid for only 180 days from approval, and require projects to be completed within this 180 day timeframe.
- If work is not completed within 180 days, allow for the possibility to approve a 90 day extension.
- Define 'project completion' to include restoration of site to pre-development conditions.
- Project proponent should provide unequivocal statement that there will be no impact to the base flood elevation (BFE).
- Require project proponents to restore the site to pre-development conditions, including grade. If a proponent does not wish to restore to pre-development conditions, then they will need to provide the engineering which demonstrates that no-rise or alteration to the flood plain characteristics has occurred.

- Restoration to pre-development conditions applies not only to the pipeline location, but also to any access roads, stream crossings, and staging areas.
- Photo documentation should be captured and retained in advance of any development activity. To ensure accuracy or validity of the photos, the floodplain administrator should conduct a site visit to verify.
- If 'temporary' development is proposed, define length of time that is temporary, such as 90 days.
- Status as temporary development is not an exemption from regulation. Any temporary development must be built to code and meet floodplain regulations.
- Require pre- and post-construction certifications from an engineer that the development is:
 - a) Watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy, and
 - b) Floodproofed with measures consistent with the flooding characteristics of the drainway or watercourse, and
 - c) Floodproofed to withstand the flood depths, pressures, velocities, impact and uplift forces, and other factors associated with the base flood.

Should you have any questions about the above guidance, please do not hesitate to contact our office. ■

Mark Your Calendar:

08.13 ■ Post-Flood Responsibilities

Location:

Manhattan, KS

8:00 am - 11:30 pm

The Kansas Department of Agriculture will host Post-Flood Responsibilities training. This class is intended for community officials responsible for administering floodplain management regulations. This course focuses on what to do during and after a disaster event. Topics include substantial damage, permitting, Increased Cost of Compliance (ICC), and violations. Certified floodplain managers will earn 3.5 CECs for their attendance.

09.01-09.04 ■ Missouri Floodplain and Stormwater Managers Association 2020 Annual Conference

Location:

Osage Beach, MO

This conference offers professionals in floodplain and emergency management the opportunity to learn and network. Topics include flood insurance, urban flooding, tools for preparation and mitigation, and more. To register, visit this [link](#).

09.02 ■ Kansas Association for Floodplain Management Annual Conference

Location:

Mulvane, KS

The Kansas Association for Floodplain Management will host their 17th Annual Conference. Registration is now open for this 1-day conference. The CFM Exam will be offered on September 3rd. For more information regarding the CFM Exam please contact Steve Samuelson at Steve.Samuelson@ks.gov. To learn more about this year's conference, visit this [link](#).

Want More Information?

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

Or, Contact:

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