Floodplain Mapping Update: Clark Fork & Bitterroot Rivers and Rock Creek

Missoula County & City of Missoula

Public Open House Meetings

October 18 – Fairgrounds | October 19 – Lolo School October 20 – County Courthouse

Project Partners

City of Missoula **Dave DeGrandpre and Alex Bramlette** City Floodplain/Community Planning



Missoula County **Matt Heimel and Bailey Minnich** County Floodplain Administrator / Planning

Department of Natural Resources and Conservation

Tiffany Lyden Mapping Outreach Specialist

Doug Brugger Floodplain Engineer

Larry Schock Regional Engineering Specialist

Shylea Wingard Floodplain Specialist Nadene Wadsworth Mapping Outreach Specialist

Katie Shank GIS Specialist











Granite County

Morrison-Maierle Luke Carlson Project Manager

Drummond, Montana



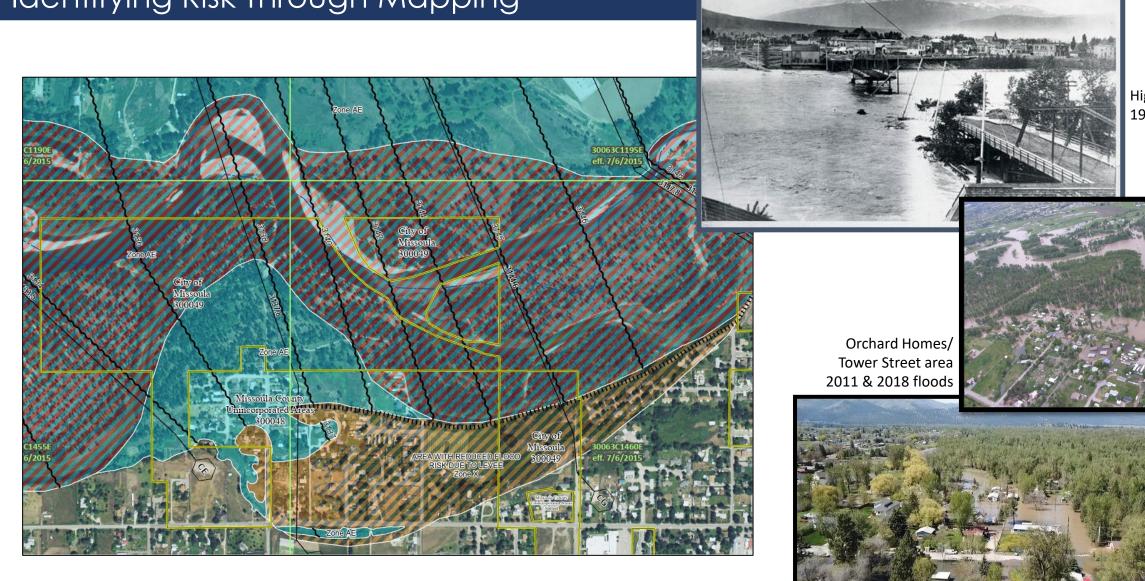
Allied Engineering Andrew Graham Project Manager

