Teton County
City of Choteau
Flood Risk Review Meeting

October 25, 2023, 10am-11am

Agenda

- Introductions
- What are floodplain maps and why are they important
- Existing community floodplain maps
- Current project
- Development and Regulations
- Next steps
- Discussion

Project Partners

Teton County

City of Choteau

Department of Natural Resources and Conservation

Federal Emergency Management Agency

DNRC Contractors:

Topography/LiDAR – NV5

Survey Morrison-Maierle

Hydrology- USGS and Michael Baker, Int.

Hydraulic Analysis and Floodplain Mapping

Muddy Creek, Deep Creek, & Tributaries- DOWL

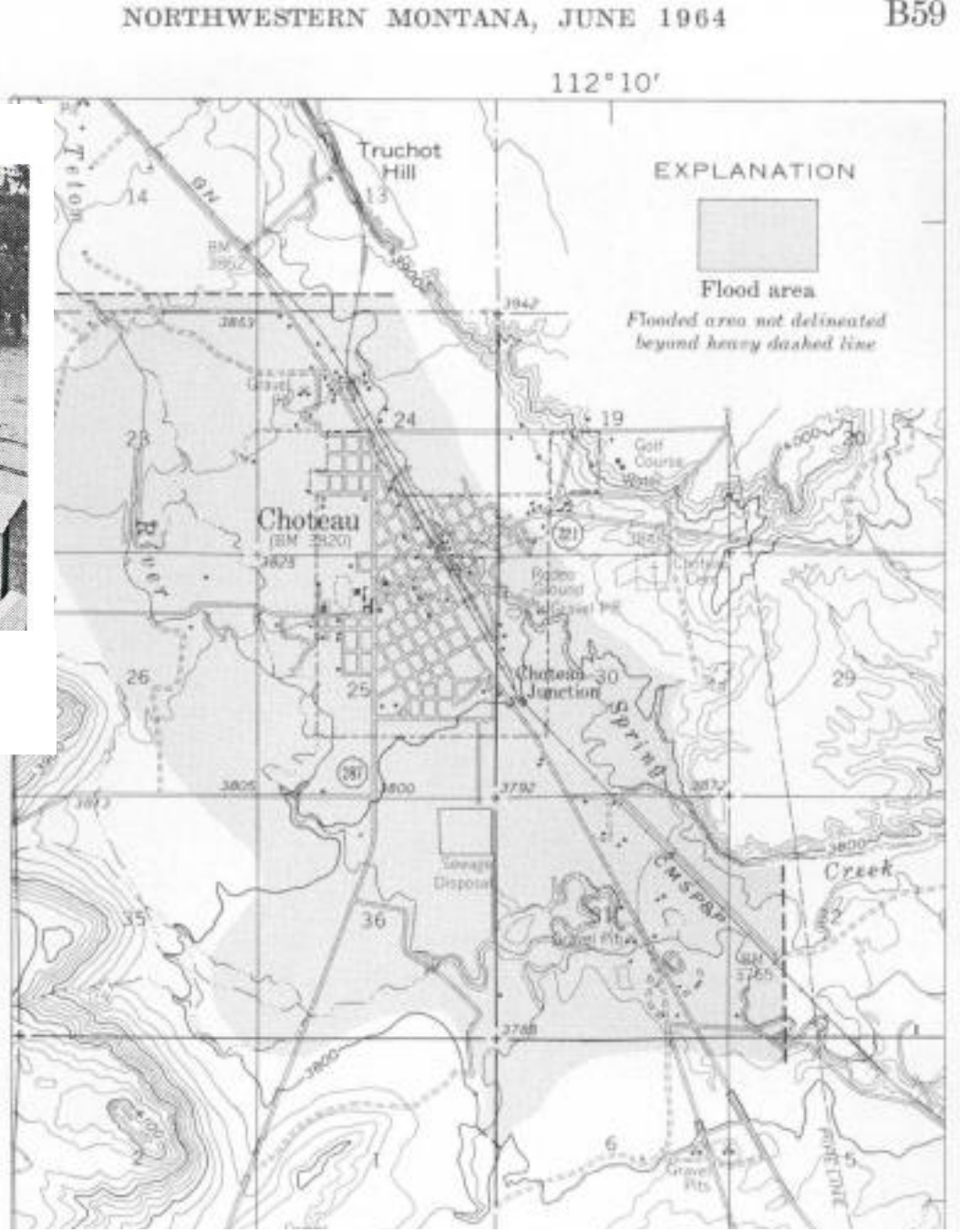
Sun River & Tributaries- RESPEC

Teton River & Tributaries- Great West

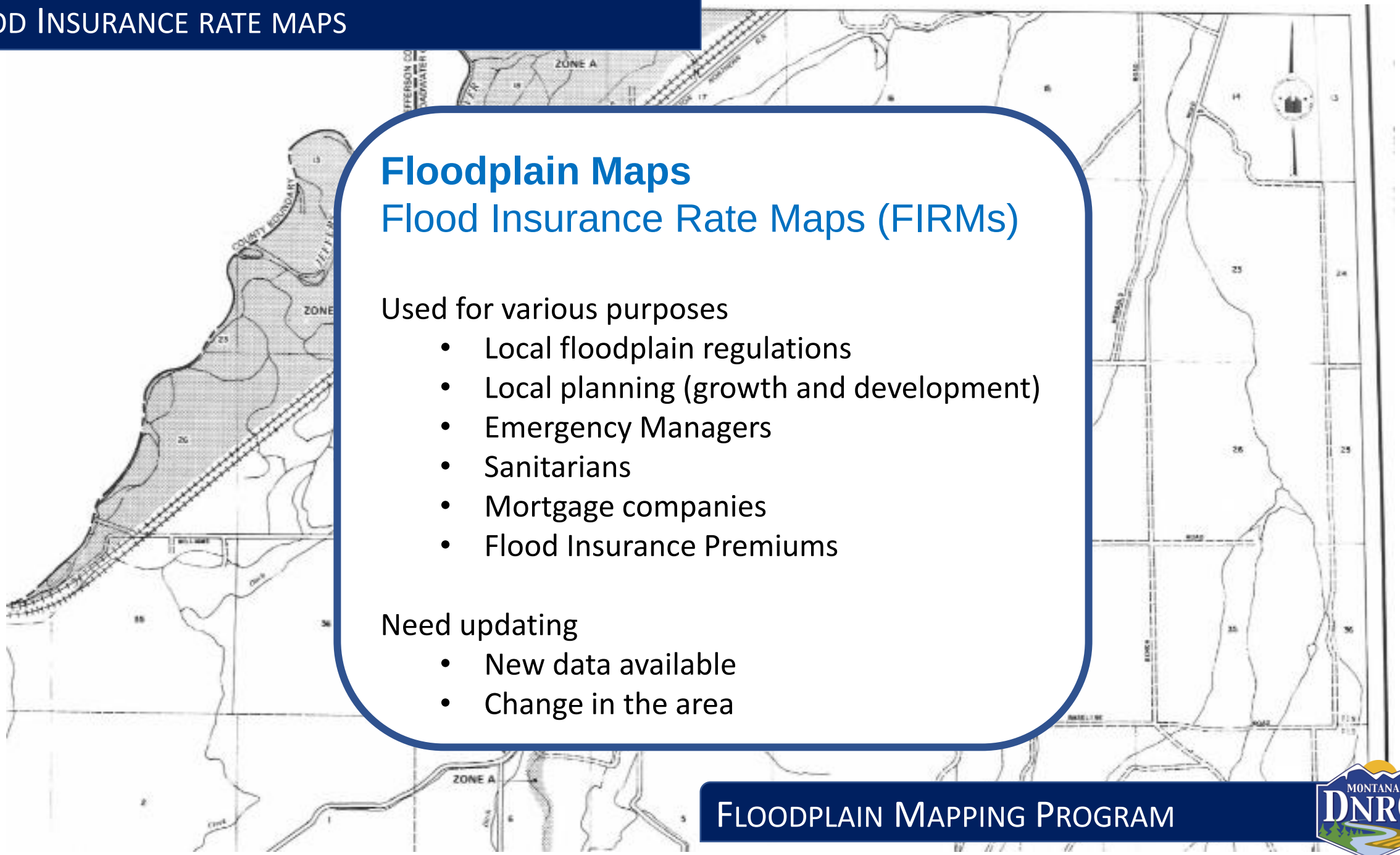
IDENTIFYING RISK THROUGH MAPPING

CHOTEAU HIT

Image from "1964 Flood" (Great Falls Tribune) showing flooding in downtown Choteau



