

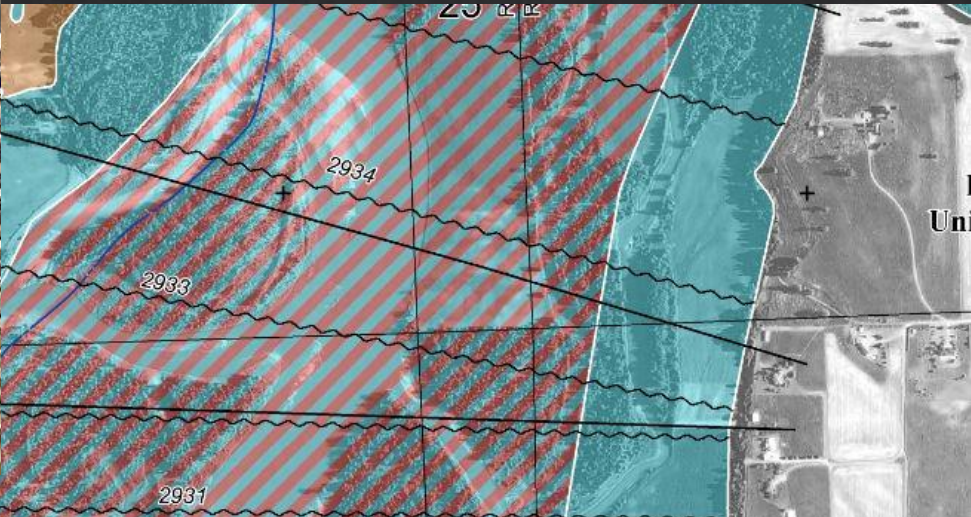


PROJECT KICKOFF MEETING
Blaine County Floodplain Mapping Project
November 6, 2019

Purpose:

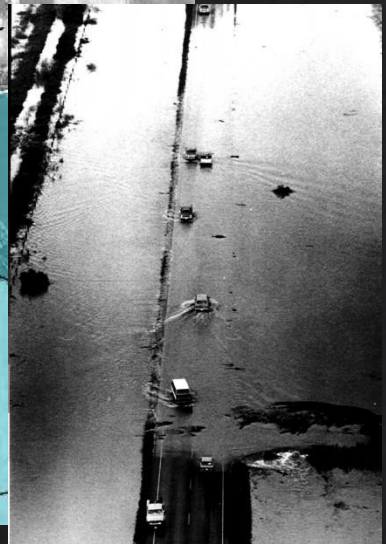
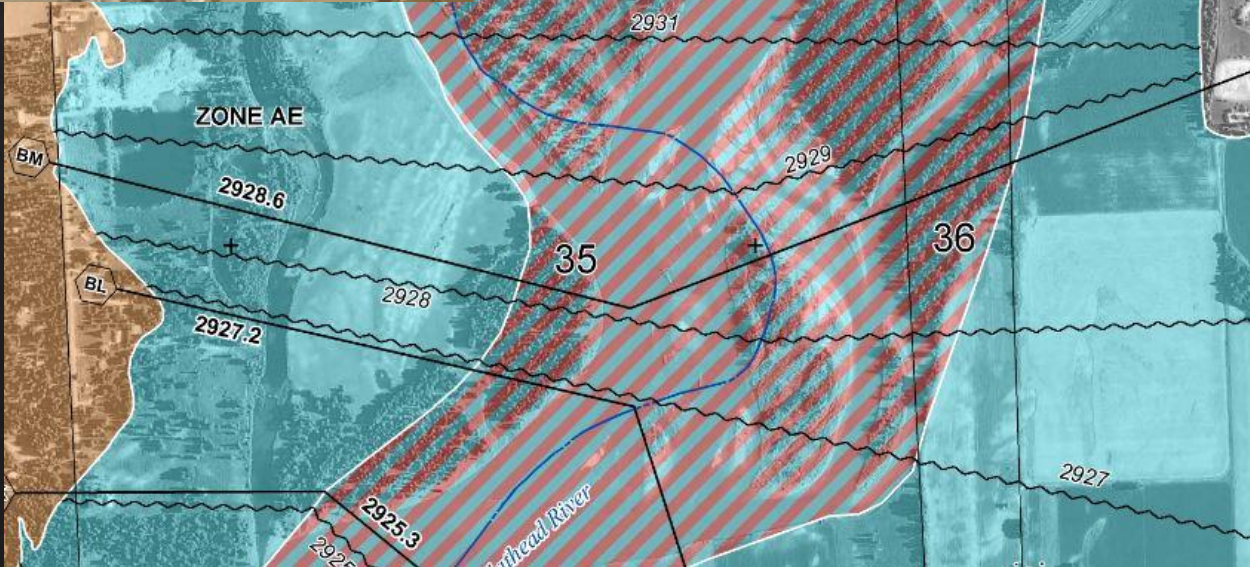
- Project Overview
- Review Project Team, Scope & Schedule
- Levee certification/accreditation
- Questions & Discussion

