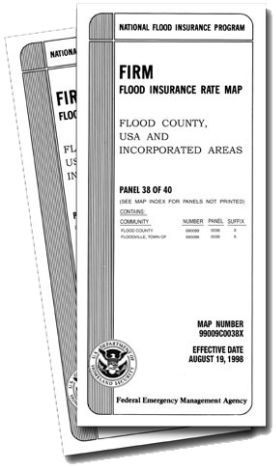
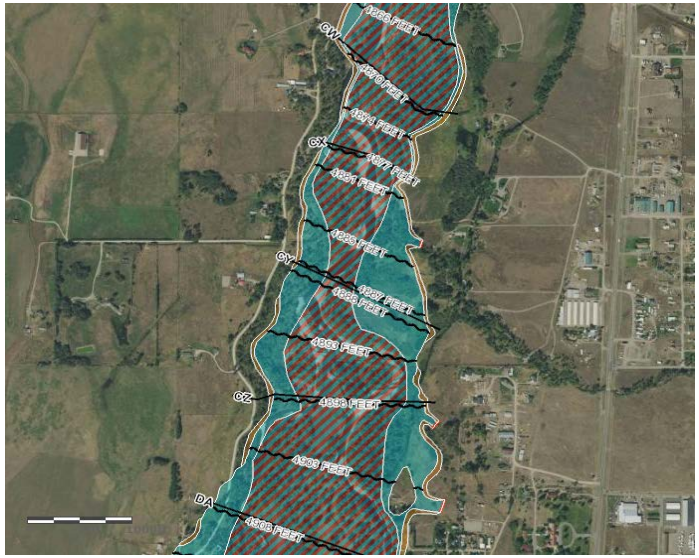
Floodplain Mapping





Floodplain Mapping and Map Revisions

Floodplain Mapping Program Update

Funding Opportunities for Floodplain Projects

MONTANA DNRC

MONTANA FLOODPLAIN MAPPING PROGRAM

Floodplain Mapping and Map Revisions

MT-2 Presentation

July 2016

MT DNRC Water Resources Division

Walt Ludlow, P.E

Nicole Decker, E.I.

Tiffany Lyden, CFM

Presentation Overview

- Definitions
- Overview of the National Flood Insurance Program (NFIP)and Floodplain Maps
- Revisions – MT-2 Process
- The FEMA Review Process
- Considerations in MT-2 Submittals
- Questions

Definitions

- NFIP – National Flood Insurance Program
- Base Flood – 1% Annual chance flood (100-year)
- BFE – Base Flood Elevation
- SFHA – Special Flood Hazard Area
- FIS – Flood Insurance Study
- FIRM – Flood Insurance Rate Map
- LOMR – Letter of Map Revision
- CLOMR – Conditional Letter of Map Revision
- MT-2: FEMA Application forms used for map Revisions (LOMR/CLOMR)
- PMR – Physical Map Revision
- ESA – Endangered Species Act

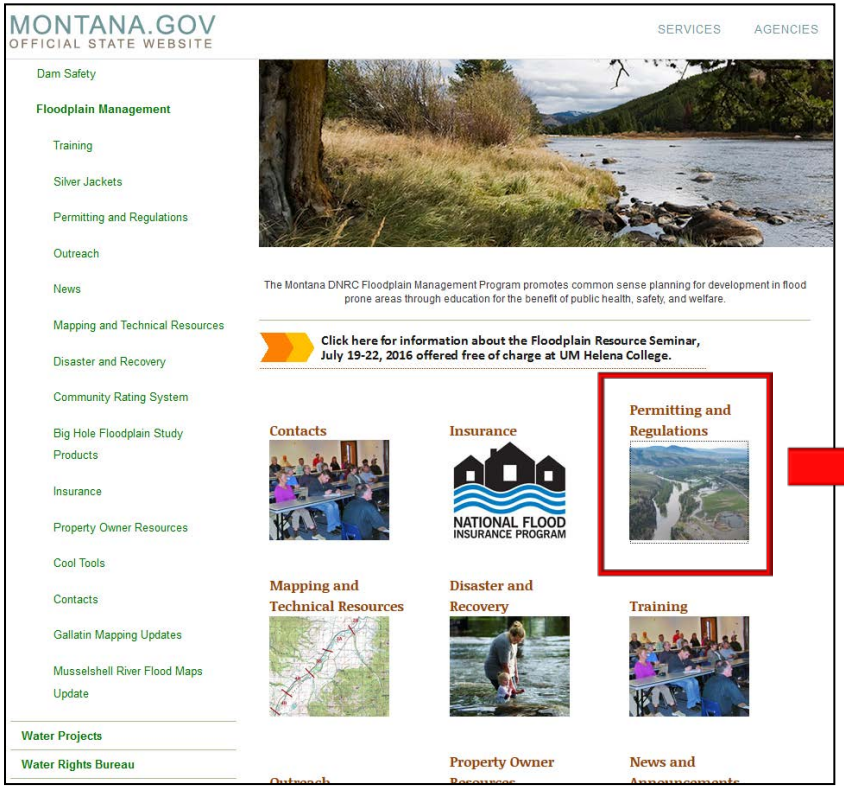
NFIP and Mapping

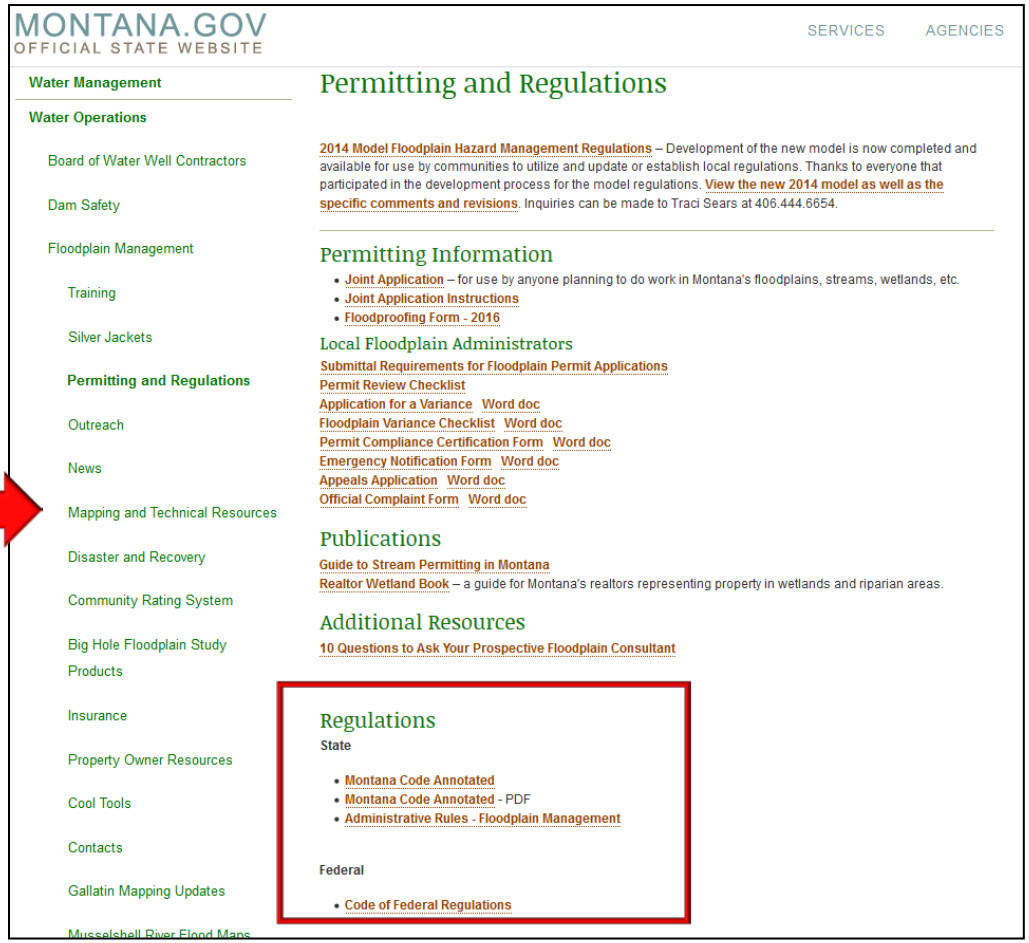
- Voluntary program between communities and FEMA
- Mapping – Identify areas of Flood Risk
  - Communities use maps as the basis for regulating new construction in flood risk areas

- Regulation
  - Community must adopt and enforce floodplain management regulations
    - Permits required for Development Activities
  - Communities failing to enforce regulations can be suspended from NFIP

Federal & State Floodplain Regulations

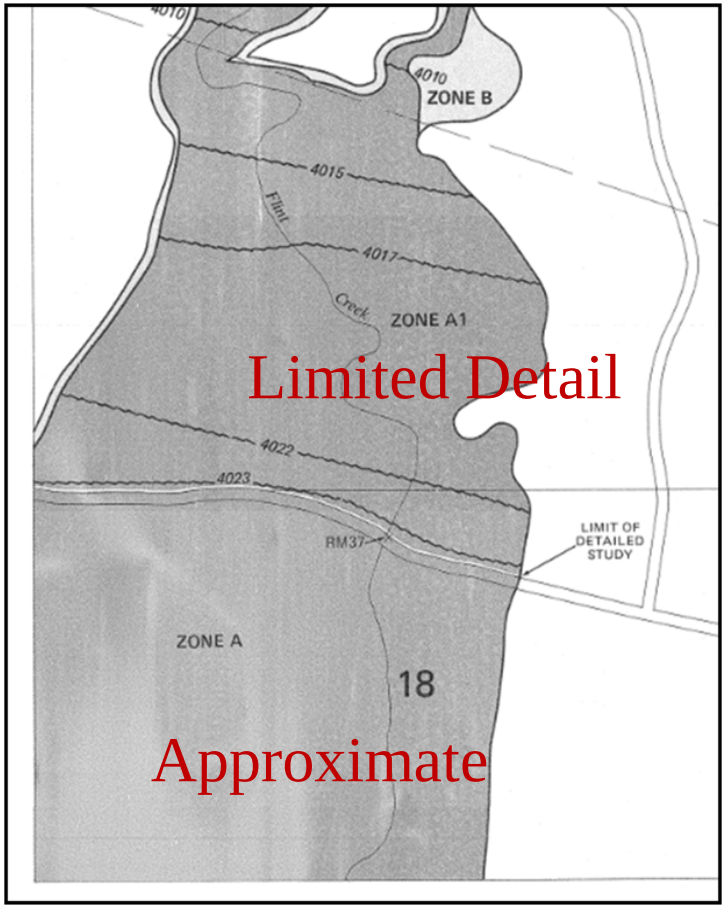
http://www.mtfloodplain.mt.gov/





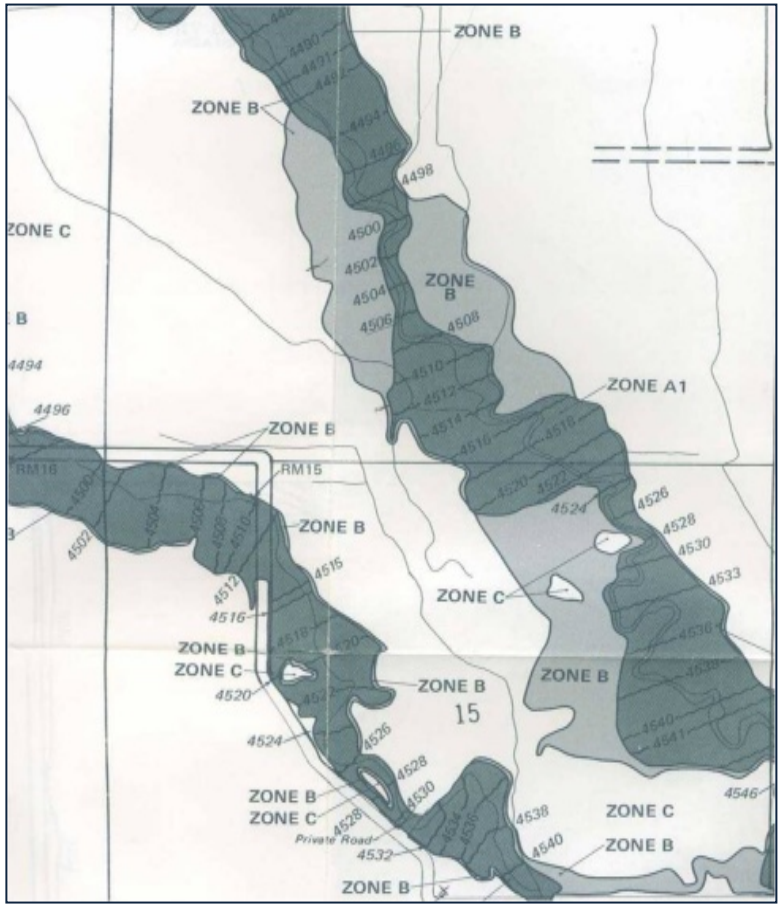
Definitions•NFIP Overview•Revisions: MT-2 Process•FEMA Review Process•Considerations in MT-2 Submittals•Questions

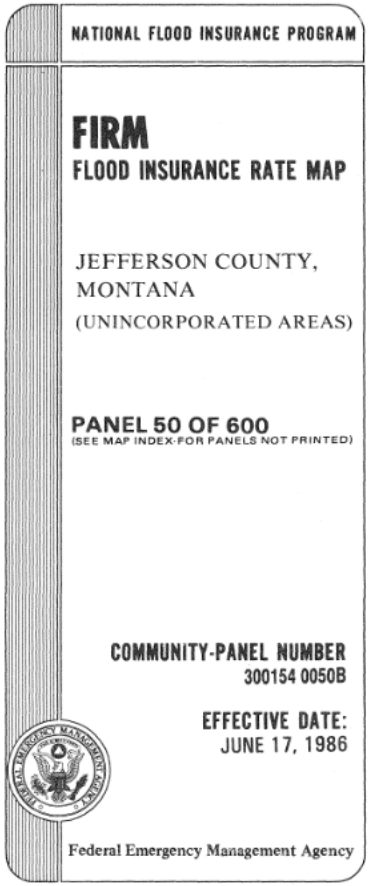
NFIP and Mapping



Definitions•NFIP Overview•Revisions: MT-2 Process•FEMA Review Process•Considerations in MT-2 Submittals•Questions

NFIP and Mapping



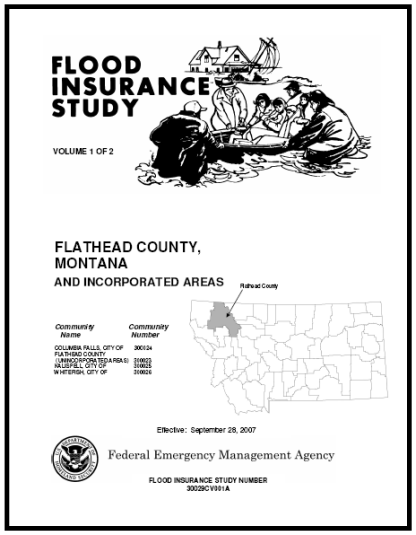


Maps indicate areas at risk of flooding, using information available at the time.

Community's official maps until revised through an official process.

Flood Insurance Study Products

- Components of a Flood Insurance Study
  - The Report
    - FIS - Flood Insurance Study Report
  - The Maps
    - FIRM - Flood Insurance Rate Map
    - FHBM – Flood Hazard Boundary Map
    - FBFM - Flood Boundary and Floodway Map (studies before 1986: FBFM shows Floodway while the FIRM shows Floodplain boundaries and Zones)


FLOOD INSURANCE STUDY

VOLUME 1 OF 2

FLATHEAD COUNTY, MONTANA
AND INCORPORATED AREAS

Flathead County

Community Name	Community Number
COLUMBIA FALLS, CITY OF	300024
FLATHEAD COUNTY (UNINCORPORATED AREAS)	300022
KALISPELL, CITY OF	300025
WHITEFISH, CITY OF	300026

Effective: September 28, 2007

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
30029CV001A

Available for free download at:

FEMA MAP SERVICE CENTER

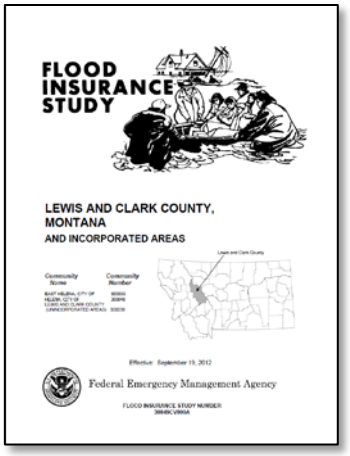
http://msc.fema.gov/portal

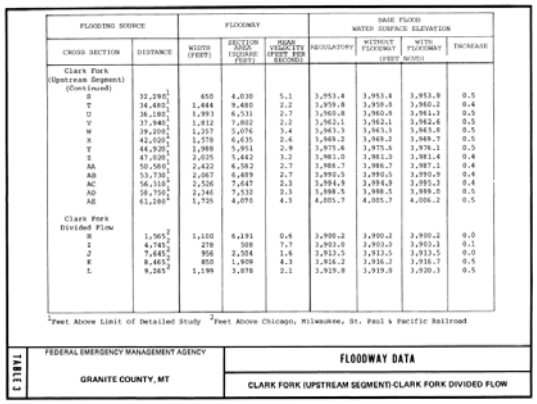
FIS Report

- FIS Report Includes
  - Community narrative
    - Purpose of study, Historic floods, Area and flooding source, Engineering methods
  - Tables summarizing flood data
    - Floodway Data Table
    - Summary of Discharges Table
  - Flood profiles

Does NOT Include:

Hydraulic model input/output data – must request from FEMA Eng. Library

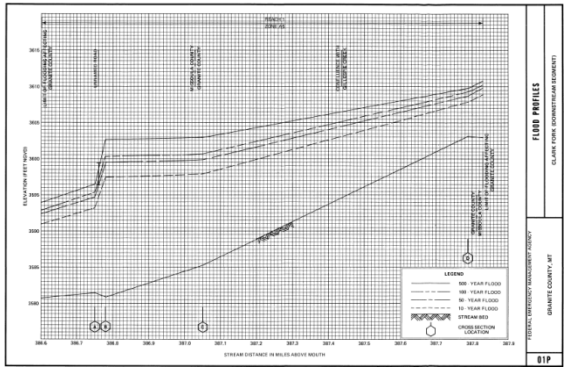




FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Clark Fork (Upstream Segment) (Continued)								
S	32,295[1]	650	4,030	5.1	3,953.4	3,953.4	3,953.9	0.5
T	34,480[1]	1,444	9,480	2.2	3,959.8	3,959.8	3,960.2	0.4
U	36,180[1]	1,993	6,531	2.7	3,960.8	3,960.8	3,961.3	0.5
V	37,940[1]	1,812	7,802	2.2	3,962.1	3,962.1	3,962.6	0.5
W	39,205[1]	1,357	5,076	3.4	3,963.3	3,963.3	3,963.8	0.5
X	42,020[1]	1,578	4,635	3.4	3,969.2	3,969.2	3,969.7	0.5
Y	44,920[1]	1,988	5,951	2.9	3,975.6	3,975.6	3,976.1	0.5
Z	47,020[1]	2,035	5,442	3.2	3,981.0	3,981.0	3,981.4	0.4
AA	50,580[1]	2,422	6,582	2.7	3,986.7	3,986.7	3,987.1	0.4
AB	53,730[1]	2,067	6,489	2.7	3,990.5	3,990.5	3,990.9	0.4
AC	56,110[1]	2,526	7,647	2.3	3,994.5	3,994.5	3,995.1	0.4
AD	58,750[1]	2,246	7,532	2.3	3,998.5	3,998.5	3,999.0	0.5
AE	61,280[1]	1,725	4,078	4.3	4,005.7	4,005.7	4,006.2	0.5
Clark Fork Divided Flow								
H	1,565[2]	1,100	6,191	0.6	3,900.2	3,900.2	3,900.2	0.0
I	4,745[2]	278	508	7.7	3,903.0	3,903.0	3,903.1	0.1
J	7,645[2]	956	2,504	1.6	3,913.5	3,913.5	3,913.5	0.0
K	8,465[2]	850	1,909	4.3	3,916.2	3,916.2	3,916.7	0.5
L	9,265[2]	1,199	3,878	2.1	3,919.8	3,919.8	3,920.3	0.5

