FLOOD INSURANCE STUDY FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 1



OURAY COUNTY, COLORADO

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
OURAY COUNTY, UNINCORPORATED AREAS	080136
OURAY, CITY OF	080137
RIDGWAY, TOWN OF	080138



EFFECTIVE:

FLOOD INSURANCE STUDY NUMBER 08091CV000A Version Number 2.6.4.6 PRELIMINARY 2/17/2022

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Uncompahgre River	12-43 P

Published Separately

Flood Insurance Rate Map (FIRM)

FLOOD INSURANCE STUDY REPORT OURAY COUNTY, COLORADO

SECTION 1.0 – INTRODUCTION

1.1 The National Flood Insurance Program

The National Flood Insurance Program (NFIP) is a voluntary Federal program that enables property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

For decades, the national response to flood disasters was generally limited to constructing flood-control works such as dams, levees, sea-walls, and the like, and providing disaster relief to flood victims. This approach did not reduce losses nor did it discourage unwise development. In some instances, it may have actually encouraged additional development. To compound the problem, the public generally could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs of disaster relief to the general taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection.

The U.S. Congress established the NFIP on August 1, 1968, with the passage of the National Flood Insurance Act of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Reform Act of 1994 and the Flood Insurance Reform Act of 2004. The NFIP is administered by the Federal Emergency Management Agency (FEMA), which is a component of the Department of Homeland Security (DHS).

Participation in the NFIP is based on an agreement between local communities and the Federal Government. If a community adopts and enforces floodplain management regulations to reduce future flood risks to new construction and substantially improved structures in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses. The community's floodplain management regulations must meet or exceed criteria established in accordance with Title 44 Code of Federal Regulations (CFR) Part 60, *Criteria for Land Management and Use*.

SFHAs are delineated on the community's Flood Insurance Rate Maps (FIRMs). Under the NFIP, buildings that were built before the flood hazard was identified on the community's FIRMs are generally referred to as "Pre-FIRM" buildings. When the NFIP was created, the U.S. Congress recognized that insurance for Pre-FIRM buildings would be prohibitively expensive if the premiums were not subsidized by the Federal Government. Congress also recognized that most of these floodprone buildings were built by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. The NFIP requires that full actuarial rates reflecting the complete flood risk be charged on all buildings constructed or substantially improved on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later. These buildings are generally referred to as "Post-FIRM" buildings.

1.2 Purpose of this Flood Insurance Study Report

This Flood Insurance Study (FIS) Report **revises and updates** information on the existence and severity of flood hazards for the study area. The studies described in this report developed flood hazard data that will be used to establish actuarial flood insurance rates and to assist communities in efforts to implement sound floodplain management.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. Contact your State NFIP Coordinator to ensure that any higher State standards are included in the community's regulations.

1.3 Jurisdictions Included in the Flood Insurance Study Project

This FIS Report covers the entire geographic area of Ouray County, Colorado.

The jurisdictions that are included in this project area, along with the Community Identification Number (CID) for each community and the United States Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC-8) sub-basins affecting each, are shown in Table 1. The FIRM panel numbers that affect each community are listed. If the flood hazard data for the community is not included in this FIS Report, the location of that data is identified.

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Ouray County, Unincorporated Areas	080136	14020002 14020006 14030003 14080104	08091C0025E ¹ 08091C0050E ¹ 08091C0075E ¹ 08091C0085E 08091C0095E 08091C0100E ¹ 08091C0125E ¹ 08091C0150E ¹ 08091C0200E ¹ 08091C0205E ¹ 08091C0210E	

Table 1. LISUNG OF NEIF JUNSUICION	I able 1:	Listing	ot	NEIP	Jurisdict	ions
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Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Ouray County, Unincorporated Areas (continued)	080136	14020002 14020006 14030003 14080104	08091C0215E 08091C0217E 08091C0219E 08091C0220E 08091C0230E 08091C0230E 08091C0236E 08091C0238E 08091C0250E 08091C0250E 08091C0325E ¹ 08091C0325E ¹ 08091C0327E 08091C0328E 08091C0329E 08091C0329E 08091C0335E ¹ 08091C0335E ¹ 08091C0340E ¹ 08091C0340E ¹ 08091C0345E ¹ 08091C0345E ¹ 08091C0345E ¹ 08091C0345E ¹ 08091C0345E ¹ 08091C0345E ¹	
Ouray, City of	080137	14020006	08091C0341E 08091C0343E	
Ridgway, Town of	080138	14020006	08091C0217E 08091C0219E 08091C0236E 08091C0238E	

¹ Panel Not Printed

1.4 Considerations for using this Flood Insurance Study Report

The NFIP encourages State and local governments to implement sound floodplain management programs. To assist in this endeavor, each FIS Report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent annual chance flood elevations (the 1-percent-annual-chance flood elevation is also referred to as the Base Flood Elevation (BFE)); delineations of the 1-percent-annual-chance floodway. This information is presented on the FIRM and/or in many components of the FIS Report, including Flood Profiles, Floodway Data tables, Summary of Non-Coastal Stillwater

Elevations tables, and Coastal Transect Parameters tables (not all components may be provided for a specific FIS).

This section presents important considerations for using the information contained in this FIS Report and the FIRM, including changes in format and content. Figures 1, 2, and 3 present information that applies to using the FIRM with the FIS Report.

• Part or all of this FIS Report may be revised and republished at any time. In addition, part of this FIS Report may be revised by a Letter of Map Revision (LOMR), which does not involve republication or redistribution of the FIS Report. Refer to Section 6.5 of this FIS Report for information about the process to revise the FIS Report and/or FIRM.

It is, therefore, the responsibility of the user to consult with community officials by contacting the community repository to obtain the most current FIS Report components. Communities participating in the NFIP have established repositories of flood hazard data for floodplain management and flood insurance purposes. Community map repository addresses are provided in Table 30, "Map Repositories," within this FIS Report.

 New FIS Reports are frequently developed for multiple communities, such as entire counties. A countywide FIS Report incorporates previous FIS Reports for individual communities and the unincorporated area of the county (if not jurisdictional) into a single document and supersedes those documents for the purposes of the NFIP.

The initial Countywide FIS Report for Ouray County became effective on **TBD**. Refer to Table 27 for information about subsequent revisions to the FIRMs.

• Selected FIRM panels for the community may contain information (such as floodways and cross sections) that was previously shown separately on the corresponding Flood Boundary and Floodway Map (FBFM) panels. In addition, former flood hazard zone designations have been changed as follows:

<u>Old Zone</u>	<u>New Zone</u>
A1 through A30	AE
V1 through V30	VE
В	X (shaded)
С	X (unshaded)

The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Visit the FEMA Web site at www.fema.gov/flood-insurance/rules-legislation/community-rating-system or contact your appropriate FEMA Regional Office for more information about this program.

 FEMA has developed a *Guide to Flood Maps* (FEMA 258) and online tutorials to assist users in accessing the information contained on the FIRM. These include how to read panels and step-by-step instructions to obtain specific information. To obtain this guide and other assistance in using the FIRM, visit the FEMA Web site at <u>www.fema.gov/flood-maps/tutorials</u>. The FIRM Index in Figure 1 shows the overall FIRM panel layout within Ouray County, and also displays the panel number and effective date for each FIRM panel in the county. Other information shown on the FIRM Index includes community boundaries, watershed boundaries, and USGS HUC-8 codes.



	1 i	nch =	22,083	feet		1:265,000
Ñ	0	1	2	4	6	Miles 8

Map Projection: State Plane Colorado South Zone FIPS 0503 Feet; North American Datum 1983

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

* PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS

COUNTY LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX

OURAY COUNTY, COLORADO and Incorporated Areas

PANELS PRINTED:

0085, 0095, 0210, 0215, 0217, 0219, 0220, 0230, 0236, 0238, 0250, 0326, 0327, 0328, 0329, 0337, 0341, 0343

PRELIMINARY 2/17/2022



MAP EFFECTIVE

Each FIRM panel may contain specific notes to the user that provide additional information regarding the flood hazard data shown on that map. However, the FIRM panel does not contain enough space to show all the notes that may be relevant in helping to better understand the information on the panel. Figure 2 contains the full list of these notes.

Figure 2: FIRM Notes to Users

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at <u>msc.fema.gov</u>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Flood Map Service Center website or by calling the FEMA Mapping and Insurance eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to Table 27 in this FIS Report.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

<u>PRELIMINARY FIS REPORT</u>: FEMA maintains information about map features, such as street locations and names, in or near designated flood hazard areas. Requests to revise information in or near designated flood hazard areas may be provided to FEMA during the community review period, at the final Consultation Coordination Officer's meeting, or during the statutory 90-day appeal period. Approved requests for changes will be shown on the final printed FIRM.

The map is for use in administering the NFIP. It may not identify all areas subject to flooding, particularly from local drainage sources of small size. Consult the community map repository to find updated or additional flood hazard information.

<u>BASE FLOOD ELEVATIONS</u>: For more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, consult the Flood Profiles and Floodway Data and/or Summary of Non-Coastal Stillwater Elevations tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

<u>FLOODWAY INFORMATION</u>: Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the FIS Report for this jurisdiction.

<u>FLOOD CONTROL STRUCTURE INFORMATION</u>: Certain areas not in Special Flood Hazard Areas may have reduced flood hazards due to flood control structures. Refer to Section 4.3 "Dams and Other Flood Hazard Reduction Measures" of this FIS Report for information on flood control structures for this jurisdiction.

<u>PROJECTION INFORMATION</u>: The projection used in the preparation of the map was NAD 1983 StatePlane Colorado South FIPS 0503 Feet. The horizontal datum was the North American Datum of 1983 NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

<u>ELEVATION DATUM</u>: Flood elevations on the FIRM are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <u>www.ngs.noaa.gov.</u>

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Table 30 of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was provided by the U.S. Census Bureau, dated 2019; the U.S. Bureau of Land Management, dated 2011; the Department of Agriculture, dated 2003 and 2017; the State of Colorado Department of Local Affairs, dated 2014; and the U.S. Geological Survey, dated 2013. For information about base maps, refer to Section 6.2 "Base Map" in this FIS Report.