Identifying risk through mapping



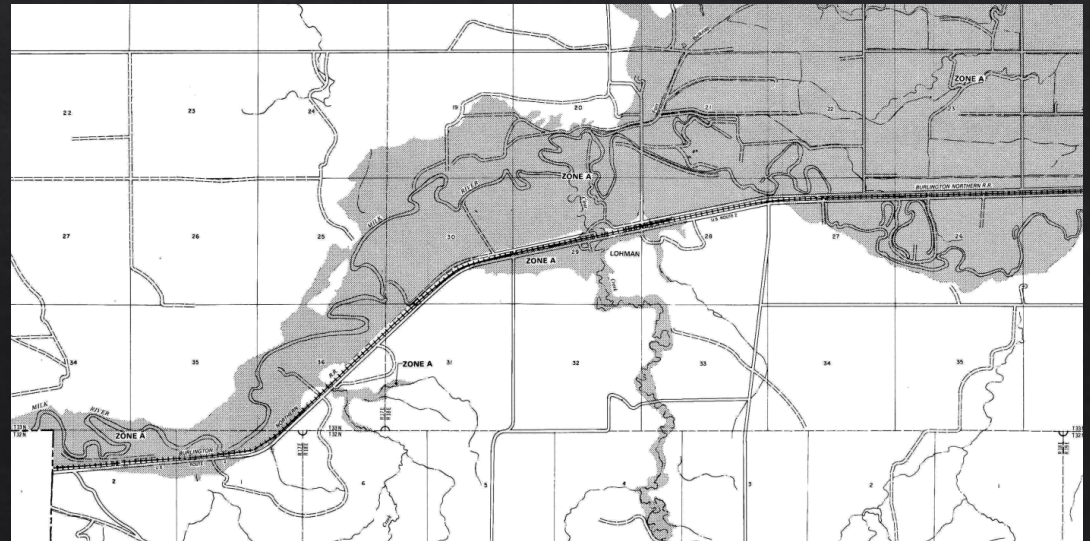
**Chinook
1986**
Compliments
Helena IR

**Chinook
2018**
Compliments
Missoulian



Flood Insurance Rate Maps

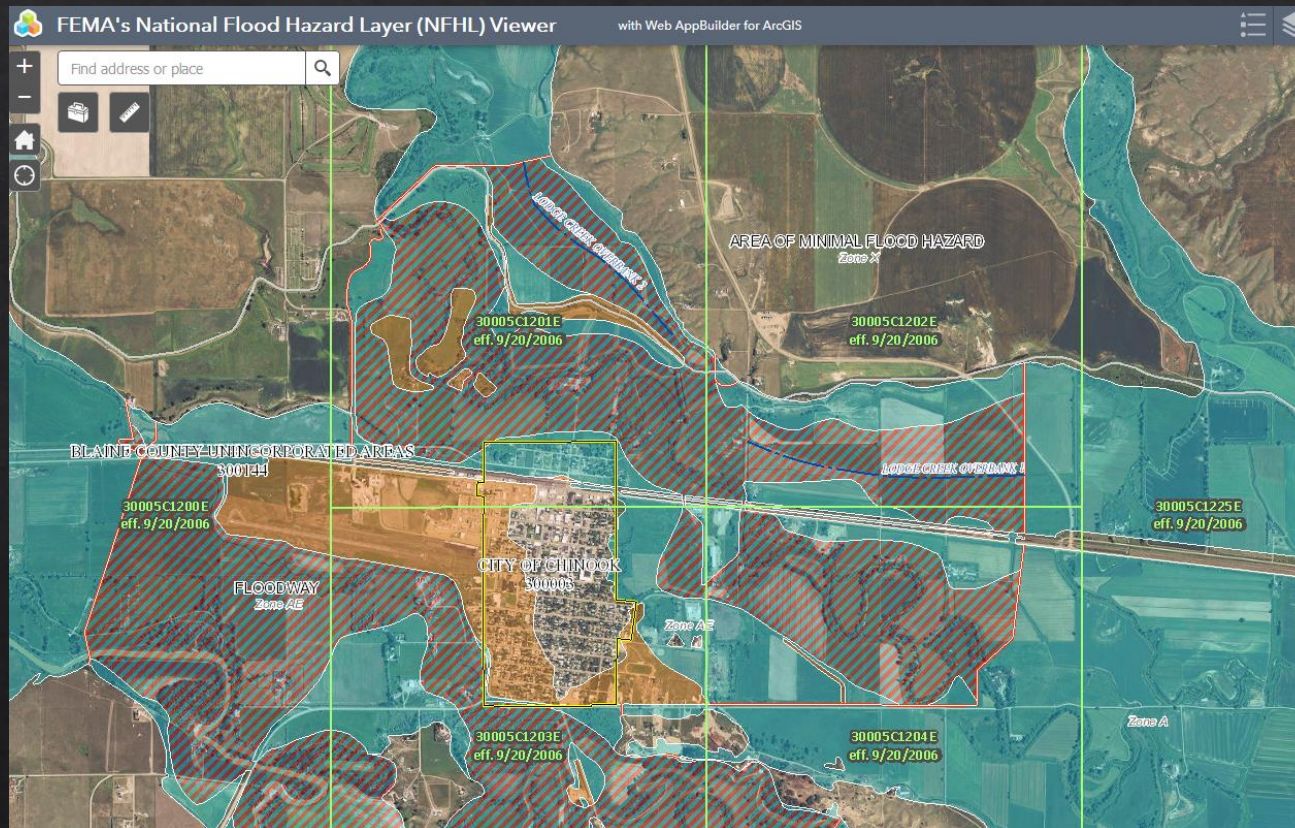
- ◆ Used for various purposes
 - ◆ Local floodplain regulations
 - ◆ Flood insurance premiums
 - ◆ Local emergency planning
- ◆ Need periodic updating



Blaine County - Floodplain Maps

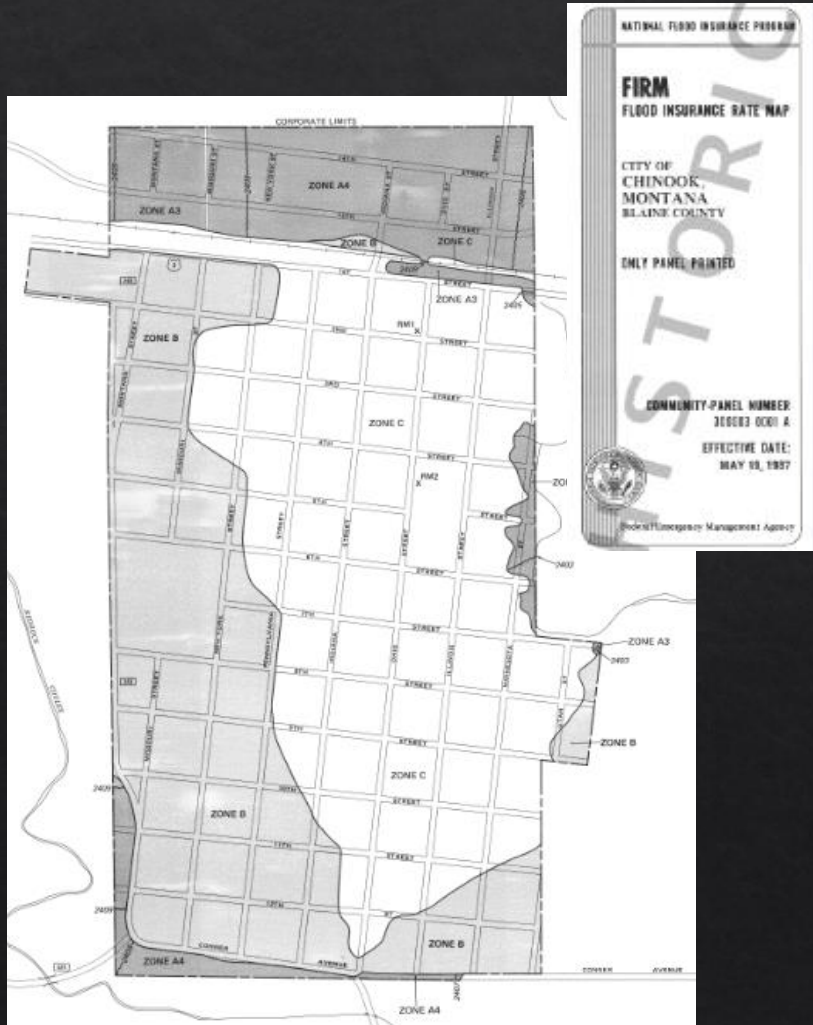
- ◇ 1978 1st floodplain maps issued
- ◇ 2006 date on map/ maps were converted to digital

Based on combination of data from 1976, 1987, 2004



City of Chinook- Floodplain Maps

◆ 1976 1st floodplain map issued



City of Chinook
1976 First map issued
1987 Map updated
2006 Map converted to digital

Project Background

BLAINE COUNTY COMMISSIONERS

Dolores Plumage, Chair
Frank DePriest
Miles Hutton

P.O. Box 278
(406)357-3250

Chinook, Montana
59523-0278

7/1/2019

Steve Story, Chief
Montana DNRC
Water Operations
1424 9th Ave
P.O. Box 201601
Helena, MT 59620-1601

Dear Mr. Story,

Blaine County supports efforts to update flood studies and existing floodplain maps in our county. All the mapped floodplains on our Flood Insurance Rate Maps are based off flood studies and information from 1985. We support updating the floodplain studies to replace our existing, outdated floodplain maps.

Blaine County is committed to protecting the river systems, managing flood risks and participating in the National Flood Insurance Program. Updated, detailed studies would be a benefit to Blaine County residents and current information would allow for better regulation of flood prone areas.

Thank you for the opportunity to participate in this effort to update floodplain studies in Blaine County. Having better available data will provide much needed support that the county has needed for a long time.