Tom Chingas Project Engineer



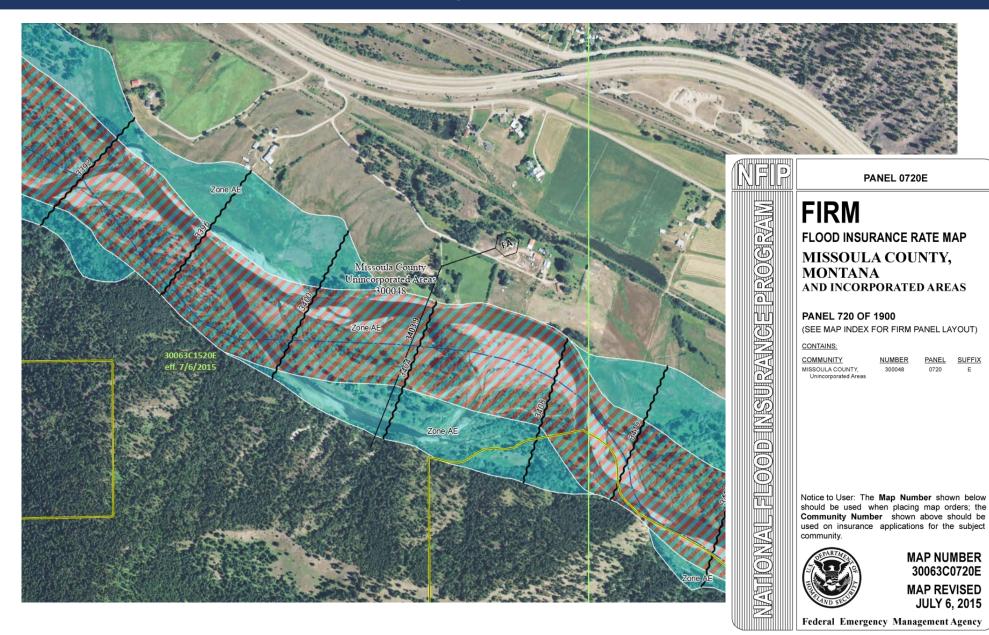


Identifying Risk Through Mapping



Higgins Avenue 1908 flood

Flood Insurance Rate Maps



100 year flood

1% annual chance flood

Flood Insurance Rate Maps

Floodplain Maps Flood Insurance Rate Maps (FIRMs)

25

Used for various purposes

- Local floodplain regulations
- Community planning
- Planning, subdivisions, septic
- Mortgage lenders
- Emergency management

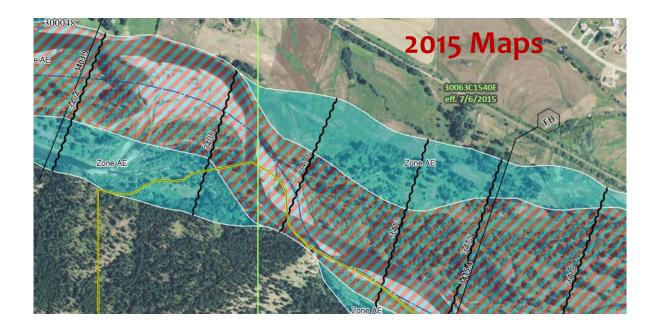
Need periodic updating

Current Floodplain Maps – Clark Fork/Bitterroot and Rock Cr

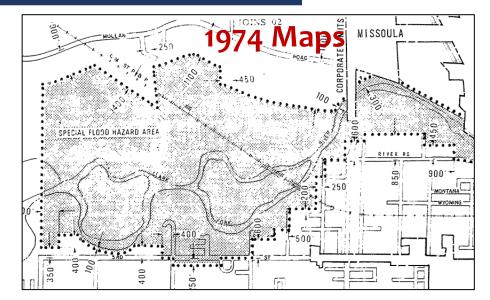
- 1974 Flood Hazard Maps
- 1980s FEMA Flood Insurance Rate Maps