USGS estimated Flood Extents in Choteau (1964)



Floodplain Maps

Flood Insurance Rate Maps (FIRMs)

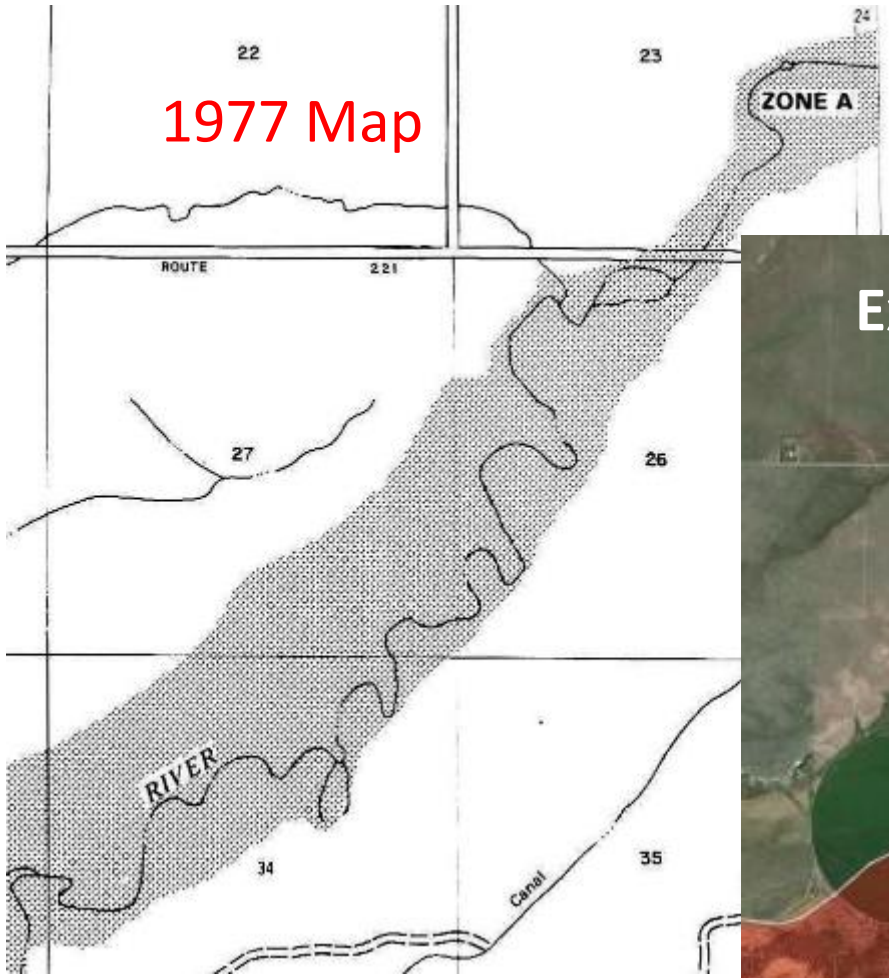
Used for various purposes

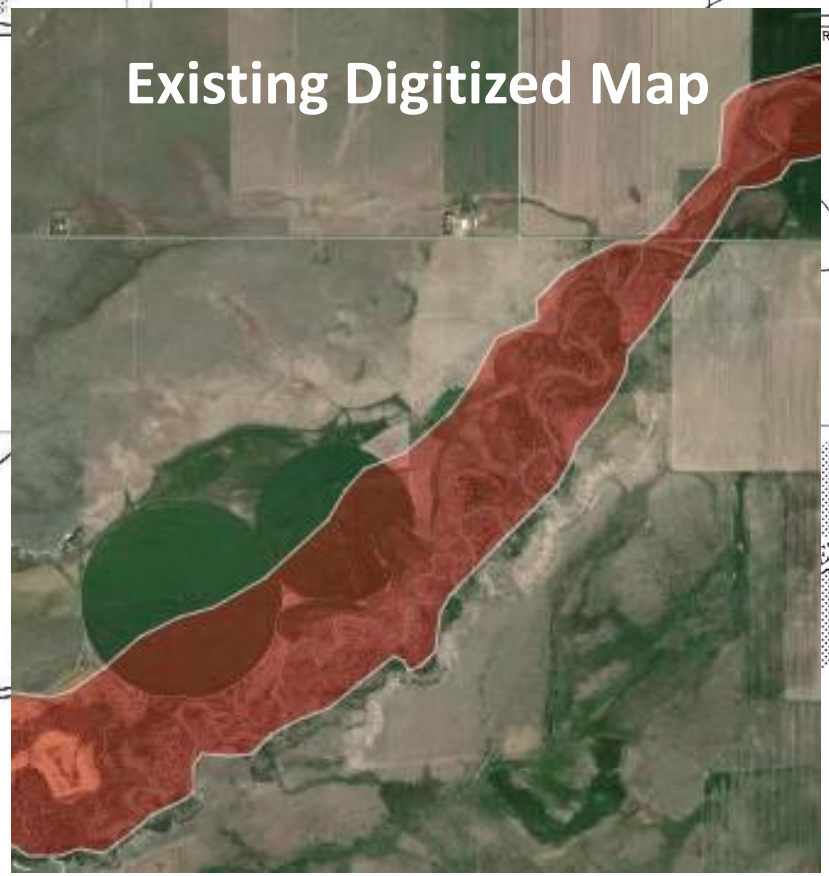
- Local floodplain regulations
- Local planning (growth and development)
- Emergency Managers
- Sanitarians
- Mortgage companies
- Flood Insurance Premiums