Sincerely,

Blaine County Commissioners

Attest:


Dolores Plumage, Chair



Tammy Williams, Clerk & Recorder


Frank DePriest, Commissioner


Miles G. Hutton, Commissioner

CITY OF CHINOOK

Keith Hanson, Mayor
Mark Harshman, Attorney
Carol Floren, City Clerk/Treasurer

Mitch Haider, Council
Robert Smith, Council
Meredy Phares, Council
James Hodgson, Council

June 28, 2019

Steve Story, Chief
Montana DNRC
Water Operations
1424 9th Avenue
PO Box 201601
Helena, MT 59620-1601

Dear Mr. Story,

The City of Chinook supports efforts to update flood studies and existing floodplain maps in our city and surrounding area. All the mapped floodplains on our Flood Insurance Rate Maps are based off flood studies and information from 1985. We support updating the floodplain studies to replace our existing, outdated floodplain maps.

The City of Chinook is committed to protecting the river systems, managing flood risks and participating in the National Flood Insurance Program. Updated, detailed studies would be a benefit to the city residents and current information would allow for better regulation of flood prone areas.

Thank you for the opportunity to participate in this effort to update floodplain studies in the City of Chinook and the surrounding areas. Having better available data will provide much needed support that the city has needed for a long time.

Sincerely,

Keith Hanson, Mayor

PO BOX 1177, 340 OHIO STREET
CHINOOK, MONTANA 59523-1177
(406) 357-3160/(406) 357-3162 FAX

cityofchinook.com



THE CITY OF HARLEM
A Municipal Corporation
The Heartbeat of the Milk River Valley
10 1st Avenue SW
PO Box 579
Harlem, Montana 59526
406-353-2361 (Office) – 406-353-2863(Fax)

June 28, 2019

Steve Story
Chief Montana DNRC Water Operations
1424 9th Ave
P.O. Box 201601 Helena,
MT 59620-1601

Dear Mr. Story,

The City of Harlem supports efforts to update flood studies and existing floodplain maps in our county. All the mapped floodplains on our Flood Insurance Rate Maps are based off flood studies and information from 1985. We support updating the floodplain studies to replace our existing, outdated floodplain maps.

The City of Harlem is committed to protecting the river systems, managing flood risks and participating in the National Flood Insurance Program. Updated, detailed studies would be a benefit to Blaine County residents and current information would allow for better regulation of flood prone areas.

Thank you for the opportunity to participate in this effort to update floodplain studies in Blaine County. Having better available data will provide much needed support that the county has needed for a long time.

Sincerely,


Ralph Schneider
Mayor

Pre 2019- Discussions to have a new flood study and updated maps/ LiDAR work began
June 2019- Communities provided letters of support for the project
July 2019- DNRC applied for FEMA grant
September 2019- Grant awarded by FEMA
Fall 2019- project underway

Milk River Floodplain Mapping Project

Update 2,325.5 stream miles

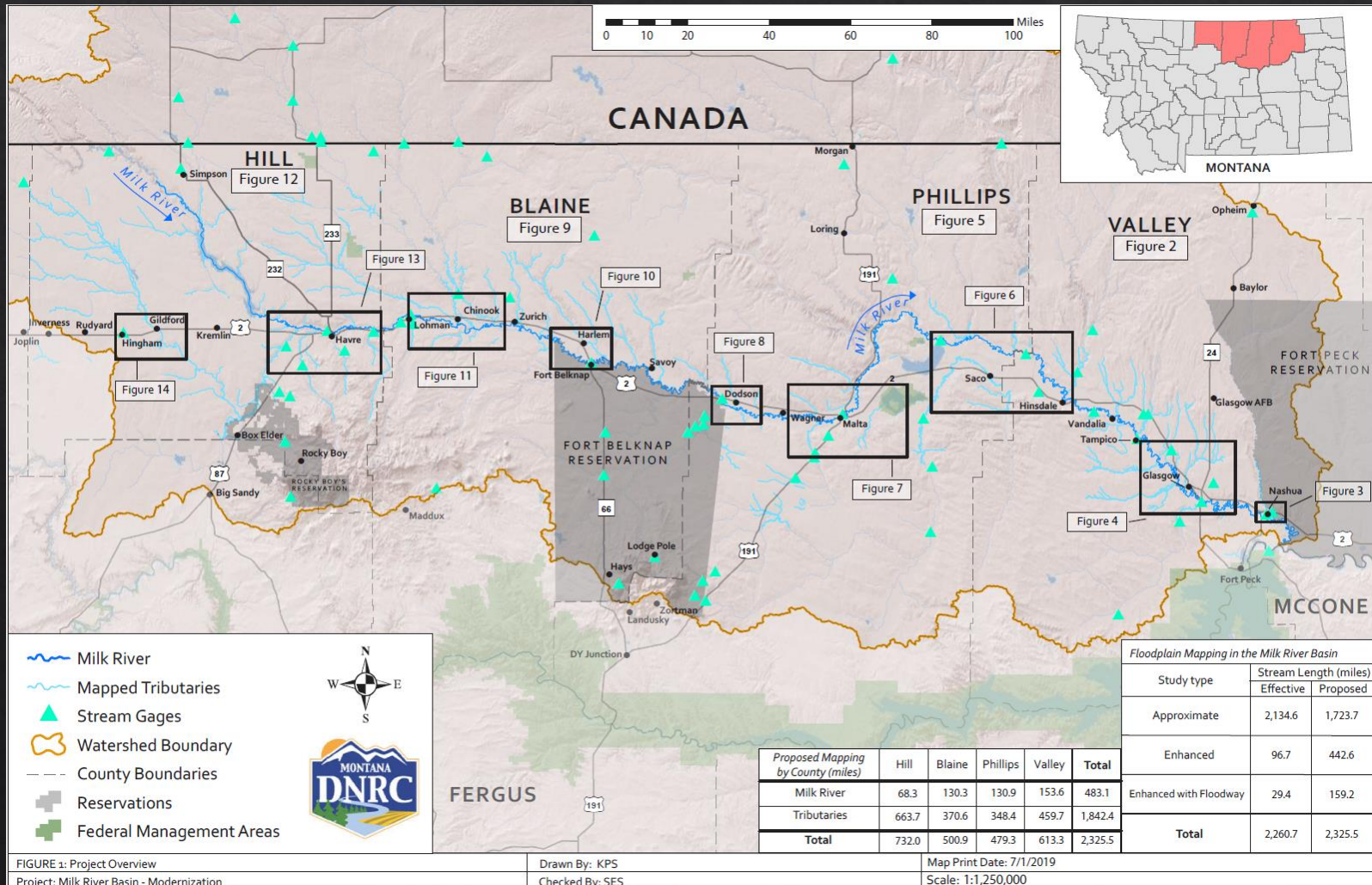
732 miles in Hill County

500.9 miles in Blaine County

479 miles in Phillips County

613 miles in Valley County

Project Funding:
\$3,544,000 FEMA



Project Team – Milk River project

- ◆ DNRC Floodplain Staff – Tiffany Lyden, Nadene Wadsworth, Steve Story, Katie Shank, Doug Brugger, Worby McNamee, Traci Sears



- ◆ Communities



Valley
County
Montana

- ◆ FEMA Region VIII



- ◆ DNRC Contractors:

- ◆ Topography/LiDAR – Quantum Spatial



- ◆ Survey Work– Bathymetric survey-River Design Group



Structure survey- Great West



- ◆ Hydrology- USGS and Michael Baker



- ◆ Hydraulic Analysis and Floodplain Mapping -



Michael Baker

Understanding the Flood Study Process

Flood Study Steps

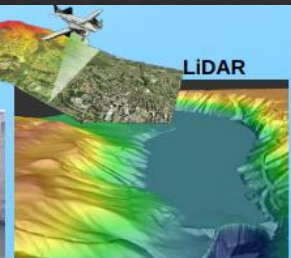
Step 1 - Survey: measurements are made of the topography around the river, along with any culverts, bridges, and road crossings. LiDAR uses an airplane to collect ground elevation over a large area, and ground survey supplements the airborne data.