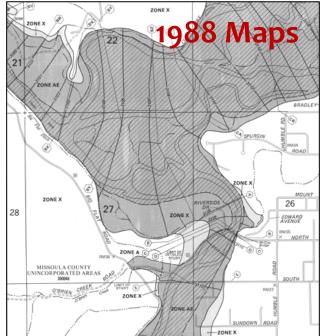
some revisions, small updates

• 2015 – Maps converted to digital format



Current maps are mostly based off data from 80s

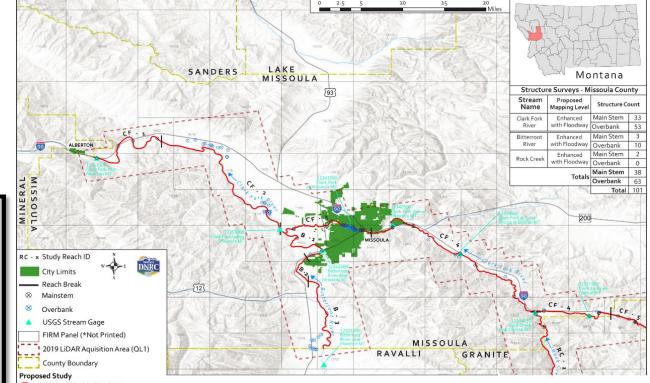




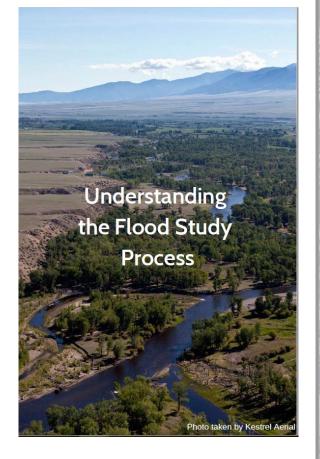
Floodplain Mapping Update

- Pre-2019 County & City expressed need for updated information, requested updates
- July 2019 FEMA grant:
 - Clark Fork River
 - Bitterroot River
 - Rock Creek
- Fall 2019 and onward Data collection and flood study work

	MISSOULA COUNTY Maiing Address: 200 West Broadway		
MISSOULA OFFICE OF THE MAYOR	Physical Address: 199 West Pine		
45 FR1MM MISCOLA, MCR1/MA 5082-437 (46) (52-861	C Missoula. M1 59902-429 (40) 354-4977 Bocc 2019-108 bocc@missoulacounty.us June 6, 2019		
July 1, 2019 Steve Story Montana DNRC Water Operations 1424 9 th Avenue	Stewn Story PE, CFM - Chief DNRC - Visiter Resources Division Proteina, MT 59520-1601 Hetera, MT 59520-1601 RE- Floodplan Magnica Scooling Meeting, Feb. 19, 2019		
P.O. Box 201601			
Helena, MT 59620-1601	Dear Mr. Story,		
Dear Mr. Story: The City of Missoula supports efforts to update flood studies and existing floodplain maps in the city. Most of the mapped floodplaims on our Flood Insurance Rate Maps are based on flood studies and	Thank you for visiting with us on Feb. 19, 2019, to discuss floodplain study options for the Clark Fork and Bitterroot Rivers as well as Rock Creck. We sincerely appreciate your willingness to come to Missoula and meet with us personally to explore options for updating the Federal Emergency Management Agency floodplain maps for these streams.		
information from the mid-1990s. As conditions and circumstances have changed – sometimes dimantically – in the intervening time decades, we believe that updating the floodplain studies to replace our existing, outflated floodplain maps is ever more critical. As the City of Articoals continues to grow, there has been an increase in requests for development located closer to the many dirches, creeks, streams and rivers throughout the city As of foods, the City of Missouh has approximately 4.837 residential unity, or 10.200 resident, within 150 feet of flooving water.	We understand that current LIDAR toopgraphy, as well as updated hydrology and new hydraulics, will be used to determine appropriate floodplain imaging for these areas. These are algorithant updates to our effective maps which, in some locations, use data that dates back to the 1960s. Missould County fully supports these mapping efforts and is willing to provide our previously acquired LIDAR, limited on-the-ground survey and bathymetry, as well as a hard match of \$8,500 for remapping some of these locations, per the effective BFEs to assist DNRC and FEMA.		
In the last tra years more than 304 residential units, or 638 residents, have located in areas adjacent to streams and revers. The city structs of botter smart development and encourage growth and updated flood studies are important in order for the city to do so in a manner that maintains the integrity of the raparana areas, which also protecting the staffset of life and property located along the water's edge. The City of Misseab is committed to protecting the river systems, managing flood risks and participating in the National Flood Insurger Program. Updated, detailed studies would be a benefit to City of	An issue that we discussed on Feb. 19 relates to what we believe to be inappropriate flootplain mapping of atormwater-related issues in bissouls's 30xH thile. In particular, we beliew that the AO flootplain designation identified on FEMA map panel #1460 associated with South Hills Drive is not associated with a vartercourse or drainways as defined by MCA 756-103 and should not have been identified as a designated, regulatory flootplain. We ask for your assistance in requesting a formal evaluation from FEMA.		
Missoula 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 floodplains studies in the City of Missoula. Thisma better data is a locar studing need of both the city and Missoula County. To the extent we are able, we will be pleased to provide any support that will further the achievement of this project.	Once again, we thank you and your staff for your efforts and assistance to define and manage flood risks in Missoula County. If you have questions concerning this letter, please feel free to contract Tood Kletz, floodplain adverter, at 409-258-1441 or via email at kiletz@missoulacounty.us. Sincerely.		
Sincerely,	BOARD OF COUNTY COMMISSIONERS Nicole Royley, Chair Jefn Stofnek, Commissioner		
John Engen Mayor	JUN 10 7/10		
	D.N.R.C		



Enhanced with Floodway



Flood Study Steps

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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.