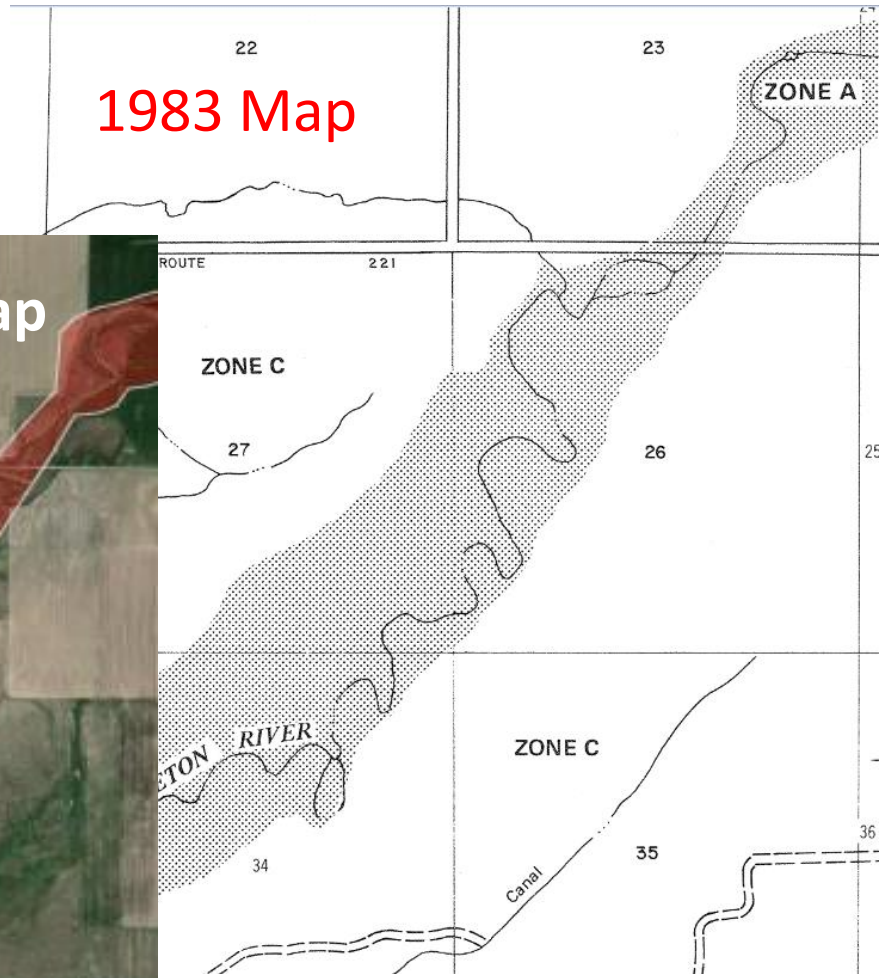
Need updating

- New data available
- Change in the area

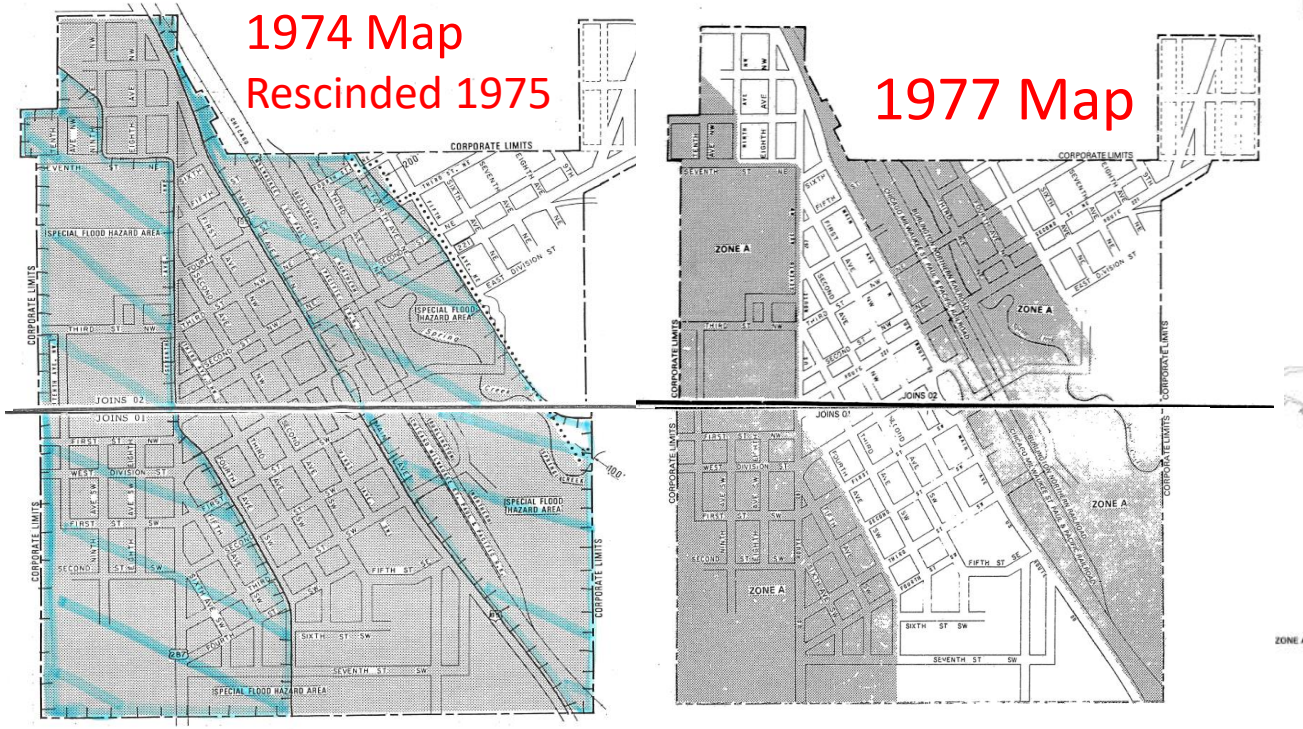
TETON COUNTY FLOODPLAIN MAPS

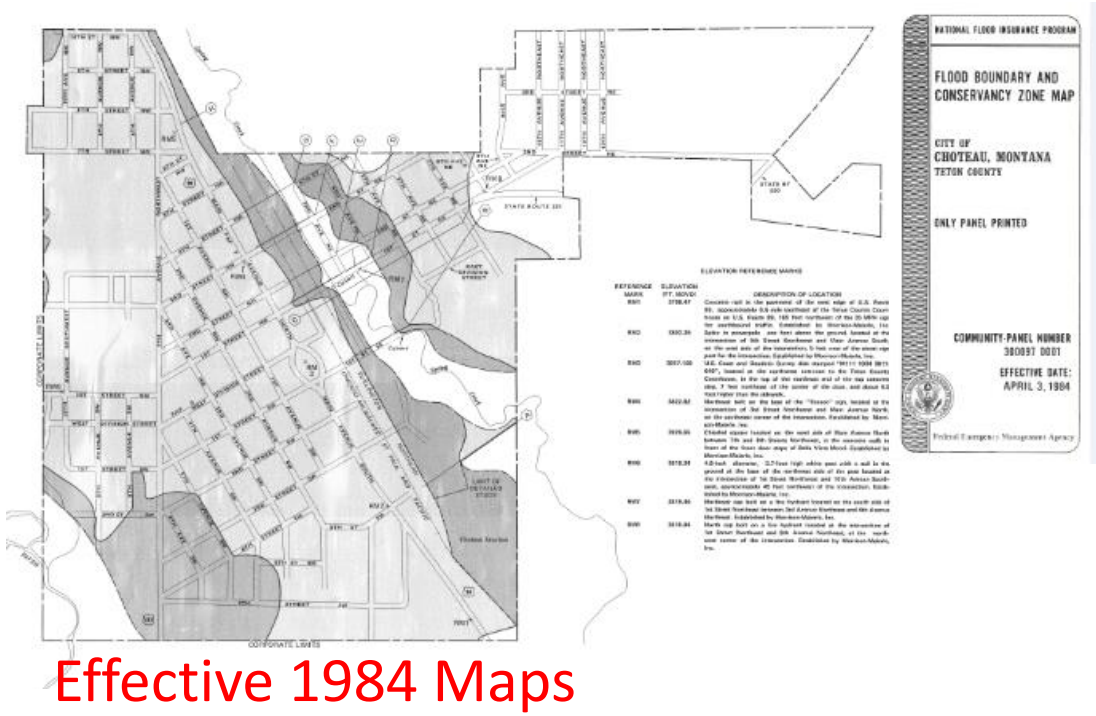




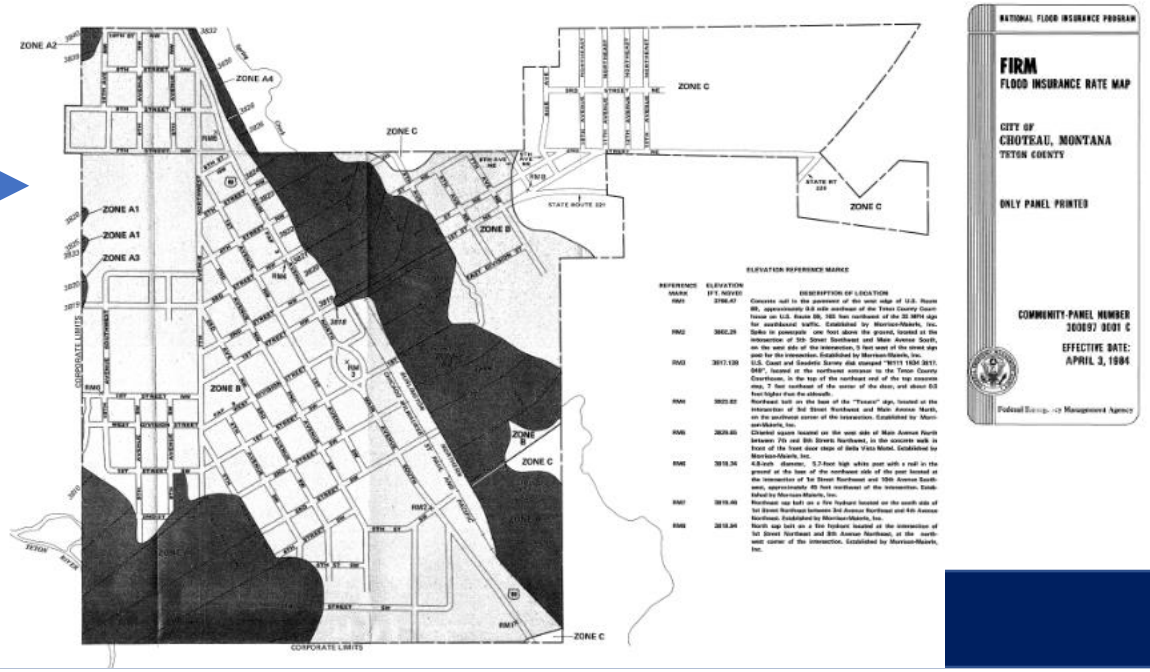


CHOTEAU FLOODPLAIN MAPS





Effective 1984 Maps



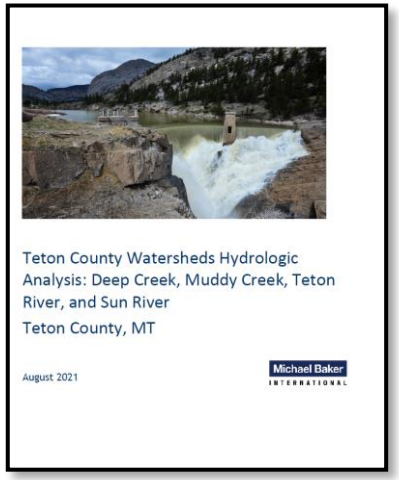
1983 Maps

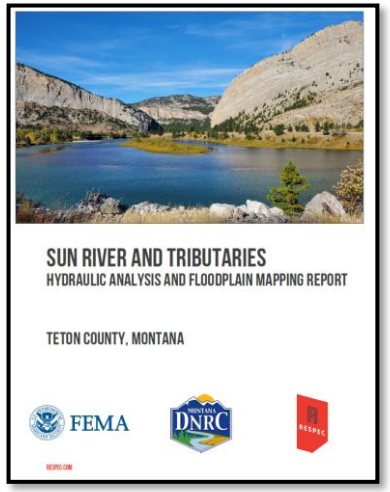
- Early ‘80s flood studies:
  - Teton R (5.9 miles)
  - Spring Creek (1.6 miles)
  - Sun River (3.1 miles)

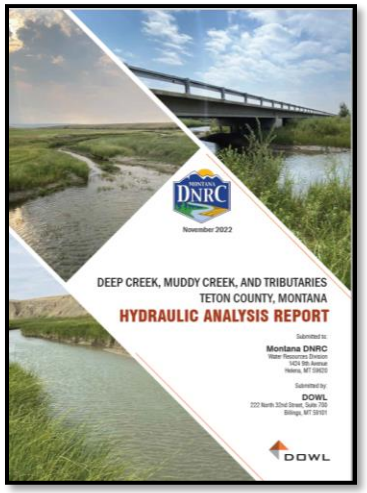
Project Background and Products

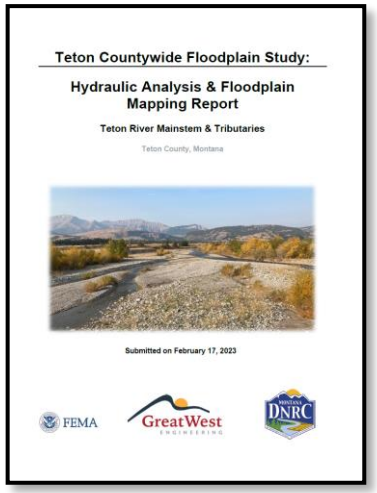
2020-Request and support for new mapping
2020-2021-Data Collection
2021-2023- Engineer modeling
2023-Draft data available

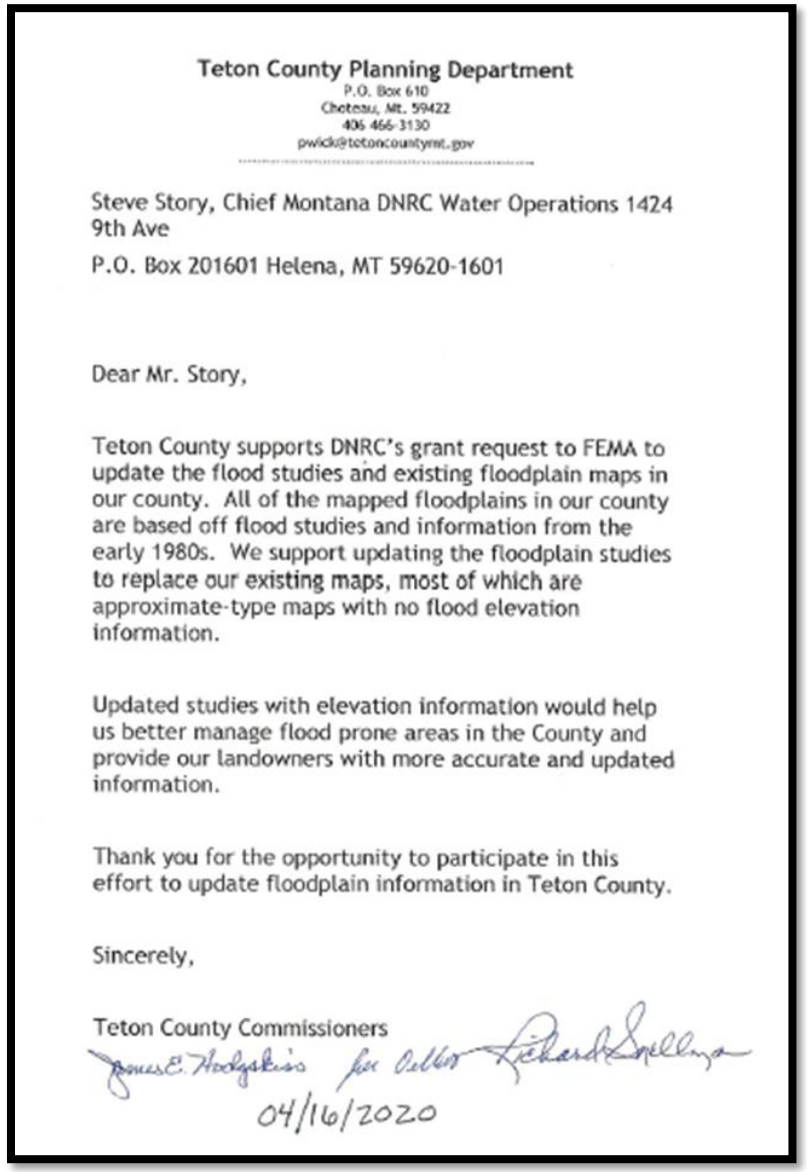
- Survey report
- Hydrology report