Corporate limits shown on the map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after the map was published, map users should contact appropriate community officials to verify current corporate limit locations.

NOTES FOR FIRM INDEX

<u>REVISIONS TO INDEX</u>: As new studies are performed and FIRM panels are updated within Ouray County, CO, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to Table 27 of this FIS Report to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for Ouray County, CO, effective TBD.

<u>FLOOD RISK REPORT</u>: A Flood Risk Report (FRR) may be available for many of the flooding sources and communities referenced in this FIS Report. The FRR is provided to increase public awareness of flood risk by helping communities identify the areas within their jurisdictions that have the greatest risks. Although non-regulatory, the information provided within the FRR can assist communities in assessing and evaluating mitigation opportunities to reduce these risks. It can also be used by communities developing or updating flood risk mitigation plans. These plans allow communities to identify and evaluate opportunities to reduce potential loss of life and property. However, the FRR is not intended to be the final authoritative source of all flood risk data for a project area; rather, it should be used with other data sources to paint a comprehensive picture of flood risk.

Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Ouray County.

Figure 3: Map Legend for FIRM

SPECIAL FLOOD HAZARD AREAS: The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. See note for specific types. If the floodway is too narrow to be shown, a note is shown.

Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (Zones A, AE, AH, AO, AR, A99, V and VE)

- Zone A The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone.
- Zone AE The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone.
- Zone AH The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the hydraulic analyses are shown at selected intervals within this zone.
- Zone AO The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the hydraulic analyses are shown within this zone.
- Zone AR The flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- Zone A99 The flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or flood depths are shown within this zone.
 - Zone V The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone.
- Zone VE Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone.



Regulatory Floodway determined in Zone AE.

OTHER AREAS OF FLOO	DD HAZARD
	Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile.
	Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone.
	Area with Reduced Flood Hazard due to Accredited or Provisionally Accredited Levee System: Area is shown as reduced flood hazard from the 1-percent-annual-chance or greater flood by a levee system. Overtopping or failure of any levee system is possible.
	Area with Undetermined Flood Hazard due to Non-Accredited Levee System: Analysis and mapping procedures for non-accredited levee systems were applied resulting in a flood insurance rate zone where flood hazards are undetermined, but possible.
OTHER AREAS	
	Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.
NO SCREEN	Unshaded Zone X: Areas of minimal flood hazard.
FLOOD HAZARD AND OT	THER BOUNDARY LINES
(ortho) (vector)	Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)
	Limit of Study
	Jurisdiction Boundary
	Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet
GENERAL STRUCTURES	5
Aqueduct Channel Culvert Storm Sewer	Channel, Culvert, Aqueduct, or Storm Sewer
Dam Jetty Weir	Dam, Jetty, Weir
	Levee, Dike, or Floodwall