Limit Of Study

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.

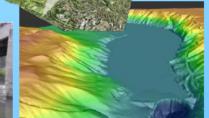
Step 4 - Mapping (delineation): the results from step 3 are combined with the elevation data and official maps to see how far the water will spread out. The area shown to be underwater during the flood is the regulatory floodplain.

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

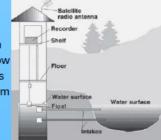




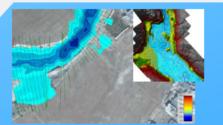


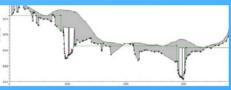
Lidar

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 model1) Hydrology (stream flow data)2) Cross Sections (measurements ofthe river bottom at key locations)3) Roughness (thickness ofvegetation, land cover, etc determinedby 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.

Draft Maps – ready for review

www.floodplain.mt.gov/missoula-granite

Missoula-Granite Floodplain Mapping Update

A Story Map

Draft Floodplain Mapping

The flood hazard information in this section is currently a draft product. It only includes selected areas pertaining to this study in Missoula and Granite Counties. The draft floodplain designations are undergoing public review and are based on updated flood study information.

To see the current FEMA mapping, go to section 2.

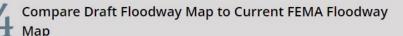
100-year Floodplain (1% Annual Chance) Floodway within 100-year Floodplain

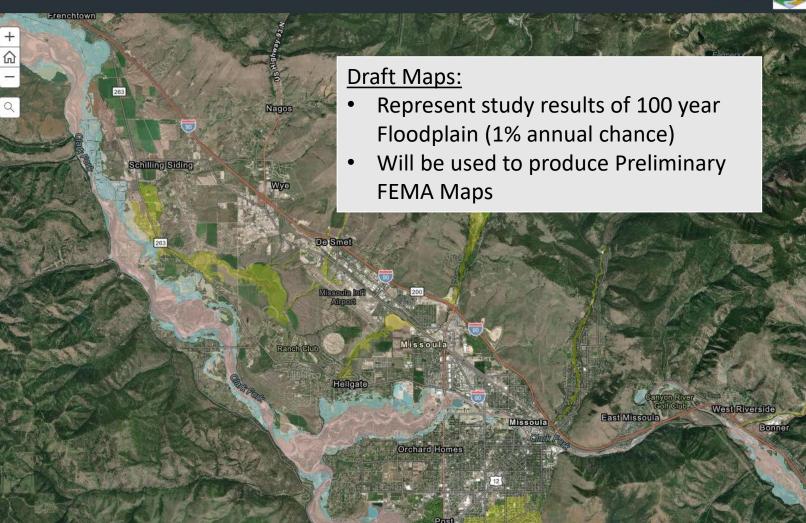
500-year	Floodplair	n (0.2% Annual	Chance)
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Current Effective FEMA Mapping

Current FEMA Floodplain Mapping







Resources

www.floodplain.mt.gov/missoula-granite

www.floodplain.mt.gov/missoula-granite

- draft map viewer
- reports
- study details and timeline

can also access from:

https://www.engagemissoula.com/floodplainmapping-project

https://tinyurl.com/3nc24dhm

Missoula-Granite Floodplain Maps Update

Missoula and Granite Counties are working with MT DNRC and FEMA to update and produce new Flood Insurance Rate Maps (FIRMS) for the Clark Fork River, Bitterroot River, Rock Creek, and Rock Creek Tributaries. Updated floodplain maps will depict the latest, most accurate flood risk data, and will eventually replace the existing floodplain maps which are based on data from the 1970s.

For more information, see: Background on existing floodplain maps.

Meeting Information

Public Open House Meetings for Missoula County and the City of Missoula:

Tuesday, Oct 18 6pm Commercial Building at the Missoula Fairgrounds Wednesday, Oct 19, 6pm Lolo School Lower Gym Lolo Thursday, Oct 20, 6pm Missoula County Courthouse Sophie Moiese Room

Virtual Option will be offered all three nights

Zoom link: https://ogilvy.zoom.us/j/93562758029

Passcode: 7477

To register (not required) for the virtual option for the meetings please click here.