- Hydraulics reports











Teton County Planning Department
P.O. Box 610
Choteau, Mt. 59422
406 466-3130
pwick@tetoncountymt.gov

Steve Story, Chief Montana DNRC Water Operations 1424 9th Ave

P.O. Box 201601 Helena, MT 59620-1601

Dear Mr. Story,

Teton County supports DNRC's grant request to FEMA to update the flood studies and existing floodplain maps in our county. All of the mapped floodplains in our county are based off flood studies and information from the early 1980s. We support updating the floodplain studies to replace our existing maps, most of which are approximate-type maps with no flood elevation information.

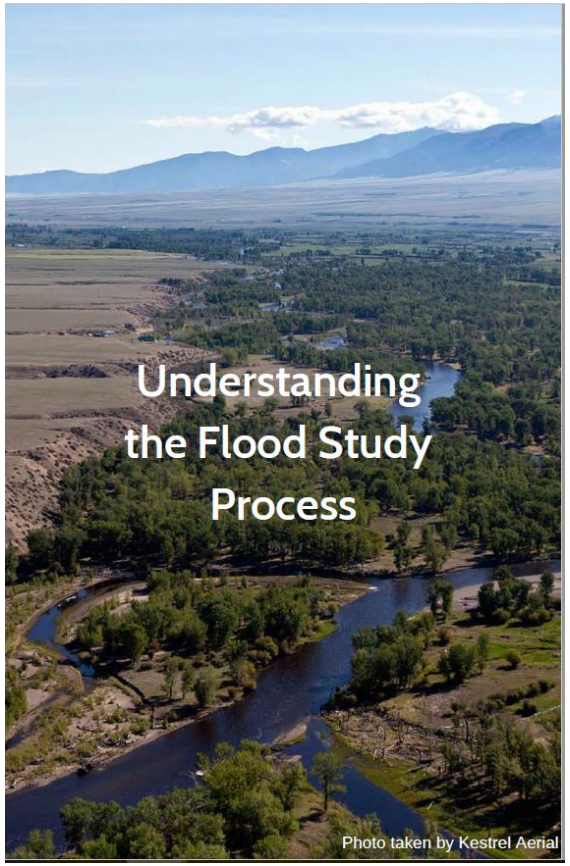
Updated studies with elevation information would help us better manage flood prone areas in the County and provide our landowners with more accurate and updated information.