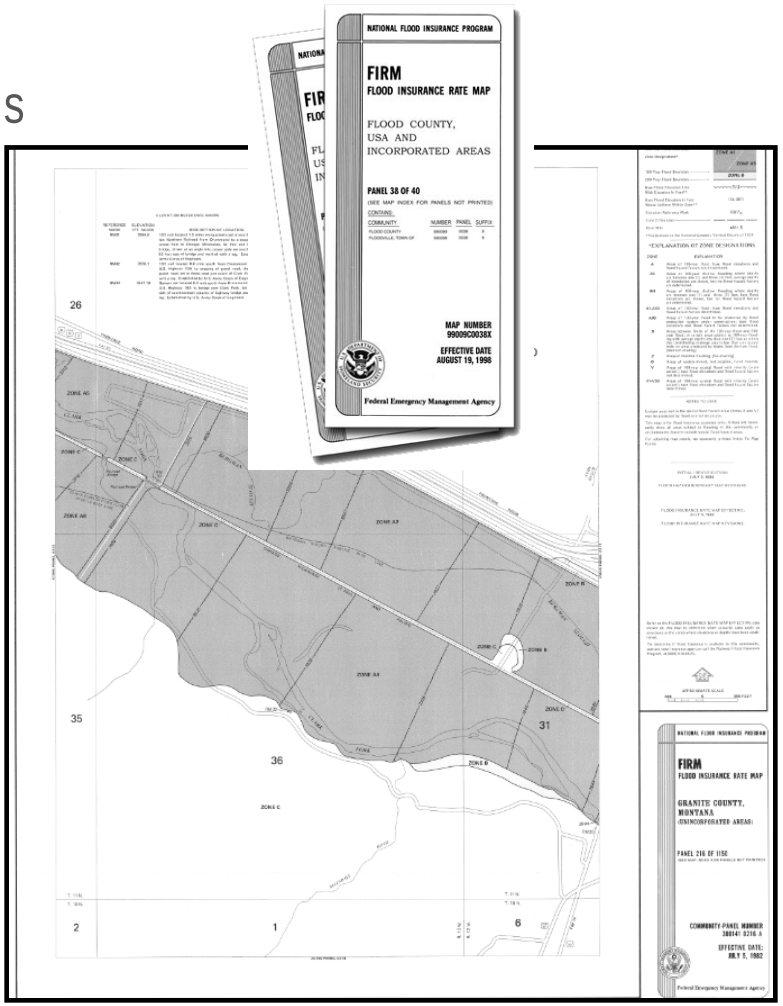
[1]Feet Above Limit of Detailed Study [2]Feet Above Chicago, Milwaukee, St. Paul & Pacific Railroad

TABLE 3 — FEDERAL EMERGENCY MANAGEMENT AGENCY — GRANITE COUNTY, MT — FLOODWAY DATA — CLARK FORK (UPSTREAM SEGMENT)-CLARK FORK DIVIDED FLOW



Flood Insurance Rate Map (FIRM)

- Flood Insurance Rate Map Includes
  - Floodplain Delineation
  - Floodways
  - Base Flood Elevation, BFE
  - Cross Sections
  - Flood Risk Zones: A, AE, AO, X, etc.



Available for free download at:

FEMA MAP SERVICE CENTER

http://msc.fema.gov/portal

Flood Insurance Study

- Base Flood Elevations (BFE)
  - Rounded to nearest foot on DFIRM Panels
  - Published to nearest tenth (0.1') in Floodway Data Table & Profiles

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
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AD	58,750[1]	2,346	7,532	2.3	3,998.5	3,998.5	3,999.0	0.5
AE	61,280[1]	1,725	4,070	4.3	4,005.7	4,005.7	4,006.2	0.5
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[1]Feet Above Limit of Detailed Study [2]Feet Above Chicago, Milwaukee, St. Paul & Pacific Railroad

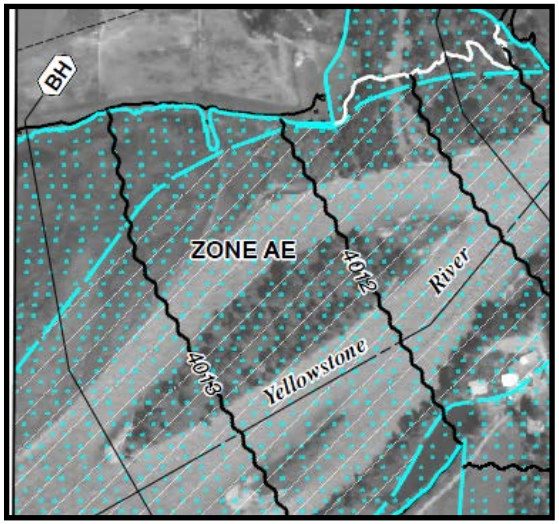
TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRANITE COUNTY, MT

FLOODWAY DATA

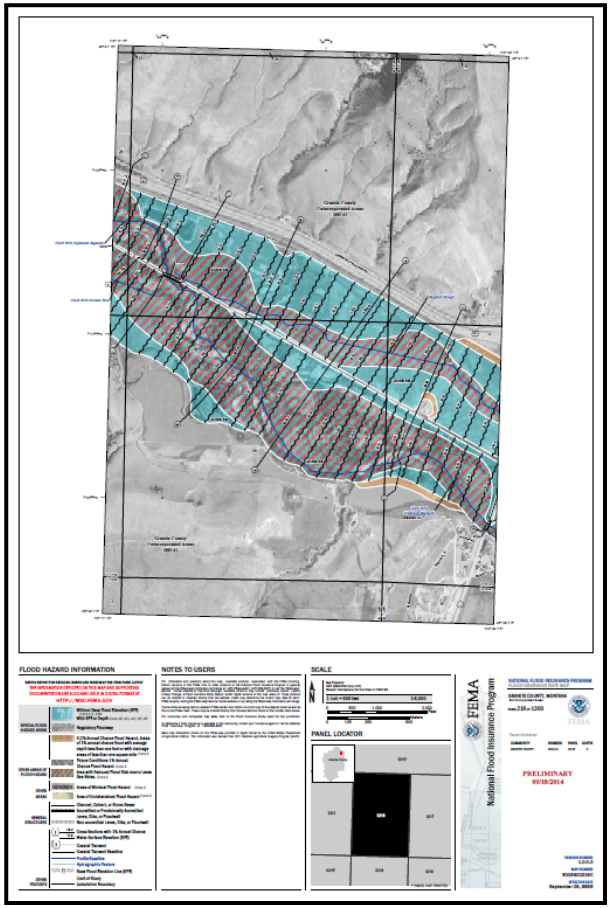
CLARK FORK (UPSTREAM SEGMENT)-CLARK FORK DIVIDED FLOW



Why is this important?

- Understand limitations of use & application
- i.e. accuracy dependent on map scale, topo and survey data used to develop the maps.

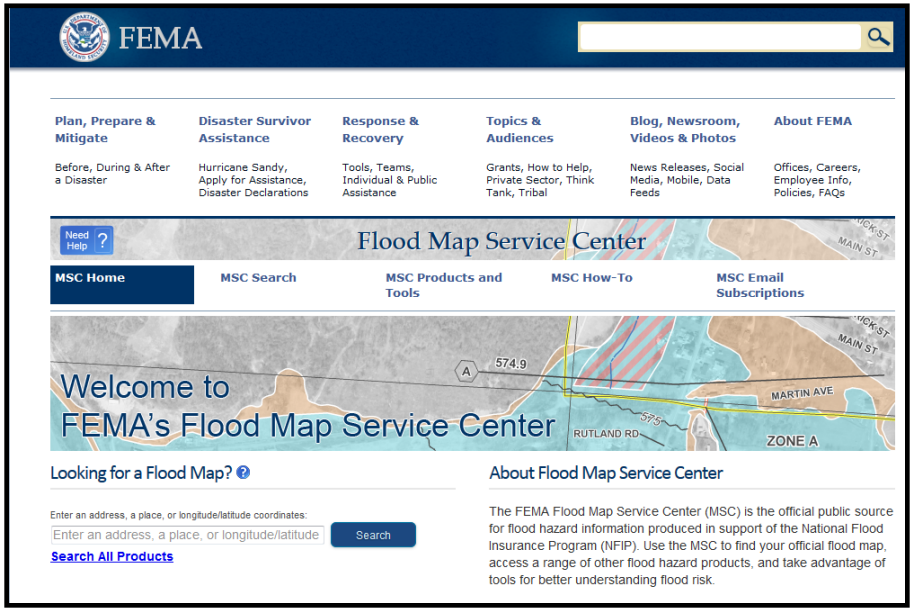
Obtaining Flood Insurance Study Products



- Map Service Center
  - FIRMs, FISs, and most completed LOMCs
- FEMA Engineering Library
  - Backup FIS and LOMC data
- Mapping Information Platform (MIP)
  - LOMCs, DFIRM data
  - https://hazards.fema.gov

Obtaining Flood Insurance Study Products

- **FEMA Map Service Center**
  -http://msc.fema.gov/portal
  - Effective, Pending, Preliminary & Historic: FIS Reports and maps (FIRM, DFIRM, FHBM, FBFM)
  - GIS files for Modernized communities
  - RiskMAP Flood Risk Products
  - Paper copies are no longer available for purchase
  - LOMCs: pdf copies for most



All products are Free

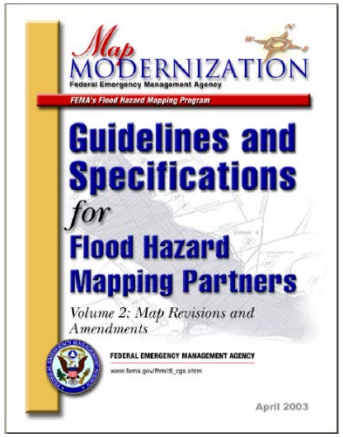
Guidelines and Standards for Flood Risk Analysis and Mapping

- Provides FEMA guidelines and standards for flood risk analysis and mapping activities in adherence to National Flood Insurance Program (NFIP) requirements and regulations.
  - Guidelines and Standards: Master Index
    - http://www.fema.gov/media-library/assets/documents/94095

Standards Table:

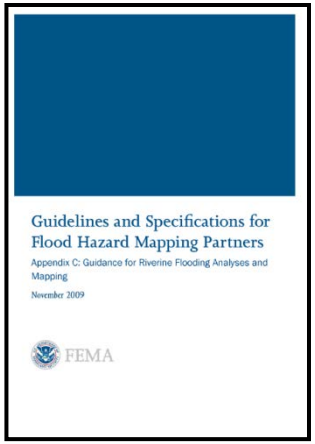
SID #	Standard	Related Guidance
1	All Flood Risk Projects and LOMCs must be tracked in the MIP.	• Discovery
2	A Project Management Team shall be formed as soon as a Flood Risk Project is initiated, and this team shall manage the project for its entire lifecycle.	• Discovery • SE: Preliminary NFIP Map Release • SE: Data & Product Development • SE: Risk Awareness
3	When a community is initially considered for a Flood Risk Project involving a new or revised flood hazard analysis, FEMA must establish and maintain a community case file per 44 CFR 66.3.	• Discovery • SE: Preliminary NFIP Map Release • SE: Data & Product Development • SE: Risk Awareness
4	All newly initiated Flood Risk Projects must be watershed-based, with the exception of coastal and small-scale Flood Risk Projects related to levee accreditation status.	• Discovery • SE: Preliminary NFIP Map Release • SE: Data & Product Development • SE: Risk Awareness
5	No flooding source will receive a lower level of regulatory flood map product than what currently exists on effective maps.	• Discovery

Important References and Guidelines



- "Guidelines and Specifications for Flood Hazard Mapping Partners"

- 3 Volumes with 14 Appendices
  - Volume 2: Map Revisions and Amendments
  - Appendix C: Guidance for Riverine Flooding Analyses and Mapping

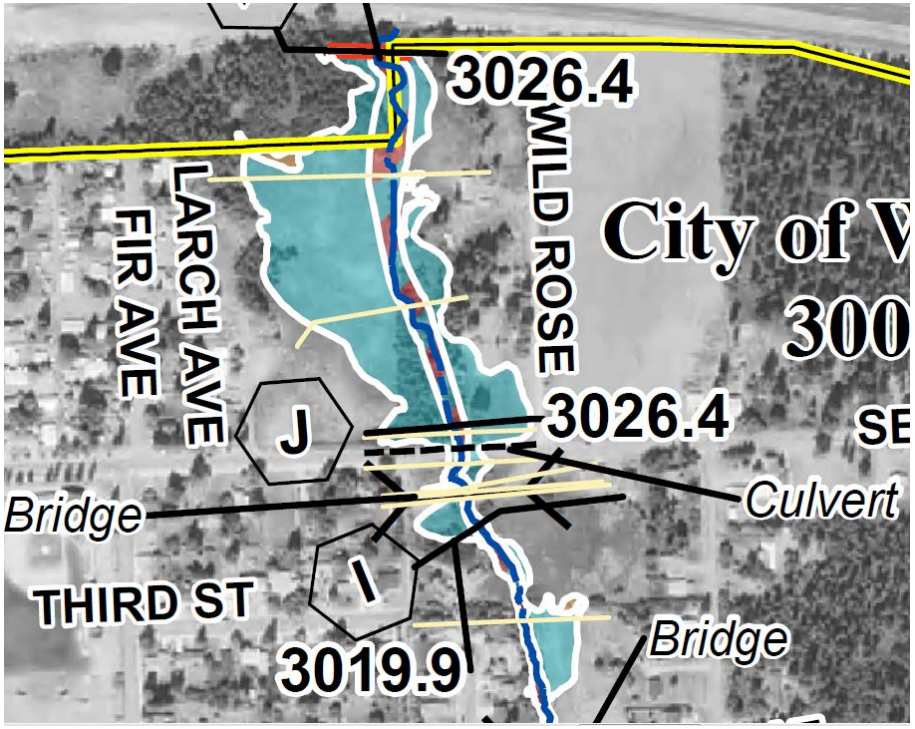


Revisions to Maps - LOMRs

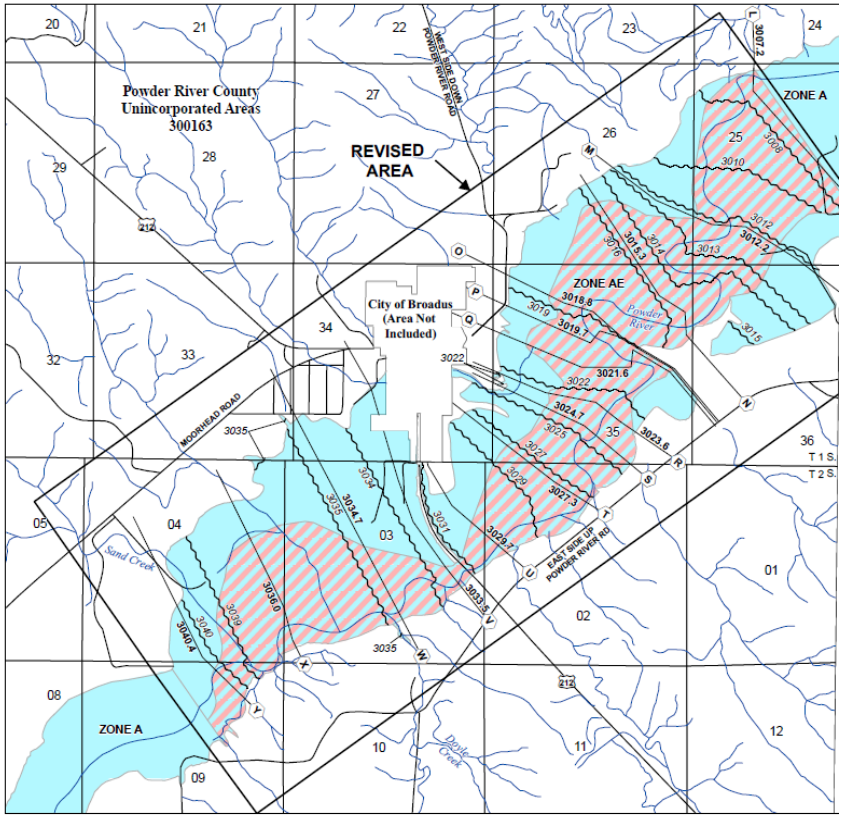
- The FIS and FIRMs are prepared with rigorous technical standards
- Although – Changes are sometimes necessary
  - Improved techniques
  - Physical changes – both natural and man-made
  - New Data
  - Limitations of Map Production Scale

- Letter of Map Revision (LOMR) process allows revisions to the FIRM and/or FIS

LOMR Examples



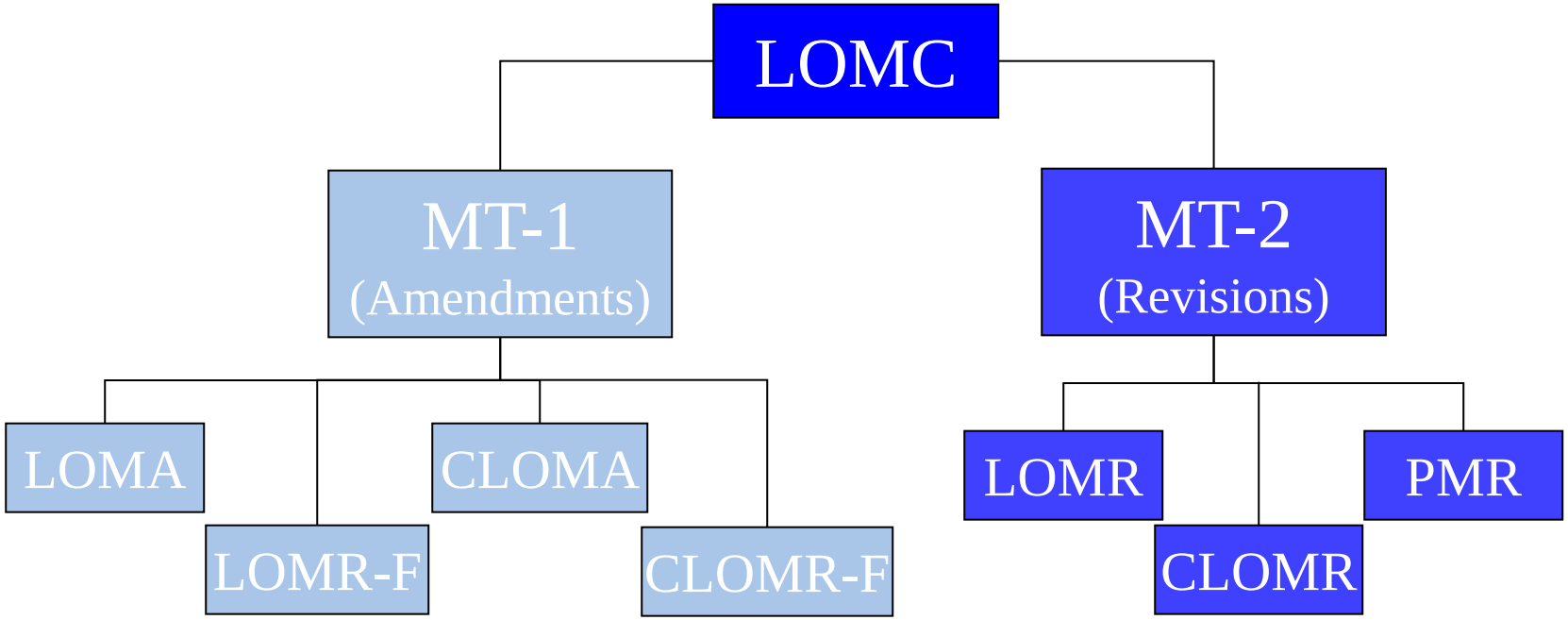
Physical Change



New Data

Letters of Map Change (LOMC)

Tradecraft Lingo



Do NOT Revise BFEs

Revise BFEs or Floodplains

Letters of Map Change - LOMC

- Amendments:
  - Structures or legally defined parcels
  - Does not typically involve an engineering analysis
  - Requires submittal of MT-1 Forms
  - Does not involve changes in BFE
  - Can not be used for properties in some flood areas (alluvial fan)
- Revisions:
  - More complex map changes
  - Not usually lot or structure specific
  - Typically involves H&H analysis
  - Requires submittal of MT-2 Forms

- **MT-1:**
  - LOMA
  - LOMR-F
  - CLOMA
  - CLOMR-F
- **MT-2:**
  - LOMR
  - CLOMR
  - PMR

Letter of Map Revision (LOMR)

- A **LOMR** revises the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report to show changes in Base Flood Elevations (BFEs), Special Flood Hazard Areas (SFHAs), and regulatory floodways
- The FIRM and FIS report are <u>not republished</u>, but annotated FIRMs, profiles, and tables are attached to a determination letter. LOMRs show up in National Flood Hazard Layer.
- Can only be based on as-built or existing conditions

LOMR Requirements

When is a LOMR Required?