Figure 3: Map Legend for FIRM

Figure 3: Map Legend for FIRM

Bridge	Bridge
REFERENCE MARKERS	
22.0 ●	River mile Markers
CROSS SECTION & TRA	NSECT INFORMATION
⟨ B <mark>20.2</mark>	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
<u> 5280</u> <u> 21.1</u>	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
17.5_	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
8	Coastal Transect
	Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.
	Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.
~~~~ 513 ~~~~	Base Flood Elevation Line
ZONE AE (EL 16)	Static Base Flood Elevation value (shown under zone label)
ZONE AO (DEPTH 2)	Zone designation with Depth
ZONE AO (DEPTH 2) (VEL 15 FPS)	Zone designation with Depth and Velocity
BASE MAP FEATURES	River, Stream or Other Hydrographic Feature
(234)	Interstate Highway
234	U.S. Highway
(234)	State Highway
234	County Highway

MAPLE LANE	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
RAILROAD	Railroad
	Horizontal Reference Grid Line
—	Horizontal Reference Grid Ticks
+	Secondary Grid Crosshairs
Land Grant	Name of Land Grant
7	Section Number
R. 43 W. T. 22 N.	Range, Township Number
⁴² 76 ^{000m} E	Horizontal Reference Grid Coordinates (UTM)
365000 FT	Horizontal Reference Grid Coordinates (State Plane)
80° 16' 52.5"	Corner Coordinates (Latitude, Longitude)

#### Figure 3: Map Legend for FIRM

#### SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS

#### 2.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annualchance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance (500-year) flood is employed to indicate additional areas of flood hazard in the community.

Each flooding source included in the project scope has been studied and mapped using professional engineering and mapping methodologies that were agreed upon by FEMA and Ouray County as appropriate to the risk level. Flood risk is evaluated based on factors such as known flood hazards and projected impact on the built environment. Engineering analyses were performed for each studied flooding source to calculate its 1-percent-annual-chance flood elevations; elevations corresponding to other floods (e.g. 10-, 4-, 2-, 0.2-percent annual chance, etc.) may have also been computed for certain flooding sources. Engineering models and methods are described in detail in Section 5.0 of this FIS Report. The modeled elevations at cross sections were used to delineate the floodplain boundaries on the FIRM; between cross sections, the boundaries were interpolated using elevation data from various sources. More information on specific mapping methods is provided in Section 6.0 of this FIS Report.

Depending on the accuracy of available topographic data (Table 22), study methodologies employed (Section 5.0), and flood risk, certain flooding sources may be mapped to show both the 1-percent and 0.2-percent-annual-chance floodplain boundaries, regulatory water surface elevations (BFEs), and/or a regulatory floodway. Similarly, other flooding sources may be mapped to show only the 1-percent-annual-chance floodplain boundary on the FIRM, without published water surface elevations. In cases where the 1-percent and 0.2percent-annual-chance floodplain boundaries are close together, only the 1-percentannual-chance floodplain boundary is shown on the FIRM. Figure 3, "Map Legend for FIRM", describes the flood zones that are used on the FIRMs to account for the varying levels of flood risk that exist along flooding sources within the project area. Table 2 and Table 3 indicate the flood zone designations for each flooding source and each community within Ouray County, respectively.

Table 2, "Flooding Sources Included in this FIS Report," lists each flooding source, including its study limits, affected communities, mapped zone on the FIRM, and the completion date of its engineering analysis from which the flood elevations on the FIRM and in the FIS Report were derived. Descriptions and dates for the latest hydrologic and hydraulic analyses of the flooding sources are shown in Table 12. Floodplain boundaries for these flooding sources are shown on the FIRM (published separately) using the symbology described in Figure 3. On the map, the 1-percent-annual-chance floodplain corresponds to the SFHAs. The 0.2-percent-annual-chance floodplain shows areas that, although out of the regulatory floodplain, are still subject to flood hazards.

Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data. The procedures to remove these areas from the SFHA are described in Section 6.5 of this FIS Report.

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub- Basin(s)	Length (mi) (streams or coastlines)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Cascade Creek	Ouray, City of; Ouray County Unincorporated Areas	Confluence with Uncompahgre River	0.12 miles upstream of 8th Ave	14020006	0.6	Y	AE	03/31/2021
Cottonwood Creek	Ridgeway, Town of; Ouray County Unincorporated Areas	Confluence with Uncompahgre River	0.27 miles upstream of County Rd 5	14020006	1.5	Y	AE	03/31/2021
Cow Creek	Ouray County Unincorporated Areas	Confluence with Uncompahgre River	1.2 miles upstream of County Rd 12	14020006	12.1	N	А	03/31/2021
Dallas Creek	Ouray County Unincorporated Areas	Confluence with Uncompahgre River	0.09 miles downstream of HWY 62	14020006	6.3	N	А	03/31/2021
Pleasant Valley Creek	Ouray County Unincorporated Areas	Confluence with Dallas Creek	0.6 miles upstream of County Rd 24	14020006	3.6	N	А	03/31/2021
Portland Creek	Ouray, City of; Ouray County Unincorporated Areas	Confluence with Uncompahgre River	0.08 miles downstream of Amphitheater Rd	14020006	0.5	Y	AE	03/31/2021
Uncompahgre River Reach 1	Ouray County Unincorporated Areas	Northern Border of Ouray County	Ridgway Reservoir	14020006	7.9	N	А	03/31/2021
Uncompahgre River Reach 2	Ouray County Unincorporated Areas	Ridgway Reservoir	1.5 miles upstream of Ridgway Reservoir	14020006	1.5	N	А	03/31/2021
Uncompahgre River Reach 3	Ridgway, Town of and Ouray, City of; Ouray County Unincorporated Areas	1.5 miles upstream of Ridgway Reservoir	615 feet upstream of County Rd 361	14020006	13.9	Y	AE	03/31/2021

#### Table 2: Flooding Sources Included in this FIS Report

#### 2.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard.

For purposes of the NFIP, a floodway is used as a tool to assist local communities in balancing floodplain development against increasing flood hazard. With this approach, the area of the 1-percent-annual-chance floodplain on a river is divided into a floodway and a floodway fringe based on hydraulic modeling. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order to carry the 1-percent-annual-chance flood. The floodway fringe is the area between the floodway and the 1-percent-annual-chance floodplain boundaries where encroachment is permitted. The floodway must be wide enough so that the floodway fringe could be completely obstructed without increasing the water surface elevation of the 1-percent-annual-chance flood at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.



#### **Figure 4: Floodway Schematic**

Floodway widths presented in this FIS Report and on the FIRM were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. For certain stream segments, floodways were adjusted so that the amount of floodwaters conveyed on each side of the floodplain would be reduced equally. The results of the floodway computations have been tabulated for selected cross sections and are shown in Table 23, "Floodway Data."

All floodways that were developed for this Flood Risk Project are shown on the FIRM using the symbology described in Figure 3. In cases where the floodway and 1-percent-annualchance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown on the FIRM. For information about the delineation of floodways on the FIRM, refer to Section 6.3.

#### 2.3 Base Flood Elevations

The hydraulic characteristics of flooding sources were analyzed to provide estimates of the elevations of floods of the selected recurrence intervals. The BFE is the elevation of the 1-percent-annual-chance flood. These BFEs are most commonly rounded to the whole foot, as shown on the FIRM, but in certain circumstances or locations they may be rounded to 0.1 foot. Cross section lines shown on the FIRM may also be labeled with the BFE rounded to 0.1 foot. Whole-foot BFEs derived from engineering analyses that apply to coastal areas, areas of ponding, or other static areas with little elevation change may also be shown at selected intervals on the FIRM.

BFEs are primarily intended for flood insurance rating purposes. Cross sections with BFEs shown on the FIRM correspond to the cross sections shown in the Floodway Data table and Flood Profiles in this FIS Report. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. For example, the user may use the FIRM to determine the stream station of a location of interest and then use the profile to determine the 1-percent annual chance elevation at that location. Because only selected cross sections may be shown on the FIRM for riverine areas, the profile should be used to obtain the flood elevation between mapped cross sections. Additionally, for riverine areas, whole-foot elevations shown on the FIRM may not exactly reflect the elevations derived from the hydraulic analyses; therefore, elevations obtained from the profile may more accurately reflect the results of the hydraulic analysis.

#### 2.4 Non-Encroachment Zones

This section is not applicable to this Flood Risk Project.

#### 2.5 Coastal Flood Hazard Areas

This section is not applicable to this Flood Risk Project.

#### 2.5.1 Water Elevations and the Effects of Waves

This section is not applicable to this Flood Risk Project.

#### Figure 5: Wave Runup Transect Schematic [Not Applicable to this Flood Risk Project]

#### 2.5.2 Floodplain Boundaries and BFEs for Coastal Areas

This section is not applicable to this Flood Risk Project.

#### 2.5.3 Coastal High Hazard Areas

This section is not applicable to this Flood Risk Project.

#### Figure 6: Coastal Transect Schematic

#### [Not Applicable to this Flood Risk Project]

#### 2.5.4 Limit of Moderate Wave Action

This section is not applicable to this Flood Risk Project.

#### **SECTION 3.0 – INSURANCE APPLICATIONS**

#### 3.1 National Flood Insurance Program Insurance Zones

For flood insurance applications, the FIRM designates flood insurance rate zones as described in Figure 3, "Map Legend for FIRM." Flood insurance zone designations are assigned to flooding sources based on the results of the hydraulic or coastal analyses. Insurance agents use the zones shown on the FIRM and depths and base flood elevations in this FIS Report in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

