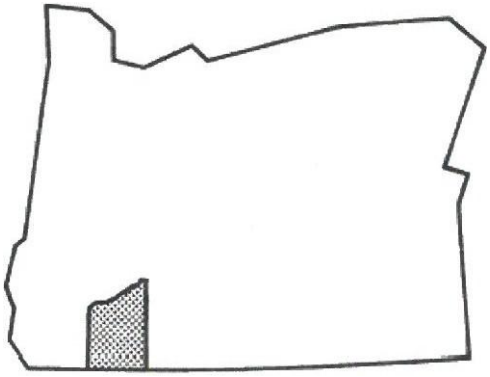
FLOOD INSURANCE STUDY

VOLUME 1 OF 3

JACKSON COUNTY, OREGON
AND INCORPORATED AREAS



COMMUNITY NAME	COMMUNITY NUMBER
ASHLAND, CITY OF	410090
CENTRAL POINT, CITY OF	410092
EAGLE POINT, CITY OF	410093
GOLD HILL, CITY OF	410094
JACKSON COUNTY, UNINCORPORATED AREAS	415589
JACKSONVILLE, CITY OF	410095
MEDFORD, CITY OF	410096
PHOENIX, CITY OF	410097
ROGUE RIVER. CITY OF	410098
SHADY COVE, CITY OF	410099
TALENT, CITY OF	410100

Notice

This revised preliminary FIS report includes only revised Flood Profiles and Floodway Data tables. See "Notice to Flood Insurance Study Users" page for additional details.

Preliminary: May 31, 2016

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
41029V001C

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) report may not contain all data available within the Community Map Repository. Please contact the Community Map Repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. Therefore, users should consult with community officials and check the Community Map Repository to obtain the most current FIS report components.

This FIS report was revised on _____. Users should refer to Section 10.0, Revisions Description, for further information. Section 10.0 is intended to present the most up-to-date information for specific portions of this FIS report. Therefore, users of this report should be aware that the information presented in Section 10.0 supersedes information in Sections 1.0 through 9.0 of this FIS report.

Initial Countywide FIS Effective Date: May 3, 2011

Revised Countywide Date(s): To Be Determined

This preliminary FIS report does not include unrevised Floodway Data Tables or unrevised Flood Profiles. These Floodway Data Tables and Flood Profiles will appear in the final FIS report.

TABLE OF CONTENTS

Volume 1 – (Date to be Determined)

		Page
SECTION 1.0 – INTRODUCTION		**1**
1.1	Purpose of Study	1
1.2	Authority and Acknowledgments	1
1.3	Coordination	2
SECTION 2.0 – AREA STUDIED		**3**
2.1	Scope of Study	3
2.2	Community Description	4
2.3	Principal Flood Problems	8
2.4	Flood Protection Measures	11
SECTION 3.0 – ENGINEERING METHODS		**12**
3.1	Hydrologic Analyses	13
3.2	Hydraulic Analyses	16
3.3	Vertical Datum	21
SECTION 4.0 – FLOODPLAIN MANAGEMENT APPLICATIONS		**22**
4.1	Floodplain Boundaries	22
4.2	Floodways	23
SECTION 5.0 – INSURANCE APPLICATIONS		**63**
SECTION 6.0 – FLOOD INSURANCE RATE MAP		**63**
SECTION 7.0 – OTHER STUDIES		**64**
SECTION 8.0 – LOCATION OF DATA		**65**
SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES		**67**
SECTION 10.0 – REVISION DESCRIPTIONS		**73**
10.1	First Revision	73
10.2	Second Revision	75
10.3	Third Revision	76
10.4	Fourth Revision	78
10.5	Fifth Revision	87
10.6	Sixth Revision	95

TABLE OF CONTENTS *(continued)*

Volume 1 *(continued)*

Figures

	Page
Figure 1: Floodway Schematic	24
Figure 2: FIRM Notes to Users	89
Figure 3: Map Legend	91
Figure 4: Frequency Discharge – Drainage Area Curves	105

Tables

	Page
Table 1: CCO Meeting Dates for Pre-Countywide FISs	2
Table 2: Flow Regulation on the Rogue River in Jackson County, Oregon	11
Table 3: Computed Peak Flows	14
Table 4: Summary of Discharges	17
Table 5: Floodway Data	25
Table 6: Community Map History	66
Table 7: Summary of Flood Frequency Quantiles for Study Reaches in Central Point, Oregon	79
Table 8: Vertical Datum Conversion	83
Table 9: Revised Study Descriptions	86
Table 10: Basin Characteristics	95
Table 11: Flooding Sources Included in the Sixth Revision	96
Table 12: Stream Gage Information used to Determine Discharges in the Sixth Revision	101
Table 13: Summary of Discharges for the Sixth Revision	102
Table 14: Roughness Coefficients for the Sixth Revision	106
Table 15: Summary of Hydrologic and Hydraulic Analyses for the Sixth Revision	107
Table 16: Base Map Sources for the Sixth Revision	110
Table 17: Summary of Topographic Data Used for the Sixth Revision	111
Table 18: Summary of Contracted Studies Used for the Sixth Revision	114
Table 19: Community Map Repositories	115
Table 20: Additional Information	117

Volume 2 – (Date to be determined)

Exhibits

Exhibit 1 - Flood Profiles

	Panel
Applegate River	01P-17P
Ashland Creek	18P-25P
Bear Creek	26P-47P
Bear Creek Split Flow	48P
Clay Creek	49P-56P
Coleman Creek	57P-59P
Crooked Creek	60P-67P
Daisy Creek	68P-69P
Daisy Creek (at Jacksonville)	70P-77P

TABLE OF CONTENTS *(continued)*

Volume 2 (continued)

Exhibits *(continued)*

Exhibit 1 - Flood Profiles (continued)

	Panel
Elk Creek	78P-79P
Evans Creek	80P-85P
Foots Creek	86P-93P

Volume 3 – (Date to be Determined)

Exhibits *(continued)*

Exhibit 1 - Flood Profiles (continued)

	Panel
Griffin Creek	94P-113P
Horn Creek	114P-115P
Jackson Creek	116P-124P
Jackson Creek Overbank	125P-126P
Larson Creek	127P-131P
Lazy Creek	132P-136P
Little Butte Creek	137P-144P
Profile Not Printed	145P
Lone Pine Creek	146P-151P
Mingus Creek	152P-154P
Pleasant Creek	155P-161P
Rogue River	162P-182P
Profile Not Printed	183P
Wagner Creek	184P-194P
Ward Creek	195P-196P

Exhibit 2 - Flood Insurance Rate Map Index
Flood Insurance Rate Map

FLOOD INSURANCE STUDY
JACKSON COUNTY, OREGON
AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the FIS reports and/or Flood Insurance Rate Maps (FIRMs) in the geographic area of Jackson County, Oregon including the Cities of Ashland, Central Point, Eagle Point, Gold Hill, Jacksonville, Medford, Phoenix, Rogue River, Shady Cove, Talent, and unincorporated areas of Jackson County (hereinafter referred to collectively as Jackson County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Jackson County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the *Code of Federal Regulations* at 44 CFR, 60.3. Please note that the City of Butte Falls is geographically located in Jackson County, but it is published separately. The FIS for Jackson County is being prepared in a partial-county wide format.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum NFIP requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this FIS are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The original hydrologic and hydraulic analyses for this study were performed by STRAAM Engineers, Inc., for the Federal Emergency Management Agency (FEMA), under Contract No.H-3995. This study was completed in June 1978, and covered all significant flooding sources affecting the unincorporated areas of Jackson County, as well as the cities of Ashland, Central Point, Eagle Point, Gold Hill, Jacksonville, Medford, Phoenix, Rogue River, Shady Cove, and Talent.

Several revisions to the Unincorporated Jackson County FIS have occurred subsequent to the initial publishing. These revisions are discussed further in Section 10 of this FIS. The first publication on the Applegate River was performed by OTAK, Inc., for FEMA under contract No. EMW-89-C-2847. This work was completed in December 1989. A second revision occurred to incorporate a Letter of Map Revision (LOMR) on Bear

Creek, and was based on analyses conducted by URS Consultants. This work was completed on September 15, 1993. A third revision occurred on Wagner Creek within the City of Talent and in unincorporated Jackson County, and was performed by Ogden Beeman & Associates, Inc., for FEMA under contract No. EMS-1999-C0-0068-T01. This work was completed on May 15, 2002.

The fourth revision occurred as part of the countywide Digital Flood Insurance Rate Map (DFIRM) conversion for Jackson County, Oregon. Two separate analyses and studies were incorporated as part of the DFIRM conversion. The first consisted of new detailed studies of Daisy, Elk, Griffin, Horn, Jackson, and Mingus Creeks within the City of Central Point, Oregon. The second consisted of redelineation of effective floodplain hazard areas using newly obtained topographic data within the Cities of Ashland, Medford, Phoenix, Rogue River, and Shady Cove. Both tasks were performed by Northwest Hydraulic Consultants, Inc. for FEMA under Contract No.EMS-1999-C0-0068-T01, between 2003 and 2009.

1.3 Coordination

Consultation Coordination Officer's (CCO) meetings may be held for each jurisdiction in this countywide FIS. An initial CCO meeting is held typically with representatives of FEMA, the community, the state,, and the study contractor to explain the nature and purpose of a FIS and to identify the streams to be studied by detailed methods. A final CCO meeting is held typically with representative of FEMA, the community, and the study contractor to review the results of the study.

The dates of the initial and final CCO meetings held for Jackson County and the incorporated communities within its boundaries are shown in Table 1, "CCO Meeting Dates for Pre-Countywide FISs."

Table 1: CCO Meeting Dates for Pre-Countywide FISs

Community Name	Initial CCO Date	Final CCO Date
Jackson, County of	April 1976	August 20, 1980
Ashland, City of	April 1976	November 16, 1978
Central Point, City of	April 1976	November 15, 1978
Eagle Point, City of	April 1976	November 15, 1978
Gold Hill, City of	April 1976	November 16, 1978
Jacksonville, City of	April 1976	November 16, 1978
Medford, City of	April 1976	April 10, 1979
Phoenix, City of	April 1976	November 16, 1978
Rogue River, City of	April 1976	April 10, 1979
Shady Cove, City of	April 1976	November 15, 1978
Talent, City of	April 1976	November 16, 1978

The initial CCO meeting for the countywide study was held on December 15, 2005, and was attended by representatives of FEMA; the state; the cities of Central Point, Eagle Point, Gold Hill, Jacksonville, Medford, Phoenix, Talent; and the Study Contractor (SC).

The results of the countywide study were reviewed at final CCO meetings; August 19, 2009 for the City of Central Point, and August 20th for Jackson County / remaining cities. The meetings were attended by representatives of FEMA, the mapping partner, and the communities. All problems raised at that meeting have been addressed in this study.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Jackson County, Oregon, including the incorporated communities listed in Section 1.1. The scope and methods of study were proposed to, and agreed upon, by FEMA and the communities. The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development. Detailed analyses were performed on the following streams in Jackson County:

Ashland Creek	Horn Creek
Applegate River	Jackson Creek
Bear Creek	Larson Creek
Clay Creek	Lazy Creek
Coleman Creek	Little Butte Creek
Crooked Creek	Lone Pine Creek
Daisy Creek	Mingus Creek
Elk Creek	Pleasant Creek
Evans Creek	Rogue River
Foots Creek	Wagner Creek
Griffin Creek	Ward Creek

Approximate analyses were used to study those areas having a low development potential or minimal flood hazard. The following streams were studied by approximate methods due to lack of development along these streams:

Anderson Creek	Neil Creek
Big Butte Creek	Ross Lane Drainage
Forest Creek	Sams Creek
Galls Creek	Sardine Creek
Hamilton Creek	Savage Creek
Kane Creek	Slagle Creek
Little Antelope Creek	Snider Creek
Little Applegate River	Thompson Creek
Little Butte Creek	Trail Creek
Midway Drainage	Whetstone Creek
Mill Creek	Willow Creek

2.2 Community Description

Jackson County is in southwestern Oregon. Its southern boundary is the border between Oregon and Siskiyou County, California. To the east is Klamath County, Oregon, to the north is Douglas County, Oregon, and to the west is Josephine County, Oregon. Interstate Highway 5, the only interstate highway running north-south along the west coast, runs through Jackson County. The county has an area of 2,821 square miles, a population of 181,300 (Reference 72).

Jackson County is a popular retirement area, and much of its recent growth has taken place in the Bear Creek and Rogue River valleys. The main industries in the county are lumbering, agriculture, and some light manufacturing. The major flood plain development pressures in the county are along Rogue River and Bear Creek. Development pressures are especially severe along Rogue River because of its scenic attractions. This is also the area most subject to hazardous flooding, especially in the area near the City of Rogue River, on the south shore of the river.