Step 2 - Hydrology: determines how much water there will be in the river during a flood event. Data from stream gages will tell how many cubic feet of water per second the river will carry during the flood.

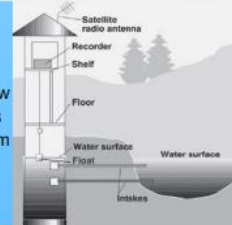
Step 3 - Hydraulics: once the first two steps are complete, calculations can show where the water will go during the flood. The elevation data is combined with the flood flow data to determine where the water will go when it overflows the channel.

Step 4 - Mapping (delineation): the results from step 3 are combined with the elevation data and official maps to see how far the water will spread out. The area shown to be underwater during the flood is the regulatory floodplain.

Step 1 - Survey: The type of the survey depends on the size of the study area and type of study.



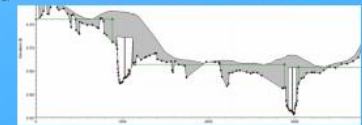
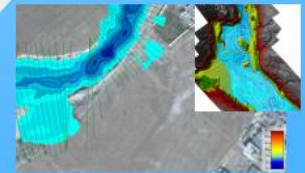
Step 2 - Hydrology: Stream gage stations are an important tool to determine flow rates. If nearby stream gages aren't available, gage data from a similar location is used to determine the flow rate.



Step 3 - Hydraulics:

5 main components to the model

- 1) Hydrology (stream flow data)
- 2) Cross Sections (measurements of the river bottom at key locations)
- 3) Roughness (thickness of vegetation, land cover, etc determined by surveyors)
- 4) Structures (road crossings, culverts, bridges, etc.)
- 5) Downstream conditions



Step 4 - Mapping (delineation):

The result will be the floodplain boundary and a depth grid identifying the shallower and deeper areas of flooding.



Photo taken

S33.T2N.R12W

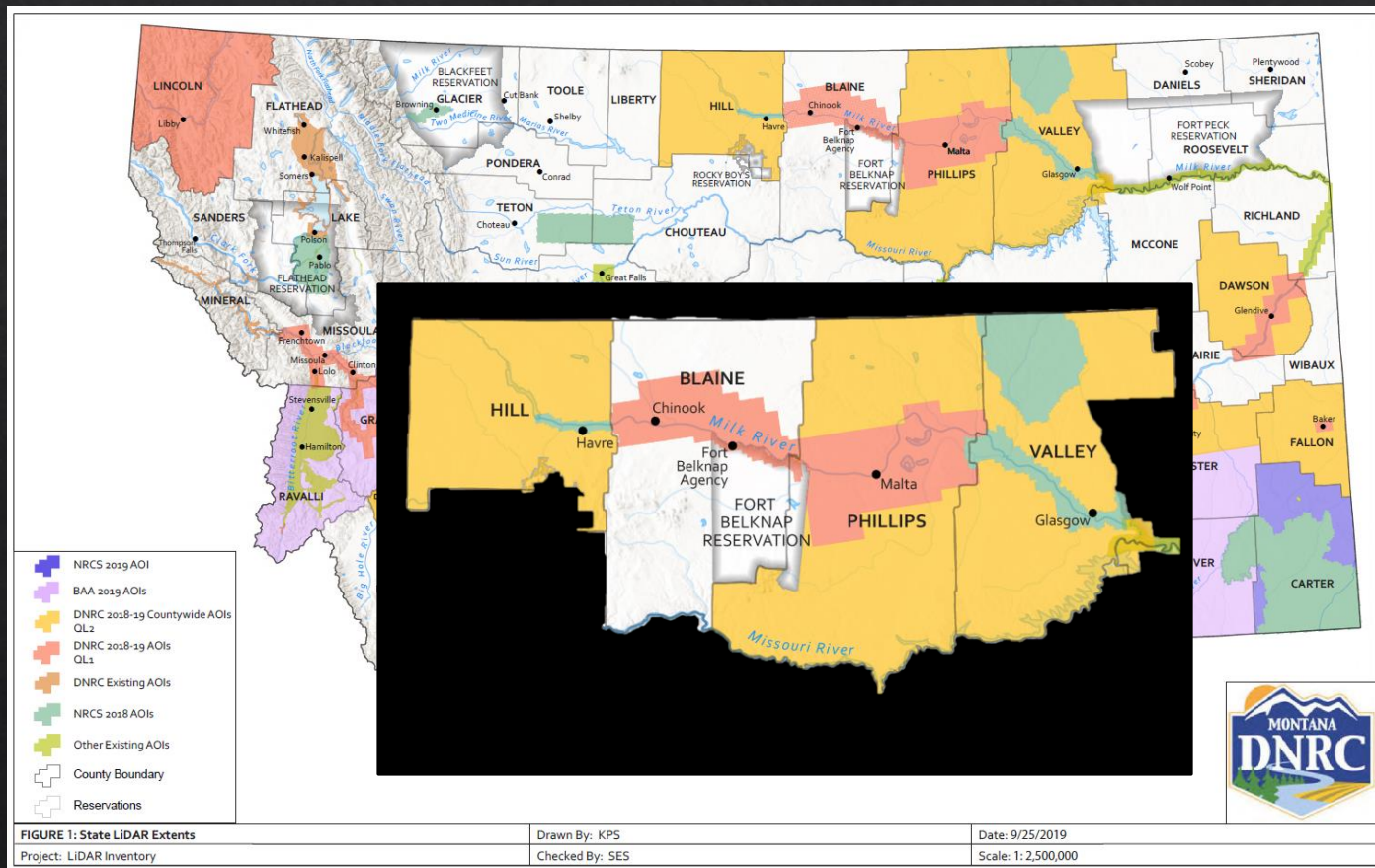
Project Scope

Topographic Data Collection



◆ Lidar Data Acquisition:

◆ LiDAR uses an airplane to collect ground elevation over a large area, and Ground Survey supplements the airborne data.



Project Scope

Survey Work

Provides in-stream and bridge/crossing data needed for hydraulic modeling and floodplain mapping.