The 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (e.g. Zones A, AE, V, VE, etc.), and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of additional flood hazards.

Table 3 lists the flood insurance zones in Ouray County.

Community	Flood Zone(s)
Ouray County, Unincorporated Areas	A, AE, X
Ouray, City of	AE, X
Ridgway, Town of	AE, X

#### Table 3: Flood Zone Designations by Community

#### **SECTION 4.0 – AREA STUDIED**

#### 4.1 Basin Description

Table 4 contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a brief description of the basin, and its drainage area.

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (square miles)
Animas	14080104	Animas River	Affecting a very small area (<1%) on the southern side of the county, with the subbasin boundary forming the boundary between Ouray and San Juan Counties.	1,370
San Miguel	14030003	San Miguel River	Affecting a very small area (<1%) on the western side of the county, with the subbasin boundary forming the southern portion of the boundary between Ouray and San Miguel Counties	1,555
Uncompahgre	14020006	Uncompahgre River	Begins north of the county boundary, affecting the entire area of Ouray County	1,115
Upper Gunnison	14020002	Gunnison River	Affecting a very small area (<1%) on the eastern side of the county, with the subbasin boundary forming the boundary between Ouray and Hinsdale Counties	2,412

**Table 4: Basin Characteristics** 

#### 4.2 Principal Flood Problems

Table 5 contains a description of the principal flood problems that have been noted for Ouray County by flooding source.

Flooding Source	Description of Flood Problems
Uncompahgre River	Floodflows on the Uncompany River within the study area result from the rapid melting of the mountain snowpack during the period of May through early July. This snowmelt is occasionally augmented by rainfall. The runoff from snowmelt typically sustains periods of high flows and marked daily fluctuation.
	All streams that tributary to the Uncompany River within the study area drain minor areas and, while many are subject to cloudburst-type flooding, none drain areas large enough to individually affect the peak flows in the main channel of the Uncompany River.
	The earliest reference to flooding on the Uncompany River is contained in USGS Water-Supply Paper 997 (USGS 1948). Widespread flooding occurred during the spring and early summer of 1884 due to melting snowpack.
	USGS gaging stations along the Uncompany River show that, during the period of record (intermittently from 1903 to the mid-1980s), the highest peak peak flow occurred in 1921 (USGS 1966). The flow reached a volume of 2,000 cubic feet per second (cfs) at Ouray, 2,400 cfs below Ouray, and 4,080 cfs at Colona. Other major high flows occurred in August 1909, July 1927, July 1929, July 1965, and July 1973. Major damage during these events occurred in and near the City of Ouray.

#### Table 5: Principal Flood Problems

Table 6 contains information about historic flood elevations in the communities within Ouray County.

#### **Table 6: Historic Flooding Elevations**

#### [Not applicable to this Flood Risk Project]

#### 4.3 Dams and Other Flood Hazard Reduction Measures

Table 7 contains information about non-levee flood hazard reduction measures within Ouray County such as dams or jetties. Levee systems are addressed in Section 4.4 of this FIS Report.

#### Table 7: Dams and Other Flood Hazard Reduction Measures

#### [Not applicable to this Flood Risk Project]

#### 4.4 Levee Systems

This section is not applicable to this Flood Risk Project.

#### Table 8: Levee Systems

#### [Not applicable to this Flood Risk Project]

#### **SECTION 5.0 – ENGINEERING METHODS**

For the flooding sources in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2-percent-annual-chance, respectively, of being equaled or exceeded during any year.

Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

In addition to these flood events, the "1-percent-plus", or "1%+", annual chance flood elevation has been modeled and included on the flood profile for certain flooding sources in this FIS Report. While not used for regulatory or insurance purposes, this flood event has been calculated to help illustrate the variability range that exists between the regulatory 1-percent-annual-chance flood elevation and a 1-percent-annual-chance elevation that has taken into account an additional amount of uncertainty in the flood discharges (thus, the 1% "plus"). For flooding sources whose discharges were estimated using regression equations, the 1%+ flood elevations are derived by taking the 1-percent-annual-chance flood discharges and increasing the modeled discharges by a percentage equal to the average predictive error for the regression equation. For flooding sources with gage- or rainfall-runoff-based discharge estimates, the upper 84-percent confidence limit of the discharges is used to compute the 1%+ flood elevations.

#### 5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. A summary of the hydrologic methods applied to develop the discharges used in the hydraulic analyses for each stream is provided in Table 12. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

A summary of the discharges is provided in Table 9. Frequency Discharge-Drainage Area Curves used to develop the hydrologic models may also be shown in Figure 7 for selected flooding sources. A summary of stillwater elevations developed for non-coastal flooding sources is provided in Table 10. Stream gage information is provided in Table 11.

		Drainage Peak Discharge (cfs)						
Flooding Source	Location	Area (Square Miles)	10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1%+ Annual Chance	0.2% Annual Chance
Cottonwood Creek	Confluence with Uncompahgre River	3.7	84	162	244	347	500	634
Uncompahgre River Reach 3	Uncompahgre River near Ridgway, CO	149	1,780	2,020	2,190	2,350	2,630	2,670
Uncompahgre River Reach 3	Uncompahgre River below confluence with Cottonwood Creek	131	1,620	1,840	2,000	2,140	2,400	2,440
Uncompahgre River Reach 3	Uncompahgre River below confluence with Dexter Creek	90	1,630	1,770	1,870	1,960	2,260	2,170
Uncompahgre River Reach 3	Uncompahgre River near Ouray, CO	77	1,460	1,590	1,680	1,760	2,030	1,950
Uncompahgre River Reach 3	Uncompahgre River below confluence with Cascade Creek	74	1,420	1,550	1,640	1,710	1,980	1,900
Uncompahgre River Reach 3	Uncompahgre River below confluence with Portland Creek	72	1,400	1,520	1,610	1,680	1,940	1,870
Uncompahgre River Reach 3	Uncompahgre River above confluence with Canyon Creek	42	951	1,040	1,090	1,150	1,320	1,270

#### Table 9: Summary of Discharges

Figure 7: Frequency Discharge-Drainage Area Curves

[Not applicable to this Flood Risk Project]

Table 10: Summary of Non-Coastal Stillwater Elevations[Not applicable to this Flood Risk Project]

		Agency		Drainage	Period o	of Record
Flooding Source	Gage Identifier	that Maintains Gage	Site Name	Area (Square Miles)	From	То
Uncompahgre River	9146020	USGS	Uncompahgre River near Ouray, CO	77	6/2/2001	6/18/2017
Uncompahgre River	9146200	USGS	Uncompahgre River near Ridgway, CO	149	6/9/1959	6/5/2016
Uncompahgre River	9147025	USGS	Uncompahgre River below Ridgway Reservoir, CO	265	5/11/1989	6/14/2016
Uncompahgre River	9147500	USGS	Uncompahgre River at Colona, CO	448	5/11/1989	6/11/2016

Table 11: Stream Gage Information used to Determine Discharges

#### 5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Base flood elevations on the FIRM represent the elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations. These whole-foot elevations may not exactly reflect the elevations derived from the hydraulic analyses. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. The hydraulic analyses for this FIS were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

For streams for which hydraulic analyses were based on cross sections, locations of selected cross sections are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 6.3), selected cross sections are also listed in Table 23, "Floodway Data."

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 12. Roughness coefficients are provided in Table 13. Roughness coefficients are values representing the frictional resistance water experiences when passing overland or through a channel. They are used in the calculations to determine water surface elevations. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Cascade Creek	Confluence with Uncompahgre River	0.12 miles upstream of 8th Ave	HEC-HMS 4.2	HEC-RAS 5.0.7 (Unsteady)	3/31/2021	AE w/ Floodway	Engineered Channel, Unsteady State
Cottonwood Creek	Confluence with Uncompahgre River	0.27 miles upstream of County Rd 5	HEC-HMS 4.2	HEC-RAS 5.0.7	3/31/2021	AE w/ Floodway	
Cow Creek	Confluence with Uncompahgre River	1.2 miles upstream of County Rd 12	Regression Equations	HEC-RAS 5.0.7	3/31/2021	A	No modeled structures
Dallas Creek	Confluence with Uncompahgre River	0.09 miles downstream of HWY 62	Regression Equations	HEC-RAS 5.0.7	3/31/2021	A	No modeled structures
Pleasant Valley Creek	Confluence with Dallas Creek	0.6 miles upstream of County Rd 24	Regression Equations	HEC-RAS 5.0.7	3/31/2021	A	No modeled structures
Portland Creek	Confluence with Uncompahgre River	0.08 miles downstream of Amphitheater Rd	HEC-HMS 4.2	HEC-RAS 5.0.7 (Unsteady)	3/31/2021	AE w/ Floodway	Engineered Channel, Unsteady State
Uncompahgre River Reach 1	Northern Border of Ouray County	Ridgway Reservoir	Bulletin 17C	HEC-RAS 5.0.7	3/31/2021	А	No modeled structures
Uncompahgre River Reach 2	Ridgway Reservoir	1.5 miles upstream of Ridgway Reservoir	Regression Equations	HEC-RAS 5.0.7	3/31/2021	A	No modeled structures
Uncompahgre River Reach 3	1.5 miles upstream of Ridgway Reservoir	615 feet upstream of County Rd 361	Bulletin 17C	HEC-RAS 5.0.7	3/31/2021	AE w/ Floodway	Stream Gage Analysis

#### Table 12: Summary of Hydrologic and Hydraulic Analyses

#### Table 13: Roughness Coefficients

Flooding Source	Channel "n"	Overbank "n"
Cascade Creek	0.045-0.050	0.013-0.100
Cottonwood Creek	0.035	0.020-0.120
Cow Creek	0.035-0.100	0.035-0.100
Dallas Creek	0.045	0.013-0.100
Pleasant Valley Creek	0.045	0.030-0.100
Portland Creek	0.013-0.060	0.013-0.100
Uncompahgre River	0.035	0.040-0.120

#### 5.3 Coastal Analyses

This section is not applicable to this Flood Risk Project.

## Table 14: Summary of Coastal Analyses[Not Applicable to this Flood Risk Project]

#### 5.3.1 Total Stillwater Elevations

This section is not applicable to this Flood Risk Project.

#### Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas [Not Applicable to this Flood Risk Project]

## Table 15: Tide Gage Analysis Specifics[Not Applicable to this Flood Risk Project]

#### 5.3.2 Waves

This section is not applicable to this Flood Risk Project.

#### 5.3.3 Coastal Erosion

This section is not applicable to this Flood Risk Project.