Rogue River and Bear Creek are the two major watercourses in Jackson County. All detailed and approximate study streams within Jackson County eventually flow into Rogue River. Bear Creek and its numerous tributaries generally flow from southeast to northwest and eventually empty into Rogue River northwest of the City of Central Point. Rogue River flows westerly in the northeastern section of the county and then southerly at the City of Shady Cove. West of the City of Eagle Point at the confluence of Little Butte Creek and Rogue River, Rogue River bends westerly and drains major tributaries before it flows into Josephine County, Oregon, at the Savage Rapids Dam.

To the south of the Rogue River and Bear Creek valleys are the Siskiyou Mountains, including Mt. Ashland with an elevation of more than 7,500 feet. The eastern side of the county is part of the Cascade Range and Mt. McLaughlin, just east of the county limits, has an elevation of nearly 9,500 feet. Elevations in the main valleys range from 2,000 feet around Ashland down to 1,000 feet where Rogue River flows into Josephine County to the west. Much of the timbered parts of the county are in the Rogue River, Siskiyou, or Umpqua National Forests. The main soil types of the valley are clay-loams and silty-clay-loams. Along Bear Creek and Rogue River there are extensive gravel deposits.

The City of Medford, located in the center of Jackson County, has an average temperature of 51.9˚F and an average annual precipitation of 20.7 inches (Reference 1).

<u>City of Ashland</u>

The City of Ashland is located in south-central Jackson County, approximately 12.5 miles southeast of Medford. Ashland was incorporated in 1874, and has a population of 21,500.

The city has several features which make it a center for tourism. The annual Shakespearean Festival, which is the most notable, draws many visitors from other states and nations. Mt. Ashland ski resort is a recreation center for the area and attracts winter

sports enthusiasts. Southern Oregon University, also located in Ashland, has a significant influence on the development of the city.

Ashland sits on the west side of the Bear Creek Valley so all of the drainage in the area is easterly, down the hills, and into Bear Creek. Ashland Creek is very steep and known to move large boulders when flooding. Ashland Creek has its origins in the Rogue River National Forest south of the city. The East and West Forks Ashland Creek flow into Reeder Reservoir approximately 3 miles to the south of Ashland. From the reservoir, the creek flows south-north and cuts through the western part of the city before entering Bear Creek to the north. Clay Creek rises in the hills to the southeast of Ashland, flows south-north at the eastern edge of the city, and enters Bear Creek to the north.

City of Central Point

The City of Central Point is located in central Jackson County, approximately 3.5 miles northwest of Medford. Central Point was incorporated in 1889, and has a population of 12,500 (Reference 72).

Central Point is a local agricultural supply center and is the residence for many people who work in the Medford metropolitan area. The primary industries in the area are agriculture and forest products. Because of a very favorable climate, the area is also becoming a popular retirement area.

Central Point lies at the lower end of a valley drained by Bear Creek. The city is very flat with drainage in the area generally directed northward. Bear Creek flows along the eastern boundary of Central Point. Several other tributaries flow through the city. The largest of these are Griffin and Jackson Creeks, followed by Mingus and Elk Creeks. Horn and Daisy Creeks, tributaries to Jackson and Griffin Creeks, respectively, are also located in Central Point.

City of Eagle Point

The City of Eagle Point is located in central Jackson County, approximately 10.5 miles northeast of Medford. Eagle Point was incorporated in 1911, and has a population of 4,800 (Reference 72).

Lumbering and agriculture are the two main resources of the area. Eagle Point supplies many of the needs of the community and surrounding area, including elementary and secondary schools, grocery and general stores, and a rescue and ambulance service.

Little Butte Creek has its origin in the Rogue River National Forest, which lies to the north and east of the city. It enters the expanding agricultural valley in which Eagle Point is located at approximately 3 to 4 miles upstream from Eagle Point.

Little Butte Creek flows through the center of Eagle Point from the northeast to the southwest, eventually emptying into the Rogue River; it is the major cause of flooding in the city. In the vicinity of Eagle Point, this creek has a drainage area of approximately 280 square miles.

The major access roads in the area are Crater Lake Road (State Highway 62) and Royal Avenue (Brownsboro Road) to State Highway 140. Both of these roads were under water during the flood of 1962, isolating Eagle Point.

City of Gold Hill

Gold Hill is located in central Jackson County, approximately 20 miles northwest of Medford. Gold Hill was incorporated in 1895, and has a population of 1,100 (Reference 72).

It is primarily a local supply center with several stores, restaurants, service stations, and a school. Interstate Highway 5 runs along the south side of the Rogue River.

City of Jacksonville

The City of Jacksonville is located in west-central Jackson County, approximately 5 miles west of Medford. Jacksonville was incorporated in 1860, and has a population of 2,200 (Reference 72).

The city is predominantly residential, with most of the work force being employed in the greater Medford area. Jacksonville lies along the west slope of a valley drained by the Bear Creek.

The two sources of flooding in Jacksonville are Jackson Creek and Daisy Creek. Daisy Creek flows into Jacksonville from the hills to the south of the city. It flows in a northerly direction through the southern part of Jacksonville, before changing course to continue in a north-easterly direction. Jackson Creek enters the city from the west, having had its origins in the hills to the west and southwest of the city. South Fork Jackson Creek flows into the main creek approximately 0.75 mile west of the city. Having entered the city center area, the creek turns to flow in a northeasterly direction to the north of, and approximately parallel to, Daisy Creek.

Both creeks intersect the Phoenix Canal, which enters the city from the east. The canal cuts across the northeast corner of the city. It intersects Daisy Creek and after passing under Fifth Street and Shaffer Lane, it crosses Jackson Creek.

City of Medford

The City of Medford, the county seat, is located in central Jackson County. Medford was incorporated in 1885, and has a population of 63,200 (Reference 72).

The city is the commercial center for southern Oregon and parts of northern California. The lumber industry is the largest employer in the area, with agriculture being second in terms of employment. Medford has an international airport and numerous medical facilities. In addition to being an important commercial center, Medford is also a popular retirement area because of its moderate climate.

Medford lies at the lower end of a valley drained by Bear Creek. The city is fairly flat, except for some hills on the east side of Bear Creek. Several tributaries, including Crooked, Larson, Lone Pine, and Lazy Creeks flow through the city.

City of Phoenix

The City of Phoenix is located in south-central Jackson County, approximately 4 miles southeast of the City of Medford. Phoenix was incorporated in 1910, and has a population of 4,100 (Reference 72).

The city is mainly a residential community providing homes for people who work in the Cities of Medford and Ashland. The community is served by a library, police department, volunteer fire department, elementary school, and a junior high school.

Phoenix lies in the middle of a valley drained by Bear Creek to the east. Coleman and Anderson Creeks enter Bear Creek from the west within the city.

City of Rogue River

The City of Rogue River is located approximately 3 miles east of the Jackson-Josephine County line, in west-central Jackson County, and approximately 20 miles north of the City of Medford. Rogue River was incorporated in 1912, and has a population of 1,900 (Reference 72).

Interstate Highway 5 runs along the Rogue River and provides the main route of access to the city. It is primarily a local supply center, with several stores, restaurants, service stations, and a school. The City of Rogue River is located on flat ground in a narrow valley with high hills on both sides.

The Rogue River flows through the City of Rogue River, as well as its tributaries Evans and Ward Creeks.

City of Shady Cove

Shady Cove is located near the center of Jackson County, approximately 20 miles north of the City of Medford. Shady Cove was incorporated in 1972, and has a population of 2,300 (Reference 72).

Crater Lake Highway (State Highway 62) runs through the city and provides the main means of access. It is primarily a local supply center with several stores, restaurants, service stations, and a school.

Most of the potentially developable flood plain areas in Shady Cove have already been developed in the form of mobile home sites on the east bank of the river, downstream from the State Highway 62 bridge.

City of Talent

The City of Talent is located in south-central Jackson County, approximately 8 miles southeast of the City of Medford and approximately 7 miles northwest of the City of Ashland. Talent was incorporated in 1910; as of July 1, 2008 the population is 6,635.

The city is mainly a residential community, providing homes for people who work in the Cities of Medford and Ashland. The community is served by a library, police department, volunteer fire department, elementary school, and junior high school.

Talent lies in a valley drained by Bear Creek. Wagner Creek, the major cause of flooding in the city, flows through the center of Talent from the southwest to the northeast, eventually emptying into Bear Creek.

Wagner Creek has its origin in the Rogue River National Forest, which lies to the south of the city. It enters the expanding agricultural valley in which Talent is located at approximately 3 to 4 miles upstream.

2.3 Principal Flood Problems

The major floods in this area are usually the result of a heavy snowfall followed by a sudden warm rain. A freeze on top of the snow just before the warm rain can further complicate matters by causing very rapid runoff conditions. The chief sources of flooding in Jackson County are Rogue River, Bear Creek, Ashland Creek, and Applegate River.

In 1861, there was major flooding in the county. The extent of this flood on Rogue River is indicated in the report by the USACE (Reference 3). The most dramatic flood in the recent past occurred along Rogue River in December 1964. Two of the areas receiving heavy damage by Rogue River in the 1964 flood were the areas around the City of Rogue River and the City of Shady Cove. Floodwaters reached depths of more than 4 feet in some structures.

More recent flooding occurred in Jackson County during the January 1997 event. Based on stream gage records, the 1997 event ranged from a 5-year to 30-year event throughout the region, with the median being approximately a 20-year event (Reference 73).

The flooding patterns in the Bear Creek Valley are complicated by the existence of a series of irrigation canals along the sides of the valley. These canals collect all runoff from the land above, thereby altering the natural drainage areas of the smaller streams.

At every junction of a canal and a stream or creek, there is a diversion structure or some means of diverting the contents of the canal into the stream or creek. The irrigation districts are responsible for the operation of these structures and are supposed to operate them so as to minimize their influence on the flows within these streams or creeks.

In making the flood flow calculations in these areas, it was presumed that wherever there was a canal, the drainage area above that canal contributed to the flow in the canal and

the entire contents of the canal were discharged into the next major stream or creek downstream.

Past flood situations indicate that, in practice, these diversion structures are sometimes closed or partially closed at the time of a flood. There have also been instances of dike failures and debris jamming in the canals.

City of Ashland

The chief source of flood problems within the City of Ashland is Ashland Creek, which has a drainage area of approximately 27.5 square miles. The 1974 flood on Ashland Creek received special attention because it caused a failure of the Ashland water-supply system for several days. The peak flow for this flood was believed to have been caused by a debris dam breakage above the city reservoir. The 1997 event also caused substantial damage along Ashland Creek (Reference 74).

City of Central Point

The worst flooding in recent years occurred in Central Point in December 1962 and December 1964, with the flood of 1964 being more severe. Most of the flood damage within the city occurred along Mingus Creek and Daisy Creek. In both cases, there was high water but no extensive structural damage. The situation on Daisy Creek was aggravated by a channel obstruction on Griffin Creek. The Mingus Creek situation was partly due to undersized drainage structures which have been enlarged or replaced since then. Moderate flooding was observed during the 1997 event, including minor overtopping of Highway 99 at Griffin Creek (Reference 75).

City of Eagle Point

The chief source of flood problems within Eagle Point is Little Butte Creek. The highest flood in the Eagle Point area occurred in December 1962; the next highest was in December 1964. Most of the damage from these floods occurred along Little Butte Creek, although there was also substantial flooding in west Eagle Point in 1962 as a result of inadequate drainage facilities and overflows from the irrigation canal.

In the past, there have also been some problems with local drainage into west Eagle Point. An irrigation canal runs along hills to the north. If the ends of this canal are not left open and the canal intake is not closed off from Little Butte Creek, there can be substantial drainage problems from this source. Recent improvements to the drainage structures in west Eagle Point and improved communications with the local irrigation district have presumably eliminated this threat. A detailed analysis was not made of this local drainage problem.

City of Gold Hill

Because of Gold Hill's high position overlooking the Rogue River, there has never been any flood damage in Gold Hill. There are no significant developable areas within Gold Hill which are susceptible to flooding from the Rogue River; thus there is no major flood

hazard in the City of Gold Hill. The city does have a vital interest in the condition of the Rogue River because of the two bridges that provide access to Interstate Highway 5 on the south side of the river.

In the 1964 flood the only damage caused by flooding on the Rogue River was the flooding out of a single pump and motor at the city's sewage treatment plant.

City of Jacksonville

Flooding occurred in Jacksonville in 1964 and 1974. In both cases, there was extensive sheet flow through the streets of Jacksonville and some minor flooding of low-lying residences and commercial establishments. At the corner of Fifth and Main Streets a service station that was flooded out in the 1974 flood had a high water depth of approximately 1 foot.