Thank you for the opportunity to participate in this effort to update floodplain information in Teton County.

Sincerely,

Teton County Commissioners

04/16/2020



Flood Study Steps

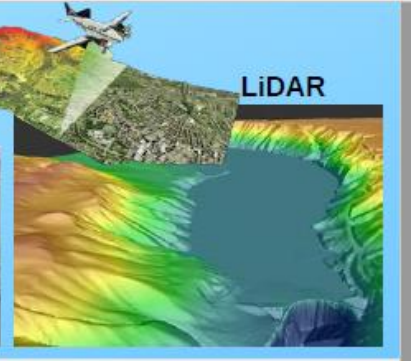
Step 1 - Survey: measurements are made of the topography around the river, along with any culverts, bridges, and road crossings. LiDAR uses an airplane to collect ground elevation over a large area, and ground survey supplements the airborne data.

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.

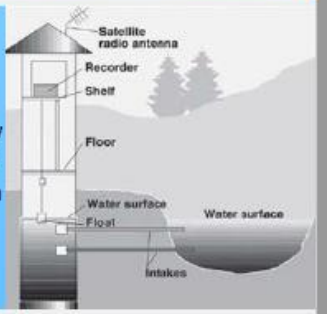
Step 3 - Hydraulics: once the first two steps are complete, calculations can show where the water will go during the flood. The elevation data is combined with the flood flow data to determine where the water will go when it overflows the channel.

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.

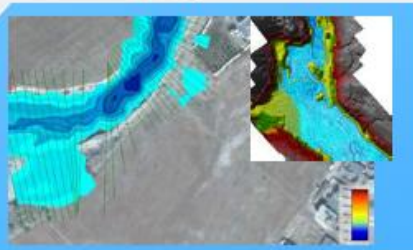
Step 1 - Survey: The type of the survey depends on the size of the study area and type of study.

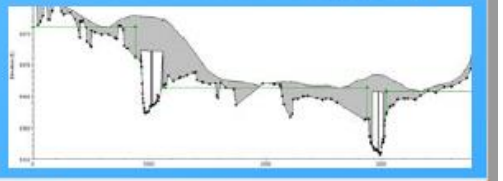


Step 2 - Hydrology:
Stream gage stations are an important tool to determine flow rates. If nearby stream gages aren't available, gage data from a similar location is used to determine the flow rate.

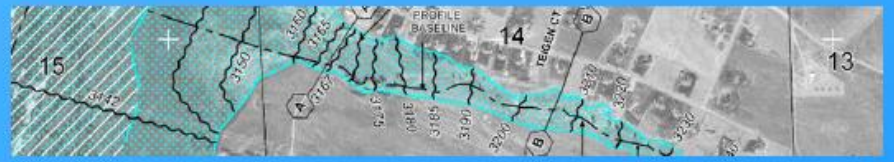


Step 3 - Hydraulics:
5 main components to the model
1) Hydrology (stream flow data)
2) Cross Sections (measurements of the river bottom at key locations)
3) Roughness (thickness of vegetation, land cover, etc determined by surveyors)
4) Structures (road crossings, culverts, bridges, etc.)
5) Downstream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

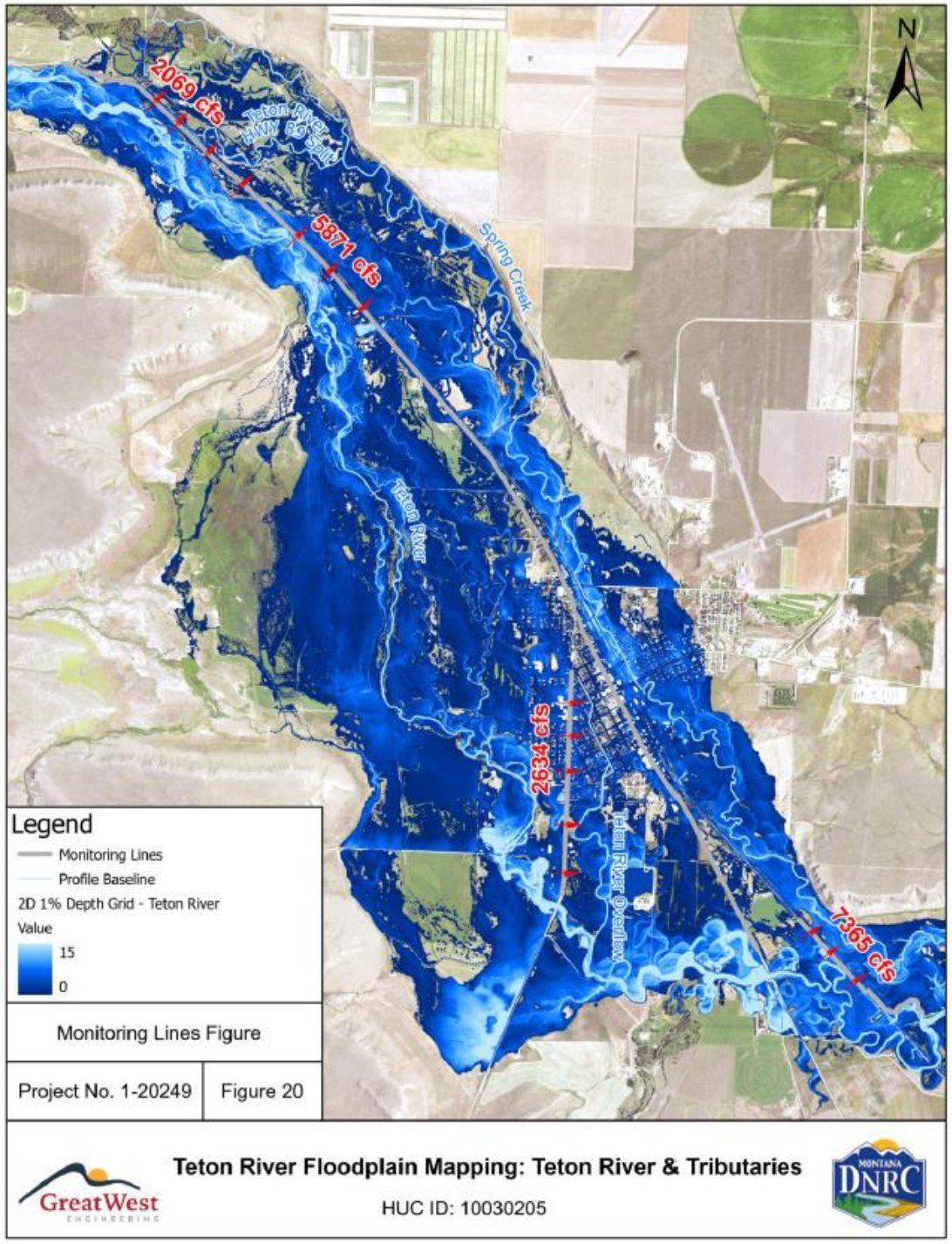




Step 4 - Mapping (delineation):
The result will be the floodplain boundary and a depth grid identifying the shallower and deeper areas of flooding.



Flows through Choteau



- Updated Hydrology shows flood flows are greater than what the original FIS shows.
  Table 5 in the Hydrology report- original 16,000 cfs new 23,181 cfs

Table 5. Comparison of peak flow values from effective FIS to results from this study.