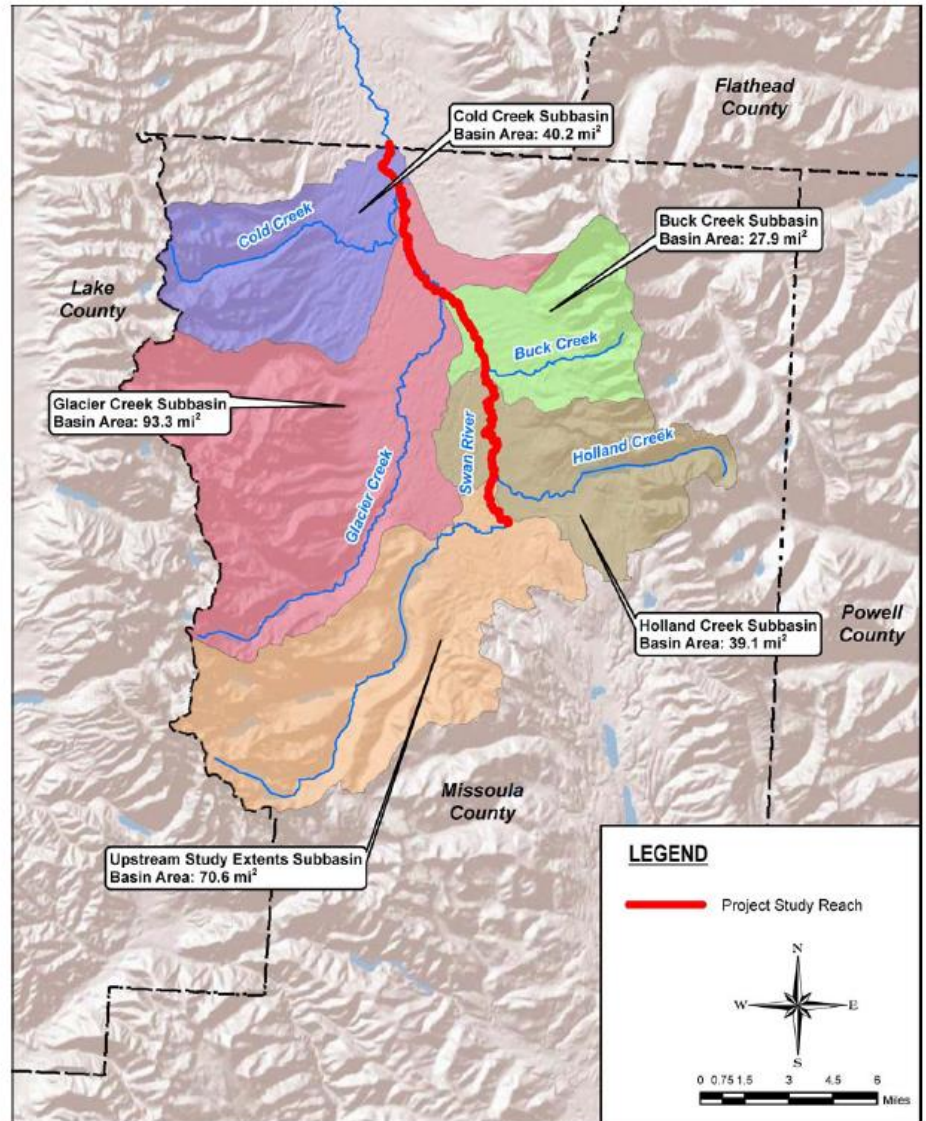


Project Scope

Hydrology

Determines how much water there will be in the river during a flood event. Data from stream gages will tell how many cubic feet per second the river will carry.

Figure 3: Drainage Basin Area



Project Scope

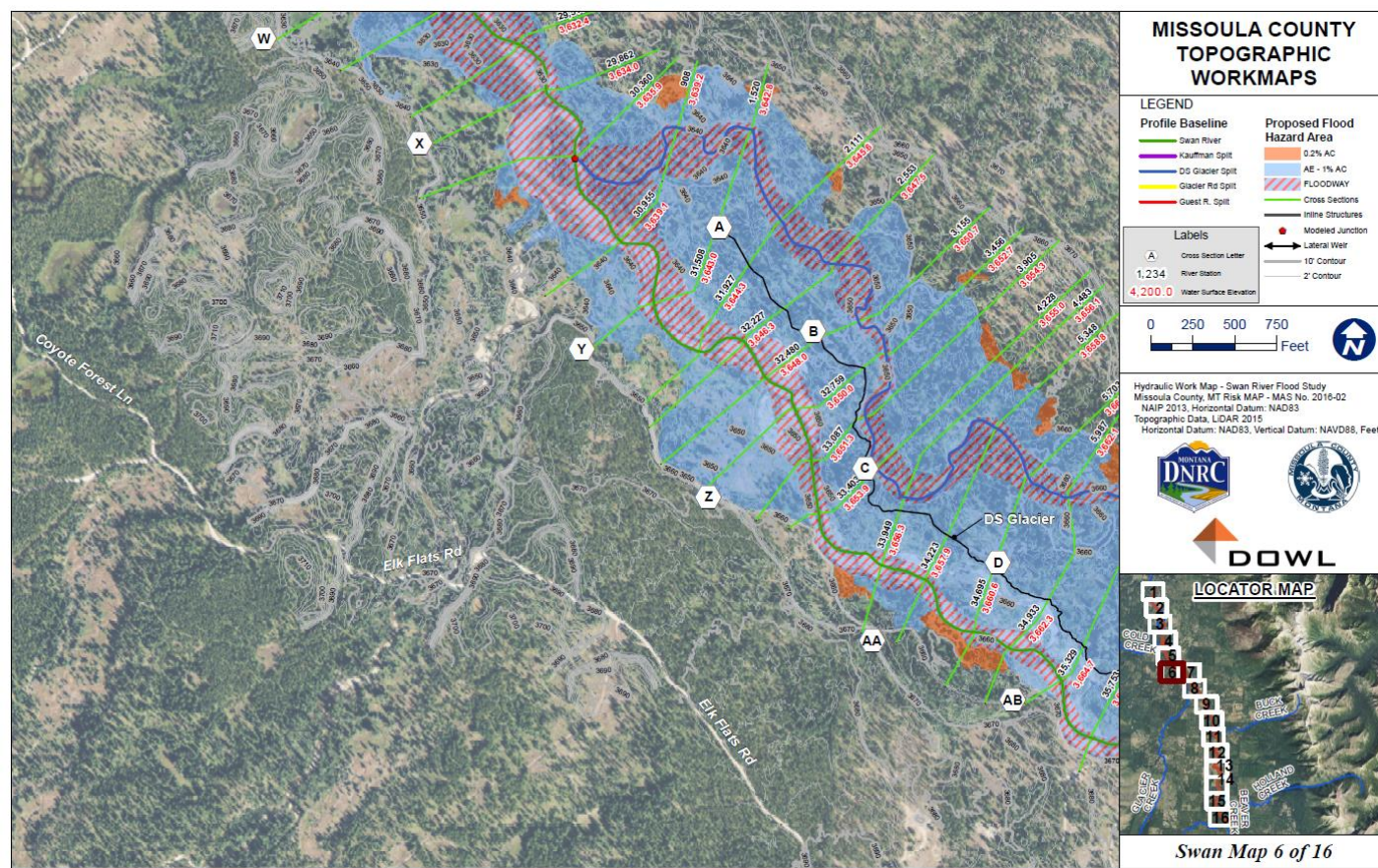
Hydraulic Analysis and Floodplain Mapping

Hydraulic modeling (where the water will go when it overflows the channel) and engineering to produce draft maps.



Hydraulic Analysis Report

Swan River
Missoula County, MT
July 2016



Prepared For:
Montana Department of Natural Resources and Conservation
Water Resources Division
24 9th Avenue
Helena, MT 59620

Prepared By:
DOWL
2 North 32nd Street, Suite 700
Helena, MT 59101

Estimated Project Schedule

Topographic (LiDAR) – Complete

Survey Work- completed early 2021

Hydrology- completed mid to late 2021

Hydraulics-

 Tributaries-completed mid 2022

 Milk River- phase II

Draft Maps

Public review of draft maps

FEMA Map Production/
Preliminary Maps

Public review of preliminary maps

FEMA maps finalized



Community Contribution

ATTENTION SWAN RIVER PROPERTY OWNERS in or near the FLOODPLAIN...

Missoula County is currently working with FEMA and Montana DNRC to update floodplain maps for the Swan River. FEMA's Preliminary Digital Flood Insurance Rate Maps (DFIRM) are intended to provide more reliable and detailed information about flood-prone areas along the Swan River. You are receiving this postcard because proposed floodplain mapping changes could affect your property.

www.missoulacounty.us/swanfp

Visit the County's website above to view FEMA's Preliminary DFIRM showing proposed floodplain changes and/or attend the public open house to get more information about this project.