- Chapter 44 of the Code of Federal Regulations Section 65.3
  - A community must submit technical data notifying FEMA of any change (increases or decreases) in BFE resulting from physical changes within the floodplain within 6 month of project completion.
  - The MT-2 Revisions process is the mechanism for submitting the technical data to FEMA.
  - Projects should be evaluated on a case by case basis.
- Floodway changes - CFR 44 Section 65.7
- At the request of the community
  - The community ordinances may have the requirement that a LOMR is completed as a condition for development within the floodplain.

Important!

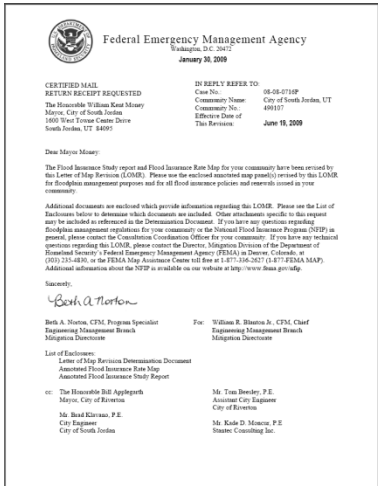
Communities are responsible for map maintenance

Accomplish this through Permitting Process

LOMR Requirements

- When can a LOMR be submitted (Basis for Revisions):
  - New or More Detailed Analyses
    - Updated hydrology
    - Additional hydraulic information (more cross sections, etc.)
    - New topographic information
    - No previous study (Zone A)
  - Physical Changes resulting in floodplain modifications
    - Projects (bridge/culvert, channelization, levee, etc.)
    - Physical changes (fill, grading, etc.)
    - Natural Changes (erosion, subsidence, bridge/culvert removal, etc.)
  - Error Corrections

Effective LOMR – Typical Elements



Federal Emergency Management Agency
Washington, D.C. 20472
January 30, 2009

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 08-08-0716P
Community Name: City of South Jordan, UT
Community No.: 490107
Effective Date of This Revision: June 19, 2009

The Honorable William Kent Money
Mayor, City of South Jordan
1600 West Towne Centre Drive
South Jordan, UT 84095

Dear Mayor Money:

The Flood Insurance Study report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Denver, Colorado, at (303) 235-4830, or the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Sincerely,

Beth A. Norton

Beth A. Norton, CFM, Program Specialist
Engineering Management Branch
Mitigation Directorate

For: William R. Blanton Jr., CFM, Chief
Engineering Management Branch
Mitigation Directorate

List of Enclosures:
Letter of Map Revision Determination Document
Annotated Flood Insurance Rate Map
Annotated Flood Insurance Study Report

cc: The Honorable Bill Applegarth
Mayor, City of Riverton

Mr. Brad Klavano, P.E.
City Engineer
City of South Jordan

Mr. Tom Beesley, P.E.
Assistant City Engineer
City of Riverton

Mr. Kade D. Moncur, P.E.
Stantec Consulting Inc.

Cover Letter

Page 1 of 2 | Issue Date: January 30, 2009 | Effective Date: June 19, 2009 | Case No.: 08-08-0716P | LOMR-APP

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City of Riverton Salt Lake County Utah COMMUNITY NO.: 490104	CHANNELIZATION CULVERT	FLOODWAY HYDRAULIC ANALYSIS NEW TOPOGRAPHIC DATA
IDENTIFIER	Midas Creek Realignment	APPROXIMATE LATITUDE & LONGITUDE: 40.538, -111.944 SOURCE: Precision Mapping Sheets DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURES			ANNOTATED STUDY ENCLOSURES	
TYPE: FIRM* TYPE: FIRM*	NO.: 49035C0436 F NO.: 49035C0437 F	DATE: May 15, 2002 DATE: May 15, 2002	DATE OF EFFECTIVE FLOOD INSURANCE STUDY: May 15, 2002 PROFILE(S): 213P, 214P FLOODWAY DATA TABLE: 11	

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map, ** FBFM - Flood Boundary and Floodway Map, *** FHBM - Flood Hazard Boundary Map

FLOODING SOURCE(S) & REVISED REACH(ES)

Midas Creek - from approximately 350 feet downstream of 11925 South Street to approximately 130 feet downstream of Jordra Drive

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Midas Creek	Zone AE	Zone AE	YES	YES
	Zone X (shaded)	Zone X (shaded)	YES	YES
	Floodway	Floodway	YES	YES
	BFEs*	BFEs	YES	YES

* BFEs - Base Flood Elevations

DETERMINATION

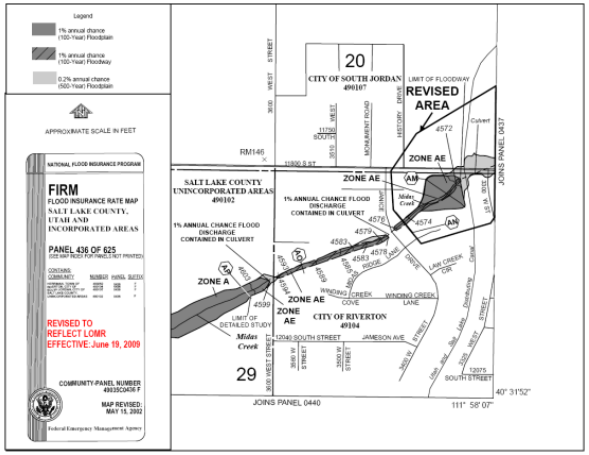
This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Beth A. Norton, CFM, Program Specialist
Engineering Management Branch
Mitigation Directorate

112893 10.3.1.0808716 102-1A-C

Determination Document



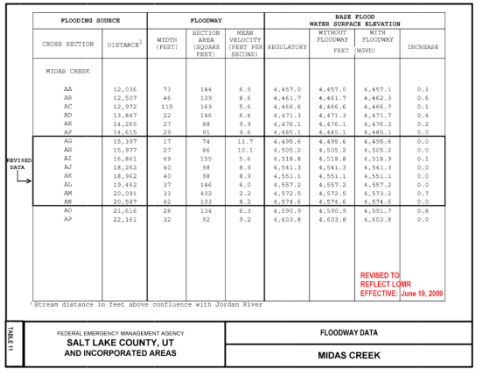
Legend
1% annual chance (100-Year) Floodplain
1% annual chance (100-Year) Floodway
0.2% annual chance (500-Year) Floodplain

APPROXIMATE SCALE IN FEET

NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SALT LAKE COUNTY, UTAH AND INCORPORATED AREAS
PANEL 436 OF 625
REVISED TO REFLECT LOMR EFFECTIVE: June 19, 2009
COMMUNITY-PANEL NUMBER 49035C0436 F
MAP REVISED: MAY 15, 2002
Federal Emergency Management Agency

CITY OF SOUTH JORDAN 490107
LIMIT OF FLOODWAY
REVISED AREA
ZONE AE
SALT LAKE COUNTY UNINCORPORATED AREAS 490192
1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CULVERT
ZONE A
CITY OF RIVERTON 49104
LIMIT OF DETAILED STUDY
Midas Creek
JOINS PANEL 0440
111° 58' 07"
40° 31'52"

Annotated FIRM



FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY FEET	WITH FLOODWAY (NGVD)	INCREASE
MIDAS CREEK								
AA	12,036	73	144	6.5	4,457.0	4,457.0	4,457.1	0.1
AB	12,527	46	159	8.6	4,461.7	4,461.7	4,462.3	0.6
AC	12,972	115	169	5.6	4,466.6	4,466.6	4,466.7	0.1
AD	13,847	22	146	6.4	4,471.3	4,471.3	4,471.7	0.4
AE	14,265	27	88	9.9	4,476.1	4,476.1	4,476.3	0.2
AF	14,615	29	91	9.6	4,485.1	4,485.1	4,485.1	0.0
AG	15,397	17	74	11.7	4,495.6	4,495.6	4,495.6	0.0
AH	15,977	27	86	10.1	4,505.2	4,505.2	4,505.2	0.0
AI	16,861	49	155	5.6	4,518.8	4,518.8	4,518.9	0.1
AJ	18,262	40	98	8.9	4,541.3	4,541.3	4,541.3	0.0
AK	18,962	40	98	8.9	4,551.1	4,551.1	4,551.1	0.0
AL	19,462	37	146	6.0	4,557.2	4,557.2	4,557.2	0.0
AM	20,091	33	402	2.2	4,572.5	4,572.5	4,573.2	0.7
AN	20,587	42	103	8.2	4,574.6	4,574.6	4,574.6	0.0
AO	21,616	28	134	6.3	4,590.9	4,590.9	4,591.7	0.8
AP	22,161	32	92	9.2	4,603.8	4,603.8	4,603.8	0.0

REVISED DATA
REVISED TO REFLECT LOMR EFFECTIVE: June 19, 2009

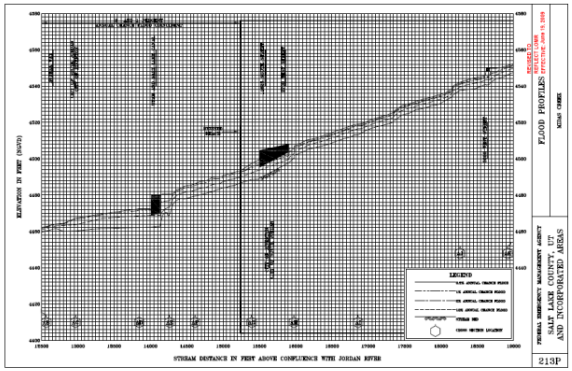
[1] Stream distance in feet above confluence with Jordan River

FEDERAL EMERGENCY MANAGEMENT AGENCY
SALT LAKE COUNTY, UT
AND INCORPORATED AREAS
FLOODWAY DATA
MIDAS CREEK

Annotated FIS Tables

Important!

FIRMs are NOT Updated or Republished



FLOOD PROFILES
MIDAS CREEK
SALT LAKE COUNTY, UT
AND INCORPORATED AREAS
FEDERAL EMERGENCY MANAGEMENT AGENCY
REVISED TO REFLECT LOMR EFFECTIVE: June 19, 2009
LEGEND
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH JORDAN RIVER
ELEVATION IN FEET (NGVD)
213P

Annotated FIS Profiles

Definitions•NFIP Overview•Revisions: MT-2 Process•FEMA Review Process•Considerations in MT-2 Submittals•Questions

Conditional Letter of Map Revision (CLOMR)

- **CLOMRs** are for proposed projects, prior to any construction being completed or Floodplain Permit Issuance
- Allows FEMA to comment on the effects that a proposed project would have on the effective FIRM and FIS Report
- Does not revise the FIRM
  - Must be followed by a LOMR request when project completed
- Not A Permit

Important when scoping projects for Schedule and Cost estimates

CLOMR Requirements

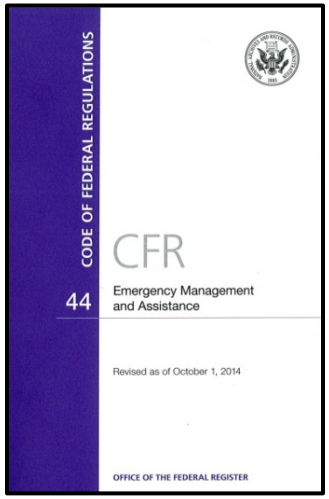
**Perform No-Rise/Encroachment Review to determine if CLOMR is required

** Complete during design and assess design changes

- When a CLOMR is Required
  - At the request of the community
  - Proposed projects that:
    - 44CFR 60.3(d)(4): **Encroach upon the floodway** and cause an increase > 0.00 ft
    - 44CFR 60.3(c)(13): **Encroach upon a floodplain** when a floodway has not been established and cause an increase of > 1.00 ft (0.5 ft in MT)
      - Cumulative: Includes all existing and anticipated development
      - Includes Approximate Zone A
        - May require development of a model
      - Local community may have more strict regulations
  - What is an increase?
    - Comparison between pre-project (existing conditions) and post project (proposed conditions) model

CLOMR Requirements

- Per 44CFR 60.3(c)(13) and (d)(4), must fulfill the requirements of **S65.12**:
  - **Community must receive CLOMR <u>prior</u> to issuing floodplain permit**
  - Alternatives analysis and feasibility
  - Legal notice to impacted property owners
  - Certification that no structures impacted
  - Follow up LOMR



Issued CLOMR – Typical Elements

- A letter that includes
  - Project description
  - FEMA's comment
  - Comparison of changes
  - LOMR submittal Requirements
  - Community information

Page 1 of 5	Issue Date: April 18, 2011	Case No.: 11-08-0183R	CLOMR-APP

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT

COMMUNITY INFORMATION		PROPOSED PROJECT DESCRIPTION	BASIS OF CONDITIONAL REQUEST
COMMUNITY	City of Steamboat Springs Routt County Colorado COMMUNITY NO.: 080150	FILL CULVERT OTHER	HYDRAULIC ANALYSIS NEW TOPOGRAPHIC DATA FLOODWAY
IDENTIFIER	Burgess Creek – Walton Road to Wildhorse	APPROXIMATE LATITUDE & LONGITUDE: 40.451, -106.811 SOURCE: USGS QUADRANGLE DATUM: NAD 83	

AFFECTED MAP PANELS			
TYPE: FIRM*	NO.: 08107C0679D	DATE: February 4, 2005	* FIRM - Flood Insurance Rate Map
TYPE: FIRM*	NO.: 08107C0683D	DATE: February 4, 2005	

FLOODING SOURCE(S) AND REACH DESCRIPTION

Burgess Creek – From just upstream to approximately 960 feet upstream of Walton Creek Road

PROPOSED PROJECT DESCRIPTION

Flooding Source	Proposed Project	Location of Proposed Project
Burgess Creek	New (Triple 6" CMP) Culvert	Approximately 510 feet upstream of Walton Creek Road
	Other - Drop Structure	Approximately 590 feet upstream of Walton Creek Road
	Fill Placement - within existing pond	Along the right overbank from approximately 240 feet to approximately 450 feet upstream of Walton Creek Road.

SUMMARY OF IMPACTS TO FLOOD HAZARD DATA

Flooding Source	Effective Flooding	Proposed Flooding	Increases	Decreases
Burgess Creek	Zone AE	Zone AE	Yes	Yes
	Floodway	Floodway	Yes	Yes
	BFEs*	BFEs	Yes	Yes

* BFEs - Base (1-percent-annual-chance) Flood Elevations

COMMENT

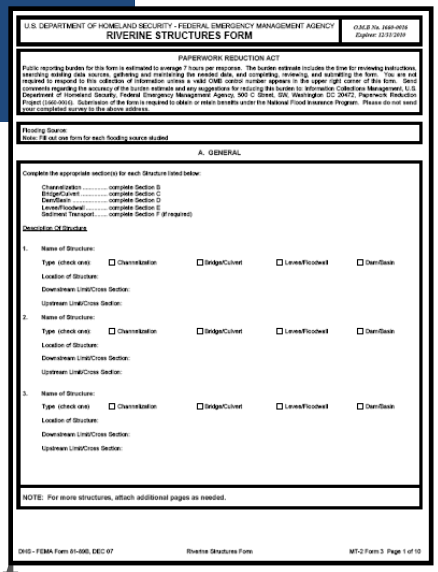
This document provides the Federal Emergency Management Agency's (FEMA's) comment regarding a request for a CLOMR for the project described above. This document is not a final determination; it only provides our comment on the proposed project in relation to the flood hazard information shown on the effective National Flood Insurance Program (NFIP) map. We reviewed the submitted data and the data used to prepare the effective flood hazard information for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. Your community is responsible for approving all floodplain development and for ensuring that all permits required by Federal or State/Commonwealth law have been received. State/Commonwealth, county, and community officials, based on their knowledge of local conditions and in the interest of safety, may set higher standards for construction in the Special Flood Hazard Area (SFHA), the area subject to inundation by the base flood. If the State/Commonwealth, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 7390 Coca Cola Drive, Suite 204, Hanover, MD 21076. Additional information about the NFIP is available on the FEMA website at http://www.fema.gov/nfip.

David N. Bascom, CFM, Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

122451 PT202.BKR.11080183R.H15 104

Application: MT-2 Forms



U.S. DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B. No. 1660-0016
Expires: 12/31/2010

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472. Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. Please do not send your completed survey to the above address.

Flooding Source:
Note: Fill out one form for each flooding source studied

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization ..... complete Section B
Bridge/Culvert ..... complete Section C
Dam/Basin ..... complete Section D
Levee/Floodwall ..... complete Section E
Sediment Transport ..... complete Section F (if required)

Description Of Structure

1. Name of Structure:
   Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam/Basin
   Location of Structure:
   Downstream Limit/Cross Section:
   Upstream Limit/Cross Section:
2. Name of Structure:
   Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam/Basin
   Location of Structure:
   Downstream Limit/Cross Section:
   Upstream Limit/Cross Section:
3. Name of Structure:
   Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam/Basin
   Location of Structure:
   Downstream Limit/Cross Section:
   Upstream Limit/Cross Section:

NOTE: For more structures, attach additional pages as needed.