#### 5.3.4 Wave Hazard Analyses

This section is not applicable to this Flood Risk Project.

Table 16: Coastal Transect Parameters[Not Applicable to this Flood Risk Project]

#### Figure 9: Transect Location Map [Not Applicable to this Flood Risk Project]

#### 5.4 Alluvial Fan Analyses

This section is not applicable to this Flood Risk Project.

## Table 17: Summary of Alluvial Fan Analyses[Not Applicable to this Flood Risk Project]

Table 18: Results of Alluvial Fan Analyses[Not Applicable to this Flood Risk Project]

#### **SECTION 6.0 – MAPPING METHODS**

#### 6.1 Vertical and Horizontal Control

All FIS Reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS Reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the completion of the North American Vertical Datum of 1988 (NAVD88), many FIS Reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

Flood elevations shown in this FIS Report and on the FIRMs are referenced to NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between NGVD29 and NAVD88 or other datum conversion, visit the National Geodetic Survey website at <u>www.ngs.noaa.gov</u>.

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the archived project documentation associated with the FIS Report and the FIRMs for this community. Interested individuals may contact FEMA to access these data.

To obtain current elevation, description, and/or location information for benchmarks in the area, please visit the NGS website at <u>www.ngs.noaa.gov</u>.

The datum conversion locations and values that were calculated for Ouray County are provided in Table 19.

#### Table 19: Countywide Vertical Datum Conversion

#### [Not Applicable to this Flood Risk Project]

# Table 20: Stream-Based Vertical Datum Conversion[Not Applicable to this Flood Risk Project]

#### 6.2 Base Map

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA's FIRM Database specifications and geographic information standards. This information is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features. For example, the information contained in the Floodway Data table and Flood Profiles can be linked to the cross sections that are shown on the FIRMs. Additional information about the FIRM Database and its contents can be found in FEMA's *Guidelines and Standards for Flood Risk Analysis and Mapping*, www.fema.gov/flood-maps/guidance-partners/guidelines-standards.

Base map information shown on the FIRM was derived from the sources described in Table 21.

Data Type	Data Provider	Data Date	Data Scale	Data Description
Digital Orthophoto	USDA/FSA - Aerial Photography Field Office	2017	1:12,000	NAIP digital ortho imagery for FIRM base map
Political boundaries	CDOT	2012	1:5,000	Municipal and county boundaries
Transportation features	U.S. Department of Commerce, U.S. Census Bureau, Geography Division	2015	1:100,000	TIGER/Line Shapefile, Ouray, CO, USA, All Roads County- Based Shapefile
Public Land Survey System (PLSS)	BLM Cadastral Survey - CO	2011	N/A	Cadastral PLSS Standardized Data – PLSS Intersected - Version 1.1

#### Table 21: Base Map Sources

#### 6.3 Floodplain and Floodway Delineation

The FIRM shows tints, screens, and symbols to indicate floodplains and floodways as well as the locations of selected cross sections used in the hydraulic analyses and floodway computations.

For riverine flooding sources, the mapped floodplain boundaries shown on the FIRM have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using the topographic elevation data described in Table 22.

In cases where the 1-percent and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

The floodway widths presented in this FIS Report and on the FIRM were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. Table 2 indicates the flooding sources for which floodways have been determined. The results of the floodway computations for those flooding sources have been tabulated for selected cross sections and are shown in Table 23, "Floodway Data."

		Source for Topographic Elevation Data				
Community	Flooding Source	Description	Vertical Accuracy	Horizontal Accuracy	Citation	
Ouray County	All within HUC	Light Detection and Ranging data (LiDAR)	0.087 m RMSEz	0.075 meter at 95% confidence	Quantum 2015	

14020006

Table 22: Summary of Topographic Elevation Data used in Mapping

BFEs shown at cross sections on the FIRM represent the 1-percent-annual-chance water surface elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report.

level

LOCA	TION		FLOODWAY	,	1% ANNUAL CHANCE FLOOD WATER SURFACE EL (FEET NAVD88)			ELEVATION
CROSS SECTION	DISTANCE1	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
٨	25	10	00	20.4	7 604 0	7 604 0	7 604 0	0.0
A	30 97	10	23	38.4	7,094.0	7,694.0	7,694.0	0.0
Б	200	10	32	20.9	7,090.4	7,090.4	7,090.4	0.0
	200	10	30 119	23.2 7.4	7,090.4	7,090.4	7,090.4	0.0
E	241	49 54	142	7.4	7,090.9	7,090.9	7,090.9	0.0
	330	04 27	72	12.1	7,099.9	7,099.9	7,099.9	0.0
G	440	10	14	64.0	7,701.0	7,701.0	7,701.0	0.0
ы Ц	403	10	14	30.0	7,700.9	7,700.9	7,700.9	0.0
	509	10	19	39.9 49.5	7,711.4	7,711.4	7,711.4	0.0
1	681	10	10	40.5	7 733 8	7 733 8	7 733 8	0.0
K J	720	10	10	49.4	7,735.0	7,733.0	7,733.0	0.0
	725	10	17	50.7	7,740.4	7,740.4	7,740.4	0.0
M	876	10	17	50.0	7,743.4	7,743.4	7,743.4	0.0
N	9/3	10	17	51 1	7,760.0	7,760.8	7,760.8	0.0
	1 033	10	17	50.0	7,703.0	7,709.0	7,709.0	0.0
P	1,035	10	18	40 8	7 789 7	7 789 7	7 789 7	0.0
0	1,000	10	17		7 802 0	7 802 0	7 802 0	0.0
R	1 294	10	16	53.2	7,002.0	7,818.2	7,002.0	0.0
S	1 387	10	17	50.5	7,810.2	7 830 8	7,810.2	0.0
Т	1 454	10	17	50.8	7,000.0	7 839 8	7,839,8	0.0
·	1,707	10	.,,	00.0	7,000.0	7,000.0	7,000.0	0.0

Table 23: Floodway Data

FEDERAL EMERGENCY MANAGEMENT AGENCY

OURAY COUNTY, COLORADO

TABLE

23

AND INCORPORATED AREAS

#### FLOODWAY DATA

#### FLOODING SOURCE: CASCADE CREEK

ELEVATION	1% ANNUAL CHANCE FLOOD WATER SURFACE EI (FEET NAVD88)			FLOODWAY		ION	LOCAT	
INCREAS	WITH FLOODWAY	WITHOUT FLOODWAY	REGULATORY	MEAN VELOCITY (FEET/ SEC)	SECTION AREA (SQ. FEET)	WIDTH (FEET)	DISTANCE ¹	CROSS SECTION
0.0	7 847 9	7 847 9	7 847 9	53.0	16	10	1 501	U
0.0	7 851 7	7 851 7	7 851 7	57.1	15	10	1,524	V
0.0	7 861 5	7 861 5	7 861 5	56.2	16	10	1,581	Ŵ
0.0	7 884 3	7 884 3	7 884 3	55.2	16	10	1 714	X
0.0	7 895 7	7 895 7	7 895 7	56.4	15	10	1 779	Ŷ
0.0	7.897.6	7.897.6	7.897.6	49.9	17	10	1,790	Ž
0.0	7,904,9	7.904.9	7,904,9	54.3	16	10	1,833	ĀĀ
0.0	7.921.1	7.921.1	7.921.1	55.5	16	10	1.927	AB
0.0	7.951.0	7.951.0	7.951.0	55.4	16	10	2.100	AC
0.0	7.985.8	7.985.8	7.985.8	55.5	16	10	2.301	AD
0.0	7.996.5	7.996.5	7.996.5	22.2	39	24	2.349	AE
0.0	8.005.9	8.005.9	8.005.9	19.7	44	20	2,414	AF
0.0	8.029.0	8.029.0	8.029.0	18.2	48	34	2,519	AG
0.0	8.043.3	8.043.3	8.043.3	26.4	33	17	2.580	AH
0.0	8.053.5	8.053.5	8.053.5	27.6	32	17	2,609	AI
0.0	8.068.8	8.068.8	8.068.8	21.7	40	28	2.686	AJ
0.0	8.087.3	8,087.3	8.087.3	20.1	43	34	2,766	AK
					ver	Incompahare Ri	f confluence with l	feet unstream o

FEDERAL EMERGENCY MANAGEMENT AGENCY

#### OURAY COUNTY, COLORADO

AND INCORPORATED AREAS

TABLE 23

#### FLOODWAY DATA

#### FLOODING SOURCE: CASCADE CREEK
LOCA	LOCATION FLOODWAY			,	1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
٨	612	20	11	7.0	6 003 7	6 003 7	6 003 7	0.0
R	072	20	44 55	63	7 010 8	7 010 8	7 010 8	0.0
C C	1 1 1 0	20	35 45	0.3	7,010.0	7,010.0	7,010.0	0.0
	1,110	ZZ /1	4J 67	5.2	7,012.0	7,012.0	7,012.0	0.0
E	1,211	79	102	3.4	7,010.1	7,010.1	7,010.1	0.0
E	7,404	16	103	3.4 9.5	7,027.0	7,027.0	7,027.0	0.0
G	2,141	10	25	0.5	7,040.0	7,040.0	7,040.9	0.1
С Ц	2,419	17	33 07	9.0 4.0	7,004.3	7 069 0	7,004.0	0.2
	2,501	17	07	4.0	7,000.0	7,000.0	7,000.0	0.0
1	2,602	15	38	9.1	7,070.2	7,070.2	7,070.2	0.0
J	3,130	23	45	1.1	7,087.2	7,087.2	7,087.2	0.0
ĸ	3,848	10	35	9.9	7,124.0	7,124.0	7,124.1	0.1
L	3,954	16	152	2.3	7,134.7	7,134.7	7,135.2	0.5
IVI	4,100	17	40	8.6	7,140.2	7,140.2	7,140.3	0.1
N	4,466	24	45	7.8	7,162.5	7,162.5	7,162.6	0.1
0	5,492	14	38	9.2	7,213.7	7,213.7	7,213.7	0.0
Р	5,535	38	189	1.8	7,223.7	7,223.7	7,224.2	0.5
Q	5,690	13	36	9.5	7,225.5	7,225.5	7,225.7	0.2
R	6,974	44	57	6.1	7,309.8	7,309.8	7,310.1	0.3
S	7,105	16	76	4.6	7,321.9	7,321.9	7,322.3	0.4
Т	7,206	8	32	11.0	7,326.8	7,326.8	7,326.8	0.0
U	7,325	15	38	9.1	7,341.4	7,341.4	7,341.8	0.4
V	8,546	10	34	10.2	7,430.0	7,430.0	7,430.0	0.0
feet upstream o	of confluence with L	Jncompahgre R	iver					
FEDERAL	_ EMERGENCY I	MANAGEMEN			FL	.OODWAY	DATA	
OUR		Y, COLO	RADO					

### **OURAY COUNTY, COLORADO**

AND INCORPORATED AREAS

## FLOODING SOURCE: COTTONWOOD CREEK

CROSS SECTION         DISTANCE ¹ WIDTH (FEET)         SECTION AREA (SQ. FEET)         MEAN VELOCITY (FEET/SEC)         REGULATORY         WITHOUT FLOODWAY         WITH FLOODWAY         INCRUTH FLOODWAY           A         30         10         22         88.0         7,735.8         7,735.8         7,735.8         0.0           B         67         10         51         38.1         7,742.2         7,742.2         7,742.2         0.0           C         107         10         38         50.6         7,744.2         7,744.2         0.0           D         230         10         36         53.3         7,760.8         7,760.8         7,760.8         0.0           F         431         10         36         54.2         7,760.7         7,769.7         7,769.7         0.0           G         529         10         36         53.5         7,777.5         7,777.5         0.0           H         554         10         35         56.0         7,792.9         7,792.9         7,792.9         0.0           J         719         10         40         47.8         7,792.9         7,792.9         7,792.9         0.0           L         9	LUCAI			FLOODWAY			(FEET N	AVD88)	
A         30         10         22         88.0         7,735.8         7,735.8         7,735.8         7,735.8         0.0           B         67         10         51         38.1         7,742.2         7,742.2         7,742.2         0.0           C         107         10         38         50.6         7,744.2         7,744.2         7,744.2         0.0           D         230         10         36         53.3         7,753.7         7,753.7         0.0           E         321         10         36         54.0         7,769.7         7,769.8         7,760.8         0.0           G         529         10         36         53.5         7,777.5         7,779.6         0.0           H         554         10         35         56.0         7,79.6         7,786.8         7,786.8         0.0           J         719         10         40         47.8         7,792.9         7,792.9         0.0           K         859         10         36         53.9         7,803.8         7,803.8         7,803.8         7,803.8         7,803.8         0.0           J         719         10         40	CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A       50       10       22       68.0       7,733.6       7,733.6       7,733.6       7,733.6       0.0         B       67       10       51       38.1       7,742.2       7,742.2       7,742.2       0.0         C       107       10       38       50.6       7,744.2       7,744.2       7,744.2       0.0         D       230       10       36       53.3       7,753.7       7,753.7       7,753.7       0.0         E       321       10       36       54.0       7,760.8       7,760.8       7,769.7       7,769.7       0.0         G       529       10       36       54.2       7,779.7       7,769.7       7,769.7       7,769.7       0.0         H       554       10       35       56.0       7,779.6       7,779.6       7,779.6       0.0         J       719       10       40       47.8       7,792.9       7,792.9       7,792.9       0.0         K       859       10       36       53.9       7,803.8       7,803.8       7,803.8       7,803.8       0.0         L       964       10       35       55.6       7,812.6       7,817.1	٨	20	10	22	<u> </u>	7 725 9	7 725 0	7 725 9	0.0