PUBLIC OPEN HOUSE

Tuesday, June 20, 2017 | 6:00 p.m. - 7:00 p.m.
Swan Valley Community Hall | 6803 HWY 83N, Condon, MT

Staff from the DNRC Floodplain Program and Missoula County will be on hand during the open house to answer questions and provide an overview of the project. We ask anyone with information relevant to potential flood hazards to share information at the meeting.

We look forward to seeing you there. For more information, contact Todd or Tiffany.



TODD KLIEZ

Missoula County Floodplain Administrator
tkliez@missoulacounty.us
406.258.4841

TIFFANY LYDEN

MT DNRC
tlyden@mt.gov
406.444.0599



Project Webpage

Carbon County Flood Maps Update

by [Nadene Wadsworth](#) — last modified Oct 17, 2019 01:18 PM — [History](#)

Background on the floodplain maps in the County:

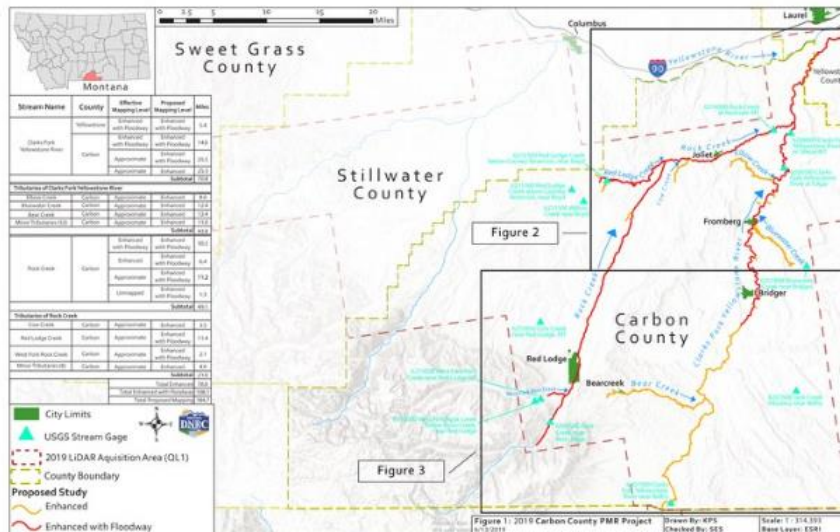
Carbon County floodplain maps were modernized through a Digitized Flood Insurance Rate Map (DFIRM) project in 2012. The maps were converted from paper to the digital environment. Most of the mapped floodplains in the county are still based off flood studies from the late 1970s and early 1980s. The 2012 DFIRM project entailed digital conversion of the effective floodplains in the county, with the exception of revised hydraulics and mapping on 9 miles of the Clarks Fork of the Yellowstone (upstream from the Carbon/Yellowstone County border). This revision, however, did not include updated hydrology or survey data. In 2017 a Partial Mapping Revision (PMR) was completed for the portion of the Yellowstone River in the county. The PMR leveraged US Army Corps of Engineers information from a Yellowstone River corridor study and updated floodplain mapping in Stillwater and Yellowstone Counties to update and replace the approximate floodplain mapping on the Carbon County side of the Yellowstone River with enhanced and floodway mapping.

2019 Project

DNRC with support from Carbon County applied and received a FEMA grant to update the flood study and floodplain maps for the Clarks Fork of the Yellowstone, Rock Creek, and tributaries.

DNRC held a project kick off meetings on October 3rd & 4th, 2019 with Carbon County, Joliet, Red Lodge, Bear Creek, and Fromberg. [To view the slides that were presented click here.](#)

Below are the figures of the study extents for the project.



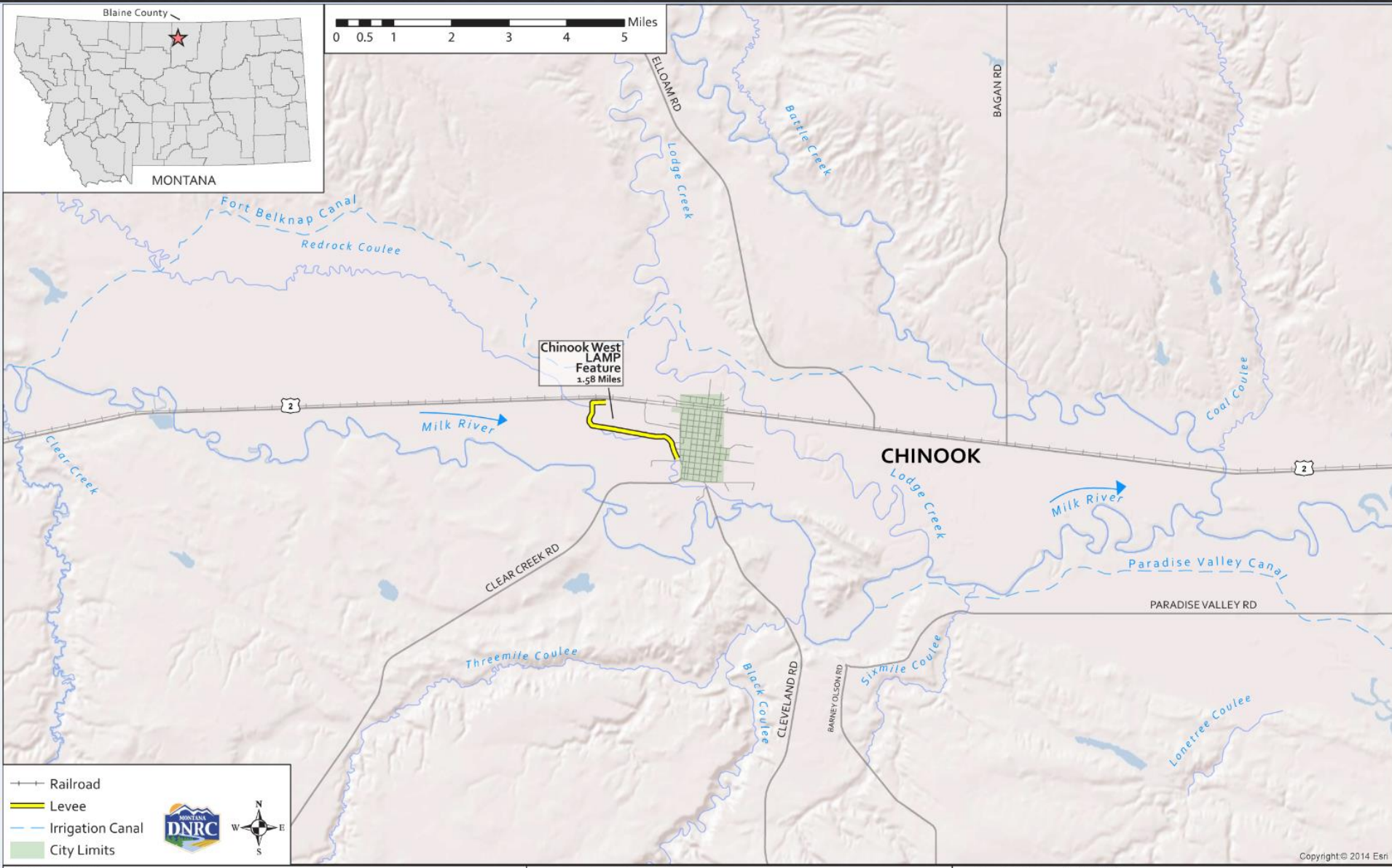
Project Points of Contact

Annie Gillespie
Carbon County Floodplain Administrator
(406) 445-7300
[email](#)

Tiffany Lyden
MT DNRC Outreach Specialist
(406)444-0599
[email](#)

Nadene Wadsworth
MT DNRC Outreach Specialist
(406)444-6732
[email](#)

[Manage portals](#)