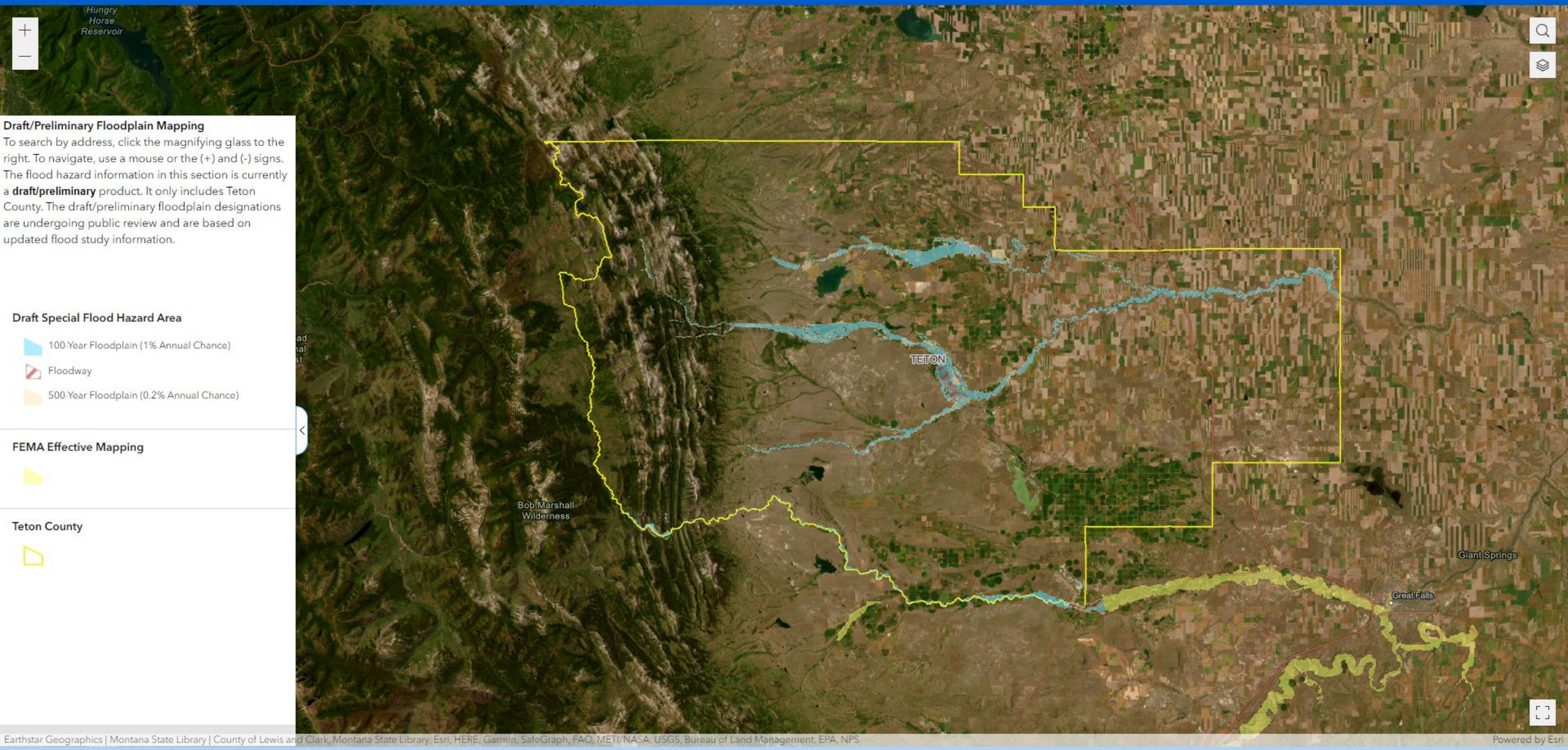
Baker Node (or USGS Station ID if gaged site)	Location Description	Peak Flood Frequency Source	Drainage Area (mi²)	Peak Flow (cfs) 10% Annual Chance 10-year	4% Annual Chance 25-year	2% Annual Chance 50-year	1% Annual Chance 100-year	0.2% Annual Chance 500-year	Methodology
TR-99.7	Teton River above Choteau	USGS 2021 Peak Flow Analysis	164	3,342	7,737	13,857	23,181	64,884	Linear interpolation between Dutton and Strabane gages
		Teton County Effective FIS (Effective 1983)	221	3,400	(1)	10,000	16,000	45,800	Regression Analyses performed on 10 gages in the general area.
TR-90.1	Teton River at US 287	USGS 2021 Peak Flow Analysis	181	3,397	7,831	13,977	23,342	65,312	Linear interpolation between Dutton and Strabane gages
		Teton County Effective FIS (Effective 1983)	221	3,400	(1)	9,540	15,200	38,100	Regression Analyses performed on 10 gages in the general area. Reduction in flow due to overflow into Spring Creek drainage
TR-85.2	Teton River downstream of Deep Creek	USGS 2021 Peak Flow Analysis	475	4,003	8,837	15,238	25,019	69,777	Linear interpolation between Dutton and Strabane gages
		Teton County Effective FIS (Effective 1983)	447	5,000	(1)	14,040	21,200	62,500	Regression Analyses performed on 10 gages in the general area. Reduction in flow due to overflow into Spring Creek drainage
USGS 06085800	Sun River at Simms	USGS 2021 Peak Flow Analysis	1,296	12,800	19,000	24,800	31,500	52,100	MOVE3 record extension. From 38 peak flow events at-site to 86 events.
		Teton County Effective FIS (Effective 1983)	1,224	12,000	(1)	24,500	38,000	100,000	LPIII Analysis (Bulletin 17A) from 26 yrs of record.
SPC-3-5.3	Spring Creek at Choteau	Regression Analyses	5.6	213	398	591	822	1,670	StreamStates regression equations.
		Teton County Effective FIS (Effective 1983)	5.6	375	(1)	1,100	1,700	8,075	Rainfall-runoff methods. Cross checked against regional runoff methods, found to be close enough to appropriately represent flood risk from Spring Cr. May require incorporation of Teton River overflows into Spring Creek.

Notes: (1) data not provided

Teton County Flood Risk Map Viewer

Montana DNRC Floodplain Mapping Program

Montana DNRC Floodplain Mapping Projects



Draft/Preliminary Floodplain Mapping

To search by address, click the magnifying glass to the right. To navigate, use a mouse or the (+) and (-) signs. The flood hazard information in this section is currently a **draft/preliminary** product. It only includes Teton County. The draft/preliminary floodplain designations are undergoing public review and are based on updated flood study information.

Draft Special Flood Hazard Area

- 100-Year Floodplain (1% Annual Chance)
- Floodway
- 500-Year Floodplain (0.2% Annual Chance)