Some problems with the irrigation canal could arise; but, because the canal is almost at the corporate limits, it was assumed that it had no effect on either Daisy or Jackson Creek within the study area.

City of Medford

The worst flooding in recent years occurred in Medford in December 1962. The flow in Bear Creek near Main Street was recorded as being 14,500 cfs. This flood caused water to spill onto the floors of some shops along Bear Creek, especially in the area between Barnett Road and Main Street. The situation in 1962 was further aggravated by a canal levee break near where a canal crosses Crooked Creek. This increased the flow in Crooked Creek and added to the problems along Riverside Avenue, below Barnett Road. The 1962 flood along Bear Creek did not cause extensive structural damage to buildings in Medford other than damage caused by the high waters.

City of Rogue River

The Rogue River flows from east to west through the City of Rogue River and is the major cause of flooding. On both Evans Creek and Ward Creek, the major flooding problems are due to backwater from the Rogue River, not from flooding on these two creeks.

The areas in Rogue River that are especially flood prone are the areas just south of and west of the Depot Street bridge over the Rogue River, along the Rogue River, and an area just west of Evans Creek, near its mouth.

City of Shady Cove

Rogue River flows through the city from north to south and is the major source of flooding in the city. Indian Creek flows into Rogue River within the corporate limits, but flood damage from this creek occurs only in times of exceptionally high water along Rogue River.

The State Highway 62 bridge in Shady Cove is vital to the economy of this region because it is an essential link between the national forests to the north and east and the wood processing mills in the Medford area to the south. The loss of this bridge in the 1964 flood caused a substantial hardship for the local lumber industry. The peak flow for the 1964 flood was estimated at 87,600 cfs at Dodge Bridge, located 8 miles downstream from Shady Cove.

City of Talent

The worst flooding in Talent occurred on Bear Creek in 1928, and the most recent flood was in 1964 on Wagner Creek. Wagner Creek has backed up into some of the yards along the creek, but did not pond.

To the west of the city, irrigation canals have been built along the sides of the valley, above the existing ground slope. These canals collect all runoff from the lands above, thereby altering the natural drainage areas on the smaller streams.

2.4 Flood Protection Measures

Flood control measures have been proposed for Jackson County for many years. There have been proposals for flood control dams on both Rogue River and its tributary, Elk Creek. The Lost Creek Dam has been built on Rogue River and its impact on the flows is shown below in Table 2.

Table 2: Flow Regulation on the Rogue River in Jackson County, OR

	Natural Flows (cfs)			
Location	10-percent-annual-chance	2-percent-annual-chance	1-percent-annual-chance	0.2-percent-annual-chance
Dodge Bridge	48,000	80,000	98,000	145,000
Raygold	64,000	110,000	135,000	200,000
Grants Pass	91,000	150,000	180,000	270,000
	Regulated Flows (cfs)			
Location	10-percent-annual-chance	2-percent-annual-chance	1-percent-annual-chance	0.2-percent-annual-chance
Dodge Bridge	29,000	46,000	62,000	135,000
Raygold	50,000	84,000	105,000	180,000
Grants Pass	73,000	128,000	144,000	260,000

On Bear Creek, the U.S. Bureau of Reclamation constructed Emigrant Dam and its reservoir. This facility is operated for irrigation purposes and, according to U.S. Bureau of Reclamation personnel, has no significant flood control function. This facility was in operation prior to the flooding in the 1960s, the basis for most of the calculations in this report.

City of Medford

Since the 1962 flood event and a lesser flood event in 1964, there have been several reports on the drainage problems in the Medford area (References 36, 53, and 54). In general, these reports were aimed at relieving damage from a 10-percent-annual-chance flood. Peak flows developed as part of these reports have been used as the basis of design for some of the recent drainage structures built in Medford. Residences have been built directly over the drainage structures and residents have constructed high, solid wooden fences around their property.

On both the east and west sides of the city, there are irrigation canals that are built above the existing normal ground slope and act as runoff diversion structures. In time of flood, the diversion gates from these canals are supposed to open into the natural drainage courses; however, this is not always the case.

Past flood situations in other areas of Jackson County indicate that, in practice, these types of diversion structures are sometimes closed or partially closed at the time of a flood. There have also been instances of dike failures and debris jamming in the canals. A failure of one of these structures could result in local flooding in excess of what is indicated in this study.

City of Phoenix

West of the city, there are irrigation canals which are built above the existing normal ground slope and act as runoff diversion structures. In time of flood, the diversion gates from these canals are supposed to open into the natural drainage.

The mobile home park adjacent to Bear Creek has a small dike along the creek for flood control purposes. The analysis for peak flows along Bear Creek indicates that this dike will be overtopped during the 1-percent-annual-chance flood. There are no other flood protection measures in Phoenix.

City of Talent

Most of the problems occur from overbank flooding on Wagner Creek. After the 1964 flood, one of the landowners built a dike to protect his property. There are no other flood protection measures.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods 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 once on the average during any 10-, 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-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent 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 which equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); and 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.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community.

The U.S. Geological Survey maintains a number of gaging stations in Jackson County. On special request, the U.S. Geological Survey did a computerized analysis of the flood flows at all gaging stations for which there were records of sufficient duration to permit meaningful analyses (Reference 2). Stations subject to extensive regulation were excluded from these analyses. In conjunction with these analyses, the U.S. Geological Survey applied regional skew factors in accordance with the recommendations of the U.S. Water Resources Council (Reference 4). On the basis of the observed peak flows and these regional skew factors, the U.S. Geological Survey derived the peak flows in Table 3. These flows were divided into two groups, large streams and small streams, with the dividing line being areas with over or under 100 square miles. For Bear Creek, a separate set of regression equations was determined and used to calculate peak flows

Table 3: Computed Peak Flows

U.S. Geological Survey Station Number	Name	Years of Record	Drainage Area (Square Miles)	Peak Flow (Cubic Feet per Second)			
				10-percent-annual-chance	2-percent-annual-chance	1-percent-annual-chance	0.2-percent-annual-chance
Large Drainage Areas							
14-338000	Elk Creek Near Trail	30	133.00	11,817	18,802	22,185	31,087
14-362000	Applegate River Near Copper	37	220.00	19,078	34,025	41,454	61,175
14-363000	Applegate River Near Ruch	31	297.00	13,815	25,005	30,688	46,107
14-357500	Bear Creek at Medford	55	284.00	6,770	15,440	20,500	35,500
Small Drainage Areas							
14-354400	Butler Creek Near Ashland	12	5.11	278	667	909	1,705
14-361300	Jones Creek Near Grants Pass	24	7.41	694	1,061	1,230	1,650
14-353500	East Fork Ashland Creek	18	7.96	530	1,491	2,152	4,538
14-353000	West Fork Ashland Creek	18	9.98	500	1,350	1,920	3,926
14-343000	North Fork Little Butte Creek	50	43.80	571	1,057	1,331	2,183
14-333500	Red Blanket Creek	49	45.50	1,698	3,601	4,778	8,721

along Bear Creek. From these data, a series of drainage area versus peak flow regression equations were derived:

Large Drainage Areas (Over 100 Square Miles)	Small Drainage Areas (Under 100 Square Miles)	Bear Creek Drainage Only
$Q_{10} = 3416\ A^{0.273}$	$Q_{10} = 194\ A^{0.437}$	$Q_{10} = 54.8\ A^{0.85}$
$Q_{50} = 2418\ A^{0.440}$	$Q_{50} = 506\ A^{0.370}$	$Q_{50} = 125.0\ A^{0.85}$
$Q_{100} = 2232\ A^{0.491}$	$Q_{100} = 699\ A^{0.354}$	$Q_{100} = 166.0\ A^{0.85}$
$Q_{500} = 2034\ A^{0.579}$	$Q_{500} = 1306\ A^{0.337}$	$Q_{500} = 287.4\ A^{0.85}$

Q = peak discharge (cubic feet per second (cfs)) and A = area (square miles)

These regression equations were then used directly for those situations in which there were no streamflow records.

The flows used for Ashland, Clay, Coleman, Crooked, Daisy (at Phoenix Canal), Foots, Griffin, Jackson (at Phoenix Canal), Larson, Lazy, Lone Pine, Ward, and Wagner Creeks, and Unnamed Tributary to Larson Creek, were calculated based on small drainage area regression equations. In making the flood flow calculations for Wagner Creek, the effect of the irrigation canals is considered. It was presumed that where the canal was encountered, the drainage area above the canal contributed to the flow in the canal, and that the entire contents of the canal were discharged into the next major stream or creek. The drainage area and discharges shown for Wagner Creek reflect this condition. The flows for Evans and Pleasant Creeks were calculated based on large drainage area regression equations.

The U.S. Geological Survey has maintained two gaging stations on Little Butte Creek in the vicinity of Eagle Point. At the station above Eagle Point (drainage area = 269 square miles), there were 10 years of continuing record. At the station below Eagle Point (drainage area = 293 square miles), 14 years of record were available. At the upper station, no significant floodflows were recorded. At the lower station, a flow of 10,000 cfs was recorded on January 7, 1948.

Peak floodflows for various frequencies were calculated using the log-Pearson Type III method, in accordance with procedures described by the U.S. Water Resources Council (Reference 4). Regional skew factors have been developed for adjusting observed streamflows for extreme values. The skew factors used in this analysis were those determined by the U.S. Geological Survey. The peak flows for various recurrence intervals used for Little Butte Creek are the average of the flows computed for the two stations.

The floodflows for Rogue River were based on the work of the U.S. Geological Survey (Reference 5) using log-Pearson Type III analysis (Reference 4) modified to reflect the impact of the Lost Creek Dam.

Peak discharge drainage area relationships for the streams studied in detail are shown in Table 4.

3.2 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. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data table in the FIS report. 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.

Water-surface elevations (WSELs) were computed using the USACE HEC-2 step-backwater computer model (Reference 6).

Cross section information was obtained from digitized photogrammetric interpretations (Reference 7). Where deep water was present at the time of the aerial photography, underwater cross section information was obtained by direct field measurement. All bridges, culverts, and relevant irrigation structures were measured in the field. On Rogue River, all cross sections were supplied by the U.S. Geological Survey (Reference 5).

The original U.S. Geological Survey flows were first used to check the bridge routines. In a few instances, additional cross sections had to be added to duplicate the U.S. Geological Survey profiles obtained with another method and presented in the U.S. Geological Survey report on Rogue River (Reference 5). Once the data matched the original profiles, the flows established by the U.S. Geological Survey were adjusted to show the impact of the Lost Creek Dam, and these revised flows were used as the basis for the flood profiles used in this study.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments, for which a floodway is computed (Section 4.2), selected cross section locations are also shown on the Flood Insurance Rate Map.

Table 4: Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet Per Second)			
		10-Percent-Annual-Chance	2- Percent-Annual-Chance	1- Percent-Annual-Chance	0.2- Percent-Annual-Chance
Applegate River					
Near Ferris Gulch	531	13,200	29,600	41,100	80,500
At Gaging Station Near Applegate (No. 14366000)	483	10,800	24,900	34,000	69,000
At BM 1399 Near Ruch	463	10,300	23,700	33,400	67,700
At Spencer Gulch	425	9,300	21,300	32,100	65,200
Upstream of Little Applegate River	305	6,400	14,300	27,600	56,400
At McKee Bridge	275	5,700	12,600	26,400	53,900
At Gaging Station Near Copper (No. 14362000)	223	4,500	9,800	24,000	49,000
Ashland Creek					
At Ashland	27.5	827	1,723	2,259	3,986
Bear Creek					
At Medford (USGS Survey Gate No. 14357500)	284	6,770	15,440	20,500	35,500
Near Coleman Creek	250	6,090	13,880	18,430	31,920
At Talent	224	5,450	12,430	16,510	28,590
At Ashland	186	4,460	10,180	13,510	23,400
Clay Creek					
At Ashland	2.0	263	654	893	1,649
Coleman Creek					
At Phoenix	7.0	458	1,045	1,399	2,526
Coleman Creek					
At Mouth	5.6	413	957	1,286	2,332

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet Per Second) 10-Percent-Annual-Chance	2- Percent-Annual-Chance	1- Percent-Annual-Chance	0.2- Percent-Annual-Chance
Daisy Creek					
At Mouth[1]	0.5	134	158	167	184
At Phoenix Canal near Jacksonville	2.5	290	710	967	1,778
Elk Creek[1]					
At Mouth	4.8	370	490	530	610
Evans Creek					
At Mouth	678	14,839	25,854	31,333	45,959
Foots Creek					
At Mouth	27	820	1,712	2,244	3,962
Griffin Creek[1]					
At Mouth	23.3	1,790	2,400	2,640	3,110
Horn Creek[1]					
At Mouth	0.8	231	308	336	390
Jackson Creek					
At Scenic Avenue[1]	19.5	1,489	2,000	2,191	2,573
Overbank[1]	--	326	922	1,220	1,850
At Phoenix Canal near Jacksonville	10.0	531	1,186	1,579	2,835
Larson Creek					
At Mouth	7.0	455	1,039	1,392	2,514
Lazy Creek					
At Mouth	5.2	399	931	1,253	2,275