DNRC held project kickoff meetings on October 23, 2019 with Missoula County and the City of Missoula. To view the slides that were presented click here.

<u>View Draft Data</u>

Draft Map Viewer

Draft maps and studies need to go through a lengthy technical and public review process. When finalized, new maps could have effects on some property owners in mapped 100-year floodplains. Click on your county below to learn about the floodplain designations referenced on the maps:

Missoula County [Show/Hide]

Granite County [Show/Hide]

Draft data reports



More Info

DNRC

Background on existing floodplain maps

Contact Missoula County

Matt Heimel Missoula County Floodplain Administrator (406) 258-4657 email

mheimel@missoulacounty.us

Contact the City of Missoula

Cassie Tripard City of Missoula Floodplain Administrator (406) 552-6673 email

TripardC@ci.missoula.mt.us

Contact Granite County

Linda Bouck Granite County Floodplain Administrator (406) 859-7021 email

Gcplanning@co.granite.mt.us

Contact Town of Drummond

Cary McLure Town of Drummond Floodplain Administrator (406) 288-3231 email

townofdrummond@blackfoot.net

Contact DNRC

Nadene Wadsworth MT DNRC Outreach Specialist (406) 444-6732 email Nadene.Wadsworth@mt.gov

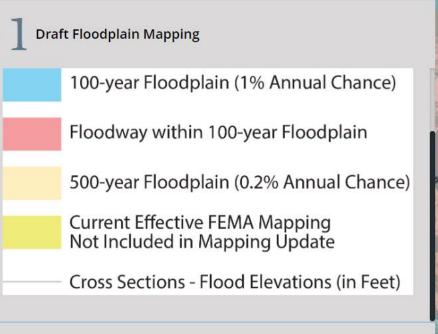
Tiffany Lyden

MT DNRC Outreach Specialist (406) 444-0599 email TLyden@mt.gov

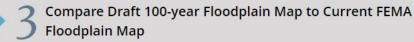
Draft Maps – ready for review

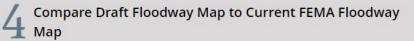
Missoula-Granite Floodplain Mapping Update

A Story Map



Current FEMA Floodplain Mapping







Draft Map Viewer

Missoula-Granite Floodplain Mapping Update

Draft Floodplain Mapping

100-year Floodplain (1% Annual Chance)

Floodway within 100-year Floodplain

500-year Floodplain (0.2% Annual Chance)

Current Effective FEMA Mapping Not Included in Mapping Update

Cross Sections - Flood Elevations (in Feet)

Current FEMA Floodplain Mapping

Compare Draft 100-year Floodplain Map to Current FEMA Floodplain Map

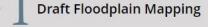
Compare Draft Floodway Map to Current FEMA Floodway Map



Draft Map Viewer - Current Maps

Missoula-Granite Floodplain Mapping Update

A Story Map



Current FEMA Floodplain Mapping

The FEMA floodplain boundaries and information were digitized from current FEMA maps. This viewer is not intended to be used for regulatory purposes and should only be used as a visualization tool. The official FEMA maps and other flood hazard products are available from the FEMA Map Service Center online at: http://www.msc.fema.gov

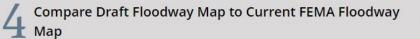
100-year Floodplain (1% Annual Chance)