FEMA Effective Mapping

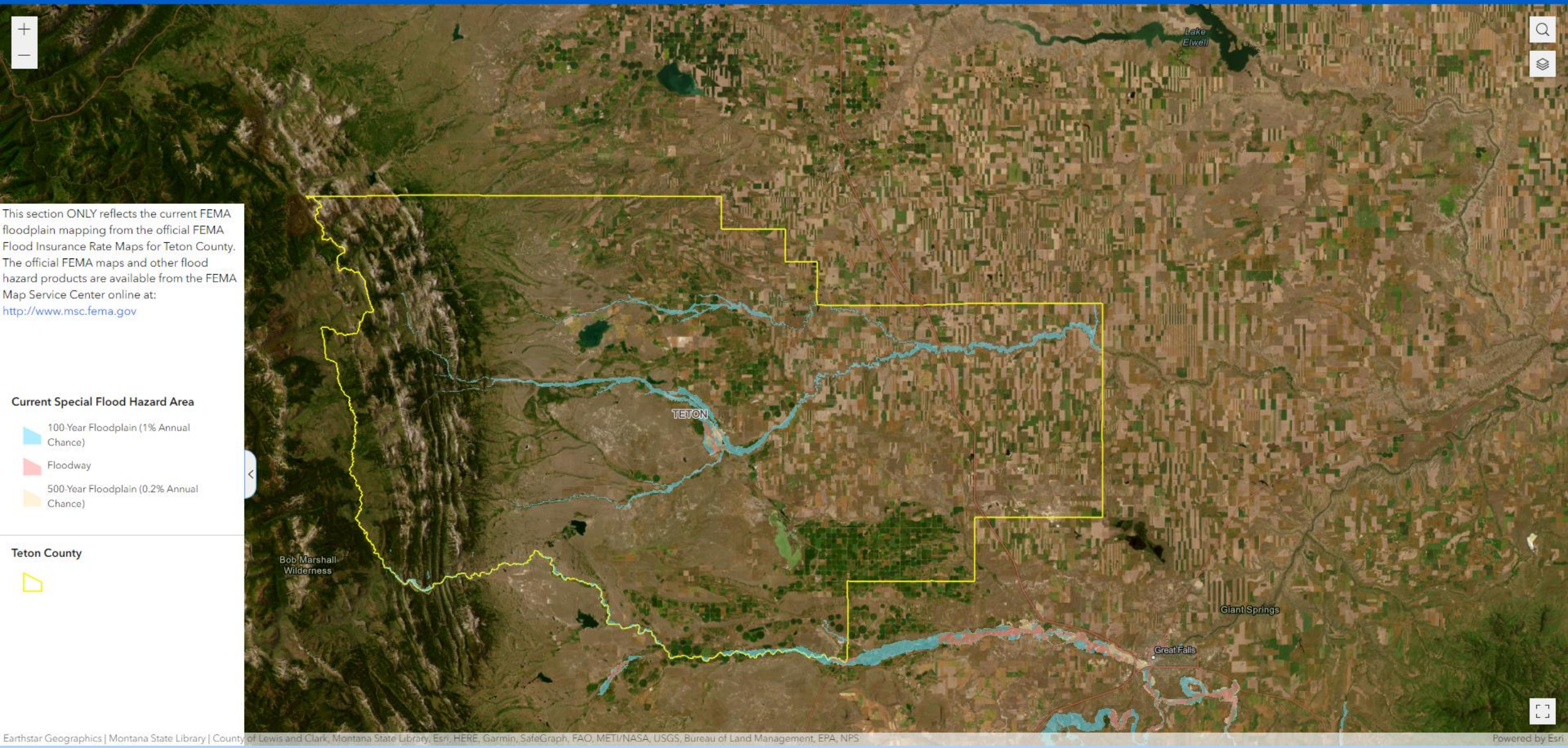
Teton County

Draft Mapping | Effective Mapping | Floodplain Changes | Floodway Changes

Teton County Flood Risk Map Viewer

Montana DNRC Floodplain Mapping Program

Montana DNRC Floodplain Mapping Projects



This section ONLY reflects the current FEMA floodplain mapping from the official FEMA Flood Insurance Rate Maps for Teton County. The official FEMA maps and other flood hazard products are available from the FEMA Map Service Center online at: http://www.msc.fema.gov

Current Special Flood Hazard Area

- 100-Year Floodplain (1% Annual Chance)
- Floodway
- 500-Year Floodplain (0.2% Annual Chance)

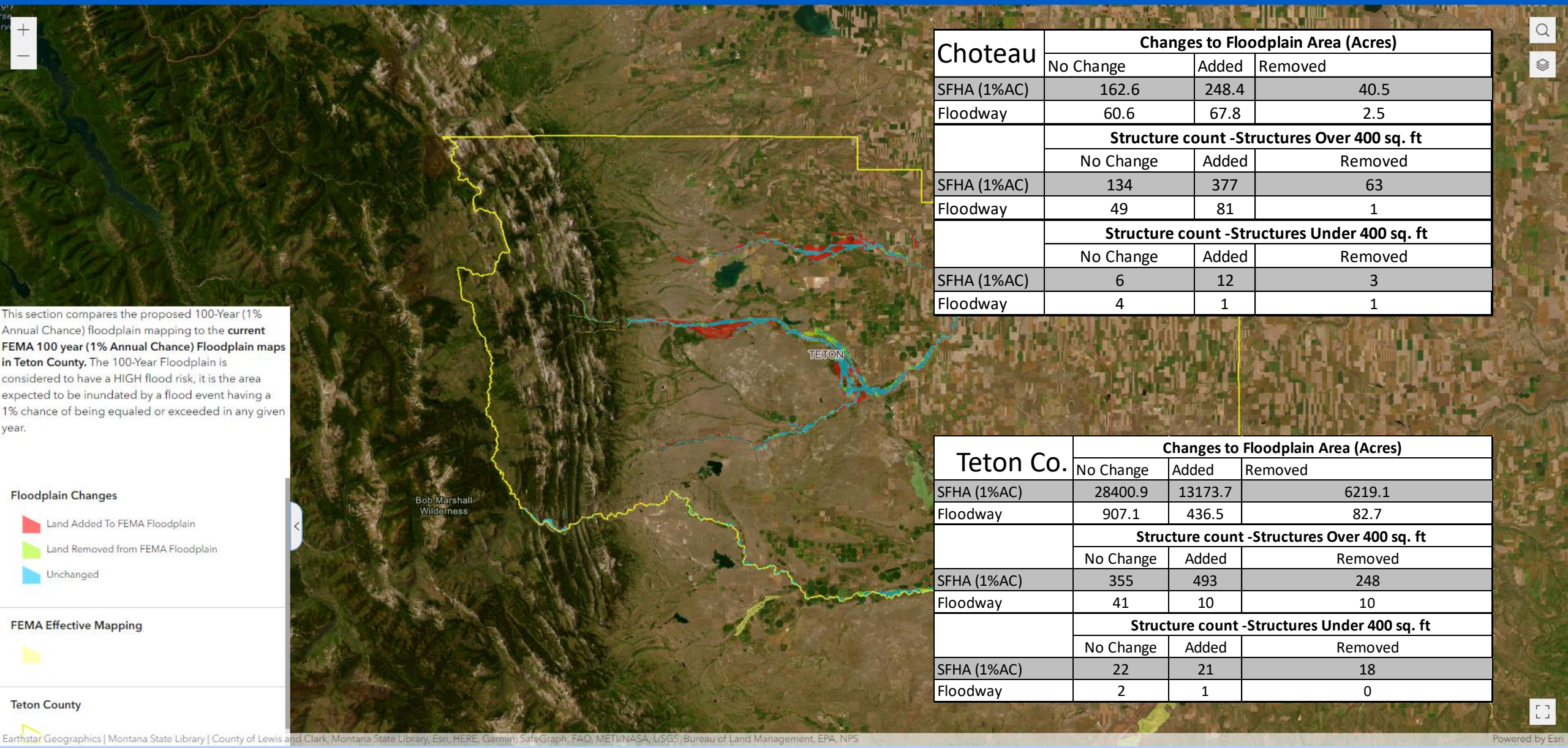
Teton County

Draft Mapping | **Effective Mapping** | Floodplain Changes | Floodway Changes

Teton County Flood Risk Map Viewer

Montana DNRC Floodplain Mapping Program

Montana DNRC Floodplain Mapping Projects



This section compares the proposed 100-Year (1% Annual Chance) floodplain mapping to the **current FEMA 100 year (1% Annual Chance) Floodplain maps in Teton County.** 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.