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet Per Second)			
		10-Percent-Annual-Chance	2- Percent-Annual-Chance	1- Percent-Annual-Chance	0.2- Percent-Annual-Chance
Little Butte Creek					
At Main Street in Eagle Point	290	7,426	11,743	13,822	19,266
Lone Pine Creek					
At Crater Lake Highway	4.5	375	883	1,190	2,167
Mingus Creek[1]					
At Pine Street	1.3	120	147	158	176
Pleasant Creek					
At Mouth	193	14,377	24,565	29,598	42,956
Rogue River					
Below Evans Creek	--[1]	71,000	125,000	141,000	254,000
Below Ward Creek	--[1]	58,000	97,000	118,000	206,000
Above Ward Creek	--[1]	57,000	96,000	117,000	204,000
Below Kane Creek	--[1]	52,000	87,000	108,000	187,000
Above Kane Creek	--[1]	52,000	86,000	107,000	186,000
At Gold Ray Dam	2,053	50,000	84,000	105,000	180,000
Below Indian Creek	1,200[2]	28,500	45,000	60,000	132,000
Above Indian Creek	1,200[2]	28,000	44,000	59,000	128,000
Wagner Creek					
At Mouth	23.8	776	1,634	2,146	3,797
Ward Creek					
At Mouth	35.2	712	1,782	2,466	4,762

[1]Data Not Available [2]Approximate Drainage Area

Roughness values (Manning's "n") for each stream were determined on the basis of field inspection, color photographs of the streams at the time of inspection, and photogrammetric interpretation (Reference 7). For those cross sections extending into areas with numerous structures, the presence of structures was reflected by higher "n" values rather than attempting to model the existence of the structure in the cross section. As a consequence, "n" values ranged from 0.030 in some of the channels to 1.000 in some of the overbank areas where there was extensive development. On Rogue River, all cross sections, "n" values, and reach lengths were supplied by the U.S. Geological Survey (Reference 5).

Starting water-surface elevations on Rogue River were established by assuming critical flow at the Savage Rapids Dam, located on the Jackson-Josephine County limits.

Starting water-surface elevations on tributaries of Rogue River (Bear Creek, Evans Creek, Foots Creek, and Little Butte Creek) were taken from the analysis of Rogue River. Likewise, starting water-surface elevations on the tributaries of Bear Creek (Coleman Creek, Crooked Creek, Griffin Creek, Larson Creek, Lazy Creek, Lone Pine Creek, Unnamed Tributary to Larson Creek, and Wagner Creek) were then taken from the analysis of Bear Creek. The starting water-surface elevation on Pleasant Creek was taken from the analysis of Evans Creek. Starting water-surface elevations on Daisy Creek, Ashland Creek, and Clay Creek were based on an assumed critical depth upstream from the supercritical analyses done on the three creeks.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1).

For Lone Pine Creek, the Crater Lake Highway acted as the downstream control, and critical flow over the highway was assumed for those flows which would not pass through the existing culvert. For Little Butte Creek and the upper portions of Evans Creek, the first station in the channel was extended 2000 feet downstream. Critical flow was assumed at this point and the water-surface profile was worked back up to the study area.

Some of the smaller streams were found to contain supercritical flow; therefore, the use of the HEC-2 program (Reference 6) was confined to an analysis of the natural channel without the existing bridges. Corrections for the existence of the bridges or culverts were then made on the basis of separate wider flow calculations for each such structure. This method was used only where super-critical flow was present as determined by the HEC-2 program (Reference 6).

On Applegate River, approximate flood information was taken from a U.S. Soil Conservation Service Type 10 Flood Insurance Study (Reference 8).

Approximate flooding affecting some portions of Jackson County were taken from the Flood Hazard Boundary Map (Reference 9).

Approximate flooding was also determined by the use of historical records, field observations, and aerial photogrammetric interpretation (Reference 7).

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the Flood Profiles (Exhibit 1) are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

Ashland and Clay Creeks were found to contain supercritical flow; therefore, the use of the HEC-2 program (Reference 6) was confined to an analysis of the natural channel without the existing bridges. Discharges through each bridge/culvert were calculated by manual methods and subtracted from the total discharge at that point. This reduced discharge was then modeled so as to flow across the top of the roadway. Having passed over the bridge/culvert, the discharge was restored to its original quantity, flowing in the natural channel. For Clay Creek, the total discharge was relatively small and the capacity of many of the culverts was almost insignificant. Instead of subtracting the discharge through each culvert, the channel was modeled so as to allow for this discharge.

Approximate elevations for Hamilton Creek were determined by field investigation (Reference 33).

3.3 Vertical Datum

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 in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the finalization of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

This report has been updated to countywide format in association with a partial countywide map modernization of the FIRM. Flood elevations shown in this FIS report and on the FIRM for panels included in the map modernization are referenced to NAVD88. Specific vertical datum conversion values used for the map modernization are discussed in Section 10.4 of this FIS. On panels not included as part of the map modernization flood elevations remain referenced to NGVD29. It is important to note that adjacent counties may be referenced to NGVD29. This may result in differences in Base Flood Elevations (BFEs) across the county boundaries.

For more information on NAVD88, see the FEMA publication entitled *Converting the National Flood Insurance Program to the North American Vertical Datum of 1988* (FEMA, June 1992), or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, 1315 East-West Highway, Silver Spring, Maryland 20910-3282 (Internet address http://www.ngs.noaa.gov).

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 Technical Support

Data Notebook associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages state and local governments to adopt sound floodplain management programs. Therefore, each FIS provides 1-percent-annual-chance flood elevations and delineations of the 1- and 0.2-percent-annual-chance floodplain boundaries and 1-percent-annual-chance floodway to assist communities in developing floodplain management measures. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data Table and Summary of Stillwater Elevations Table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:4,800, with contour intervals of 3 and 5 feet (Reference 10), and developed photogrammetrically, using aerial photographs at a scale of 1:12,000 (Reference 7).

Approximate boundaries for Applegate River were taken from a U.S. Soil Conservation Service Type 10 Flood Insurance Study (Reference 8).

Approximate flood boundaries in some portions of the study area were taken from the Flood Hazard Boundary Map (Reference 9).

The study contractor has determined that some areas shown on the Flood Hazard Boundary Map (Reference 9) are areas of minimal flooding; therefore, they were not delineated on the maps.

Approximate boundaries were also determined by the use of historical records, field observations, and aerial photogrammetric interpretation (Reference 7).

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, and AO); and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- 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.

For the streams studied by approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM (Exhibit 2).

Approximate flood boundaries for Hamilton Creek were determined by field investigation and delineated on topographic work maps

4.2 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 this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodway presented in this FIS report and on the FIRM was 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. The results of the floodway computations have been tabulated at selected cross sections (Table 5). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

Floodways were computed for Ashland Creek and Clay Creek using criteria based on energy grade lines. A maximum surcharge of 1.0 foot was allowed in the energy grade.

Floodways for Lazy, Larson, Crooked, and Lone Pine Creeks, and Unnamed Tributary to Larson Creek are contained in the existing channels.

Because of their narrow width and/or steep streambed, Coleman, Daisy, and Wagner Creeks were studied without floodway determination.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the WSEL of the 1-percent-annual-chance flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

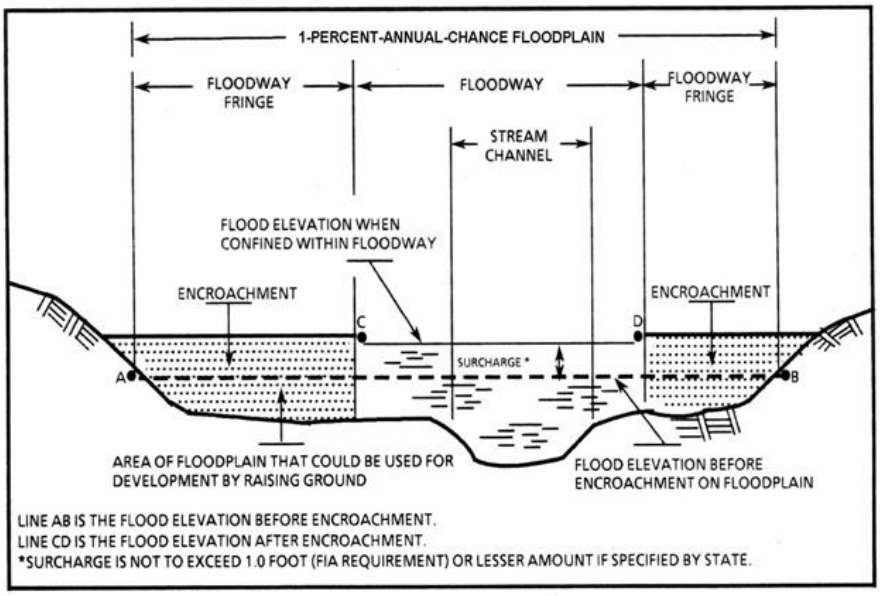


Figure 1: Floodway Schematic

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (Feet NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (Feet)	SECTION AREA (Square Feet)	MEAN VELOCITY (Feet / Second)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	15,977	262	1,420	8.4	1,261.3	1,261.3	1,261.8	0.5
B	18,060	605	3,222	3.7	1,268.2	1,268.2	1,269.1	0.9
C	19,479	126	824	14.4	1,269.4	1,269.4	1,269.4	0.0
D	20,923	129	1,505	7.9	1,278.6	1,278.6	1,278.8	0.2
E	22,721	99	1,168	10.2	1,284.8	1,284.8	1,285.6	0.8
F	25,234	91	1,202	9.9	1,293.1	1,293.1	1,293.9	0.8
G	28,082	123	1,566	7.6	1,304.8	1,304.8	1,304.9	0.1
H	30,691	139	1,419	8.4	1,318.2	1,318.2	1,319.2	1.0
I	33,256	123	1,071	11.1	1,329.8	1,329.8	1,330.3	0.5
J	34,201	200	1,245	9.6	1,336.8	1,336.8	1,337.1	0.2
K	36,141	133	1,401	8.5	1,346.6	1,346.6	1,347.3	0.7
L	38,691	125	1,006	11.8	1,356.5	1,356.5	1,356.7	0.2
M	39,478	118	1,253	9.5	1,361.9	1,361.9	1,362.6	0.7
N	40,313	105	1,265	9.4	1,364.5	1,364.5	1,365.4	0.9
O	42,697	97	1,144	10.4	1,375.3	1,375.3	1,376.0	0.6
P	46,607	420	1,951	6.1	1,393.8	1,393.8	1,394.8	1.0
Q	48,989	139	1,244	9.6	1,404.5	1404.5	1,405.3	0.8
R	50,345	365	1,331	8.9	1,412.6	1,412.6	1,413.2	0.6
S	51,874	168	1,485	8.0	1,419.9	1,419.9	1,420.8	1.0
T	55,685	128	1,352	8.8	1,436.5	1,436.5	1,437.3	0.8
U	57,982	131	1,190	9.3	1,450.7	1,450.7	1,451.2	0.5

[1]Distance in feet above confluence with Rogue River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, OREGON

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: LITTLE BUTTE CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (Feet NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (Feet)	SECTION AREA (Square Feet)	MEAN VELOCITY (Feet / Second)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	59,747	549	1,516	7.3	1,457.2	1,457.2	1,458.0	0.8
W	61,951	700	1,707	6.5	1,469.9	1,469.9	1,470.1	0.2
X	62,657	499	1,066	10.4	1,473.5	1,473.5	1,473.7	0.1

[1]Distance in feet above confluence with Rogue River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, OREGON