B       07       10       31       36.1       7,742.2       7,742.2       7,742.2       7,744.2       0.0         C       107       10       38       50.6       7,744.2       7,744.2       7,744.2       0.0         D       230       10       36       53.3       7,753.7       7,753.7       7,753.7       0.0         E       321       10       36       54.0       7,760.8       7,760.8       7,760.8       7,760.7       0.0         G       529       10       36       53.5       7,777.5       7,779.6       7,779.6       0.0         H       554       10       35       56.0       7,779.6       7,779.6       7,779.6       0.0         J       719       10       40       47.8       7,792.9       7,792.9       0.0         K       859       10       36       53.9       7,803.8       7,803.8       7,803.8       7,803.8       0.0         L       964       10       35       55.6       7,812.6       7,817.1       7,817.1       0.0         M       1,019       10       36       53.9       7,817.1       7,817.1       7,835.3       7,835.3		30 67	10	22 51	00.U 29.1	7,730.0	7,730.0	7,730.0	0.0
C       107       10       36       50.0       7,744.2       7,744.2       7,744.2       7,744.2       7,744.2       7,744.2       7,744.2       7,744.2       7,744.2       7,744.2       7,744.2       7,744.2       7,744.2       7,744.2       7,744.2       7,744.2       7,753.7       7,753.7       7,753.7       7,753.7       7,753.7       0.0         E       321       10       36       54.0       7,760.8       7,760.8       7,760.8       7,769.7       7,769.7       0.0         G       529       10       36       53.5       7,777.5       7,777.5       7,777.5       7,779.6       7,779.6       0.0         H       554       10       35       56.0       7,779.6       7,779.6       7,779.6       0.0         J       719       10       40       47.8       7,792.9       7,792.9       7,792.9       0.0         K       859       10       36       53.9       7,803.8       7,803.8       7,803.8       7,803.8       7,803.8       7,803.8       0.0         L       964       10       35       55.6       7,812.6       7,812.6       7,812.6       0.0         M       1,019       10	Б	107	10	20	50.1	7,742.2	7,742.2	7,742.2	0.0
D       230       10       30       33.3       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,733.7       7,769.7       7,769.7       7,769.7       7,769.7       7,769.7       7,769.7       7,769.7       7,769.7       7,769.7       7,769.7       0.0         G       529       10       36       53.5       7,777.5       7,777.5       7,777.5       7,777.5       0.0         H       554       10       35       56.0       7,779.6       7,779.6       7,779.6       0.0         I       641       10       36       54.4       7,786.8       7,786.8       7,792.9       7,792.9       0.0         K       859       10       36       53.9       7,803.8       7,803.8       7,803.8       7,803.8       0.0         L       964       10       35       55.6       7,812.6       7,812.6       7,812.6       0.0		230	10	30	53.3	7,744.2	7,744.2	7,744.2	0.0
E       321       10       36       54.0       7,700.8       7,700.6       7,700.8       7,700.8       0.         F       431       10       36       54.2       7,769.7       7,769.7       7,769.7       0.         G       529       10       36       53.5       7,777.5       7,777.5       7,779.6       0.         H       554       10       35       56.0       7,779.6       7,786.8       7,779.6       0.         J       641       10       36       54.4       7,786.8       7,786.8       7,786.8       0.         J       719       10       40       47.8       7,792.9       7,792.9       7,792.9       0.         K       859       10       36       53.9       7,803.8       7,803.8       7,803.8       0.         L       964       10       35       55.6       7,812.6       7,812.6       7,812.6       0.         M       1,019       10       36       53.9       7,817.1       7,817.1       7,817.1       0.         N       1,121       10       34       57.0       7,826.6       7,835.3       7,835.3       0.         O		200	10	30	54.0	7,755.7	7,755.7	7,755.7	0.0
I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I <thi< th=""> <thi< th=""> <thi< th=""></thi<></thi<></thi<>		JZ1 //31	10	30	54.0	7,700.0	7,700.0	7,700.8	0.0
G       32.9       10       30       53.3       7,777.6       7,777.6       7,779.6       7,779.6       0.         H       554       10       35       56.0       7,779.6       7,779.6       7,779.6       0.         I       641       10       36       54.4       7,786.8       7,786.8       7,786.8       7,786.8       0.         J       719       10       40       47.8       7,792.9       7,792.9       7,792.9       0.         K       859       10       36       53.9       7,803.8       7,803.8       7,803.8       7,803.8       7,803.8       0.         L       964       10       35       55.6       7,812.6       7,812.6       7,812.6       0.         M       1,019       10       36       53.9       7,817.1       7,817.1       7,817.1       0.         N       1,121       10       34       57.0       7,826.6       7,826.6       7,826.6       0.         O       1,210       10       33       57.8       7,835.3       7,835.3       7,835.3       0.	G	520	10	36	53.5	7,703.7	7,703.7	7,703.7	0.0
I       334       10       33       50.0       7,775.0       7,775.0       7,775.0       7,775.0       7,775.0       7,775.0       7,775.0       7,775.0       7,775.0       7,775.0       7,775.0       7,775.0       7,775.0       7,775.0       7,775.0       7,775.0       7,776.8       7,786.8       0.0         J       719       10       40       47.8       7,792.9       7,792.9       7,792.9       0.0         K       859       10       36       53.9       7,803.8       7,803.8       7,803.8       0.0         L       964       10       35       55.6       7,812.6       7,812.6       0.0         M       1,019       10       36       53.9       7,817.1       7,817.1       7,817.1       0.0         N       1,121       10       34       57.0       7,826.6       7,826.6       7,826.6       0.0         O       1,210       10       33       57.8       7,835.3       7,835.3       7,835.3       0.0	ц Ц	554	10	35	56.0	7,779.6	7 770 6	7,770.6	0.0
I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I <thi< th=""> <thi< th=""> <thi< th=""></thi<></thi<></thi<>	1	641	10	36	54.4	7,7786.8	7 786 8	7,7786.8	0.0
K       859       10       36       53.9       7,803.8       7,803.8       7,803.8       7,803.8       0.         L       964       10       35       55.6       7,812.6       7,812.6       7,812.6       0.         M       1,019       10       36       53.9       7,817.1       7,817.1       7,817.1       0.         N       1,121       10       34       57.0       7,826.6       7,826.6       7,826.6       0.         O       1,210       10       33       57.8       7,835.3       7,835.3       7,835.3       0.	1	710	10	30 40	J4.4 17.8	7,700.0	7,700.0	7,700.0	0.0
L         964         10         35         55.6         7,812.6         7,812.6         7,812.6         0.           M         1,019         10         36         53.9         7,817.1         7,817.1         7,817.1         0.           N         1,121         10         34         57.0         7,826.6         7,826.6         7,825.3         0.           O         1,210         10         33         57.8         7,835.3         7,835.3         7,835.3         0.	K J	850	10	36	53.0	7,732.3	7 803 8	7,803.8	0.0
M         1,019         10         36         53.9         7,817.1         7,817.1         7,817.1         0.           N         1,121         10         34         57.0         7,826.6         7,826.6         7,826.6         0.           O         1,210         10         33         57.8         7,835.3         7,835.3         7,835.3         0.		964	10	35	55.6	7,003.0	7,003.0	7,003.0	0.0
N         1,121         10         34         57.0         7,826.6         7,826.6         7,826.6         0.0           O         1,210         10         33         57.8         7,835.3         7,835.3         7,835.3         0.0	M	1 019	10	36	53.0	7,012.0	7,012.0	7,012.0	0.0
O 1,210 10 33 57.8 7,835.3 7,835.3 7,835.3 0.	N	1 1 2 1	10	34	57.0	7,826.6	7,826.6	7,826.6	0.0
	0	1,121	10	33	57.8	7,020.0	7,825.3	7,825.3	0.0
P 1275 10 32 601 78417 78417 78417 0	P	1,275	10	32	60.1	7,000.0	7 841 7	7 841 7	0.0
0 1 327 10 35 560 7 8465 7 8465 7 8465 0	0	1 327	10	35	56.0	7,846.5	7 846 5	7,846.5	0.0
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	R	1 357	10	33	57.9	7 849 4	7 849 4	7 849 4	0.0
S 1 447 10 34 56.9 7.857.9 7.857.9 7.857.9 0	S	1 447	10	34	56.9	7,857.9	7 857 9	7 857 9	0.0
T 1.525 10 34 57.4 7.865.2 7.865.2 7.865.2 0	T	1,525	10	34	57.4	7 865 2	7 865 2	7 865 2	0.0
	•	1,020	10		07.4	1,000.2	1,000.2	1,000.2	0.0

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

## OURAY COUNTY, COLORADO

AND INCORPORATED AREAS

## **FLOODWAY DATA**

### FLOODING SOURCE: PORTLAND CREEK

LOCAT	ION		FLOODWAY	,	1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
U V W X Y Z AA AB AC AD AE AF AG AH	1,619 1,677 1,740 1,762 1,816 1,942 2,059 2,163 2,226 2,338 2,375 2,419 2,489 2,569	10 10 10 10 10 10 10 10 10 29 22 18	34 34 35 33 34 37 35 34 33 34 41 108 101 112	57.0 57.2 55.0 58.8 57.3 52.4 54.5 56.8 58.3 57.5 47.1 17.9 19.1 17.3	7,874.1 7,879.7 7,885.6 7,887.7 7,893.0 7,903.6 7,913.2 7,923.0 7,929.1 7,939.9 7,942.8 7,946.0 7,953.2 7,958.6	7,874.1 7,879.7 7,885.6 7,887.7 7,893.0 7,903.6 7,913.2 7,923.0 7,929.1 7,939.9 7,942.8 7,946.0 7,953.2 7,958.6	7,874.1 7,879.7 7,885.6 7,887.7 7,893.0 7,903.6 7,913.2 7,923.0 7,929.1 7,929.1 7,939.9 7,942.8 7,946.0 7,953.2 7,958.6	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
AI AJ	2,703 2,795	18 21	102 115	18.9 16.8	7,967.4 7,978.3	7,967.4 7,978.3	7,967.4 7,978.3	0.0