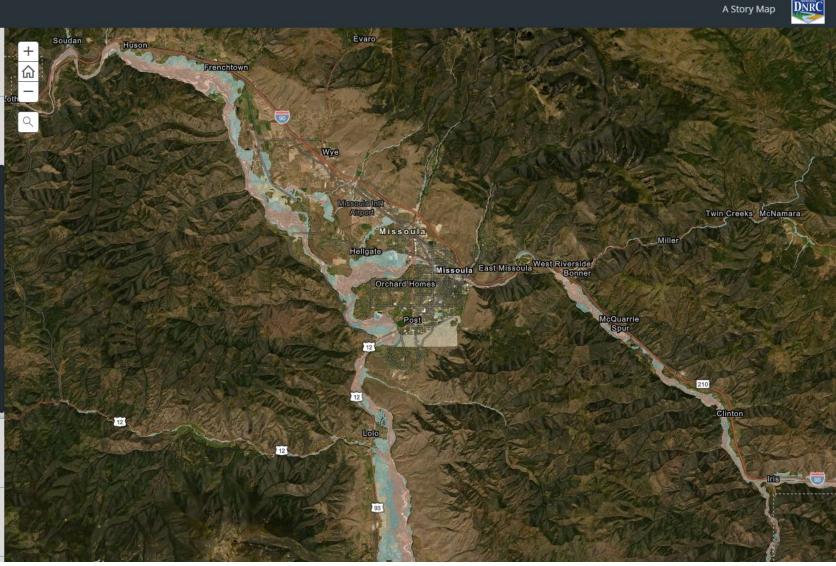
Floodway within 100-year Floodplain

500-year Floodplain (0.2% Annual Chance)

Cross Sections - Flood Elevations (in Feet)

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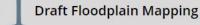




Draft Map Viewer – Floodplain Changes

Missoula-Granite Floodplain Mapping Update

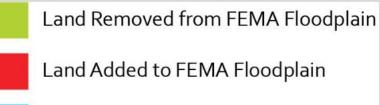
A Story Map



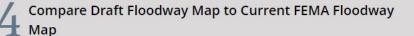
Current FEMA Floodplain Mapping

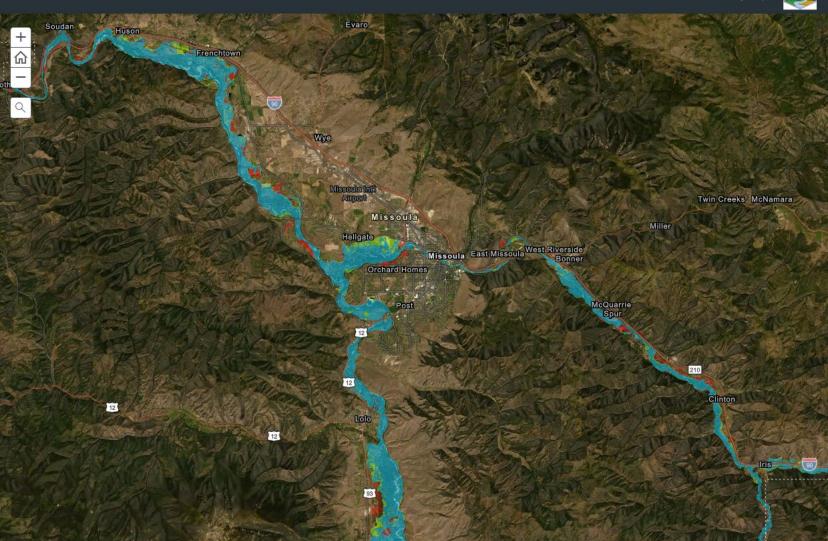
Compare Draft 100-year Floodplain Map to Current FEMA Floodplain Map

This section compares the proposed 100-Year (1% Annual Chance) floodplain mapping to the current FEMA 100 year (1% Annual Chance) Floodplain maps in portions of Missoula and Granite Counties. The 100-Year Floodplain is considered to have a HIGH flood risk, it is the area expected to be inundated by a flood event having a 1% chance of being equaled or exceeded in any given year.