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: LITTLE BUTTE CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (Feet NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (Feet)	SECTION AREA (Square Feet)	MEAN VELOCITY (Feet / Second)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CB	26,430	1,281	15,944	5.0	1,195.1	1,195.1	1,195.8	0.7
CC	27,420	1,042	8,955	8.9	1,195.3	1,195.3	1,196.1	0.8
CD	28,990	1,100	8,877	9.0	1,199.7	1,199.7	1,199.8	0.1
CE	29,570	1,605	15,571	4.6	1,201.6	1,201.6	1,202.1	0.5
CF	31,421	1,104	10,347	6.9	1,201.6	1,201.5	1,202.5	1.0
CG	33,110	1,604	9,199	7.8	1,204.6	1,204.6	1,205.1	0.5
CH	35,591	1,230	7,314	6.8	1,210.6	1,210.6	1,211.0	0.4
CI	36,907	1,678	12,404	4.0	1,213.5	1,213.5	1,214.5	1.0
CJ	39,861	730	5,117	9.7	1,219.8	1,219.8	1,220.2	0.5
CK	42,189	680	6,491	7.6	1,226.8	1,226.8	1,227.6	0.8
CL	44,683	533	4,926	10.0	1,231.7	1,231.7	1,232.7	1.0
CM	47,622	362	4,100	12.1	1,240.0	1,240.0	1,240.4	0.4
CN	50,199	339	4,411	11.2	1,246.1	1,246.1	1,247.1	1.0
CO	52,222	288	4,218	11.7	1,250.9	1,250.9	1,251.3	0.3
CP	55,299	313	4,748	10.4	1,257.1	1,257.1	1,257.8	0.7
CQ	57,090	330	3,751	13.2	1,260.1	1,260.1	1,260.4	0.3
CR	59,344	242	3,130	15.8	1,267.1	1,267.1	1,267.2	0.1
CS	62,866	2,270	8,454	5.9	1,277.6	1,277.6	1,278.3	0.7
CT	64,835	1,284	6,605	7.5	1,283.7	1,283.7	1,284.2	0.5
CU	69,783	950	6,516	7.6	1,295.2	1,295.2	1,295.3	0.1
CV	72,917	1,025	7,071	6.6	1,303.5	1,303.5	1,304.5	1.0

[1]Feet above Gold Ray Dam

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, OREGON

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: ROGUE RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (Feet NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (Feet)	SECTION AREA (Square Feet)	MEAN VELOCITY (Feet / Second)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CW	74,877	521	4,385	10.7	1,307.8	1,307.8	1,308.6	0.8
CX	77,913	700	6,386	7.3	1,315.9	1,315.9	1,316.7	0.8
CY	80,316	2,200	9,170	5.1	1,320.7	1,320.7	1,321.5	0.8
CZ	82,378	1,984	6,113	7.7	1,325.9	1,325.9	1,326.0	0.1
DA	85,969	558	4,614	10.1	1,336.9	1,336.9	1,337.6	0.7
DB	88,316	921	5,154	9.1	1,343.2	1,343.2	1,343.2	0.0
DC	89,537	982	5,362	8.7	1,346.3	1,346.3	1346.9	0.6
DD	94,027	940	4,132	11.3	1,356.8	1,356.8	1,357.0	0.2
DE	96,433	362	3,695	12.7	1,362.8	1,362.8	1,363.6	0.7
DF	97,827	541	5,814	8.0	1,369.3	1,369.3	1,369.6	0.4
DG	99,913	457	4,365	10.7	1,374.4	1,374.4	1,374.6	0.2
DH	102,651	430	4,717	9.9	1,381.7	1,381.7	1,382.0	0.4
DI	104,351	309	3,232	14.5	1,385.8	1,385.8	1386.0	0.2
DJ	108,702	194	3,270	14.3	1,398.2	1,398.2	1,398.2	0.0
DK	110,723	211	3,543	13.2	1,401.9	1,401.9	1,402.3	0.3
DL	113,835	232	3,630	12.9	1,407.3	1,407.3	1,407.5	0.2
DM	116,061	274	4,274	10.9	1,413.6	1,413.6	1,414.4	0.8
DN	119,401	310	3,754	12.5	1,421.1	1,421.1	1,421.4	0.3
DO	122,805	236	4,086	10.1	1,430.8	1,430.8	1,431.6	0.8
DP	125,877	201	3,145	13.1	1,434.9	1,434.9	1,435.6	0.7
DQ	128,014	212	2,671	15.4	1,439.4	1,439.4	1,440.2	0.8

[1]Feet above Gold Ray Dam

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, OREGON

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: ROGUE RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (Feet NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (Feet)	SECTION AREA (Square Feet)	MEAN VELOCITY (Feet / Second)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
DR	130,800	273	3,292	12.5	1,450.0	1,450.0	1,450.0	0.0
DS	132,552	274	3,591	11.4	1,454.4	1,454.4	1,454.5	0.1
DT	135,340	267	3,282	12.5	1,459.7	1,459.7	1,459.9	0.1
DU	137,522	208	2,524	16.3	1,465.0	1,465.0	1,465.3	0.3
DV	140,254	180	2,043	16.5	1,471.7	1,471.7	1,472.1	0.4
DW	143,088	247	2,699	12.5	1,482.5	1,482.5	1,482.5	0.1
DX	145,587	380	4,229	10.0	1,493.5	1,493.5	1,493.8	0.3
DY	148,687	340	3,465	9.7	1,500.7	1,500.7	1,500.8	0.1
DZ	151,015	260	2,375	14.2	1,507.0	1,507.0	1,507.0	0.1
EA	153,523	379	3,581	9.4	1,522.4	1,522.4	1,523.0	0.6
EB	154,825	580	4,628	7.3	1,529.7	1,529.7	1,529.7	0.0
EC	158,581	195	1,711	12.6	1,538.8	1,538.9	1,538.9	0.0
ED	160,496	202	1,345	10.4	1,542.6	1,542.6	1,543.3	0.8
EE	163,423	318	4,760	2.9	1,564.3	1,564.3	1,564.3	0.0
EF	165,453	304	4,245	3.3	1,564.6	1,564.6	1,564.6	0.0

[1]Feet above Gold Ray Dam

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, OREGON

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: ROGUE RIVER

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or base flood depths are shown within this zone.

Zone AE

Zone AE is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance risk zone that corresponds to the areas of 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance risk zone that corresponds to the areas of 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot base flood depths derived from the detailed hydraulic analyses are shown within this zone.

Zone X

Zone X is the flood insurance risk zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by levees. No BFEs or base flood depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual-chance floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

A Flood Hazard Boundary Map was previously published for the unincorporated areas of Jackson County (Reference 9). This Flood Insurance Study is more detailed and, thus, supersedes that map.

Flood Insurance Studies for the incorporated areas of Jackson County, Oregon - the Cities of Ashland (Reference 11), Central Point (Reference 12), Eagle Point (Reference 13), Gold Hill (Reference 14), Jacksonville (Reference 15), Medford (Reference 16), Phoenix (Reference 17), Rogue River (Reference 18), Shady Cove (Reference 19), and Talent (Reference 20) - are in agreement with this Flood Insurance Study.

Flood Insurance Studies for the adjacent Siskiyou County, California (Reference 21), and Douglas County, Oregon (Reference 22) are also in agreement with this Flood Insurance Study.

In December 1965, the U.S. Army Corps of Engineers published a report (Reference 3) which contained aerial photographs of Rogue River and some of its tributaries. On the photographs were marked the extent of the 1861 and 1964 floods. This report was especially helpful in determining the extent of flooding at the mouth of the tributaries of Rogue River.

The U.S. Geological Survey report on flooding on the Rogue River (Reference 5) was the basis of the work on Rogue River presented in this study. The findings in the U.S. Geological Survey report could not be used directly. In their report, the U.S. Geological Survey did not attempt to determine levels for the major recurrence intervals, and, in their estimates of the adjusted flood levels, they included the potential impact of flood control reservoirs on both Rogue River and Elk Creek.

The U.S. Geological Survey report on Applegate River (Reference 23) was of limited value because it did not contain estimates of the 100-percent-annual-chance flood.

The U.S. Soil Conservation Service Type 10 Flood Insurance Study on flooding along Applegate River (Reference 8) did deal with the 1-percent-annual-chance flood, and the U.S. Soil Conservation Service report was the sole basis for the mapping presented as part of this Flood Insurance Study.

City of Ashland

Two reports relating to flooding and drainage problems in the Ashland area have been prepared (Reference 36 and 74).

City of Jacksonville

The only report relating to flooding and drainage problems in the Jacksonville area is Preliminary Storm Drainage Study for Jackson County, Oregon (Reference 36).

City of Medford

Other reports relating to flooding and drainage problems in the Medford area are Preliminary Storm Drainage Study for Jackson County, Oregon; Bear Creek Valley Drainage Investigation Report; and Revised Report for Storm Drainage in Three Areas, 1966 Storm Sewer Program (References 36,53, and 54 respectively).

City of Phoenix

A report relating to flooding and drainage problems in the Phoenix area is the Preliminary Storm Drainage Study for Jackson County, Oregon (Reference 36).

This FIS report either supersedes or is compatible with all previous studies on streams studied in this report and should be considered authoritative for purposes of the NFIP.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Flood Insurance and Mitigation Division, FEMA Region X, Federal Regional Center, 130 228th Street Southwest, Bothell, Washington, 98021-9796.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISION DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE(S)
City of Ashland	June 7, 1974	April 11, 1975	June 1, 1981	None
City of Central Point	June 21, 1974	January 2, 1976	September 30, 1980	January 19, 1982
City of Eagle Point	October 18, 1974	August 20, 1976	September 30, 1980	None
City of Gold Hill	January 9, 1974	January 2, 1976	September 17, 1980	None
Jackson County (Unincorporated Areas)	April 11, 1978	N/A	April 1, 1982	September 27, 1991 September 15, 1993 May 15, 2002
City of Jacksonville	June 21, 1974	February 20, 1976	December 4, 1979	None
City of Medford	June 21, 1974	March 12, 1976	April 15, 1981	February 23, 1982
City of Phoenix	June 21, 1974	January 16, 1976	May 3, 1982	None
City of Rogue River	May 31, 1974	January 9, 1976	January 2, 1981	None
City of Shady Cove	August 23, 1974	December 26, 1975	September 30, 1980	None
City of Talent	May 31, 1974	June 27, 1975	February 1, 1980	January 19, 1982 May 15, 2002 April 16, 2004

TABLE 6	FEDERAL EMERGENCY MANAGEMENT AGENCY JACKSON COUNTY, OR AND INCORPORATED AREAS	COMMUNITY MAP HISTORY

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10.0 REVISION DESCRIPTIONS

This section has been added to provide information regarding significant revisions made since the original FIS reports for the individual communities were printed. Future revisions may be made that do not result in the republishing of the FIS report. To assure that users are aware of all revisions it is advisable to contact the repository of flood hazard data located at the Jackson County Department of Planning and Development, 10 South Oakdale, Room 100, Medford, Oregon 97501.

10.1 First Revision

The purpose of the September 20, 1990 revision was to add floodplain information for the Applegate River that affects the unincorporated areas of Jackson County. The Applegate River, which flows through both Jackson and Josephine Counties, was studied by detailed methods for the reach previously studied by approximate methods.

The hydrologic and hydraulic analyses were performed by Otak, Inc., for the Federal Emergency Management Agency (FEMA) under Contract No. EMW-89-C-2847. This work was completed in December 1989.

The reach to be studied was identified at a meeting attended by representatives of Jackson County and FEMA on May 25, 1988.

Results of the hydrologic analyses performed by Otak, Inc. were coordinated with U.S. Army Corps of Engineers (COE), the U.S. Geological Survey (USGS), the Soil Conservation Service (SCS), the Oregon Department of Land Conservation and Development, and Jackson County.

On September 20, 1990, the results of this study were reviewed at the final community consultation and coordination officer meeting attended by representatives of Jackson County, FEMA, and the study contractor. This study was acceptable to the community.

The reach studied by detailed methods extended from the Josephine-Jackson County boundary to the new McKee Bridge crossing, upstream of the Town of McKee Bridge, a distance of approximately 20.2 miles. The upstream reach from the new McKee Bridge to the tailwater of Applegate Dam, a distance of approximately 7.2 miles, was also restudied using approximate methods. The Applegate Dam was part of a flood control project which became operational in 1981.

The Applegate River's headwaters are in northern California. Hydrologic analyses for the Applegate River were carried out in 1989 using the USGS data for a 42-year period of unregulated flow (i.e., 1939-1980) at the gaging stations near Applegate (No. 14366000) and Copper (No. 14362000) and the 18-year flow record (i.e., 1938-1956) for a discontinued station near Wilderville (No. 14369500) located in Josephine County. The hydrologic analyses also used the regulated flow curves for the two Jackson County gaging stations provided by the COE, and Applegate River flows published as part of the Josephine County Flood Insurance Study (Reference 24). The results of this analysis are tabulated in Table 3.

Cross sections for backwater analyses of the stream studied were field surveyed. Cross section elevations outside of the channel were taken from the 1971 1"=200' topographic maps with a contour interval of 5 feet (Reference 8). The 1-percent-annual-chance flood boundaries were delineated using the same topographic maps mentioned above.

The flood profiles were computed through use of the COE HEC-2 step-backwater computer program (Reference 25). The limited detail study for both Josephine County and Jackson County began at the upstream end of the existing detailed study for the Applegate River near Murphy. The starting water-surface elevation was taken from the last cross section in the Josephine County study.