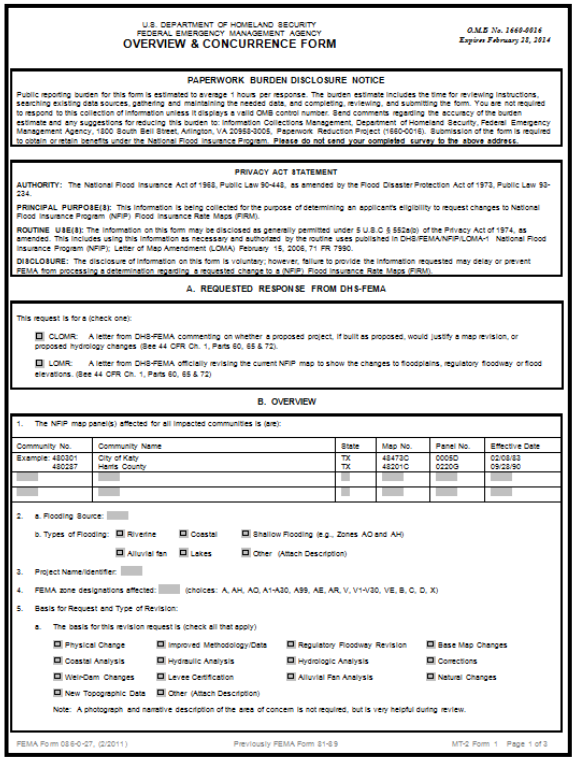
OHS – FEMA Form 81-800, DEC 07 Riverine Structures Form MT-2 Form 3 Page 1 of 10

- Most Common Forms
  - Form 1 – Overview and Concurrence Form
  - Form 2 – Riverine Hydrology and Hydraulics Form
  - Form 3 – Riverine Structures Form
  - Payment Information Form
- Additional Information in the **Instructions Packet**
  - Definitions
  - Instructions on completing the forms
  - Instructions on what needs to be submitted
  - Example notifications
  - Useful internet links
  - Addresses

Download latest forms because they are occasionally updated

https://www.fema.gov/change-flood-zone-designation-online-letter-map-change

Application: MT-2 Forms



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
OVERVIEW & CONCURRENCE FORM

O.M.B. No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005. Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. Please do not send your completed survey to the above address.

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C. § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

☐ CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☐ LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301	City of Katy	TX	48473C	0006D	02/06/83
480287	Harris County	TX	48201C	0220G	09/28/90

2. a. Flooding Source:

b. Types of Flooding: ☐ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH) ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier:

4. FEMA zone designations affected: (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

☐ Physical Change ☐ Improved Methodology/Data ☐ Regulatory Floodway Revision ☐ Base Map Changes
☐ Coastal Analysis ☐ Hydraulic Analysis ☐ Hydrologic Analysis ☐ Corrections
☐ Weir-Dam Changes ☐ Levee Certification ☐ Alluvial Fan Analysis ☐ Natural Changes
☐ New Topographic Data ☐ Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

FEMA Form 086-0-27, (2/2011) Previously FEMA Form 81-69 MT-2 Form 1 Page 1 of 3

Form Components

- **Review FEE** – must provide written explanation for fee exemption
- **Required Signatures:**
  - Community Official
  - PE and/or PLS and Stamp/Seal (44 CFR 65.2(b))
- **New Hydrology and/or Hydraulics**
  - Documentation of analysis methods and computations
  - Digital model files

Current LOMR Fees

Important for Project Scoping & Cost Estimates

LOMR	**Paper Form Fee**	**Online Submission Fee**
Bridge, Culvert, Channel or Combination	$8,250	$8,000
As-Built Follow-up to CLOMR	$8,250	$8,000
Based solely on more Detailed Data	$0	$0
CLOMR	**Paper Form Fee**	**Online Submission Fee**
New Hydrology, Bridge, Culvert, Channel or Combination	$6,750	$6,500

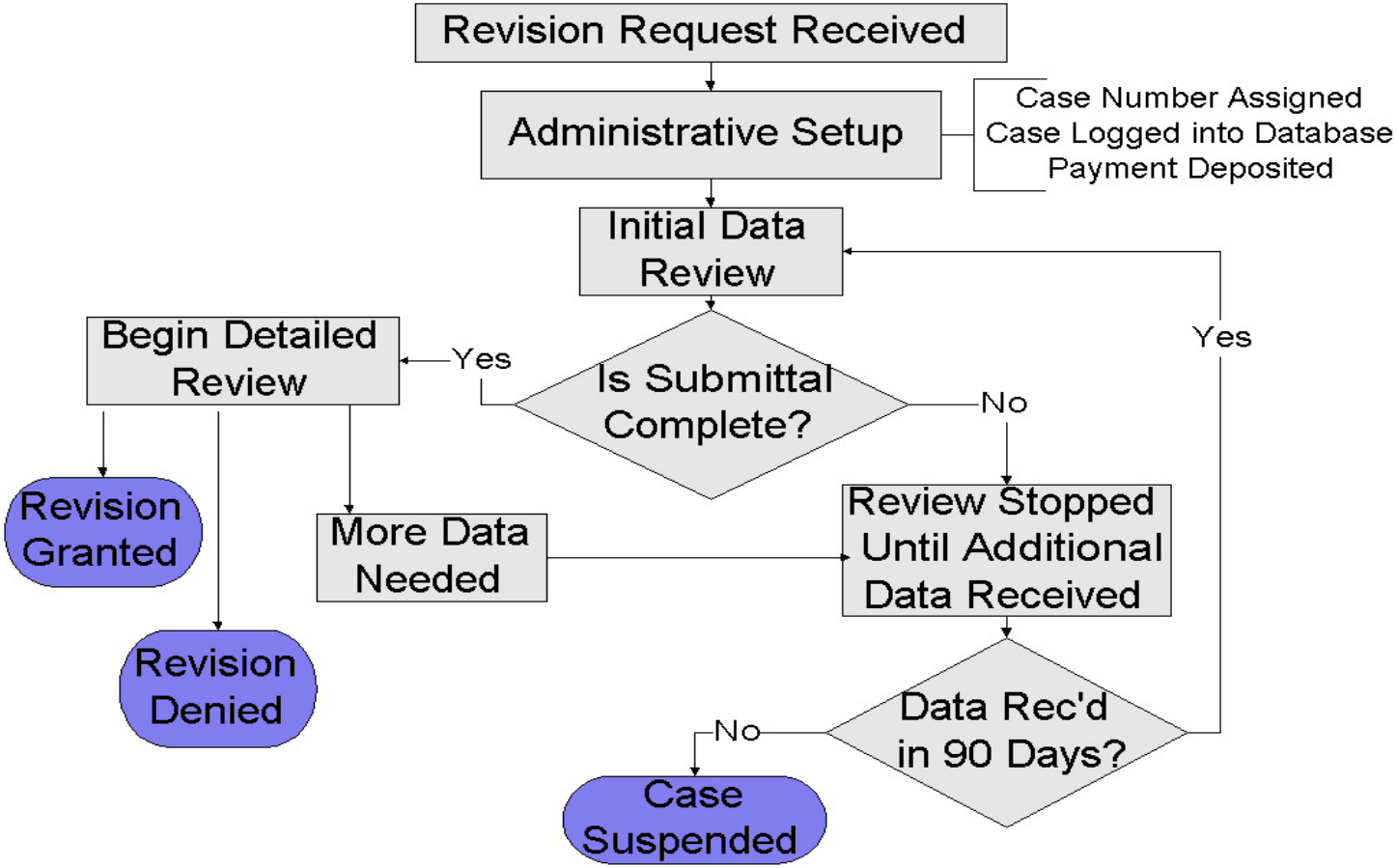
Check https://www.fema.gov/forms-documents-and-software/flood-map-related-fees for latest fees.

Fee Exemptions (S72.5)

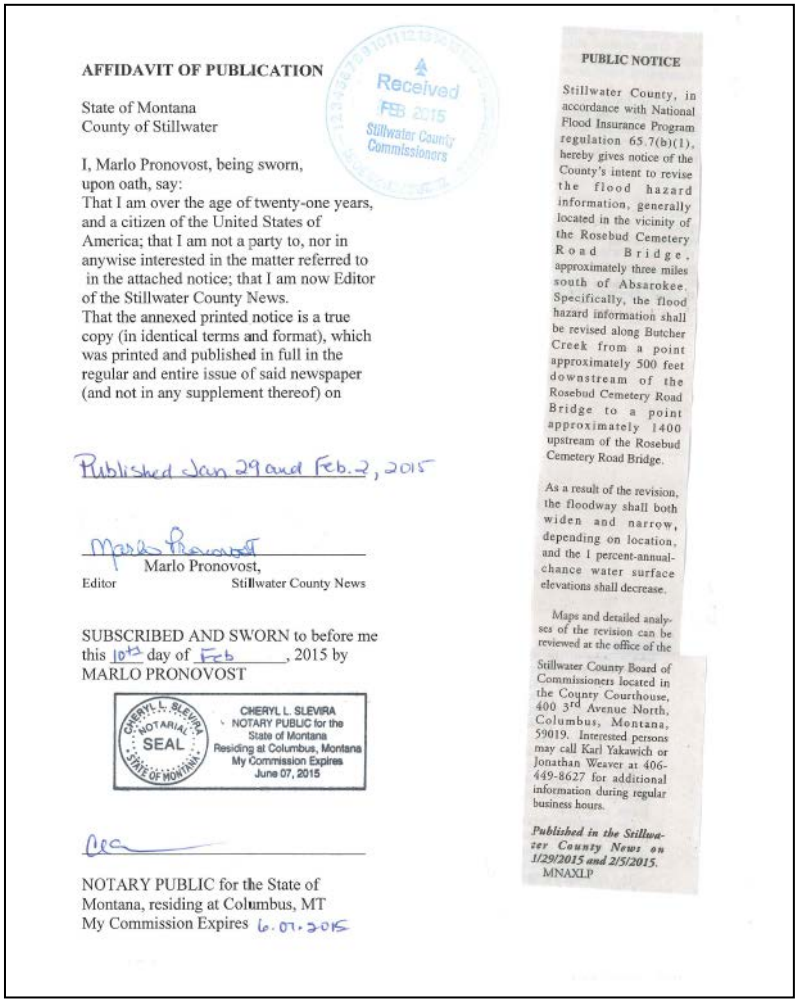
- Mapping or study analysis errors
- Effects of natural changes within SFHAs
- Adding detail to a Approximate Zone A
  - Not including manmade modifications
    (Bridges, culverts, fill, grading, drop structures, etc.)
- Flood-control projects that are 50% Federally funded
- Improved flood hazard data
  - Not including manmade modifications
    (Bridges, culverts, fill, grading, drop structures, etc.)
- Floodway Revision
- Per HFIAA (Homeowner Affordability Act of 2014): **Habitat restoration projects** funded with Federal or State funds, including dam removal, culvert redesign, or fish passage installation.

An explanation must be provided with application when claiming a fee exemption

The FEMA Review Process



Public Notice



AFFIDAVIT OF PUBLICATION

Received
FEB 2015
Stillwater County Commissioners

State of Montana
County of Stillwater

I, Marlo Pronovost, being sworn, upon oath, say:
That I am over the age of twenty-one years, and a citizen of the United States of America; that I am not a party to, nor in anywise interested in the matter referred to in the attached notice; that I am now Editor of the Stillwater County News.
That the annexed printed notice is a true copy (in identical terms and format), which was printed and published in full in the regular and entire issue of said newspaper (and not in any supplement thereof) on

Published Jan 29 and Feb. 2, 2015

Marlo Pronovost
Marlo Pronovost,
Editor Stillwater County News

SUBSCRIBED AND SWORN to before me this 10th day of Feb, 2015 by MARLO PRONOVOST

CHERYL L. SLEVIRA NOTARIAL SEAL STATE OF MONTANA
CHERYL L. SLEVIRA
NOTARY PUBLIC for the State of Montana
Residing at Columbus, Montana
My Commission Expires June 07, 2015

NOTARY PUBLIC for the State of Montana, residing at Columbus, MT
My Commission Expires 6.07.2015

PUBLIC NOTICE

Stillwater County, in accordance with National Flood Insurance Program regulation 65.7(b)(1), hereby gives notice of the County's intent to revise the flood hazard information, generally located in the vicinity of the Rosebud Cemetery Road Bridge, approximately three miles south of Absarokee. Specifically, the flood hazard information shall be revised along Butcher Creek from a point approximately 500 feet downstream of the Rosebud Cemetery Road Bridge to a point approximately 1400 upstream of the Rosebud Cemetery Road Bridge.

As a result of the revision, the floodway shall both widen and narrow, depending on location, and the 1 percent-annual-chance water surface elevations shall decrease.

Maps and detailed analyses of the revision can be reviewed at the office of the Stillwater County Board of Commissioners located in the County Courthouse, 400 3rd Avenue North, Columbus, Montana, 59019. Interested persons may call Karl Yakawich or Jonathan Weaver at 406-449-8627 for additional information during regular business hours.

Published in the Stillwater County News on 1/29/2015 and 2/5/2015.
MNAXLP

- Floodplain/Floodway Boundaries Revisions require affected **Property Owner Notification** by mail per MCA 76-5-208 (2)

Issued vs. Effective

- LOMRs have a 90-day appeal period, starts after 2nd newspaper publication date.
- LOMRs become effective 120 days from 2nd newspaper publication date

Page 1 of 5	Issue Date: June 10, 2016	Effective Date: October 25, 2016	Case No.: 15-08-1320P	LOMR-APP

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data; therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination information presented in this LOMR may be changed.

Hydraulic/Mapping Considerations

- Topographic Info
  - Vertical datum
  - Labeling
- Workmaps
  - Cross Sections
  - 500-yr, floodway, etc.
  - Provide digital copies
    - Provide spatially referenced GIS data whenever possible
- Agreement map vs. model
  - Types:
    - Topwidths
    - Channel lengths
    - BFEs vs. contours

Hydraulic Modeling Sequence

Hydraulic Model Development & Work Flow Process:

First: Acquire the Effective model data from FEMA,DNRC, or Community – Plan Accordingly

1. Duplicate Effective Model: A reproduction of the Effective model covering the Area of Revision.

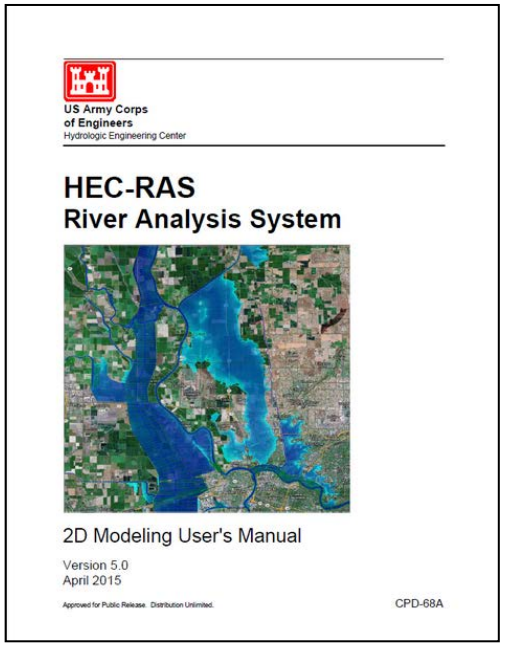
2. Corrected Effective Model: Used to correct errors in the Duplicate Effective model. Must not reflect any man-made physical changes since the date of the Effective model.

3. Existing/Pre-Project Conditions Model: Reflects current conditions/terrain. Used to evaluate actual impacts of the project.

4. Revised/Proposed/Post-Project Conditions Model: Incorporates the physical changes to the model.

Describe all the changes made between models in the Narrative

Hydraulic Modeling Considerations


US Army Corps
of Engineers
Hydrologic Engineering Center

HEC-RAS
River Analysis System

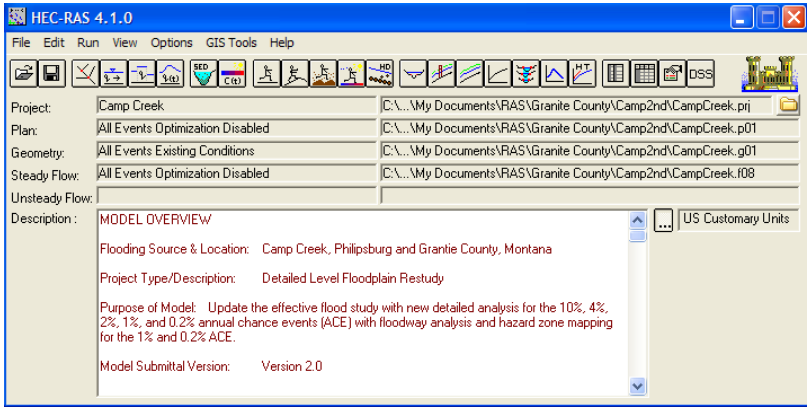
2D Modeling User's Manual

Version 5.0
April 2015

Approved for Public Release. Distribution Unlimited.