No Change to FEMA Floodplain





Draft Map Viewer – Floodway Changes

Missoula-Granite Floodplain Mapping Update

A Story Map 🛛 🚺

Draft Floodplain Mapping

Current FEMA Floodplain Mapping

Compare Draft 100-year Floodplain Map to Current FEMA Floodplain Map

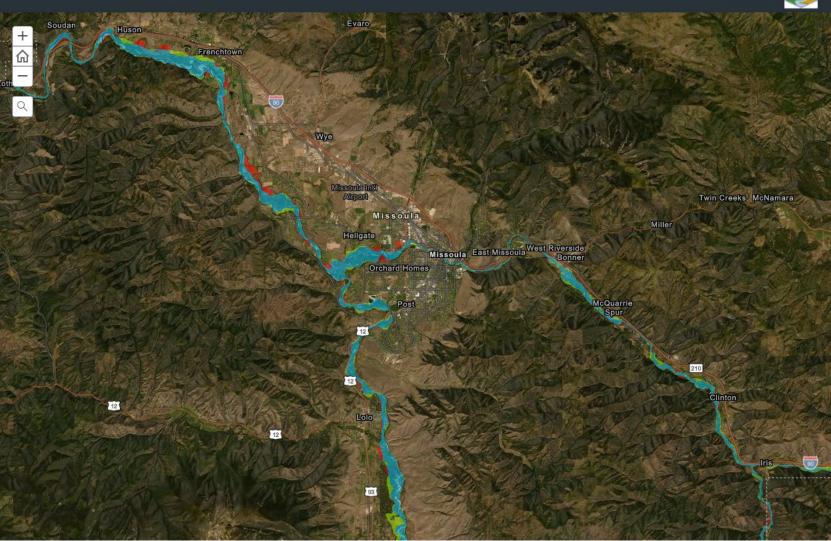
Compare Draft Floodway Map to Current FEMA Floodway Map

This section compares the proposed Floodway to the Floodway on the **current FEMA maps in portions of Missoula and Granite Counties**. A Floodway is the area within the 100-Year floodplain that must be kept free from new development so that the 100-Year flood can be carried without substantial increases in flood heights. The Floodway will usually see the deepest and fastest water during a 100-year flood event.

Land Removed from FEMA Floodway

Land Added to FEMA Floodway

No Change to FEMA Floodway



Missoula-Granite Floodplain Mapping Update

A Story Map

DNRC

Draft Floodplain Mapping

To see the current FEMA mapping, go to section 2.

100-year Floodplain (1% Annual Chance)

Floodway within 100-year Floodplain

500-year Floodplain (0.2% Annual Chance)

Current Effective FEMA Mapping Not Included in Mapping Update

Cross Sections - Flood Elevations (in Feet)

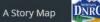
Current FEMA Floodplain Mapping

Compare Draft 100-year Floodplain Map to Current FEMA Floodplain Map

Compare Draft Floodway Map to Current FEMA Floodway Map



Missoula-Granite Floodplain Mapping Update



Draft Floodplain Mapping

Current FEMA Floodplain Mapping

Compare Draft 100-year Floodplain Map to Current FEMA Floodplain Map

This section compares the proposed 100-Year (1% Annual Chance) floodplain mapping to the current FEMA 100 year (1% Annual Chance) Floodplain maps in portions of Missoula and Granite Counties. The 100-Year Floodplain is considered to have a HIGH flood risk, it is the area expected to be inundated by a flood event having a 1% chance of being equaled or exceeded in any given year.