Manning's "n" values were chosen using engineering judgment based upon site inspections and aerial photographs. The bottom of the river consists of large cobbles and the overbanks vary from open cultivated fields and pasture to brush, scattered trees and dense trees. The channel "n" values varied from 0.030 to 0.043. The overbank "n" values varied from 0.04 for open fields to 0.09 for areas with dense forest.

The average fall of the Applegate River throughout the limited detail study area was approximately 22 feet per mile. With surveyed cross sections taken at an average

interval of one every 2,300 feet, many critical depth statements were encountered during the initial hydraulic simulations. This problem was solved by using the interpolated cross-sections option of the HEC-2 computer program (Reference 25). Approximately 130 cross sections were automatically inserted by the hydraulic model throughout this reach of the Applegate River. Overall, the 1-percent-annual-chance floodplain width on the limited detail study portion of the river varied from 150 feet to 2,500 feet.

The normal depth method was used to study the flooding of the reach upstream of the Town of McKee Bridge. Topographical data developed in the late 1970s by the SCS (Reference 8) were used for floodplain boundary delineation.

No floodway was computed for the Applegate River. The results of the flood hazard factor computations are tabulated in Table 4.

Data presented in this study are in agreement with the Flood Insurance Study being prepared for Josephine County.

This study is authoritative for the purposes of the National Flood Insurance Program; data presented herein either supersede or are compatible with all previous determinations.

10.2 Second Revision

This study was revised on September 15, 1993, to incorporate the Letter of Map Revision (LOMR) issued on October 5, 1992, for Jackson County, Oregon, to show the effects of improved hydraulic modeling along Bear Creek, from approximately 3,500 feet downstream of Valley View Road to approximately 1,150 feet upstream of Valley View Road (Cross Sections CT to CX). The basis for this LOMR was the data presented in the report entitled "Report for Letter of Map Revision of Bear Creek Flood Study, Jackson County, Oregon", prepared by URS Consultants, dated June 16, 1992, and on the topographic work map contained in the report entitled "Revised Flood Boundary and Floodway Map, Bear Creek, Jackson County, Oregon", also prepared by URS Consultants, undated.

As a result of the reanalysis, a portion of the 1-percent-annual-chance flood will overtop North Main Street (U.S. Highway 99) from north to south between Cross Sections BR and BT, and flow parallel to the highway along the south side. The 1-percent-annual-chance flood will then overtop North Main Street again (flowing from south to north) and return to the main channel of Bear Creek between Cross Sections BP and BR. A separate flood profile will be shown for portions of the 2-, 1-, and 0.2-percent-annual-chance floods which flow on the south side of North Main Street. The revised floodway, developed from two separate HEC-2 hydraulic computer models, will also be shown on both sides of North Main Street. A separate Floodway Data Table will be shown for the floodway on the south side of North Main Street, although the revised Flood Boundary and Floodway Map will show the floodway as combined between Cross Sections BQ and BS.

Modifications to the 1- and 0.2-percent-annual-chance floodplain and 1-percent-annual-chance floodway boundaries, and base (1-percent-annual-chance) flood elevations have been made along Bear Creek as a result of this LOMR and are shown on Flood Insurance Rate Map Panel 0528 and on Flood Boundary and Floodway Map Panel 0528. Modifications were also made to Flood Profile Panel 129P and the Floodway Data Table for Bear Creek. In addition, Flood Profile Panel 152P and a Floodway Data Table were created for the Bear Creek split flow channel.

10.3 Third Revision

This study was revised on May 15, 2002, to incorporate new floodplain data for Wagner Creek in Jackson County and Unincorporated Areas, Oregon.

The hydrologic and hydraulic analyses for this restudy were performed by Ogden Beeman & Associates, Inc., for the Federal Emergency Management Agency (FEMA), under Contract No. EMS-1999-CO-0068-T01, Project Order No. 361800. This work was completed in September 2000.

The study contractor did not attend any meetings. Marquess & Associates, Inc., of Medford, Oregon, was the subcontractor for the Wagner Creek restudy and surveyed 39 cross sections within the study reach including all culverts, bridges, roads, and structures. The study contractor acquired historical data for the restudy from the City of Talent, Jackson County, the Natural Resources Conservation Service (NRCS, formerly the Soils Conservation Service), FEMA, and FEMA archives.

This restudy includes the floodway and the 10-, 2-, 1-, and 0.2-percent-annual-chance flood profiles of the lower 22,937 foot reach of Wagner Creek in the City of Talent and Jackson County, Oregon. The reach extends from the confluence with Bear Creek approximately 4.3 miles upstream to the intersection of Wagner Creek Road and Ashland Mine Road.

The purpose of this restudy is to capture significant hydrologic and hydraulic aspects of the 1997 flooding. Wagner Creek suffered a large flooding event in January 1997. The stream's floodplain is relatively shallow, resulting in few damages. Those damages that did occur resulted from erosion. Except for the debris at some locations, and the eroded banks that caused one house to fall into the creek, it was hard to tell that there had been a flood on Wagner Creek. No culverts or bridges were washed out, despite inundation by swiftly moving waters.

The results of the restudy were reviewed at the final CCO meeting held on June 21, 2001. All problems raised at that meeting have been addressed in this restudy.

Hydrologic Analyses

The peak discharge values utilized in the study for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods are shown in Table 1, "Summary of Discharges". The discharges were taken from the existing study, based on U.S. Geological Survey (USGS) regression equations for basins less than 100 square miles (References 26 and 27).

In January 1997, a flood event inundated Southern Oregon. Throughout Jackson County, the gage flood flows and high water marks characterized the flood near or just below a 1-percent-annual-chance flood event (base flood). The 1997 flood flows for Wagner Creek were estimated utilizing eight high water marks obtained from FEMA personnel and local residents. Using hydraulic modeling, the 1997 flood peak discharge was estimated to be 1,500-1,800 cubic feet per second (cfs) at the mouth of Wagner Creek.

The peak discharge used in the original study for Wagner Creek was 2,146 cfs. In 1999, using updated hydrologic information, a new peak discharge was estimated at 3,309 cfs. Based on the information obtained in the 1997 base flood event, it was determined that the estimate used in the original study was more accurate than the 1999 estimate.

Hydraulic Analyses

To provide an estimate of the water surface elevations due to the 10-, 2-, 1-, and 0.2-percent-annual-chance flood events, a hydraulic analysis was performed. The resulting Flood Profiles are shown in Exhibit 1.

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. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. 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 in conjunction with the data shown on the FIRM.

Cross section locations for the model were chosen based on a site visit in January 2000, aerial photos taken in 1998 (Reference 28), and a topographic map (Reference 29). The floodplain boundaries were delineated based on digital topographic maps with a five-foot contour interval based on the 1998 aerial photography provided by Jackson County (Reference 29).

To accurately represent Wagner Creek with a hydraulic model, the Manning's "n" values were approximated as 0.065 for the channel and 0.075-0.080 for the overbanks. Wagner Creek is a very steep stream with high velocities and numerous meanders. The contraction and expansion coefficients within the model range from 0.2 to 0.6 and 0.4 to 0.8, respectively. The hydraulic analysis for Wagner Creek was completed using the standard step-backwater computer program, Hydrologic Engineering Center River Analysis System, Version 2.2.1 (HEC-RAS backwater model, Reference 30), to predict water surface elevations along the study reach.

The starting water surface elevations for flood profiles were based on normal depth with a slope of 0.01 and were computed based on a sub-critical flow regime. Due to the steep slope of the stream, critical flow was predicted at several cross sections throughout the study reach.

At the mouth of Wagner Creek, the floodway, 1-, and 0.2-percent-annual-chance floodplains were joined with the approximate floodplains of Bear Creek. The Bear Creek floodplain is shared with the Wagner Creek floodplain for several hundred feet upstream from the mouth of Wagner Creek. The mapping in this overlap area was based on the highest water surface elevation from either Wagner Creek or Bear Creek. The mapping shows the Bear Creek floodplain past the point of influence with Wagner Creek.

The floodway corresponding to the base flood was initially determined using a Method 5 encroachment analysis in the HEC-RAS backwater model, with a maximum water surface or energy gradeline rise of 1.0 foot. The Method 5 approach was then modified to ensure the water surface rise was less than 1.0 foot in all locations.

A revision to the published FIS for the City of Talent (Reference 31) is being published concurrently with this restudy. That revised study agrees with this restudy.

Marquess & Associates, Inc. provided a datum shift value of 3.44 feet to convert the North American Vertical Datum of 1988 (NAVD) hydraulic model into the National Geodetic Vertical Datum of 1929 (NGVD). All elevations are referenced to NGVD for this restudy. Elevation reference marks (ERMs) and their descriptions are shown on the maps. ERMs shown on the FIRM represent those used during the preparation of this and previous Flood Insurance Studies. The elevations associated with each ERM were obtained and/or developed during FIS production to establish vertical control for determination of flood elevations and floodplain boundaries shown on the FIRM. Users should be aware that these ERM elevations may have changed since the publication of this FIS. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

10.4 Fourth Revision

The fourth revision (May 3, 2011) includes two separate studies that were incorporated into the countywide Digital Flood Insurance Rate Map (DFIRM) conversion for Jackson County, Oregon. The first consisted of new detailed studies of Daisy, Elk, Griffin, Horn, Jackson, and Mingus Creeks within the City of Central Point, Oregon. The second consisted of the digital conversion of effective floodplain mapping throughout the County. The digital conversion included the redelineation of effective floodplain hazard areas using newly obtained topographic data within the Cities of Ashland, Central Point, Medford, Phoenix, Rogue River, and Shady Cove; as well as straight digital conversion, or capture, of flood hazards in areas without new topographic data. Both studies were performed by Northwest Hydraulic Consultants, Inc. (NHC) for FEMA.

Five Letters of Map Revision (LOMR) were also included as part of this digital conversion.

Central Point Detailed Studies

In 2002, NHC was retained by FEMA to perform detailed floodplain analyses on four creeks in the City of Central Point (Horn, Jackson, Mingus, and Daisy Creeks). In 2007, the original work order was expanded when NHC was contracted by both FEMA and the City to perform additional detailed floodplain analyses on Griffin and Elk Creeks. As part of the second work order, NHC was tasked with updating the original four creeks using terrain data newly obtained by the City in 2006.

Hydrologic Analysis

NHC conducted hydrologic analyses for the Horn, Jackson, Mingus, and Daisy Creeks (Reference 73), and later for Elk and Griffin Creeks (Reference 79). In both of these analyses flood frequency quantiles were estimated using regional regression equations developed by NHC. Table 8 summarizes the computed flood frequency quantiles for each study reach.

Table 7: Summary of Flood Frequency Quantiles for Study Reaches in Central Point, OR

Study Reach	**Discharge at Downstream End of Reach (cfs)**			
	10-percent-annual-chance	**2-percent-annual-chance**	**1-percent-annual-chance**	**0.2-percent-annual-chance**
Elk Creek	650	820	900	1,030
Griffin Creek	1,790	2,400	2,640	3,110
Griffin Mid-Reach	*1,707*	*2,299*	*2,522*	*2,969*
Daisy Creek	134	158	167	184
Horn Creek	231	308	336	390
Jackson Creek	1,489	2,000	2,191	2,573
Jackson Mid-Reach	*1,282*	*1,722*	*1,887*	*2,215*
Mingus Creek	120	147	158	176

Subsequent to the original hydrologic analyses mentioned above, mid-reach flood quantiles were computed on Jackson and Griffin Creeks to account for flow changes at the confluences with Horn and Daisy Creeks, respectively. These new flood quantiles were computed using the same regional regression equations, but using adjusted contributing drainage basin areas located just upstream of the tributary confluences. Estimated mid-reach flood quantiles are given in Table 8.

The NHC values shown in Table 8 for Griffin Creek supersede those in Table 4 for the study reach that was revised.

Hydraulic Analysis

The hydraulic analyses conducted in Central Point utilized the Army Corps of Engineers' 1-dimensional, steady-state backwater model, HEC-RAS (Reference 80). Hydraulic models were developed for each of the six, individual study reaches.

Terrain data used to construct cross-section geometry for the HEC-RAS models came from several sources. NHC conducted ground surveys to obtain channel and structures data for the four original studies (Horn, Jackson, Mingus, and Daisy Creeks), and the City of Central Point provided channel and structure survey data for Elk and Griffin Creeks. The City also provided NHC with citywide LiDAR terrain data and 2-ft contours coverage for the overbank areas. All elevations are referenced to the North American Vertical Datum of 1988 (NAVD88).