In feet upstream o	f confluence with U	Incompahgre R	iver					
FEDERAL		MANAGEMEN	IT AGENCY		FL	OODWAY	DATA	
OUR	AY COUNT	Y, COLOF	RADO					

LOCAT	TION		FLOODWAY		1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A B C D E F G H I J K L M N O P Q R S T	$\begin{array}{c} 169\\ 268\\ 481\\ 1,865\\ 6,961\\ 7,068\\ 9,001\\ 10,973\\ 14,698\\ 14,893\\ 17,780\\ 18,350\\ 25,270\\ 25,898\\ 30,200\\ 30,537\\ 32,761\\ 36,847\\ 43,324\\ 50,142\\ \end{array}$	62 68 63 64 79 95 91 122 98 131 152 282 179 162 71 193 185 263 180 55	228 366 260 254 300 449 278 788 289 519 494 608 442 304 230 542 428 423 346 205	10.3 6.4 9.0 9.3 7.8 5.2 8.5 3.0 8.1 4.5 4.3 3.5 4.9 7.0 9.3 4.0 5.0 5.1 6.2 10.4	6,888.6 6,890.6 6,891.1 6,902.8 6,933.7 6,935.6 6,945.3 6,960.7 6,974.3 6,977.4 6,988.4 6,991.0 7,036.1 7,045.7 7,072.2 7,075.0 7,091.4 7,125.0 7,187.4 7,283.3	6,888.6 6,890.6 6,891.1 6,902.8 6,933.7 6,935.6 6,945.3 6,960.7 6,974.3 6,977.4 6,988.4 6,991.0 7,036.1 7,045.7 7,072.2 7,075.0 7,075.0 7,091.4 7,125.0 7,187.4 7,283.3	6,888.6 6,890.6 6,891.1 6,902.8 6,933.7 6,935.6 6,945.3 6,960.7 6,974.6 6,977.4 6,988.9 6,991.0 7,036.4 7,045.9 7,072.2 7,075.0 7,091.6 7,125.1 7,187.4 7,283.5	$\begin{array}{c} 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0$
FEDERAL	. EMERGENCY				FL	.OODWAY	DATA	
		Y, COLOR RATED AREA	KADU S		FLOODING S	OURCE: UNCC	MPAHGRE RIV	VER

LOCA	TION		FLOODWAY		1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATIO (FEET NAVD88)			E ELEVATION
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
U W X Y Z AA AB AC AD AF AG AH AJ AK AL AM	52,474 53,643 54,119 54,847 55,926 57,484 60,078 60,584 60,901 66,489 66,797 67,378 69,044 69,161 69,276 69,570 70,214 72,379 72,557 73,272	69 97 83 51 61 39 37 62 42 55 58 66 57 44 36 42 31 41 27 31	223 267 237 226 224 179 169 278 233 207 179 256 195 211 163 170 158 163 135 146	9.6 8.0 9.0 9.5 9.6 12.0 11.6 7.0 8.4 8.5 9.8 6.9 9.0 8.4 10.8 10.3 11.2 10.5 12.7 11.7	7,321.3 7,345.9 7,354.7 7,372.1 7,396.6 7,446.9 7,557.1 7,567.5 7,570.5 7,617.0 7,629.1 7,635.3 7,667.3 7,660.2 7,661.5 7,666.0 7,679.1 7,710.0 7,713.1 7,727.4	7,321.3 7,345.9 7,354.7 7,372.1 7,396.6 7,446.9 7,557.1 7,567.5 7,570.5 7,617.0 7,629.1 7,635.3 7,667.3 7,660.2 7,661.5 7,666.0 7,679.1 7,710.0 7,713.1 7,727.4	7,321.6 7,346.3 7,355.1 7,372.5 7,397.1 7,447.1 7,557.2 7,567.5 7,570.6 7,617.4 7,629.2 7,635.6 7,657.4 7,660.2 7,661.6 7,666.1 7,679.2 7,710.0 7,713.6 7,727.4	$\begin{array}{c} 0.3\\ 0.4\\ 0.4\\ 0.4\\ 0.5\\ 0.2\\ 0.1\\ 0.0\\ 0.1\\ 0.4\\ 0.1\\ 0.3\\ 0.1\\ 0.3\\ 0.1\\ 0.0\\ 0.2\\ 0.1\\ 0.1\\ 0.0\\ 0.5\\ 0.0\\ \end{array}$
In feet upstream of FEDERA	f a point located 1.4	5 miles upstrear MANAGEMEN TY, COLOI	n of Ridgway Res IT AGENCY RADO S		FL FLOODING SO	OODWAY	DATA MPAHGRE RIV	VER

	LOCA	ΓΙΟΝ		FLOODWAY	,	1% ANNUAL (	CHANCE FLOOD (FEET N	WATER SURFAC	E ELEVATION
	CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
	AO AP AQ AR AS AT AU AV AW AX AY AZ BA BB BC	73,921 73,977 74,301 74,357 74,410 75,070 75,159 75,903 75,966 76,103 76,228 76,313 76,367 76,671	48 48 34 18 14 26 27 21 20 15 14 14 14 37 16 21	169 211 152 117 88 104 106 99 94 96 95 84 183 87 96	9.9 8.0 11.1 9.8 13.1 11.0 10.8 11.6 12.3 12.0 12.1 13.7 6.3 13.3 12.0	7,744.7 7,746.2 7,757.1 7,760.5 7,761.9 7,783.4 7,795.0 7,826.9 7,846.4 7,867.3 7,868.7 7,872.9 7,886.6 7,893.1 7,965.3	7,744.7 7,746.2 7,757.1 7,760.5 7,761.9 7,783.4 7,795.0 7,826.9 7,846.4 7,867.3 7,868.7 7,872.9 7,886.6 7,893.1 7,965.3	7,744.7 7,746.2 7,757.4 7,760.5 7,762.0 7,783.7 7,795.5 7,827.3 7,846.7 7,867.3 7,868.7 7,873.4 7,886.6 7,893.6 7,965.6	$\begin{array}{c} 0.0\\ 0.0\\ 0.3\\ 0.0\\ 0.1\\ 0.3\\ 0.5\\ 0.4\\ 0.3\\ 0.0\\ 0.0\\ 0.5\\ 0.0\\ 0.5\\ 0.2\\ \end{array}$
TAI	FEDERAL		MANAGEMEN	T AGENCY		FL	OODWAY	DATA	
	OUR	AY COUNT	Y, COLOF	RADO s		FLOODING S	OURCE: UNCC	MPAHGRE RIV	VER

# Table 24: Flood Hazard and Non-Encroachment Data for Selected Streams[Not Applicable to this Flood Risk Project]

#### 6.4 Coastal Flood Hazard Mapping

This section is not applicable to this Flood Risk Project.

# Table 25: Summary of Coastal Transect Mapping Considerations[Not Applicable to this Flood Risk Project]

#### 6.5 **FIRM Revisions**

This FIS Report and the FIRM are based on the most up-to-date information available to FEMA at the time of its publication; however, flood hazard conditions change over time. Communities or private parties may request flood map revisions at any time. Certain types of requests require submission of supporting data. FEMA may also initiate a revision. Revisions may take several forms, including Letters of Map Amendment (LOMAs), Letters of Map Revision Based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs) (referred to collectively as Letters of Map Change (LOMCs)), Physical Map Revisions (PMRs), and FEMA-contracted restudies. These types of revisions are further described below. Some of these types of revisions do not result in the republishing of the FIS Report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data (shown in Table 30, "Map Repositories").

#### 6.5.1 Letters of Map Amendment

A LOMA is an official revision by letter to an effective NFIP map. A LOMA results from an administrative process that involves the review of scientific or technical data submitted by the owner or lessee of property who believes the property has incorrectly been included in a designated SFHA. A LOMA amends the currently effective FEMA map and establishes that a specific property is not located in a SFHA.

To obtain an application for a LOMA, visit <u>www.fema.gov/flood-maps/change-your-flood-zone</u> and download the form "MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill". Visit the "Flood Map-Related Fees" section to determine the cost, if any, of applying for a LOMA.

FEMA offers a tutorial on how to apply for a LOMA. The LOMA Tutorial Series can be accessed at <u>www.fema.gov/flood-maps/tutorials</u>.

For more information about how to apply for a LOMA, call the FEMA Mapping and Insurance eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627).

#### 6.5.2 Letters of Map Revision Based on Fill

A LOMR-F is an official revision by letter to an effective NFIP map. A LOMR-F states FEMA's determination concerning whether a structure or parcel has been elevated on fill above the base flood elevation and is, therefore, excluded from the SFHA.

Information about obtaining an application for a LOMR-F can be obtained in the same manner as that for a LOMA, by visiting <u>www.fema.gov/flood-maps/change-your-flood-zone</u> for the "MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill" or by calling the FEMA Mapping and Insurance eXchange, toll free, at 1-877-FEMA MAP (1-877-336-2627). Fees for applying for a LOMR-F, if any, are listed in the "Flood Map-Related Fees" section.

A tutorial for LOMR-F is available at <u>www.fema.gov/flood-maps/tutorials</u>.

#### 6.5.3 Letters of Map Revision

A LOMR is an official revision to the currently effective FEMA map. It is used to change flood zones, floodplain and floodway delineations, flood elevations and planimetric features. All requests for LOMRs should be made to FEMA through the chief executive officer of the community, since it is the community that must adopt any changes and revisions to the map. If the request for a LOMR is not submitted through the chief executive officer of the community, evidence must be submitted that the community has been notified of the request.

To obtain an application for a LOMR, visit <u>www.fema.gov/flood-maps/change-your-flood-zone</u> and download the form "MT-2 Application Forms and Instructions for Conditional Letters of Map Revision and Letters of Map Revision". Visit the "Flood Map-Related Fees" section to determine the cost of applying for a LOMR. For more information about how to apply for a LOMR, call the FEMA Mapping and Insurance eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627) to speak to a Map Specialist.

Previously issued mappable LOMCs (including LOMRs) that have been incorporated into the Ouray County FIRM are listed in Table 26.

#### Table 26: Incorporated Letters of Map Change

#### [Not Applicable to this Flood Risk Project]

#### 6.5.4 Physical Map Revisions

A Physical Map Revisions (PMR) is an official republication of a community's NFIP map to effect changes to base flood elevations, floodplain boundary delineations, regulatory floodways and planimetric features. These changes typically occur as a result of structural works or improvements, annexations resulting in additional flood hazard areas or correction to base flood elevations or SFHAs.

The community's chief executive officer must submit scientific and technical data to FEMA to support the request for a PMR. The data will be analyzed and the map will be revised if warranted. The community is provided with copies of the revised information and is afforded a review period. When the base flood elevations are changed, a 90-day appeal period is provided. A 6-month adoption period for formal approval of the revised map(s) is also provided.

For more information about the PMR process, please visit <u>www.fema.gov</u> and visit the Floods & Maps "Change Your Flood Zone Designation" section.

#### 6.5.5 Contracted Restudies

The NFIP provides for a periodic review and restudy of flood hazards within a given community. FEMA accomplishes this through a national watershed-based mapping needs assessment strategy, known as the Coordinated Needs Management Strategy (CNMS). The CNMS is used by FEMA to assign priorities and allocate funding for new flood hazard analyses used to update the FIS Report and FIRM. The goal of CNMS is to define the validity of the engineering study data within a mapped inventory. The CNMS is used to track the assessment process, document engineering gaps and their resolution, and aid in prioritization for using flood risk as a key factor for areas identified for flood map updates. Visit www.fema.gov to learn more about the CNMS or contact the FEMA Regional Office listed in Section 8 of this FIS Report.

#### 6.5.6 Community Map History

The current FIRM presents flooding information for the entire geographic area of Ouray County. Previously, separate FIRMs, Flood Hazard Boundary Maps (FHBMs) and/or Flood Boundary and Floodway Maps (FBFMs) may have been prepared for the incorporated communities and the unincorporated areas in the county that had identified SFHAs. Current and historical data relating to the maps prepared for the project area are presented in Table 27, "Community Map History." A description of each of the column headings and the source of the date is also listed below.