Floodplain Changes

- Land Added To FEMA Floodplain
- Land Removed from FEMA Floodplain
- Unchanged

FEMA Effective Mapping

Teton County

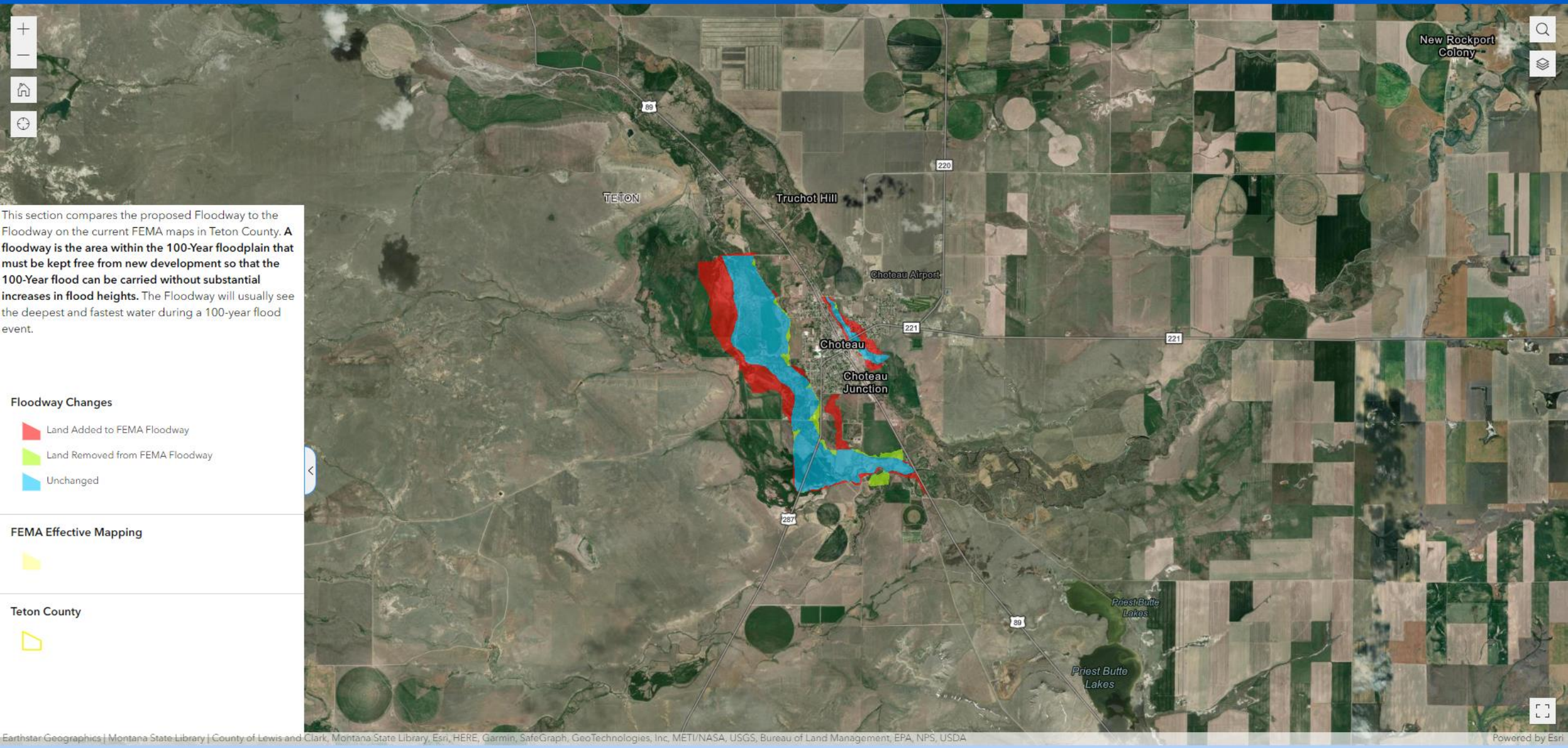
Choteau	Changes to Floodplain Area (Acres)		
	No Change	Added	Removed
SFHA (1%AC)	162.6	248.4	40.5
Floodway	60.6	67.8	2.5
	Structure count -Structures Over 400 sq. ft		
	No Change	Added	Removed
SFHA (1%AC)	134	377	63
Floodway	49	81	1
	Structure count -Structures Under 400 sq. ft		
	No Change	Added	Removed
SFHA (1%AC)	6	12	3
Floodway	4	1	1

Teton Co.	Changes to Floodplain Area (Acres)		
	No Change	Added	Removed
SFHA (1%AC)	28400.9	13173.7	6219.1
Floodway	907.1	436.5	82.7
	Structure count -Structures Over 400 sq. ft		
	No Change	Added	Removed
SFHA (1%AC)	355	493	248
Floodway	41	10	10
	Structure count -Structures Under 400 sq. ft		
	No Change	Added	Removed
SFHA (1%AC)	22	21	18
Floodway	2	1	0

Teton County Flood Risk Map Viewer

Montana DNRC Floodplain Mapping Program

Montana DNRC Floodplain Mapping Projects



This section compares the proposed Floodway to the Floodway on the current FEMA maps in Teton County. **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.

Floodway Changes

- Land Added to FEMA Floodway
- Land Removed from FEMA Floodway
- Unchanged

FEMA Effective Mapping

Teton County

FLOODPLAIN REGULATIONS

Teton County & City of Choteau 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.

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.

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

Rate Explanation Guide

FEMA's new rating methodology, **Risk Rating 2.0: Equity in Action**, considers specific characteristics of a building – the **Where, How, and What** – to provide a more modern, individualized, and equitable flood insurance rate. Understanding these characteristics helps to identify the building's unique flood risk and associated premium.

WHERE It Is Built (Property Address)

FEMA uses the building's property address to determine flood risk for the property. The property address is used to determine:

- **A building's distance to flooding sources,** *including the distance to the coast, ocean, rivers, and Great Lakes.*
- **The ground elevation** *where the building is located relative to the elevation of the surrounding area and the elevation of nearby flooding sources.*
- **Other characteristics** *such as the community where the building is located and how that relates to the Community Rating System discount or whether the building is on a barrier island.*

HOW It Is Built (Building Characteristics)

Knowing the physical characteristics of a building provides a deeper understanding of the building's individual flood risk and how it may impact premium. Relevant variables include:

Building Occupancy

The type (and use) of the building being insured sets available coverage limits and determines what is covered as indicated in the policy form.

Foundation Type

The foundation type provides important insight as to where the flood risk is likely to begin. For instance, risk varies based on whether a building's foundation is underground, at ground, or above ground.

First Floor Height

Buildings whose first floor is higher off the ground have lower flood risk.

Number of Floors

Buildings with more floors spread their risk over a higher area.

Unit Location

Individual units on higher floors have lower flood risk than units on lower floors.

Construction Type

Masonry walls perform better in different flooding events than wood frame walls.

Flood Openings

Flood openings can lower a building's flood risk as they allow floodwaters to flow through a building's enclosure or crawlspace.

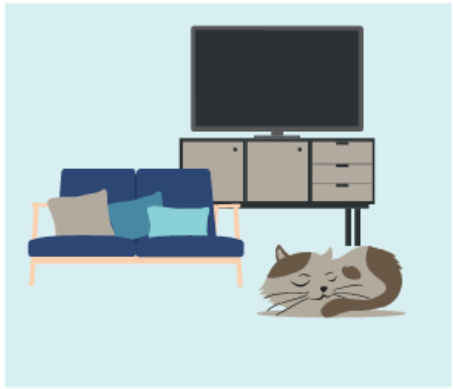
Machinery & Equipment

Elevating above the first floor lowers the risk of damage to machinery & equipment covered in the policy.

FEMA

WHAT Is Built and Covered (Replacement Cost and Coverage)

The building's replacement cost value, the amount of coverage requested, and the deductible choices influence the insurance premium.



Building Replacement Cost Value*

Buildings with higher costs to repair generally result in higher losses, resulting in higher premiums.

Building and Contents Coverage

Policies with higher coverage limits have higher potential loss costs, which lead to higher premiums. Building coverage and contents coverage amounts are selected separately.

Building and Contents Deductible

Policyholders who choose higher deductibles are assuming more of the risk during a flood event, which can result in a lower overall premium. Choosing a higher deductible means policyholders will need to cover more of the cost to rebuild out of pocket.

** The Building Replacement Cost Value used for rating does not affect the replacement cost value determined at time of loss.*

Learn more at fema.gov/flood-insurance/risk-rating

Project Timeline Teton County Floodplain Maps Update

Estimated Completion date

Completed 2021	Completed 2023	Late 2023 Draft data Open Houses Spring 2024	Mid- 2024 (est.) preliminary Late 2024-Early 2025 (est.)appeal period	Mid 2026-Late 2026 (est.)
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. Flood flow data determine how much water there will be in a river during a flood event.	The elevation and survey data are combined with the flood flow data to determine where the water will go when it overflows the channel and how far it will spread out. The area shown to be underwater and at high risk is mapped as the regulatory floodplain.	Draft data is delivered to the communities. Public open houses will be conducted for landowners to review the information Spring of 2024.	FEMA Preliminary Maps are produced and ready for public review and comment period. A second public open house is usually conducted to review the information. 90-day official comment & appeal period held.	FEMA Flood Insurance Rate Maps finalized.
Data gathering	**Engineering and floodplain modeling**	**Draft Data available public review**	**Preliminary Data public comment and appeal period**	**Flood Insurance Rate Maps become effective**

Flood Study Conducted

4 steps of a flood study.

1) Survey & LiDAR
2) Hydrology (flood flow)
3) Hydraulics (engineering)
4) Mapping (delineation)

Resiliency and Mitigation efforts

Once new maps become effective the community can determine what mitigation efforts it would like to pursue to reduce flood risks.

Public Review

A public open house will be held after draft data release and before preliminary map release.

During this time public comments are encouraged. There will be an official 90-day appeal period after the maps become preliminary.

Community work

Update floodplain ordinance.

Prepare initiatives to reduce flood risk.

Next Steps

*Photos From:
Mineral County Open Houses

- Mitigation Technical Assistance
  - Develop high level flood risk reduction options that can be used to apply for grants
- Additional Survey work to “ground truth” draft elevations
  - Public areas i.e.(intersections, parks) not private residences or businesses
- Update project website with viewer link for public
- Prepare for open houses April 2024

Discussion