Manning's 'n' values were determined using engineering judgment and field evaluation. Channel conditions of streams in Central Point vary from densely vegetated to clear with cobble and gravel substrate, while overbank conditions range from open fields to dense development. Channel 'n' values ranged from 0.03 to 0.055, while overbank values ranged from 0.045 to 0.15.

The starting water surface elevations for Elk, Griffin, Jackson, and Mingus Creeks were based on normal depth. On Daisy and Horn Creeks, the starting water surface elevations were set to those computed by the Griffin and Jackson models, respectively, near the confluences for the 10-percent-annual-chance profile.

Flood Profiles for the 10-, 2-, 1-, and 0.2-percent-annual-chance flood events were computed for each study reach and are shown in Exhibit 1.

Floodway analyses were also conducted on each study reach. Results of this analysis are reported in Table 5 of this FIS, as well as shown in Exhibit 2.

The terrain in Central Point is relatively level, thus floodplains are often uncontained and sometimes merge between the different study reaches. As a result, a number of special flooding conditions were encountered and required additional consideration during mapping.

Sheet flow flooding on Horn Creek was mapped on several parcels immediately on the right bank between cross-sections Q and O (Zone AO), because extending the BFEs to the inundation limits would result in unrealistic flooding depths.

On Jackson Creek, between cross-sections AJ and AI, upstream of the Pine Street crossing, flooding extends into the left and right overbank, with minor overflow exiting the system to Griffin Creek to the east. Further downstream, minor overtopping of Grant Road to the west is expected in isolated locations, but is expected to be negligible, so it was mapped as Zone X (0.2-percent-annual-chance). Backwater from the crossing at Scenic Avenue results in more significant overtopping of Grant Road to the west, but normal flow calculations indicated that flooding would generally be minor (less than 1 ft), thus it was mapped as Zone X (0.2-percent-annual-chance).

A detailed study was conducted for Griffin Creek for the effective FIS (Reference 78) that extends upstream of the revised detailed study reach within the City of Central Point.

Floodplain and floodway boundaries, as well as cross-section labeling and flood profiles, for the revised study were merged with the effective unrevised study reach upstream.

Flooding over the extensive and densely developed floodplain along much of Griffin Creek is expected to be shallow (less than 1 ft), thus this area was designated as Zone X (0.2-percent-annual-chance), including areas between Beall Lane and Pine Street, downstream of Taylor Way, and between Highway 99 and Scenic Avenue..

Griffin Creek is expected to overtop Pine Street during the 1-percent-annual-chance flood. Flooding is primarily routed to the north and east where it combines with Daisy Creek flooding from the east. On the left (west) overbank of Griffin Creek, between cross-sections AC and Z, shallow flooding is expected, thus this area was designated as Zone X (0.2-percent-annual-chance).

At cross-section V, Griffin Creek enters a newly realigned portion of the channel on the southeastern edge of the Twin Creeks Development. Here, flow is contained within the channel until Griffin Creek reaches a railroad bridge and the Highway 99 culvert immediately downstream. The two structures cause significant backwater that result in overtopping of the left bank and escapement of flow toward the north. Eventually, this escaping flow combines with Jackson Creek to the north and west. Because a significant amount of flow is computed to escape for the 1-percent-annual-chance flood, approximately 1,200 cfs, a separate detailed floodplain and floodway analysis for this reach ("Jackson Creek Overbank"). Said analysis relied upon topography provide by the City which indicated that the majority of flow would be concentrated along the railroad embankment along eastern portion of the parcel; however, it does expand over much of the site for several hundred feet. This floodplain merges with flooding at the downstream most end of the Jackson Creek detailed study. Merging of the floodway occurs between cross-section A of the "Jackson Creek Overbank" reach and cross-sections D and E of Jackson Creek. The floodway between the two study reaches was connected using engineering judgment and topography.

Overtopping of Highway 99 is expected on Griffin Creek for the 1-percent-annual-chance flood. A negligible amount of flow is expected to leave the system here and follow Highway 99 to the northwest, but the majority was assumed to remain within the channel corridor. As such, the corridor along Highway 99 was designated Zone X (0.2-percent-annual-chance).

On Mingus Creek, upstream of the detailed study limit, shallow ponding expected upstream, was mapped as Zone X (0.2-percent-annual-chance). Overtopping of Highway 99 is expected for the 1-percent-annual-chance flood, and similar to Griffin Creek at Highway 99, a negligible amount of this flow is expected to escape and follow the highway corridor. Areas of shallow flooding in this area were estimated using City topography and designated Zone X (0.2-percent-annual-chance).

On Elk Creek, near cross-section H, overbank flooding occurs on both the left and right banks. Lateral flow is expected to occur on the left bank between cross-sections H and E.

Here, the significant flood hazard is expected remain isolated to residences immediately adjacent to the channel. Beyond the channel corridor, flooding is expected to enter the expansive and densely developed residential area to the west. This area was mapped as Zone X (0.2-percent-annual-chance).

Downstream on Elk Creek, overtopping of Glengrove Way (cross-section E) and Interstate 5 (cross-section C) is expected for the 1-percent-annual-chance flood. At both locations flow is uncontained on the left bank, but it was determined that the flood hazard would be negligible beyond the immediate channel corridor, i.e. Zone X. Furthermore, since the effective backwater control of the lower Elk system is controlled by the grade of Interstate 5, it was determined to end the floodway delineation at the upstream face of the crossing (cross-section C).

Digital Conversion and Redelineation

NHC performed redelineation of effective floodplain hazard areas using topographic data within the Cities of Ashland, Central Point, Medford, Phoenix, Rogue River, and Shady Cove. In addition, NHC digitized effective floodplain, i.e. "effective capture", in areas where topographic data was unavailable. As part of the digitization process minor modifications were made to floodplain boundaries to improve mapping accuracy and alignment based on comparison to recent aerial photography. NHC also included five LOMR studies as part of the DFIRM conversion. Given below are descriptions of the redelineation actions performed, as well as the LOMRs incorporated by NHC.

Vertical Datum Conversions

As part of this 4th revision, water surface elevations within Jackson County were converted from the National Geodetic Vertical Datum of 1929 (NGVD29) to the North American Vertical Datum of 1988 (NAVD88) using the multiple conversion factor method as described in Appendix B of FEMA's Guidelines and Specifications. Please note that any elevations associated with map panels not a part of this revision (dated April 1, 1982 and September 27, 1991) are yet referenced to NGVD 1929.

Although the revised study area may have met the criteria established for a single conversion factor, due to the large number of detailed study streams and complexity involved in determining a single conversion factor for a partial-countywide DFIRM, a decision was made to pursue the stream-by-stream method. Using NGS's VERTCON software, a conversion factor was computed at the upstream and downstream boundary of a study reach, as well as the approximate midpoint. The average of these three conversion factors was computed and used as the vertical datum offset for that study reach. Average conversion factors are summarized in Table 9. Adding the conversion factor to an elevation referenced to NGVD29 will convert the elevation to NAVD88.

Table 8: Vertical Datum Conversion

Study Reach	Communities	Average Conversion Factor (ft)
Applegate River	Unincorporated Jackson County	3.22
Ashland Creek	City of Ashland	3.47
Bear Creek	Unincorporated Jackson County City of Ashland City of Central Point City of Medford City of Phoenix	3.39
Clay Creek	City of Ashland	3.50
Coleman Creek	City of Phoenix	3.41
Crooked Creek	City of Medford	3.37
Daisy Creek	City of Jacksonville	3.34
Evans Creek	City of Rogue River	3.28
Foots Creek	Unincorporated Jackson County	3.28
Griffin Creek	Unincorporated Jackson County	3.27
Jackson Creek	City of Jacksonville	3.34
Larson Creek	City of Medford	3.35
Lazy Creek	City of Medford	3.38
Little Butte Creek	Unincorporated Jackson County City of Eagle Point	3.39
Lone Pine Creek	City of Medford	3.39
Pleasant Creek	Unincorporated Jackson County	3.38
Rogue River	Unincorporated Jackson County City of Shady Cove City of Rogue River	3.28
Wagner Creek	Unincorporated Jackson County City of Talent	3.36
Ward Creek	City of Rogue River	3.48

City of Ashland

In the City of Ashland, 2-foot contours developed by David C. Smith and Associates in 1998 were available to redelineate the boundaries of the 1- and 0.2-percent-annual-chance floodplains for the detailed study reaches of Bear, Ashland, and Clay Creeks.

Both Ashland and Clay Creeks are steep, entrenched channels in which the relatively small flood hazard areas are generally contained within the immediate channel corridors. As a result, at several locations along both study reaches the resolution of the topography was not able to adequately capture flood levels within the corridor. In these locations the effective mapping was captured.

On Bear Creek, approximately 2.4 miles were redelineated between cross-sections DE and DU. Between cross-sections DU and DZ, redelineation only occurred along the left bank as contours were not available on the right. Because the contour data indicated

significant narrowing of the floodplain and floodway width between cross-sections EB and EG, the effective mapping was captured.

City of Central Point

Contour data in the City of Central Point were developed by 3Di West Geoterra based on aerial photographs taken in August 2006. These data were used in the detailed studies conducted within the City, as well as to redelineate the 1- and 0.2-percent-annual-chance floodplains for Bear Creek from approximately 900 downstream of cross-section H to cross-section V, or approximately 4.1 miles.

City of Medford

David C. Smith and Associates developed the half-meter contour dataset for the City of Medford from aerial photography taken in March 1998, with supplemental flights in 2001. These data were used to redelineate the 1- and 0.2-percent-annual-chance floodplains on Bear Creek, as well as Larson Creek and its tributary. The entire Bear Creek study reach within the City, from cross-section U to BK, or approximately 7.2 miles was redelineated with the exception of 1.4 miles mid-reach between cross-sections AQ and AZ. Here, the contour interval is only 5-foot, thus the effective mapping was captured in this sub-reach. On Larson Creek, approximately 2.1 miles of the effective detailed was redelineated. During the redelineation of Larson Creek is was noted that the uppermost end of the study reach was rerouted due to development and combined with what was previously referred to as the Unnamed Tributary to Larson Creek. As a result, the effective mapping and flood profiles for the Unnamed Tributary were merged with the mainstem of Larson Creek.

Redelineation of Crooked Creek was not conducted because the contour data was found to be inadequate in effectively determining flood boundaries along the reach. As a result, the effective floodplain mapping was captured.

On Lone Pine and Lazy Creeks, it was originally intended that studies being conducted by the U.S. Army Corps of Engineers, would be integrated into the Countywide DFIRM. However, scheduling issues prevented these studies from being included and it was decided that they would be incorporated as LOMRs once completed. Rather than redelineate these study reaches it was decided the effective floodplain mapping would be used.

City of Phoenix

The City of Phoenix provided NHC with 2-foot contour data developed in 1997. This data was used to redelineate the boundaries of the 1- and 0.2-percent-annual-chance floodplains for Bear and Coleman Creeks. On Bear Creek the redelineation was conducted between cross-sections BM and BY, or approximately 1.84 miles. The lower 0.4 miles of Coleman Creek, between its confluence with Bear Creek and crossing with Pacific Highway, were redelineated.

City of Shady Cove

Contour data in the City of Shady Cove were developed by 3Di West Geoterra based on aerial photographs taken in 1997. These data were used to redelineate the 1- and 0.2-percent-annual-chance floodplains on the Rogue River from cross-section EB to EL, or approximately 3.1 miles.

City of Rogue River

Western Air Maps, Inc used photogrammetry to develop a 2-foot contour dataset for the City of Rogue River from aerial photography taken in March 2001. These data were used to redelineate the 1- and 0.2-percent-annual-chance floodplains on the Rouge River, as well as portions of Evans and Ward Creeks.

On the Rogue River the redelineation included approximately 1.2 miles between cross-sections U and AA. The lower 2 miles of Evans Creek, downstream of cross-section G, were redelineated; although backwater effects from the Rouge River influence approximately the lowermost 1.3 miles of this reach. Although the entire 0.5 mile Ward Creek study reach is within the contour coverage, only the lowermost 1,000 feet of the reach was redelineated. The upper portion of the reach is deeply entrenched and the contour data indicated a significantly narrower floodplain and floodway. As a result the effective mapping was captured in this reach.

Letters of Map Revision

LOMR 06-10-B002P affects Jackson Creek approximately 90 feet downstream of the bridge over the Phoenix Canal to just upstream of Blackstone alley. For this LOMR a hydraulic analysis was performed to incorporate updated hydrologic and topographic data along Jackson Creek. It was issued on September 19, 2006 and has an effective date of January 18, 2007.

LOMR 96-10-127P affects Lone Pine Creek 150 feet downstream of Crater Lake Avenue to approximately 520 feet upstream of Crater Lake Avenue. For this LOMR a revised hydraulic analysis based on updated topographic information. This LOMR was requested by Fred Phillips and the study was carried out by Hardey Engineering and Associates. The LOMR was submitted on March 7, 1996 and has an effective date of August 2, 1996.