CPD-68A

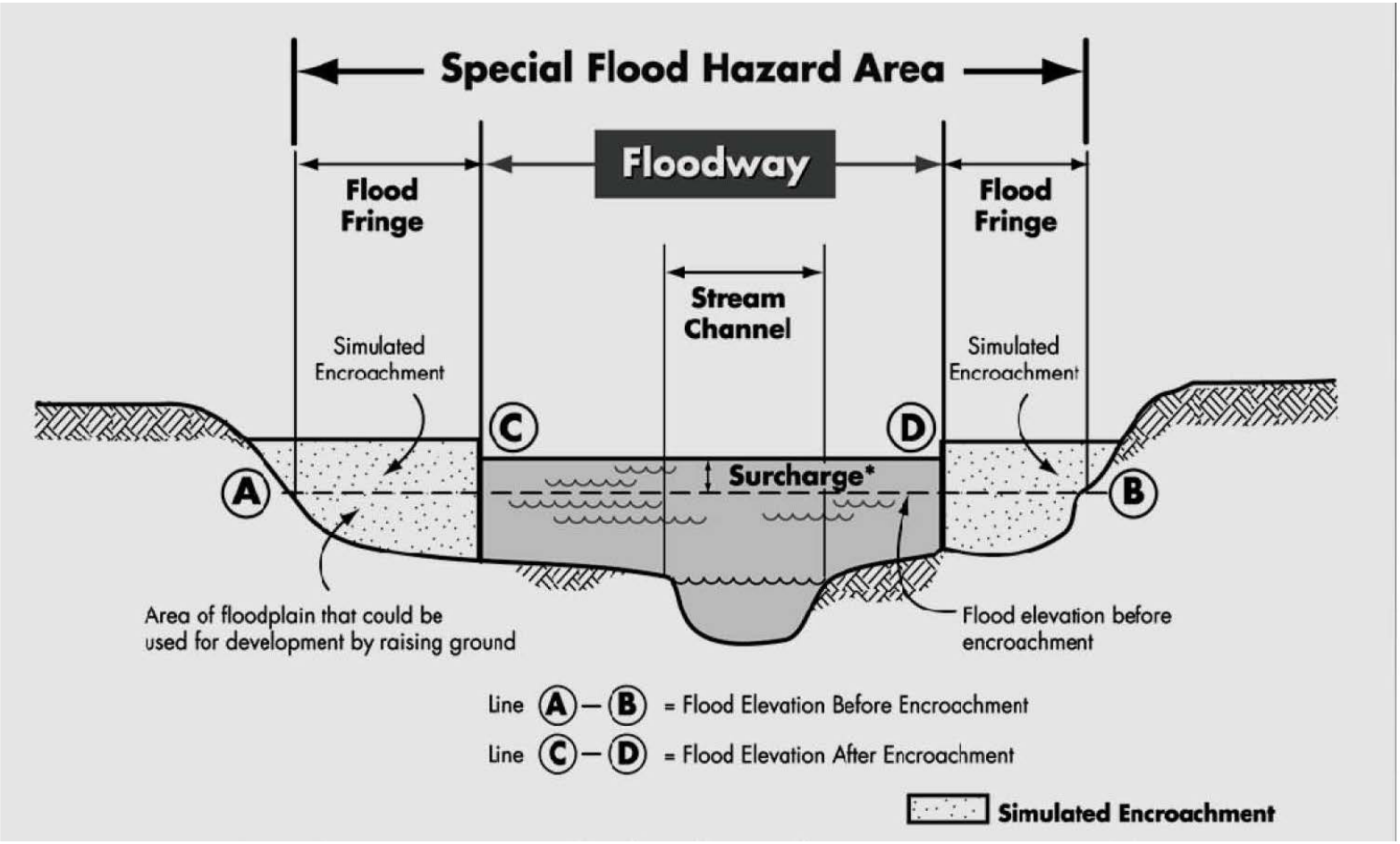
- **New Hydraulics:**
  - Accepted Hydraulic Model Software?
  - Recommend Check-RAS review program
  - Required Model metadata (per DNRC)



Tip: Match vertical datum of effective model

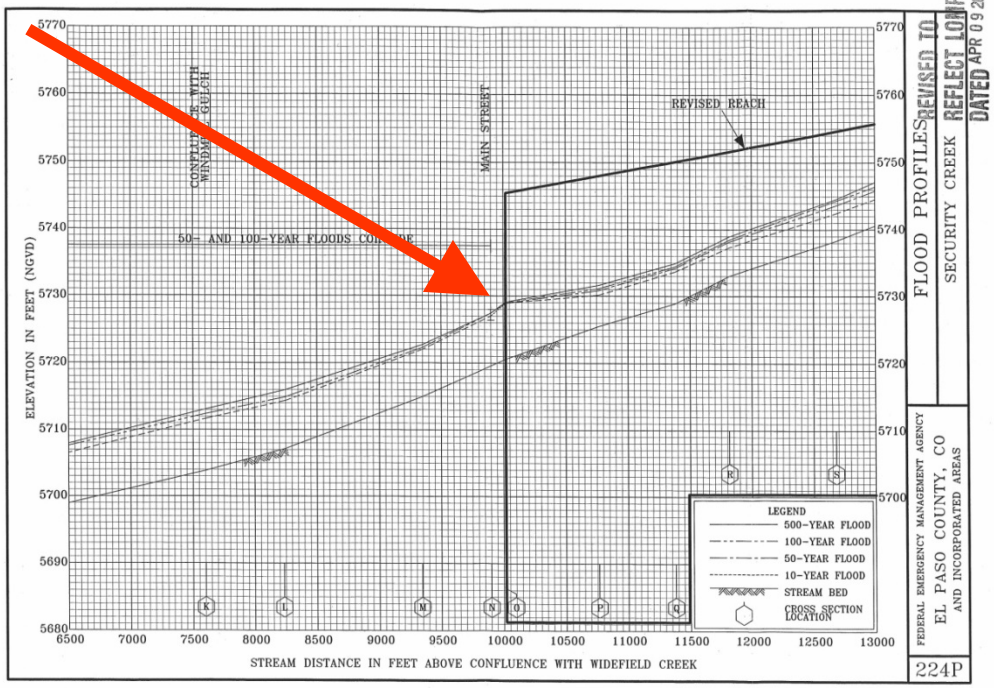
Hydraulic Modeling Considerations

Reality Check: A No-Rise Analysis is NOT a Floodway encroachment delineation – that has already been done! Therefore, Floodway surcharge values are not relevant to the No-Rise analysis process.



Hydraulic/Mapping Considerations

Tip: Use BFE at D/S Effective cross section as boundary condition



- **New Hydraulics:** Tie-ins – 44 CFR Section 65.6(a)(2)
  - **Area of Revision**: defined by a Tie-In to the effective mapping/study at the downstream (d/s) & upstream(u/s) limits:
    - Criteria: revised/post project elevations must tie-into Effective elevations within 0.5 foot at d/s and u/s limits.
    - Criteria: Floodway encroachment stations must match at d/s and u/s limits.

Questions?

Contact Information

Walt Ludlow, P.E.
State Floodplain Engineer
406.444.6664
WeLudlow@mt.gov

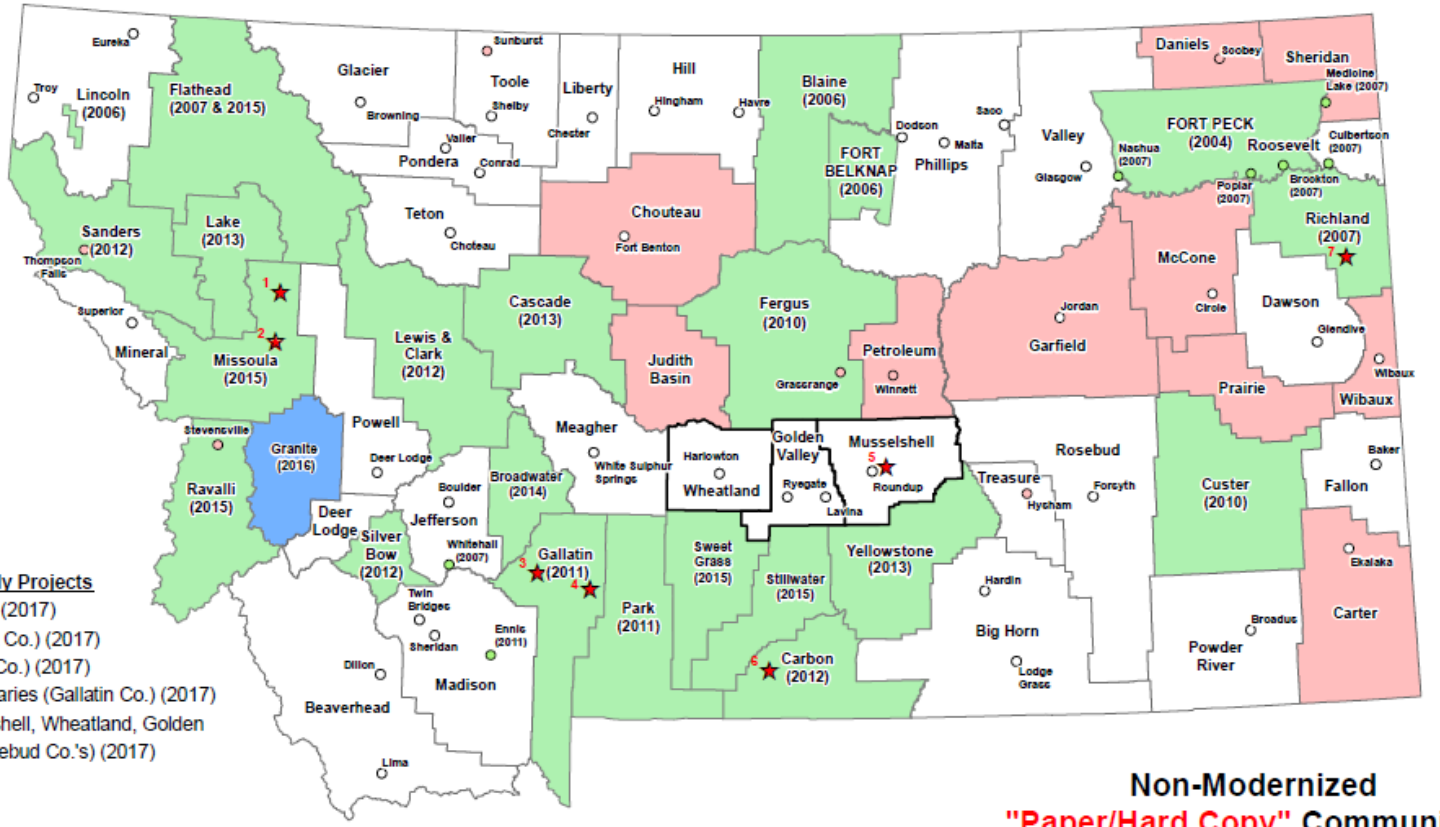
Tiffany Lyden, CFM
Outreach Specialist
406.444.0599
TLyden@mt.gov

Nicole Decker, E.I.
Civil Engineering Specialist
406.444.6656
NDecker@mt.gov

Floodplain Mapping Program Update

Updated December 29, 2015

Montana Status of Floodplain Mapping Inventory



Current Risk Map/PMR Study Projects

1. Swan River (Missoula Co.) (2017)
2. Clearwater River (Missoula Co.) (2017)
3. W. Gallatin River (Gallatin Co.) (2017)
4. Bozeman Creek and Tributaries (Gallatin Co.) (2017)
5. Musselshell River (Musselshell, Wheatland, Golden Valley, Petroleum, and Rosebud Co.'s) (2017)
6. Carbon County (2016)
7. Richland County (2016)

Modernized "DFIRM" Communities

Completed ("Year" Effective)

- 19 - Countywide
- 2 - Reservations
- 1 - Partial Countywide (Lincoln Co./Libby)
- 7 - City/Town ONLY

In Progress (Scheduled "Year" Effective)

- 1 Countywide
- 7 New Enhanced RiskMap or PMR Study Projects (see list at Left)

Non-Modernized "Paper/Hard Copy" Communities

NFIP Participating Community

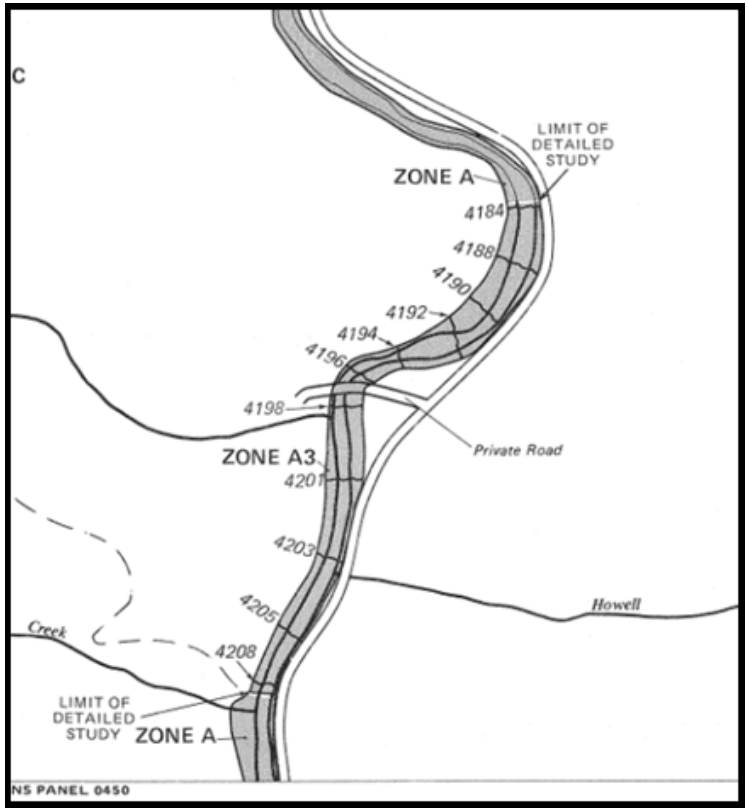
- 25 Counties
- 37 Municipalities

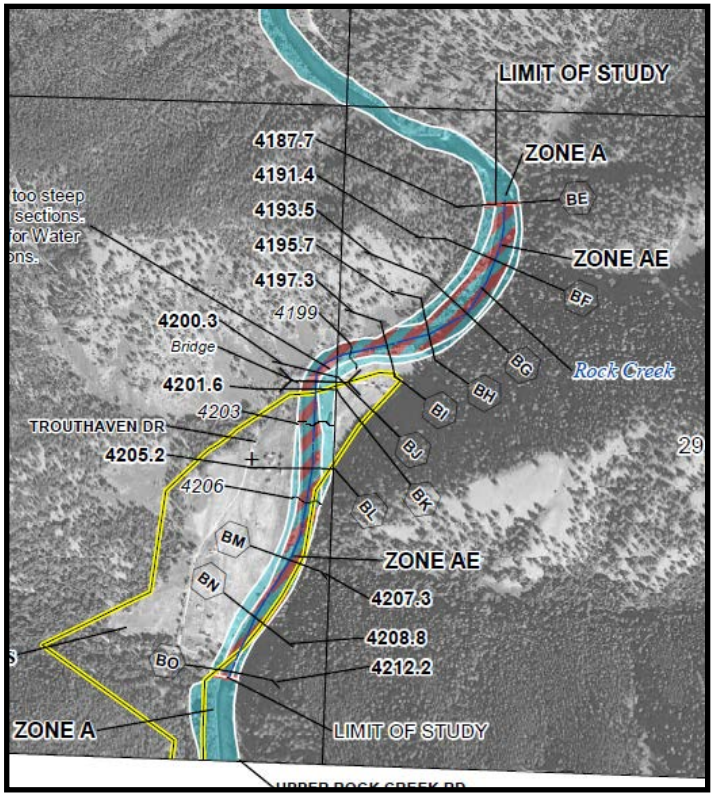
Digitized Mapping Available (Non-Regulatory)

Non-Participating or Suspended Community

- 10 Counties
- 8 Municipalities

Modernized Digital Flood Insurance Rate Maps (FIRMs)





Granite County Modernization – 4/19/2016

Granite County
Est. 1893
Montana

4 new floodplain studies

Lower Willow Creek: 8.6 miles Limited Detail (previously unmapped)

Flint Creek: 47.6 miles Limited Detail (previously 36 miles of Approximate)

Camp Creek: 2 miles Detailed (previously mix of Approx. and Detailed)

Frost Creek: 1.75 miles Detailed (previously mix of Approx. and Detailed)

1 Re-delineation to New Topographic Data

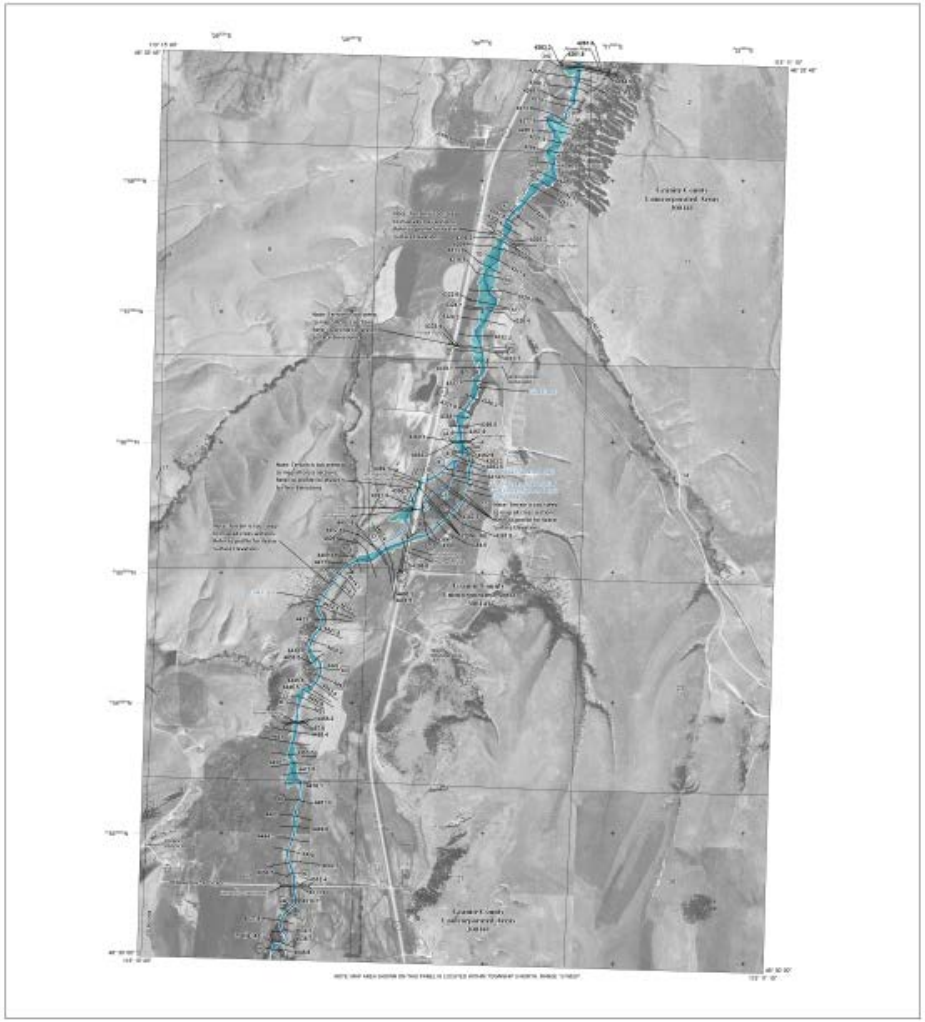
Bergman Slough (Clark Fork River at Drummond): 1.6 miles Detailed

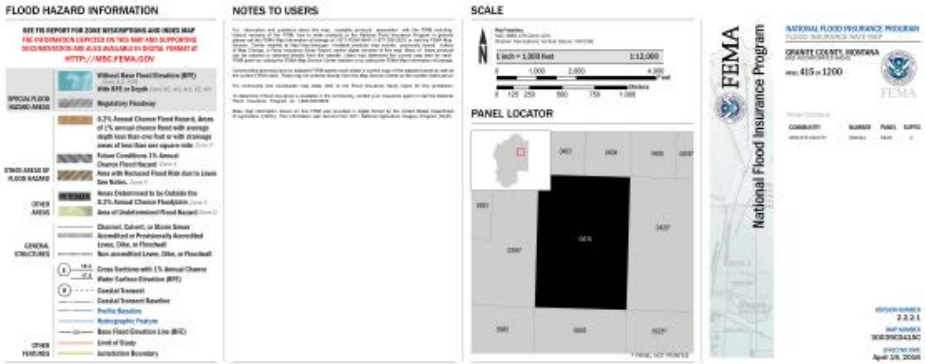
Rest of Mapped Floodplains Digitized - converted from paper to digital