- Railroad
- Levee
- Irrigation Canal
- City Limits

Copyright © 2014 Esri

Chinook Levee

Drawn By: KPS
Checked By: SES

Map Print Date: 8/30/2019
Scale: 1:90,000

DEPARTMENT OF NATURAL RESOURCES
AND CONSERVATION



STEVE BULLOCK
GOVERNOR

DIRECTOR'S OFFICE (406) 444-2074
TELEFAX NUMBER (406) 444-2684

STATE OF MONTANA

WATER RESOURCES DIVISION (406) 444-6601
TELEFAX NUMBERS (406) 444-0533 / (406) 444-5918
<http://www.dnrc.mt.gov>

1424 9TH AVENUE
PO BOX 201601
HELENA, MONTANA 59620-1601

October 28, 2019

Blaine County Commissioners
420 Ohio St. N
Chinook, MT 59523

Dear Commissioners:

The Department of Natural Resources and Conservation (DNRC) floodplain program and Blaine County have been collaborating to undertake a new flood hazard study for the Milk River Watershed which will update the existing Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM). FEMA recently awarded DNRC a grant to complete the project. Accordingly, we are beginning the process of scheduling community kickoff meetings and launching the initial project tasks.

The new study requires a review and assessment of any existing flood control structures in the Milk River watershed. FEMA requires that Levee Sponsor/Owners provide engineering certification to ensure the levees are sound and to qualify for a reduced flood risk category on the landward side of the levee systems, in accordance with FEMA's accreditation requirements (44 CFR 65.10). DNRC has identified one levee that is owned and maintained by Blaine County: West Levee (see attached figure). The existing status of this levee, based on the effective FIRMs is:

- The West levee shows a reduced risk on the landward side of the levee.

As the Owner/Sponsor of this levee, the county is responsible for providing all the necessary data, documentation, and certification (by a licensed professional engineer) to FEMA and DNRC, demonstrating that the levee system complies with FEMA's minimum requirements for accreditation (per 44 CFR 65.10).

This letter serves as our formal request of the county's intent to pursue FEMA accreditation of the levee system identified above.

The county may choose to pursue certification at the county's expense for potential accreditation by FEMA. Accreditation status from FEMA will result in the levee showing reduced risk on the landward side of the levee on the future FIRMs. Residents that live behind an accredited levee may receive reduced flood insurance premiums.

The county may choose not to pursue certification/accreditation, which would result in a different flood mapping process. The levee would be modeled and potentially mapped as not reducing the

risk on the landward side of the levee system. As a result, residents living behind a non-certified/non-accredited levee that have a federally backed mortgage would be required to carry flood insurance at the high-risk premium.

Understanding the county's intent will help DNRC facilitate the flood study process along with coordinating the project schedule and study methods. Additionally, we request the county provide us with a designated point of contact for all levee related information and questions, as well as the contact information for whichever engineering firm the county may choose to work with, if certification/accreditation is the path forward. Should you have any questions, please contact Nadene Wadsworth at Nadene.wadsworth@mt.gov (406) 444-6732 or myself sestory@mt.gov (406) 444-6816.

For your convenience, we have prepared a sample 'letter of intent' template. If you could, please fill it out and return it to our office with all the information by February 28, 2020.

Thank you,

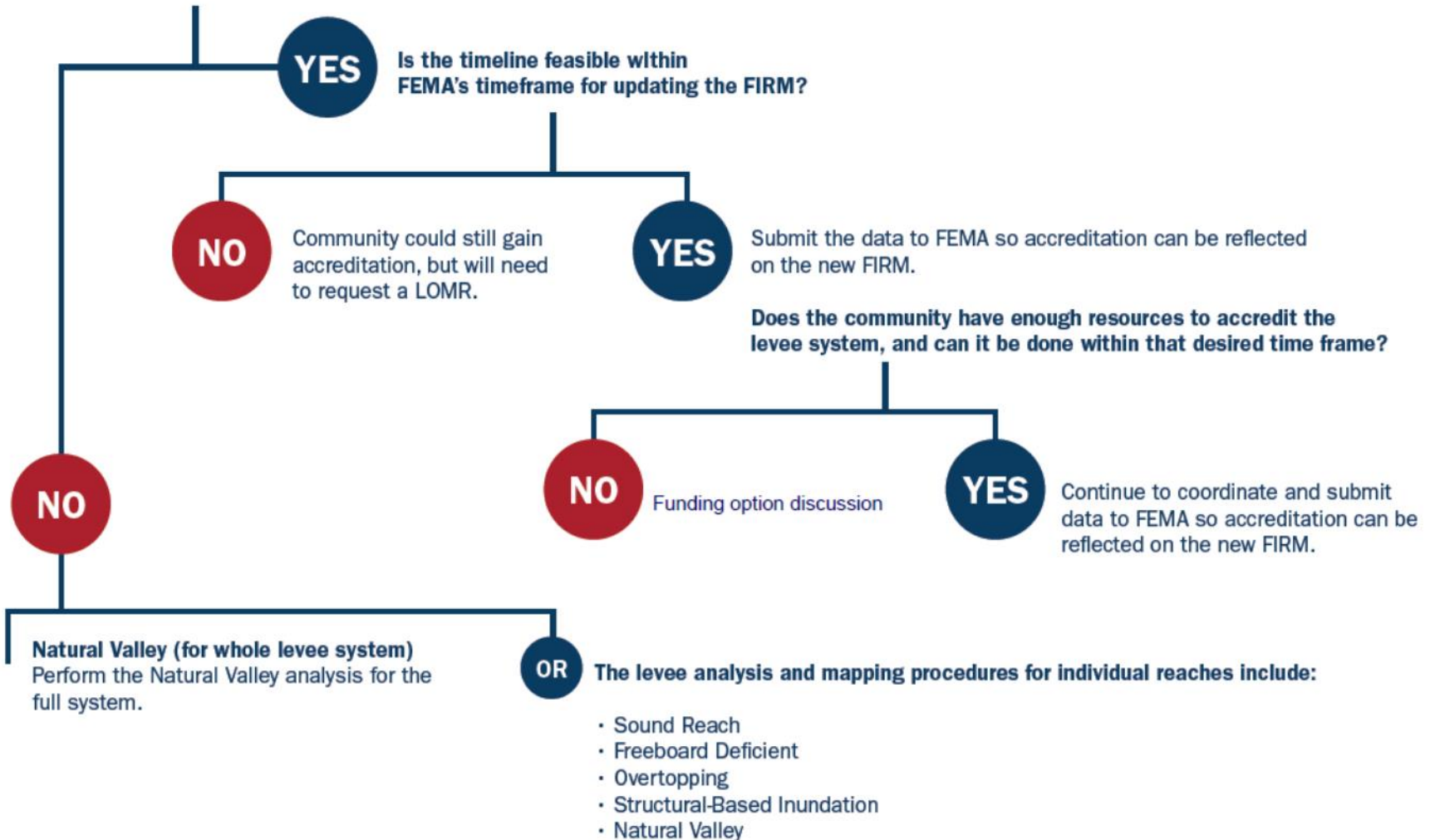
A handwritten signature in blue ink, appearing to read "Steve Story".