- Community Name includes communities falling within the geographic area shown on the FIRM, including those that fall on the boundary line, nonparticipating communities, and communities with maps that have been rescinded. Communities with No Special Flood Hazards are indicated by a footnote. If all maps (FHBM, FBFM, and FIRM) were rescinded for a community, it is not listed in this table unless SFHAs have been identified in this community.
- Initial Identification Date (First NFIP Map Published) is the date of the first NFIP map that identified flood hazards in the community. If the FHBM has been converted to a FIRM, the initial FHBM date is shown. If the community has never been mapped, the upcoming effective date or "pending" (for Preliminary FIS Reports) is shown. If the community is listed in Table 27 but not identified on the map, the community is treated as if it were unmapped.
- *Initial FHBM Effective Date* is the effective date of the first FHBM. This date may be the same date as the Initial NFIP Map Date.
- FHBM Revision Date(s) is the date(s) that the FHBM was revised, if applicable.
- Initial FIRM Effective Date is the date of the first effective FIRM for the community.
- *FIRM Revision Date(s)* is the date(s) the FIRM was revised, if applicable. This is the revised date that is shown on the FIRM panel, if applicable. As countywide studies are completed or revised, each community listed should have its FIRM dates updated accordingly to reflect the date of the countywide study. Once the FIRMs exist in countywide format, as PMRs of FIRM panels within the county are completed, the FIRM Revision Dates in the table for each community affected by the PMR are updated with the date of the PMR, even if the PMR did not revise all the panels within that community.

The initial effective date for the Ouray County FIRMs in countywide format was **TBD**.

Community Name	Initial Identification Date	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
Ouray County, Unincorporated Areas	07/03/1985	N/A	N/A	07/03/1985	TBD
Ouray, City of	05/24/1974	05/24/1974	09/03/1976 12/04/1979	07/03/1985	TBD
Ridgway, Town of	11/08/1974	11/08/1974	01/23/1976	03/18/1977	10/13/1981 09/27/1985 TBD

Table 27: Community Map History

### SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION

#### 7.1 Contracted Studies

Table 28 provides a summary of the contracted studies, by flooding source, that are included in this FIS Report.

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Cascade Creek	TBD	Wood Group PLC	COCWCB22A	03/31/2021	Ouray, City of; Ouray County Unincorporated Areas
Cottonwood Creek	TBD	Wood Group PLC	COCWCB22A	03/31/2021	Ridgeway, Town of; Ouray County Unincorporated Areas
Cow Creek	TBD	Wood Group PLC	COCWCB22A	03/31/2021	Ouray County Unincorporated Areas
Dallas Creek	TBD	Wood Group PLC	COCWCB22A	03/31/2021	Ouray County Unincorporated Areas
Pleasant Valley Creek	TBD	Wood Group PLC	COCWCB22A	03/31/2021	Ouray County Unincorporated Areas

 Table 28: Summary of Contracted Studies Included in this FIS Report

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Portland Creek	TBD	Wood Group PLC	COCWCB22A	03/31/2021	Ouray, City of; Ouray County Unincorporated Areas
Uncompahgre River Reach 1	TBD	Wood Group PLC	COCWCB22A	03/31/2021	Ouray County Unincorporated Areas
Uncompahgre River Reach 2	TBD	Wood Group PLC	COCWCB22A	03/31/2021	Ouray County Unincorporated Areas
Uncompahgre River Reach 3	TBD	Wood Group PLC	COCWCB22A	03/31/2021	Ridgeway, Town of and Ouray, City of; Ouray County Unincorporated Areas

#### 7.2 Community Meetings

The dates of the community meetings held for this Flood Risk Project and previous Flood Risk Projects are shown in Table 29. These meetings may have previously been referred to by a variety of names (Community Coordination Officer (CCO), Scoping, Discovery, etc.), but all meetings represent opportunities for FEMA, community officials, study contractors, and other invited guests to discuss the planning for and results of the project.

#### FIS Report Dated Date of Meeting Meeting Type Attended By Community FEMA, Colorado Water Conservation Board, Wood Flood Risk Group PLC, CDM Smith, Ouray County, City of Ouray, 01/28/2021 Review Town of Ridgeway Ouray County, TBD FEMA, Colorado Water Conservation Board, CDM Unincorporated Areas 10/14/2021 Resilience Smith, Ouray County, City of Ouray, Town of Ridgeway Final CCO TBD TBD FEMA, Colorado Water Conservation Board, Wood, Flood Risk CDM Smith, Ouray County, City of Ouray, Town of 01/28/2021 Review Ridgeway Ouray, City of TBD FEMA, Colorado Water Conservation Board, CDM 10/14/2021 Resilience Smith, Ouray County, City of Ouray, Town of Ridgeway Final CCO TBD TBD FEMA, Colorado Water Conservation Board, Wood, Flood Risk CDM Smith, Ouray County, City of Ouray, Town of 01/28/2021 Review Ridgeway Ridgway, Town of TBD FEMA, Colorado Water Conservation Board, CDM 10/14/2021 Resilience Smith, Ouray County, City of Ouray, Town of Ridgeway TBD Final CCO TBD

#### Table 29: Community Meetings

#### **SECTION 8.0 – ADDITIONAL INFORMATION**

Information concerning the pertinent data used in the preparation of this FIS Report can be obtained by submitting an order with any required payment to the FEMA Engineering Library. For more information on this process, see <u>www.fema.gov</u>.

Table 30 is a list of the locations where FIRMs for Ouray County can be viewed. Please note that the maps at these locations are for reference only and are not for distribution. Also, please note that only the maps for the community listed in the table are available at that particular repository. A user may need to visit another repository to view maps from an adjacent community.

Community	Address	City	State	Zip Code
Ouray County, Unincorporated Areas	Ouray County Courthouse 541 4 th Street	Ouray	со	81427
Ouray, City of	City Hall 320 6 th Avenue	Ouray	со	81427
Ridgway, Town of	Town Hall 201 North Railroad Street	Ridgway	со	81432

#### Table 30: Map Repositories

The National Flood Hazard Layer (NFHL) dataset is a compilation of effective FIRM Databases and LOMCs. Together they create a GIS data layer for a State or Territory. The NFHL is updated as studies become effective and extracts are made available to the public monthly. NFHL data can be viewed or ordered from the website shown in Table 31.

Table 31 contains useful contact information regarding the FIS Report, the FIRM, and other relevant flood hazard and GIS data. In addition, information about the State NFIP Coordinator and GIS Coordinator is shown in this table. At the request of FEMA, each Governor has designated an agency of State or territorial government to coordinate that State's or territory's NFIP activities. These agencies often assist communities in developing and adopting necessary floodplain management measures. State GIS Coordinators are knowledgeable about the availability and location of State and local GIS data in their state.

FEMA and the NFIP					
FEMA and FEMA Engineering Library website	www.fema.gov/flood-maps/products-tools/know-your- risk/engineers-surveyors-architects				
NFIP website	www.fema.gov/flood-insurance				
NFHL Dataset	msc.fema.gov				
FEMA Region VIII	Denver Federal Center, Building 710 P.O. Box 25267 Denver, CO 80255-0267 (303) 235-4812				

#### **Table 31: Additional Information**

	Other Federal Agencies			
USGS website	www.usgs.gov			
Hydraulic Engineering Center website	www.hec.usace.army.mil			
State Agencies and Organizations				
State NFIP Coordinator	Doug Mahan CWCB Community Assistance Program Coordinator 1313 Sherman Street, Suite 721 Denver, CO 80203 (303) 866-3441 x3221 doug.mahan@state.co.us			
State GIS Coordinator	Jon Gottsegen Statewide GIS Coordinator 601 E. 18th Ave Denver, CO 80203 Phone: (303) 764-7712 jon.gottsegen@state.co.us			

### **SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES**

Table 32 includes sources used in the preparation of and cited in this FIS Report as well as additional studies that have been conducted in the study area.

Citation in this FIS	Publisher/ Issuer	<i>Publication Title,</i> "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
BLM 2011	BLM Cadastral Survey – CO	Cadastral PLSS Standardized Data – PLSS Intersected - Version 1.1	BLM Cadastral Survey - CO	Lakewood, CO	04/11/2011	http://www.geocommuni cator.gov/shapefilesall/C adNSDI/CO_CadNSDI.z ip
FEMA	Federal Emergency Management Agency	Revised Detailed studies of Cascade Creek, Cottonwood Creek, Portland Creek, and Uncompahgre River Reach of the Uncompahgre River in Ouray County, CO	Federal Emergency Management Agency	Washington, DC	N/A	
DLA 2014	State of Colorado, Department of Local Affairs	Colorado Information Marketplace	State of Colorado, Department of Local Affairs	Denver, CO	11/24/2014	https://data.colorado.gov /Municipal/Municipal- Boundaries-in- Colorado/u943-ics6
USDC 2015	U.S. Department of Commerce, U.S. Census Bureau, Geography Division	TIGER/Line Shapefile, 2018, Ouray, CO, USA, All Roads County-Based Shapefile	U.S. Department of Commerce, U.S. Census Bureau, Geography Division	Fort Worth, TX	06/01/2015	https://www.census.gov/ cgi- bin/geo/shapefiles/index .php?year=2018&layergr oup=Roads
NHD 2013	U.S. Geological Survey	National Hydrography Dataset for Ouray County, Colorado	U.S. Geological Survey	Fort Worth, TX	11/23/2013	http://www.fsa.usda.gov/

## Table 32: Bibliography and References

Citation in this FIS	Publisher/ Issuer	<i>Publication Title,</i> "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
NAIP 2017	USDA/FSA - Aerial Photography Field Office	USDA-FSA-APFO Digital Ortho Mosaic	USDA/FSA - Aerial Photography Field Office	Salt Lake City, UT	10/14/2017	<u>http://www.apfo.usda.go</u> ⊻
USDA/NR CS 2003	USDA/NRCS - National Geospatial Center of Excellence	Map Index 7.5x7.5 1:24,000, Colorado	USDA/NRCS - National Geospatial Center of Excellence	Fort Worth, TX	02/24/2003	http://greenwood.cr.usgs .gov/pub/quad-indexes
USGS 1948	US Department of the Interior, Geological Survey	Water-Supply Paper 997, Floods in Colorado	US Department of the Interior, Geological Survey	Washington, DC	1948	https://pubs.usgs.gov/ws p/0997/report.pdf
USGS 1966	US Department of the Interior, Geological Survey	Water-Supply Paper 1683, Magnitude and Frequency of Floods in the US, Part 9, Colorado River Basin	US Department of the Interior, Geological Survey	Washington, DC	1966	https://pubs.er.usgs.gov/ publication/wsp1683
Wood Group PLC 2021	Wood Group PLC	Hydraulic analysis of detailed and approximate studies for Ouray County, CO	Wood Group PLC	Denver, CO	03/31/2021	https://msc.fema.gov/por tal/advanceSearch























![](_page_63_Figure_0.jpeg)

![](_page_64_Figure_0.jpeg)

![](_page_65_Figure_0.jpeg)

![](_page_66_Figure_0.jpeg)

![](_page_67_Figure_0.jpeg)

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![](_page_69_Figure_0.jpeg)

![](_page_70_Figure_0.jpeg)

![](_page_71_Figure_0.jpeg)










