Granite County Modernization

Granite County
Est. 1893
Montana

New Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) effective: 4/19/2016





West Gallatin River and Bozeman Creek and Tributaries

Gallatin County
Flood Insurance Rate Map Updates

<u>Update old floodplain maps from 1970s and 1980s</u>

West Gallatin River: 30 miles mainstem, 26 miles side channels/split flows

Bozeman Creek: 9.1 miles Detailed

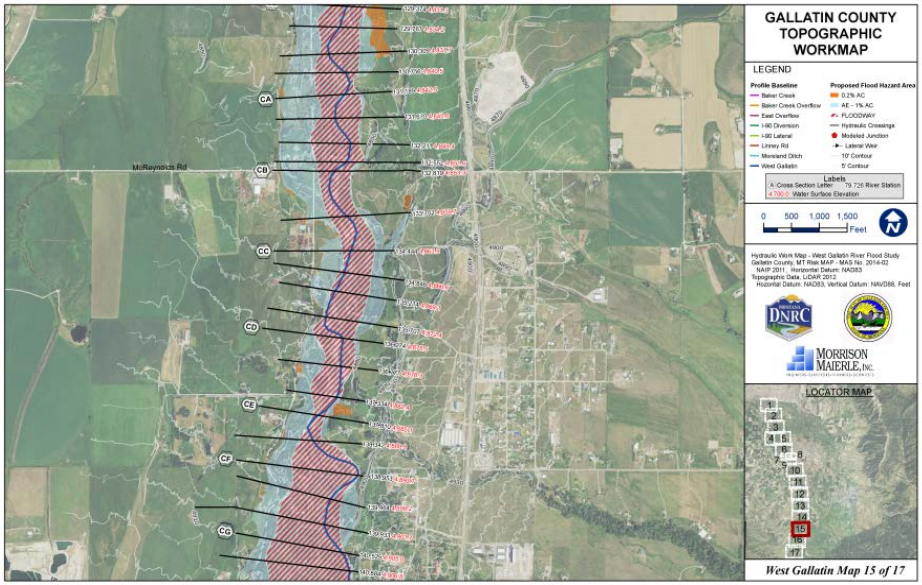
Mathew-Bird Creek: 3.8 miles Detailed

Figgins Creek: 1.8 miles Detailed

Mill Ditch Diversion: 1.8 miles Detailed

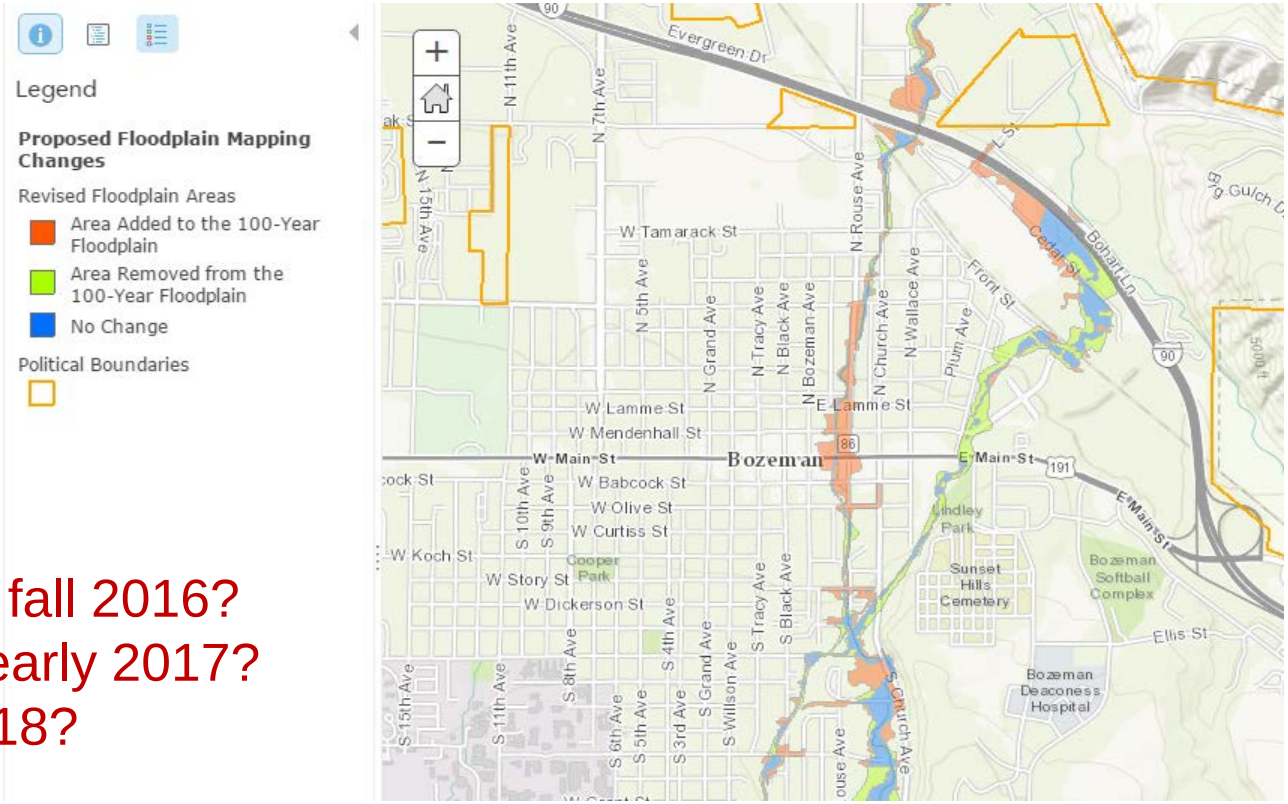
Nash Spring Creek: 2.7 miles Detailed

Flat Creek: 1.0 miles Detailed



West Gallatin River and Bozeman Creek and Tributaries

www.mtfloodplain.mt/gallatin



Project Status:

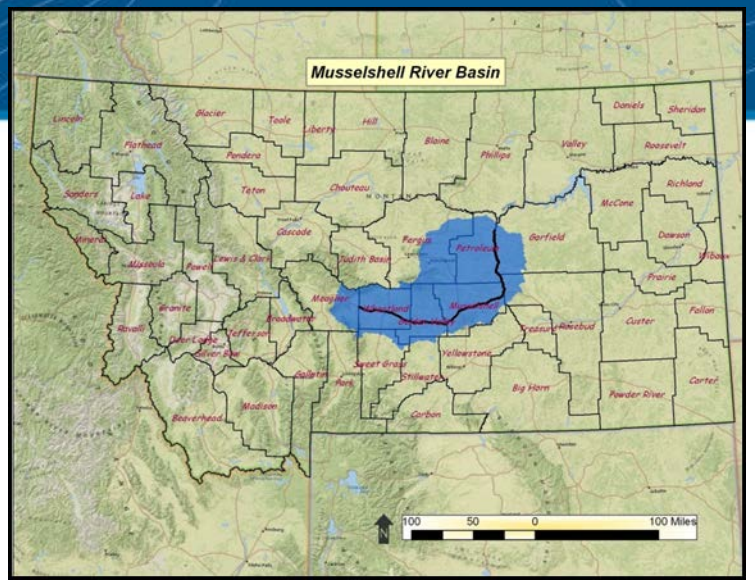
Draft maps available

Preliminary FIRMs – fall 2016?

Appeal/Comment – early 2017?

Effective - Spring 2018?

Musselshell River



<u>Update old floodplain mapping from early 1980s and add new mapping</u>

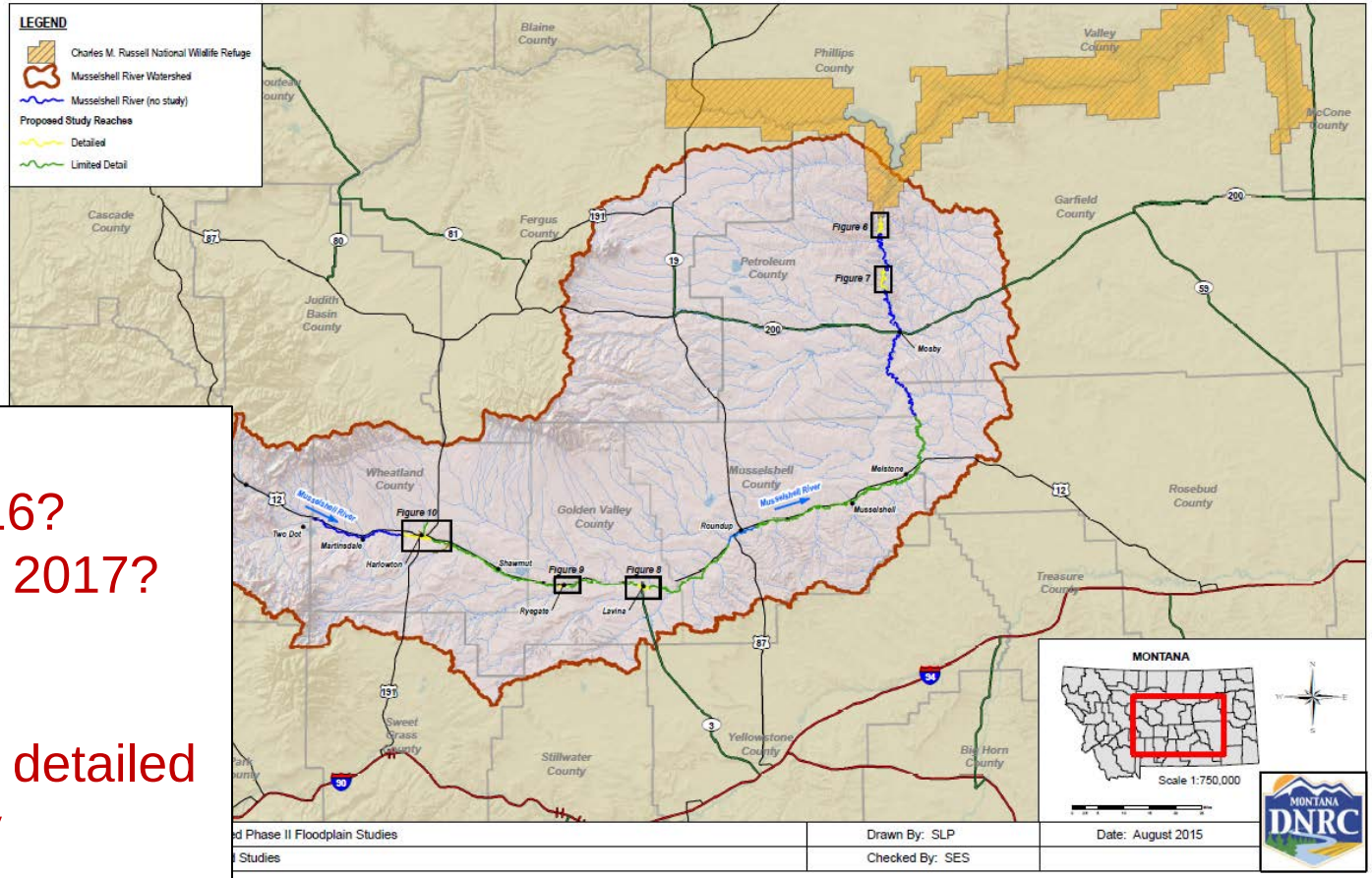
Musselshell River and Antelope Creek:

190 miles – Limited Detail
36 miles – Detailed study

(replacing 80 miles approximate A,
14 miles Detailed, 132 unmapped)

Musselshell River

www.mtfloodplain.mt/musselshell



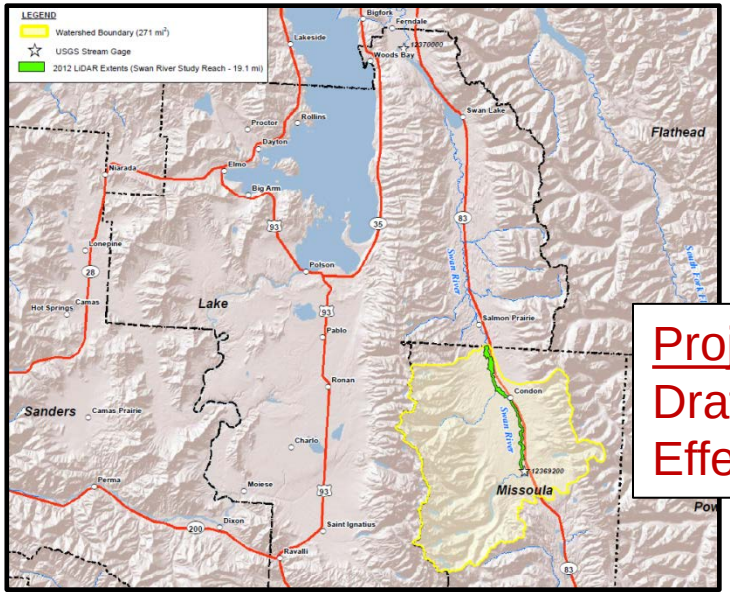
Project Status*:
Draft maps – fall 2016?
Preliminary FIRMs – 2017?
Effective - 2018?

* Roundup – 10 mile detailed study also underway

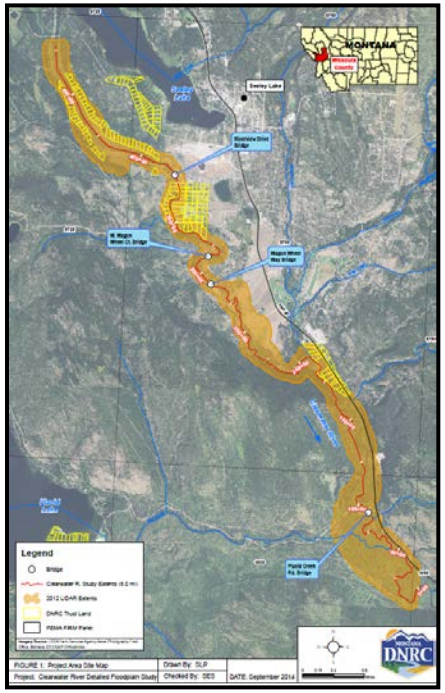
Missoula County – Swan and Clearwater Rivers

Update old floodplain mapping

Swan River: 19.1 miles Detailed
(previously Approx.)



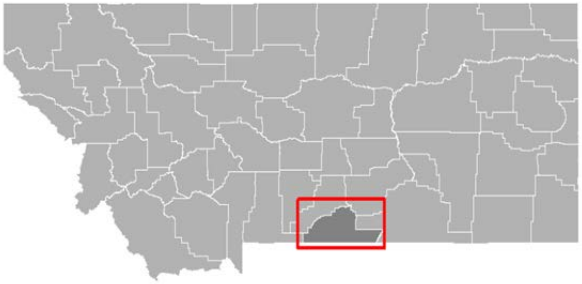
Project Status:
Draft maps – fall 2016?
Effective - 2018?



Clearwater River: 9 miles Detailed
(previously mix of Approx. and Detailed)

Project Status – in progress

Carbon County



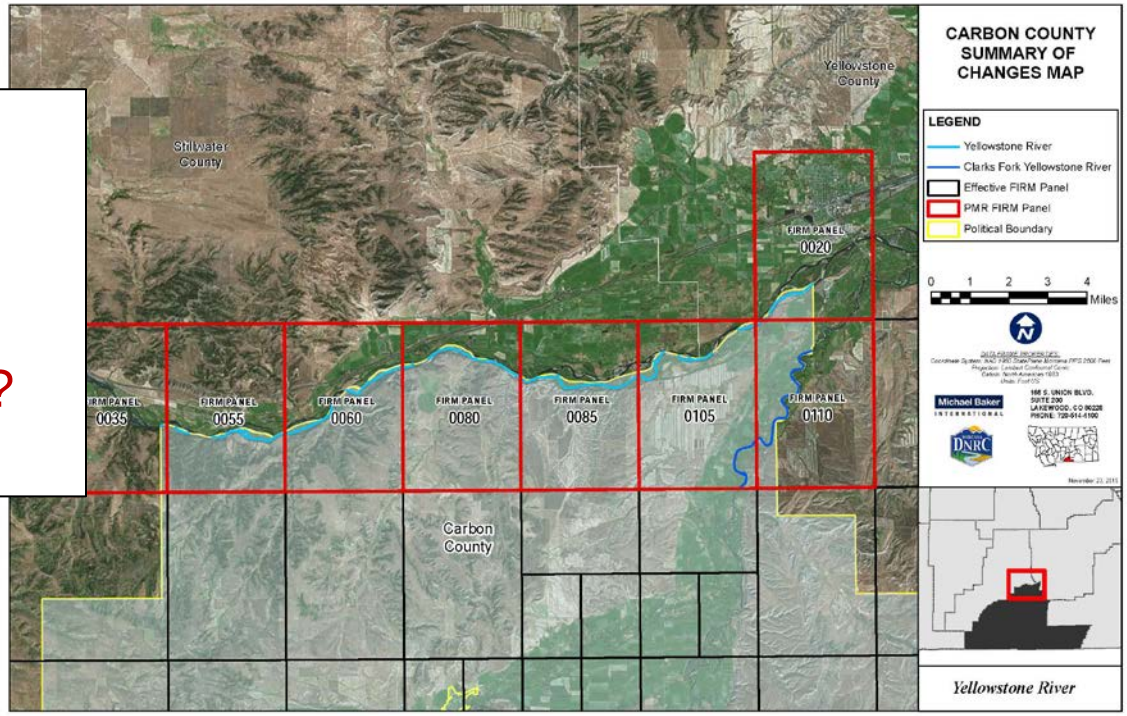
Update south half of Yellowstone River

Yellowstone River: 20 miles – Detail
(previously mix of Approx. and Detailed)

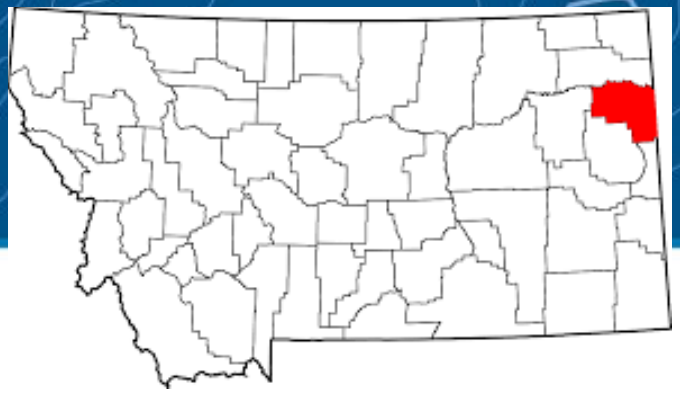
http://co.carbon.mt.us/departments/floodplain/

Project Status:
Appeal/Comment period thru Aug. 23

Effective FIRMs – early 2017?