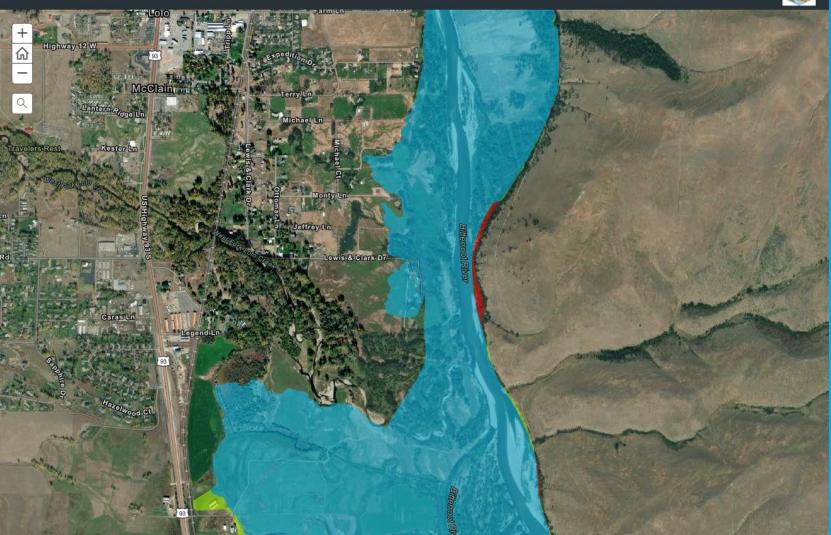


Land Removed from FEMA Floodplain

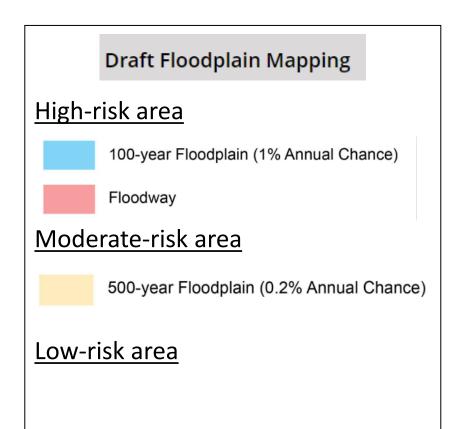
Land Added to FEMA Floodplain



Compare Draft Floodway Map to Current FEMA Floodway Map



Know where your property or building is in relation to the draft floodplain boundaries and flood risk zones



View the draft maps at home: www.floodplain.mt.gov/missoula-granite

Also accessible from:

https://www.engagemissoula.com/floodplain-mapping-project

https://tinyurl.com/3nc24dhm



FLOODPLAIN REGULATIONS

City of Missoula and Missoula County have floodplain regulations that regulate development within the 100-year floodplain.

Floodplain permits are required for any manmade activities including construction and modifications to existing structures.

New construction and additions- elevated 2'

Improvements and additions to existing structures \geq 50% of building's value, will require the entire structure to be brought into compliance.

No new buildings and limited development is allowed in the **Floodway**



FLOOD INSURANCE

Flood insurance is mandatory for buildings with a federally backed loan in a high-risk flood zone.

Flood insurance is not mandatory in a lower risk zone but is highly recommended. Lenders can always require insurance in any zone.

Landowners can buy **flood insurance** to protect their assets; renters can buy **flood insurance** for their contents.

Flood insurance is the best form of personal risk management and provides important economic protection against flooding.







Estimated Timeline

Country Country Country Project Timeline Missoula-Granite Floodplain Maps Update

Estimated Completion date Mid 2022 (est.) Early 2023 (est.) 2020 2021 2025 (est.) Measurements are made of The elevation and the topography around the Draft data is survey data are EMA Preliminary Maps FEMA Flood river, along with any culverts, delivered to the combined with the flood are produced and ready Insurance Rate bridges, and road crossings. communities. Public flow data to determine for public review and Maps finalized. LiDAR uses an airplane to open houses will be where the water will go comment period. A collect ground elevation over conducted for when it overflows the second public open a large area, and ground landowners to channel and how far it house is usually survey supplements the review the will spread out. The area conducted to review the airborne data. Flood flow information. shown to be underwate ir formation. 90-day data determine how much and at high risk is official comment & water there will be in a river mapped as the ppeal period held. during a flood event. regulatory floodplain. Preliminary Data Flood Insurance **Engineering and** Draft Data available Data gathering **Rate Maps become** public comment floodplain modeling public review and appeal period effective Public Rovie **Resiliency** and Flood Study Conducted Mitigation efforts 2 public open houses are usually held during this time. 4 steps of a flood study. Once new maps become Once at draft map stage and again at preliminary map 1) Survey & LiDAR 3) Hydraulics (engineering) effective the community stage. can determine what 2) Hydrology (flood flow) 4) Mapping (delineation) During this time public comments are encouraged. mitigation efforts it would There will be an official 90-day appeal period after the like to pursue to reduce maps become preliminary. flood risks.

- Thank You -Staff You Can Speak With

<u>City Staff</u> Alex Bramlette Dave DeGrandpre

> <u>County Staff</u> Matt Heimel Bailey Minnich

DNRC Doug Brugger Larry Schock Tiffany Lyden Katie Shank Peri Turk Shylea Wingard

Morrison-Maierle Luke Carlson

<u>Allied Engineering</u> Andrew Graham Tom Chingas

Virtual Attendees

Floodplain Mapping Specialist Nadene Wadsworth <u>Nadene.Wadsworth@mt.gov</u> (406) 444-6732

NFIP Coordinator Traci Sears <u>TSears@mt.gov</u> (406) 444-6654

Floodplain Mapping Specialist Tiffany Lyden <u>Tlyden@mt.gov</u> (406) 444-0599 Floodplain Specialist Shylea Wingard Shylea.Wingard@mt.gov (406) 444-1343

FLOODPLAIN MAPPING PROGRAM