Steve Story, PE, CFM
Chief, Water Operations Bureau

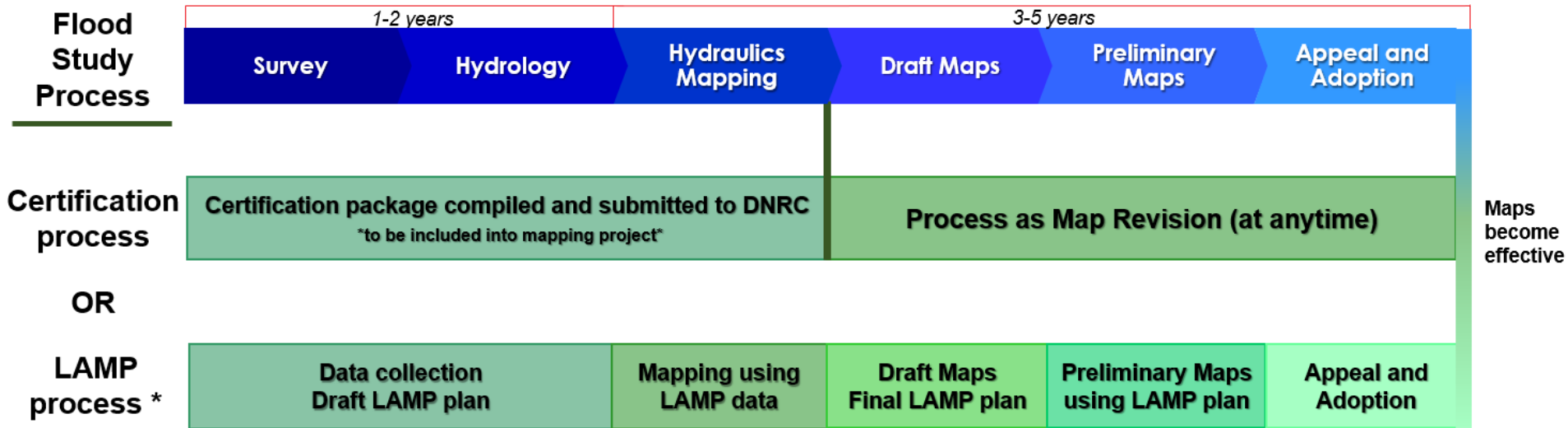
cc: Shawn Higley, Blaine County Floodplain Administrator
Haley Velk, Blaine County DES Coordinator
Mark English, FEMA

Determining your path forward:

DO YOU INTEND TO ACCREDIT YOUR LEVEE SYSTEM?



Levee Mapping Timeframe



LAMP (Levee Analysis and Mapping Procedures) mapping process for non-accredited levees, or levees that may not be able to be certified during mapping projects.

Meeting the Criteria for Accrediting Levee Systems on Flood Insurance Rate Maps: How-To Guide for Floodplain Managers and Engineers

The National Flood Insurance Program (NFIP) defines a levee system in Title 44, Chapter 1, Section 59.1 of the Code of Federal Regulations ([44 CFR 59.1](#)) as a flood risk reduction system that consists of a levee, or levees, and associated structures, such as closure and drainage devices, which are constructed and operated in accordance with sound engineering practices to protect a hydraulically distinct area. Within the NFIP, a levee is a manmade structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.

As part of the [flood mapping process](#), the Federal Emergency Management Agency (FEMA), and its State and local mapping partners, review and evaluate levee system data and documentation. Any community and/or other party seeking recognition or continued recognition of a levee system on a Flood Insurance Rate Map (FIRM) must provide FEMA with data and documentation, certified by a registered professional engineer, showing that the levee system is expected to provide 1-percent-annual-chance (base) flood risk reduction.

To be mapped on a FIRM as providing base flood risk reduction, levee systems must meet and continue to meet the NFIP minimum design, operation, and maintenance requirements described in Title 44, Chapter 1, Section 65.10 of the Code of Federal Regulations ([44 CFR 65.10](#)). FEMA has posted several guidance documents related to levee accreditation, mapping, and other topics. Please access the [Levee Resources Library](#) for updated guidance documents. To help clarify the responsibilities of community officials, levee owners, or other parties seeking recognition of a levee system identified during a study/mapping project, FEMA has posted several [guidance documents](#) related to levee accreditation, mapping, and other related topics. This document provides information regarding how FEMA maps levee systems, a checklist of the types of data and documentation that must be submitted for levee systems to be accredited on FIRMs, and an index of further resources.

A NOTE ABOUT FLOOD RISK AND FLOOD INSURANCE

Levee systems are designed to provide a specific level of protection. They can be overtopped or fail during flood events larger than those for which the system was designed. Levee systems also decay over time, which may increase the likelihood of failure. They require regular maintenance and periodic upgrades to retain their level of protection. When levees do fail, the resulting damage, including loss of life, may be much greater than if the levee system had not been built.

For all these reasons, FEMA strongly encourages people in levee-impacted areas to understand their flood risk, know and follow evacuation procedures, and protect their property by purchasing flood insurance, floodproofing their structure, or taking other precautionary measures. For more information on flood insurance, please visit [FloodSmart.gov](#).



Design Criteria		Section of the NFIP Regulations: 65.10(b)
<p>Description: For levee systems to be accredited by FEMA, communities and/or levee owners must submit data and documentation to show that adequate design and operations and maintenance systems are in place to provide reasonable assurance that the levee has, and will continue to have, base flood risk reduction capability.</p>		
<p>Checklist for Design Criteria:</p>		
■	<p>Freeboard. The minimum freeboard required is 3 feet above the Base Flood Elevation (BFE) all along the length of the levee, with an additional 1 foot within 100 feet of structures (such as bridges) or wherever the flow is restricted, and an additional 0.5 foot at the upstream end of a levee. Levees impacted by coastal flooding have special freeboard requirements (see Paragraphs 65.10(b)(1)(iii) and (iv)).</p>	
■	<p>Closures. All openings must be provided with closure devices that are structural parts of the system during operation and designed according to sound engineering practice.</p>	
■	<p>Embankment Protection. Engineering analyses must be submitted that demonstrate that no appreciable erosion of the levee embankment can be expected during the base flood, as a result of either currents or waves, and that anticipated erosion will not result in failure of the levee embankment or foundation directly or indirectly through reduction of the seepage path and subsequent instability.</p>	
■	<p>Embankment and Foundation Stability Analyses. Engineering analyses that evaluate levee embankment stability must be submitted. The analyses provided must evaluate expected seepage during loading conditions associated with the base flood and must demonstrate that seepage into or through the levee foundation and embankment will not jeopardize embankment or foundation stability. An alternative analysis demonstrating that the levee is designed and constructed for stability against loading conditions for Case IV as defined in the U.S. Army Corps of Engineers (USACE) Engineer Manual 1110-2-1913, <i>Design and Construction of Levees</i>, (Chapter 6, Section II), may be used.</p>	
■	<p>Settlement Analyses. Engineering analyses must be submitted that assess the potential and magnitude of future losses of freeboard as a result of levee settlement and demonstrate that freeboard will be maintained. This analysis must address embankment loads, compressibility of embankment soils, compressibility of foundation soils, age of the levee system, and construction compaction methods. In addition, detailed settlement analysis using procedures such as those described in USACE Engineer Manual 1110-1-1904, <i>Soil Mechanics Design—Settlement Analysis</i>, must be submitted.</p>	

RISK MAPPING, ASSESSMENT, AND PLANNING PROGRAM (RISK MAP)

The Federal Emergency Management Agency's Risk MAP Program delivers quality data that increases public awareness and leads to action to reduce risk to life and property. Risk MAP is a nationwide program that works in collaboration with States, Tribes, and Local communities using best available science, rigorously vetted standards, and expert analysis to identify risk and promote mitigation action, resulting in safer, more resilient communities.





Thank You

Tiffany Lyden
MT DNRC

Tlyden@mt.gov

(406) 444-0599

Nadene Wadsworth
MT DNRC

Nadene.Wadsworth@mt.gov

(406) 444-6732