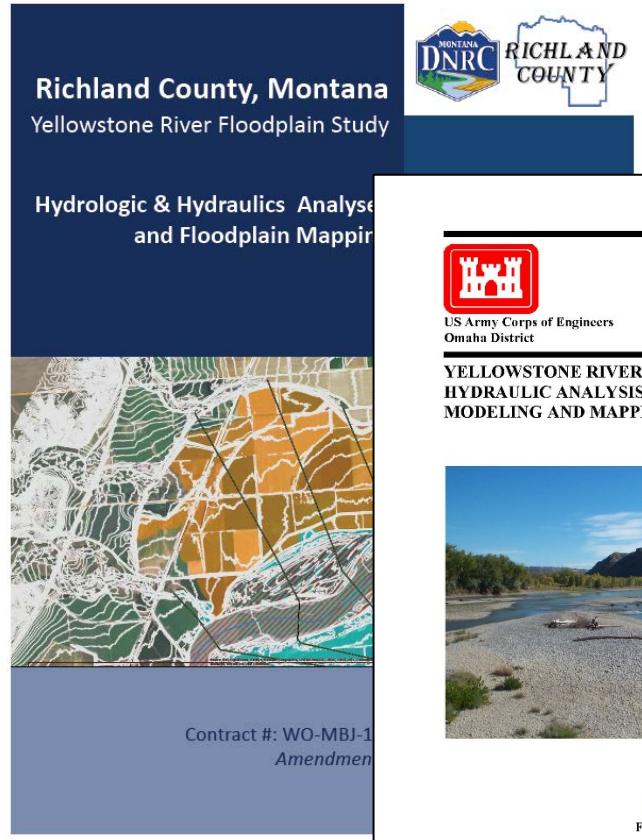


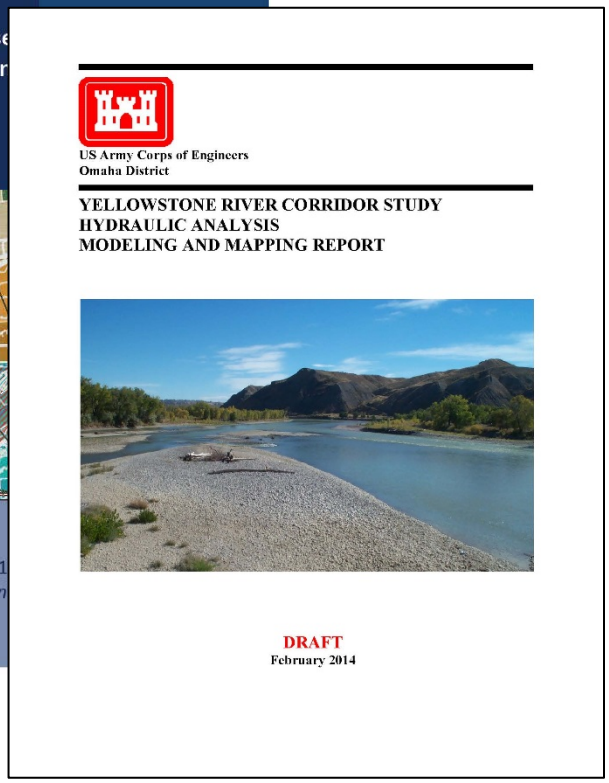
Richland County



<u>Update Yellowstone River floodplain mapping</u>
mostly county funded

Yellowstone River: 48 miles – Detail
(previously mix of Approx. and unmapped)





<u>Project Status:</u>
Draft maps – fall 2016?

Effective FIRMs – TBD

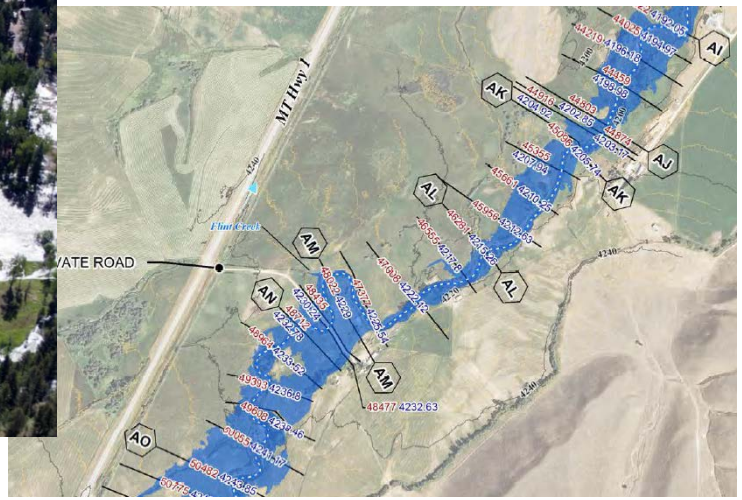
Floodplain Projects: Funding Opportunities & Resources

Project

TAX+
ON
AC
Grants
IJ
Sch

Projects

- **Understand Flood Risks - Floodplain studies and mapping**



- **Reduce Future Flood Damages – Mitigation**

Move out of risk area

- acquisition/demolition, acquisition/relocation

Make more resistant

- elevate, bridge/culvert improvement

Funding Resources

MONTANA.GOV
OFFICIAL STATE WEBSITE

SERVICES AGENCIES LOGIN SEARCH

- Water Management
- Water Operations
  - Board of Water Well Contractors
  - Dam Safety
  - Floodplain Management
    - Training
    - Silver Jackets
    - Permitting and Regulations
    - Outreach
    - News
    - Mapping and Technical Resources
    - Disaster and Recovery
    - Community Rating System
    - Big Hole Floodplain Study Products
    - Insurance
    - Property Owner Resources
    - Cool Tools
    - Contacts
    - Gallatin Mapping Updates
    - Musselshell River Flood Maps Update
    - Grants

Floodplain Management

The Montana DNRC Floodplain Management Program promotes common sense planning for development in flood prone areas through education for the benefit of public health, safety, and welfare.

Click here for information about the Floodplain Resource Seminar, July 19-22, 2016 offered free of charge at UM Helena College.

Contacts

Insurance

NATIONAL FLOOD INSURANCE PROGRAM

Permitting and Regulations

Mapping and Technical Resources

Disaster and Recovery

Training

Contacts

Steve Story, PE, CFM
Bureau Chief
Water Operations Bureau
(406) 444-6816

Breanna Caldwell
Administrative Support
(406) 444-0862

Traci Sears, CFM
NFIP/CAP Coordinator
(406) 444-6654

Tiffany Lyden, CFM
Outreach Specialist
(406) 444-0599

Nicole Decker
Civil Engineering Specialist
(406) 444-6656

Michelle Phillips
Floodplain Specialist
(406) 444-1300

Ethan Stapp
Floodplain Specialist
(406) 444-1343

Funding Resources

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DNRC Headquarters
1625 Eleventh Ave. Helena, MT 59601
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Grants

DNRC - CONSERVATION & RESOURCE DEVELOPMENT DIVISION (CARDD)

Renewable Resource Grants & Loans (RRGL) Program

Project Grants
- Activities that conserve, protect, develop or preserve natural resources
- Up to $100,000
- Applications due May 15th of even numbered years

Planning Grants
- Costs associated with the development of a project or funding application
- $5,000-10,000
- Open application cycle

Reclamation and Development Grants Program (RDGP)

Project Grants
- Activities that address a natural resource crucial state need
- Up to $300,000
- Applications due May 15th of even numbered years

Planning Grants
- Costs to help plan project
- Up to $50,000
- Open application cycle

FEDERAL EMERGENCY MANAGEMENT ADMINISTRATION (FEMA)

Pre-Disaster Mitigation (PDM) Grant Program
- Provides assistance to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk
- Awards planning and project grants annually by Congressional appropriations and are awarded on a nationally competitive basis
- Requires adoption of a hazard mitigation plan as a condition for receiving funding for HMA mitigation projects

Flood Mitigation Assistance (FMA) Program
- Provides funding for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP
- Also available for management costs
- Requires adoption of a hazard mitigation plan as a condition for receiving funding for HMA mitigation projects

US ARMY CORPS OF ENGINEERS (USACE)

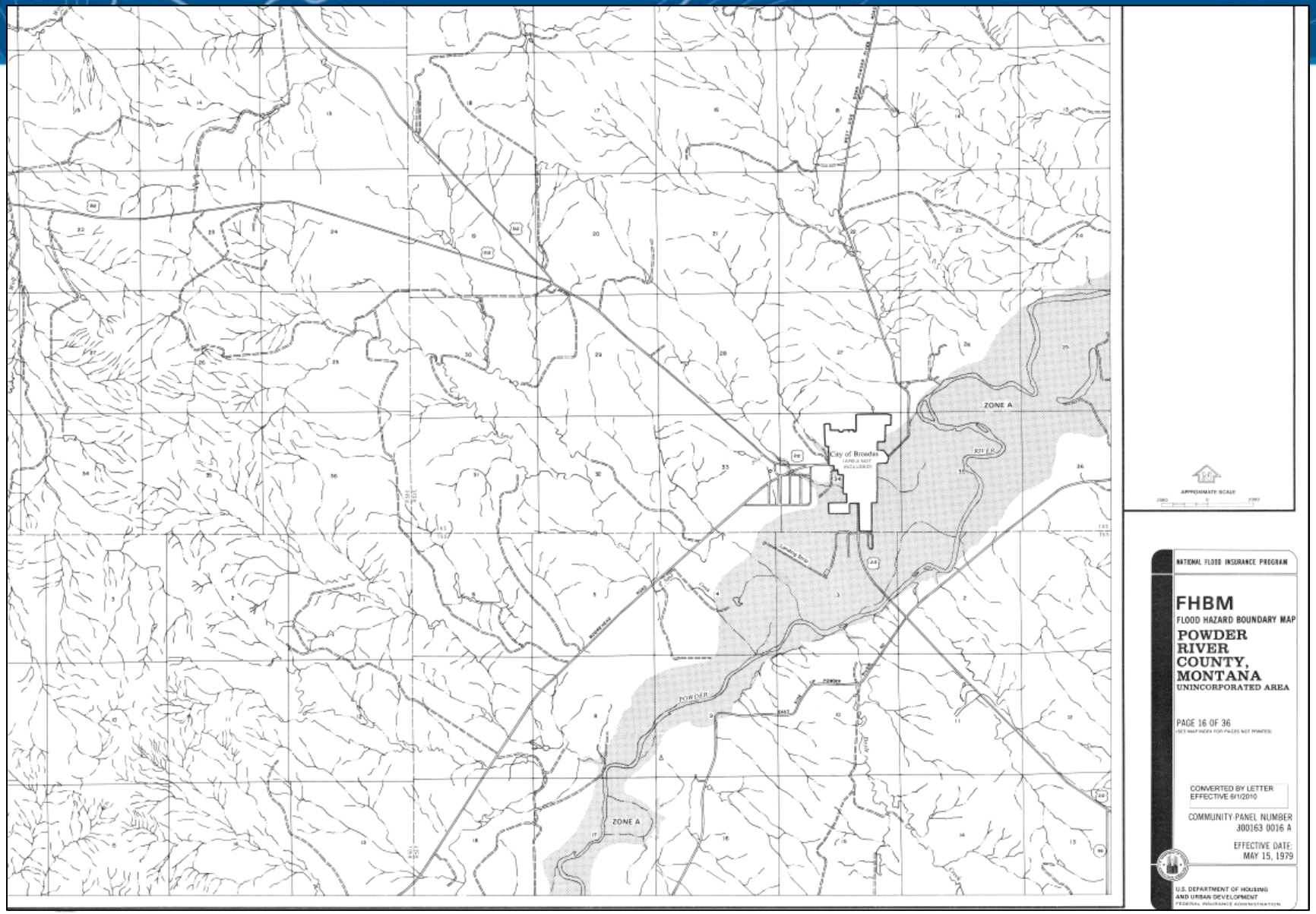
Floodplain Management Services Program
- Technical services and planning
- Will fund 100% of costs

Planning Assistance to States
- Available to communities for planning
- Will fund up to 50% of costs

MONTANA DEPARTMENT OF COMMERCE (MDOC)

Example – Floodplain Study

Example – Powder River Floodplain Study

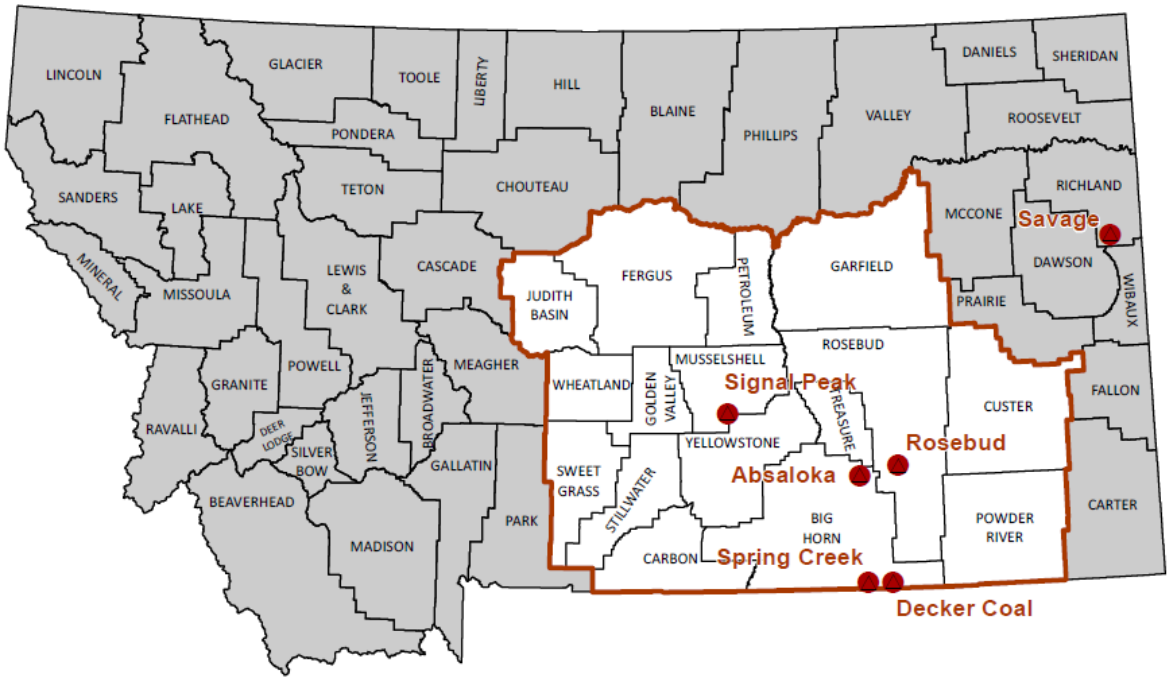


Example – Powder River Floodplain Study

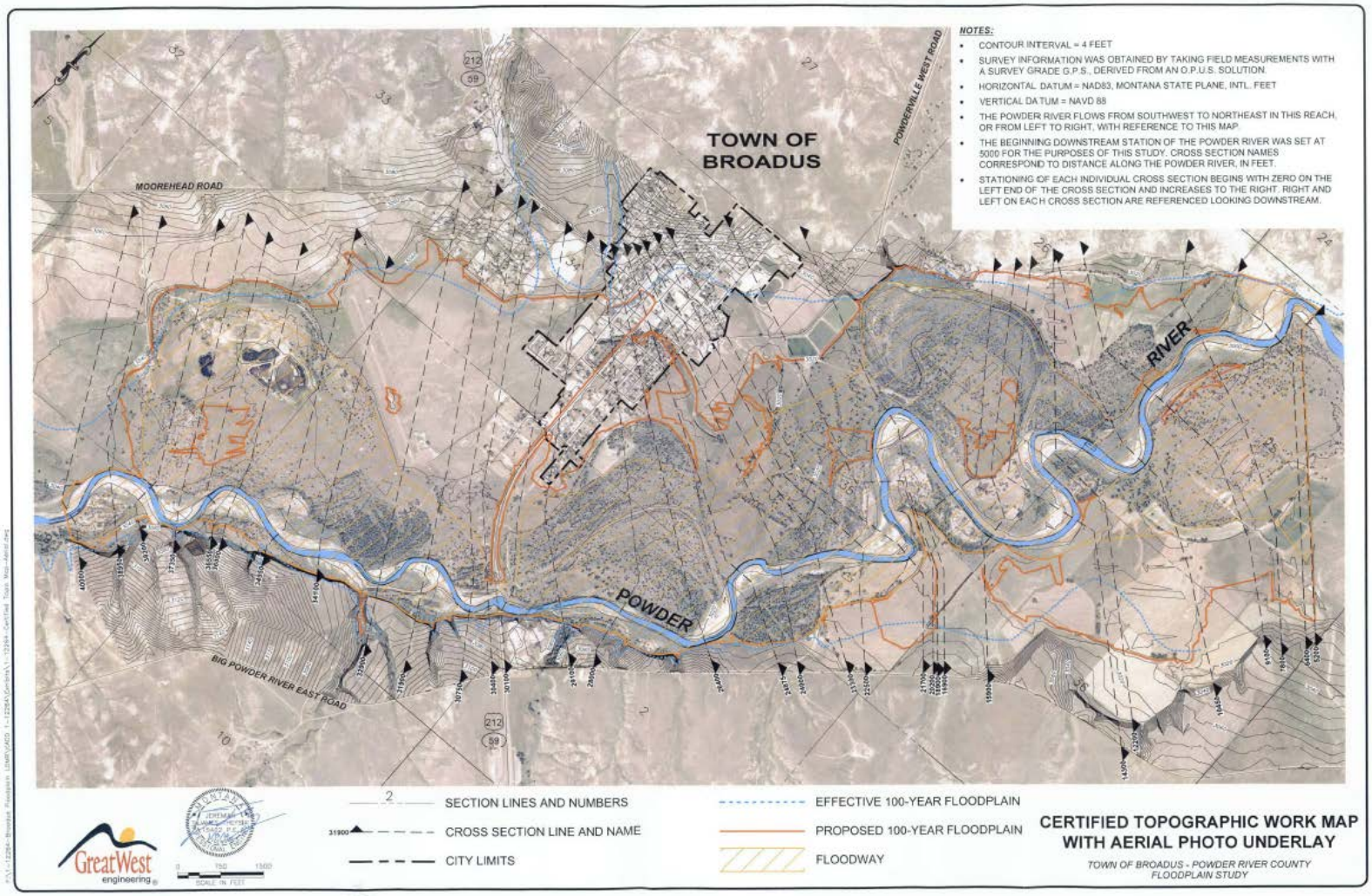
MT Coal Board Program

- Applications reviewed quarterly
- Tie to coal production or usage impacts

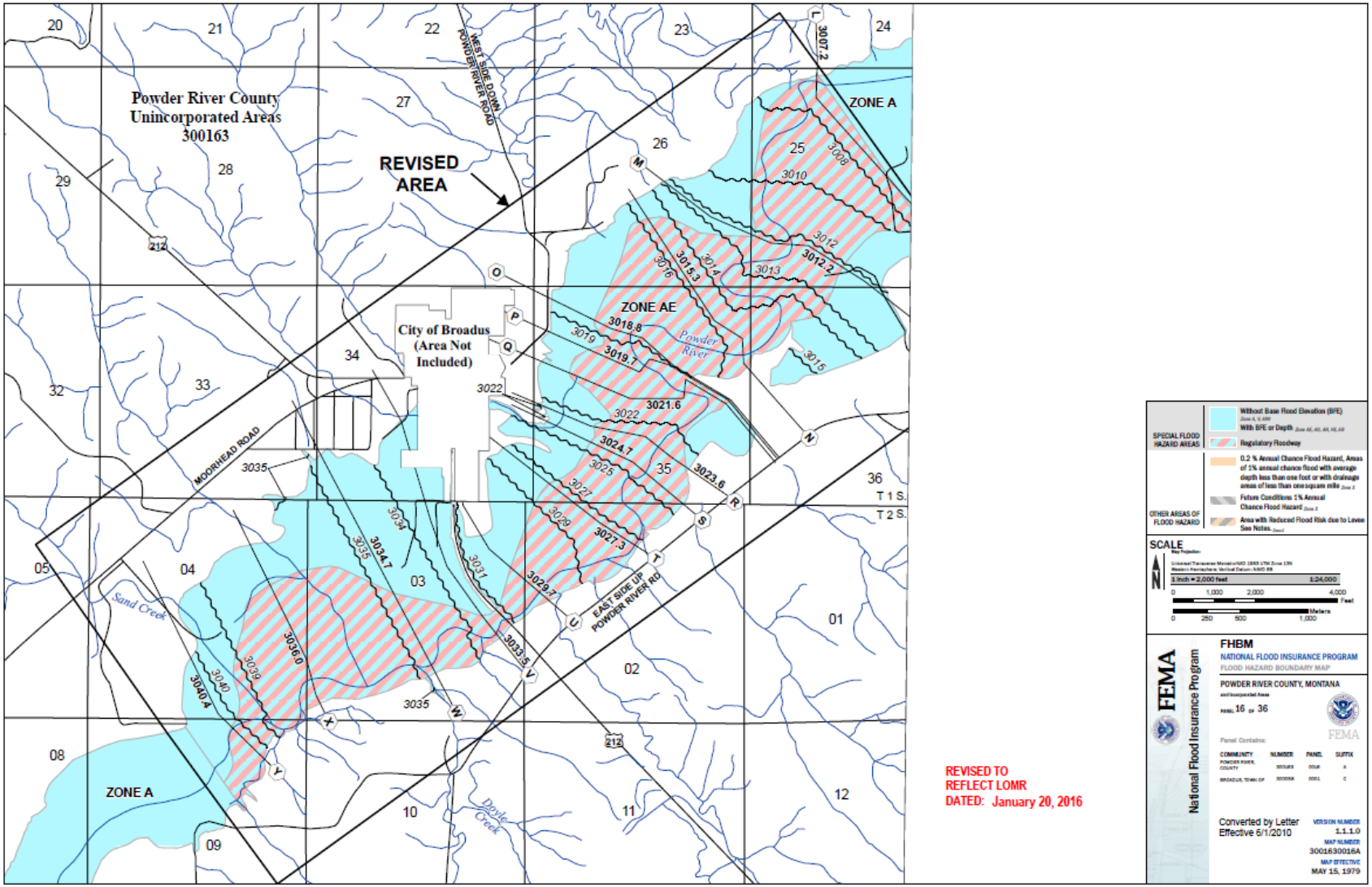
Major Coal Mines and the Designated Coal Impact Area



Example – Powder River Floodplain Study



Example – Powder River Floodplain Study



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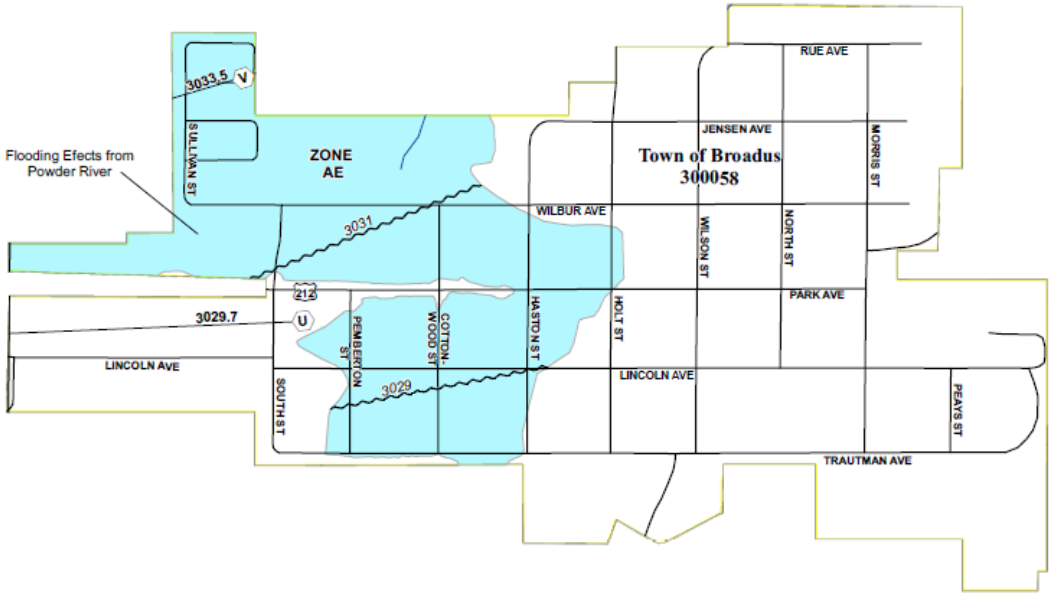
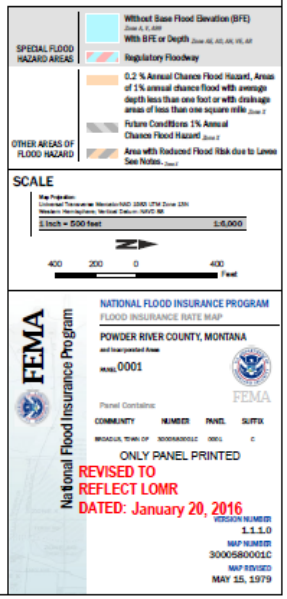
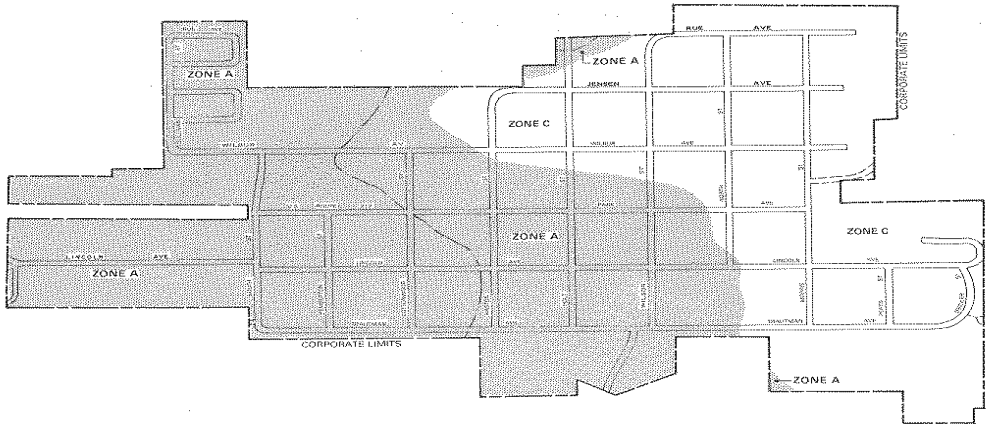
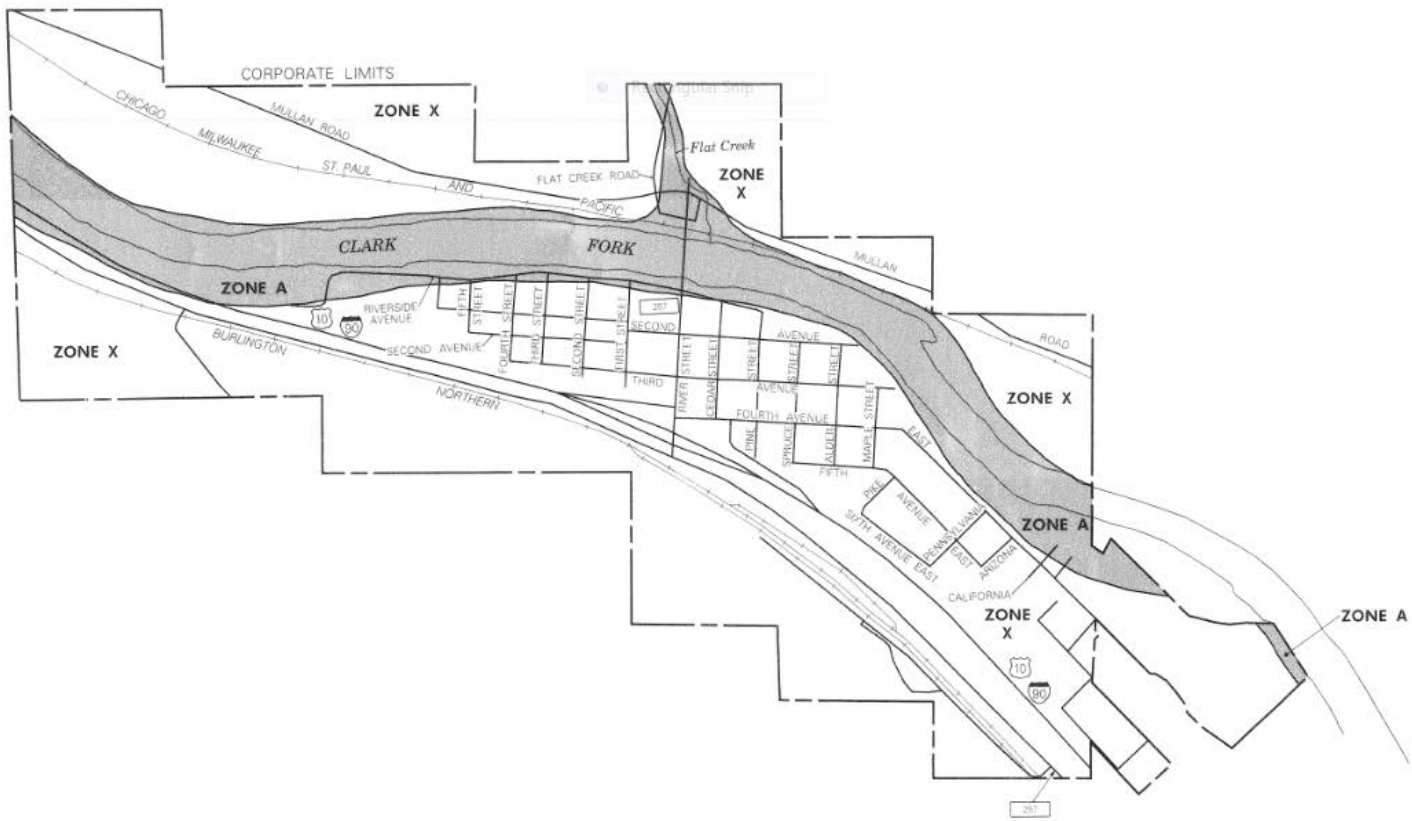






Example – Floodplain Study

Example – Flat Creek Floodplain Study



Example – Flat Creek Floodplain Study

[redacted]

Lake County Community Development Corporation

Growing Communities; Growing Businesses

LCCDC

[redacted]

DIRECTORY OF GRANT CONSULTANTS FOR:
Planning, Writing & Administration

MONTANA DEPARTMENT OF COMMERCE

NAME/ADDRESS	GRANT WRITING	GRANT ADMINISTRATION	PUBLIC FACILITIES	HOUSING	NEEDS ASSESSMENT	COMMUNITY PLANNING	ECONOMIC DEVELOPMENT	AREA SERVED
HEADWATERS RC&D Warren Harden, Economic Development Planner 305 W. Mercury, Ste. 211 Butte, MT 59701 Phone: (406) 782-7333 FAX: (406) 782-9675 e-mail: wharden@bigskyhsd.com	X	X	X	X	X	X	X	Beaverhead, Deer Lodge, Granite, Jefferson, Madison, Powell, and Silver Bow Counties
LAKE COUNTY COMMUNITY DEVELOPMENT CORPORATION Jan Niemeyer PO Box 128 Ronan, MT 59864 Phone: (406) 676-5901 FAX: (406) 676-5902 e-mail: janw@ronan.net / lccd@ronan.net	X	X			X		X	Lake, Lincoln, Mineral, and Sanders Counties
MISSOULA AREA ECONOMIC DEVELOPMENT CORPORATION 1121 East Broadway Ste 100 Missoula, MT 59802 Phone: (406) 728-3337	X	X	X		X	X	X	Missoula and Ravalli Counties

Example – Flat Creek Floodplain Study

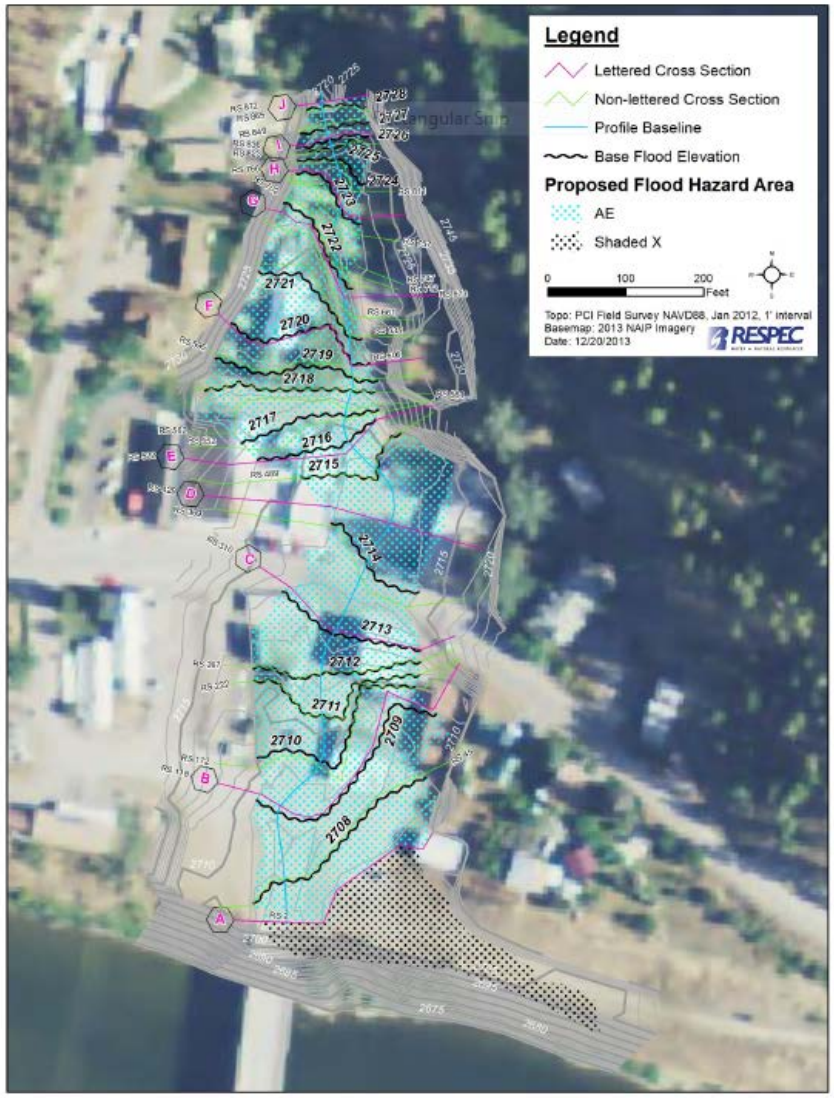
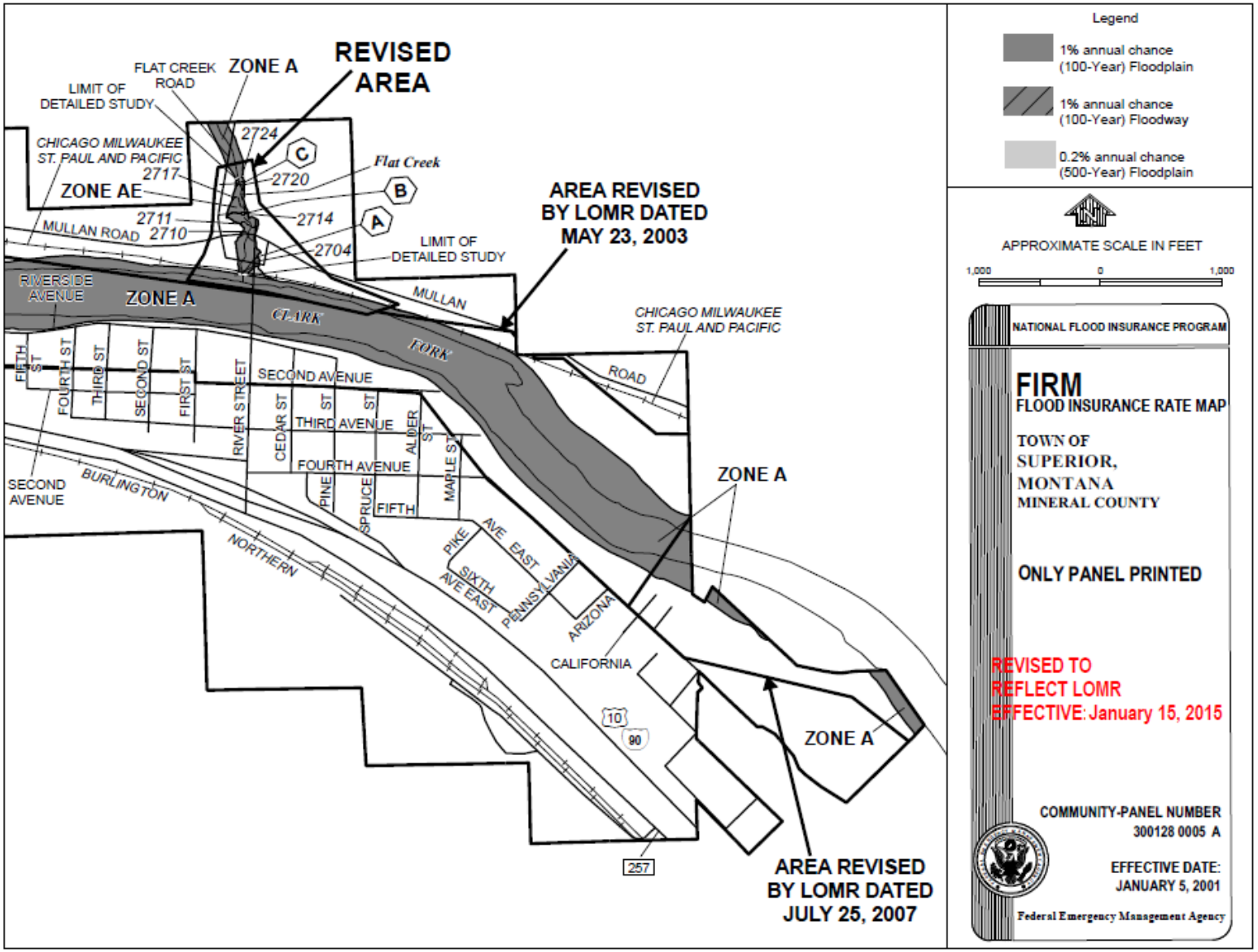


Figure 2. Flat Creek HEC-RAS model workmap.

Example – Flat Creek Floodplain Study



Mitigation Projects

Reduce Future Flood Damages

Move out of risk area

- acquisition/demolition or acquisition/relocation

Make more resistant

- elevate, bridge/culvert improvement

FEMA & MT Disaster and Emergency Services

Reduce or lessen the impacts of natural disasters to protect property and save lives

- **Pre-Disaster Mitigation (PDM) Grant Program**
- **Flood Mitigation Assistance (FMA)**
- **Hazard Mitigation Grant Program (HMGP)**

Work with Local Emergency Coordinator and MT Dept. of Emergency Services

Nadene Wadsworth, Deputy State Hazard Mitigation Officer

Examples – Mitigation Projects

<u>Elevation</u> of the Town of Valier pump house
Pondera County
Hazard Mitigation Grant Program
Project funded at 75%

<u>Replacement of undersized culverts</u> with spanning bridges
Mill Creek in Madison County, Toledo Mine Road
Hazard Mitigation Grant Program
Project funded at 75%

Example – Mitigation Projects

Musselshell County

<u>Acquisition Projects</u>
Demolition/relocation

Flood Mitigation Assistance

Hazard Mitigation Grant Program

Pre-Disaster Mitigation Grant Program

Stay Tuned…

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Thank You

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Tiffany Lyden
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Aerial Image by Chris Boyer, Kestrel Aerial Services, Inc.