LOMR 97-10-038P affects Larson Creek in the vicinity of North Phoenix Road to approximately 300 feet upstream of North Phoenix Road. A revised hydraulic analysis based on updated hydrologic and topographic information was carried out for this LOMR by Michael P Thornton of Thornton Engineering. The LOMR was submitted on December 20, 1996 and has an effective date is effective date of January 9, 1997.

LOMR 98-10-134P is based on revised topographic information including relocation of a channel along Crooked Creek from approximately 1000 feet downstream of Kings Highway to Kings Highway. The requestor was Spring View Estates and the study was

conducted by Construction Engineering Consultants Inc. The LOMR was submitted on January 8, 1998 and has an effective date of June 17, 1998.

LOMR 92-10-014P affects the Eastern side of Bear Creek upstream of Fern Valley Road within Roland Dow property boundaries. The changes are the result of excavation of existing fill from the effective floodway. Hydraulic analysis carried out with new topographic data (HEC-2 Model) by Timothy J Bossard of T.J. Bossard and Associates. The LOMR was submitted on August 7, 1992 and the effective date June 17, 1998.

Table 9: Revised Study Descriptions

Reach Name	Reach Location	Approximate Reach Miles
Applegate River	Jackson County Line to McKee Bridge	20.2
Ashland Creek	Mouth to Lithia Park Trail	1.9
Bear Creek	Bear Creek near Valley View Road	0.9
	City of Ashland	2.4
	City of Central Point	4.1
	City of Medford	5.8
	City of Phoenix	1.8
Clay Creek	Mouth to upstream of Siskiyou Boulevard	1.5
Clayton Creek	Mouth to approximately 0.5 miles upstream	0.5
Coleman Creek	Mouth to Pacific Highway	0.4
Crooked Creek	At Kings Highway	0.2
Daisy Creek	Mouth to Beall Lane	0.8
Elk Creek	Mouth to Beall Lane	0.6
Evans Creek	Mouth to Cross-Section G	2.0
Griffin Creek	Mouth to Beall Lane	2.8
Horn Creek	Mouth to Grant Avenue	0.3
Jackson Creek	Scenic Avenue to Beall Lane	2.1
	Phoenix Canal to Blackstone Alley	0.3
Larson Creek	Mouth to upstream of North Phoenix Road	2.1
Lone Pine Creek	At Crater Lake Avenue	0.1
Mingus Creek	Pine Street to Beall Lane	1.2
Rogue River	Jackson County Line to Cross-Section S	2.1
	City of Shady Cove	3.1
	City of Rogue River	1.2
Wagner Creek	Mouth to intersection of Wagner Creek and Ashland Mine Road	4.3
Ward Creek	Mouth to Cross-Section F	0.5

10.5 Fifth Revision

The Fifth Revision (Date to be determined) includes a Physical Map Revision (PMR) in the City of Ashland and the Unincorporated Areas of Jackson County, Oregon. LOMR 13-10-1570P was also incorporated as part of this revision.

a. Authority and Acknowledgments

The revision was performed by Strategic Alliance for Risk Reduction (STARR) under contract HSFEHQ-09-D-0370.

b. Coordination

The results of the Jackson County-Neil Creek PMR were reviewed at a meeting held on August 5, 2015 and attended by representatives of FEMA, the State of Oregon, Jackson County, and STARR. All concerns and problems raised at that meeting were addressed.

c. Scope of Study

The Jackson County-Neil Creek PMR incorporates revised hydraulic analysis based on new hydrologic and topographic data along Clayton and Neil Creeks the City of Ashland and the Unincorporated Areas of Jackson County, Oregon. New modeling and mapping of approximately 6.7 miles of the two creeks was completed during this project. Clayton Creek was restudied from approximately 500 feet downstream of Interstate 5 to its confluence with Neil Creek. Neil Creek was restudied from about 1,000 feet downstream of Interstate 5 to its confluence with Bear Creek. A split flow area located approximately 3,000 feet south of the confluence of Neil and Clayton Creeks was also restudied and redelineated for this revision.

d. Hydraulic and Hydrologic Analyses

STARR performed hydraulic analyses with a modeling approach that included structures for the project area. The modeling included the 1-percent-annual-chance event and floodplain boundaries were delineated for all areas where hydrologic and hydraulic modeling was performed. A state-wide regression equation provided by the Oregon Department of Water Resources was used to estimate the 1-percent-annual-chance discharge for Neil and Clayton Creeks.

Neil Creek was studied for a length of approximately 5.4 miles and Clayton Creek was studied for a length of approximately 1.3 miles. HEC-RAS Version 4.1 was used to complete this work. The Limits of Study were consistent with the effective floodplain boundary. A 2009 Bare Earth DEM was used for the HEC-RAS modeling and mapping. A split flow occurs in the HEC-RAS model with flow leaving Clayton Creek toward Neil Creek estimated at 48 cfs. The split flow, represented in the model as a lateral weir, was modeled and mapped for this revision. The Summary of Discharges table shows the discharges used in the hydraulic model. Normal depth was used to estimate the starting water surface

elevations at the downstream boundary of each stream. A Manning's "n" value of 0.045 for the channel and an overbank value of 0.09 was used in the modeling.

Summary of Discharges

Flooding Source	1%-Annual-Chance Discharge (cfs)
Clayton Creek	236
Neil Creek - Upstream of confluence with Split Flow	1,276
Neil Creek - Downstream of confluence with Split Flow	1,324
Neil Creek- Downstream of confluence with Clayton Creek	1,512
Split Flow	48

Topographic data derived from Light Detection and Ranging (LiDAR) imaging was obtained from the Oregon Department of Geology and Mineral Industries, and was used to delineate the revised floodplain boundary.

Figures 2 and 3 present important considerations for using the information contained in this FIS report and the FIRM and is provided in response to changes in format and content.

No flood profiles, floodways, or floodway data tables were produced or revised for this revision.

e. Letter of Map Revision

LOMR 13-10-1570P affects a portion of Hamilton Creek within the City of Ashland. For this LOMR, a revised hydraulic analysis based on updated hydrologic and topographic data along Hamilton Creek from approximately 80 feet downstream of Ashland Street to approximately 80 feet upstream of Mistletoe Road. This LOMR was issued on October 31, 2013, and has an effective date of March 18, 2014.

Figure 2: Notes to Users

NOTES TO USERS

For information and questions about this map, 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 Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. 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 Map Service Center website or by calling the FEMA Map Information 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 Map Service Center at the number listed above.

For community and countywide map dates, refer to Table 6 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.

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.

BASE FLOOD ELEVATIONS: 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 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.

FLOODWAY INFORMATION: 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.

FLOOD CONTROL STRUCTURE INFORMATION: Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 4.3 "Non-Levee Flood Protection Measures" of this FIS Report for information on flood control structures for this jurisdiction.

PROJECTION INFORMATION: The projection used in the preparation of the map was Universal Transverse Mercator. The horizontal datum was North American Datum 1983. 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.

ELEVATION DATUM: Flood elevations on the FIRM 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 the National Geodetic Vertical Datum of 1929 and North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/, or contact the National Geodetic Survey at the following address:

Figure 2: Notes to Users, con't

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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 31 of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was provided by U.S. Census Bureau TIGER files, dated 2014 and digital data provided by Jackson County GIS, dated 2015. For information about base maps, refer to Section 6.2 "Base Map" in this FIS Report.

The map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map.

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

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within Jackson County, Oregon and Incorporated Areas, 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 6 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 Jackson County, Oregon and Incorporated Areas, effective_____.

FLOOD RISK REPORT: 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.

Figure 3: Map Legend

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, either at cross section locations or as static whole-foot elevations that apply throughout the 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.

Figure 3: Map Legend, con't

OTHER AREAS OF FLOOD 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.
	Zone X Protected by Accredited Levee: Areas protected by an accredited levee, dike or other flood control structures. See Notes to Users for important information.
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 determined to be outside the 0.2% annual chance floodplain
FLOOD HAZARD AND OTHER BOUNDARY LINES	
	Flood Zone Boundary (white line)
	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	
Aqueduct *Channel* *Culvert* *Storm Sewer*	Channel, Culvert, Aqueduct, or Storm Sewer
Dam *Jetty* *Weir*	Dam, Jetty, Weir
	Levee, Dike or Floodwall
Bridge	Bridge

Figure 3: Map Legend, con't

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA): *CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas. See Notes to Users for important information.*	
CBRS AREA 09/30/2009	Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway.
OTHERWISE PROTECTED AREA 09/30/2009	Otherwise Protected Area
REFERENCE MARKERS	
22.0	River mile Markers
CROSS SECTION & TRANSECT INFORMATION	
B 20.2	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
5280 21.1	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 (shown for flooding sources for which no cross sections or profile are available)
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

Figure 3: Map Legend, con't

BASE MAP FEATURES	
Missouri Creek	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)

10.6 Sixth Revision

The Sixth Revision (date to be determined) includes a PMR in Jackson County, Oregon, including the Cities of Eagle Point and Shady Cove, as well as the Unincorporated Areas of the county. This PMR, known as the Jackson County-Upper Rogue River Watershed PMR, revises flooding along portions of the Rogue River and its tributaries using both detailed and approximate methods.

a. Authority and Acknowledgments

The revision was performed by STARR under contract HSFEHQ-09-D-0370.

b. Coordination

The results of the Jackson County-Upper Rogue River Watershed PMR were reviewed at a meeting held on _____, and attended by representatives of _____. All concerns and problems raised at that meeting were addressed.

c. Scope of Study

The Jackson County-Upper Rogue River Watershed PMR incorporates revised hydraulic analysis based on new hydrologic and topographic data within the Middle and Upper Rogue HUC-8 Sub-Basins. Table 10 includes a brief description of each sub-basin, and the size of each drainage area, and Table 11 includes a brief description of the flooding sources included in this revision.

Table 10: Basin Characteristics

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (square miles)
Middle Rogue	17100308	Rogue River	The second largest watershed within Jackson County, encompassing 564,000 acres in the central and northwestern portions of the County, along with smaller portions of neighboring Douglas and Josephine Counties	881
Upper Rogue	17100307	Rogue River	Largest watershed within Jackson County, encompassing more than 1 million acres in the northeastern portion of the County, as well as smaller portions of Douglas and Klamath Counties.	1,614

Table 11: Flooding Sources Included in the Sixth Revision

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Antelope Creek	Jackson County Unincorporated Areas	Confluence with Little Butte Creek	Approximately 4,000 feet downstream of East Antelope Road/Royal Oaks Drive intersection	17100307	12.1	*	N	A	2015
Big Butte Creek	Jackson County Unincorporated Areas	Confluence with Rogue River	Approximately 5,500 feet upstream of McNeil Creek Road crossing	17100307	5.4	*	N	A	2015
Constance Creek	Jackson County Unincorporated Areas	Confluence with Rogue River	Approximately 2,100 feet downstream of Jones Road/Shiloh Road intersection	17100307	6.9	*	N	A	2015
Dry Creek	Jackson County Unincorporated Areas	Confluence with Antelope Creek	Near the start of Dessery Drive	17100307	5.1	*	N	A	2015
Elk Creek 2	Jackson County Unincorporated Areas	Confluence with Rogue River	Near the intersection of Elk Creek Road and Dodes Creek Road	17100307	12.1	*	N	A	2015
Little Butte Creek 1	Jackson County Unincorporated Areas	Confluence with Rogue River	Confluence with Antelope Creek	17100307, 17100308	2.8	*	N	A	2015
Little Butte Creek 2	City of Eagle Point, Jackson County Unincorporated Areas	Confluence with Antelope Creek	Connection with Little Butte Creek 3	17100307	9.0	*	Y	AE	2015

Table 11: Flooding Sources Included in the Sixth Revision (con't)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Little Butte Creek 3	Jackson County Unincorporated Areas	Connection with Little Butte Creek 2	Confluence of North Fork and South Little Butte Creek	17100307	5.5	*	N	A	2015
McNeil Creek	Jackson County Unincorporated Areas	Confluence with Big Butte Creek	Approximately 3,800 ft downstream of McNeil Creek Road/Butte Falls Road intersection	17100307	1.4	*	N	A	2015
North Fork Little Butte Creek	Jackson County Unincorporated Areas	Confluence with South Fork Little Butte Creek	Near the intersection of Highway 140 and Wassen Canyon Road	17100307	4.7	*	N	A	2015
North Fork Reese Creek	Jackson County Unincorporated Areas	Confluence with Reese Creek	Approximately 3,750 feet downstream from the start of the closest unnamed road	17100307	1.3	*	N	A	2015
Reese Creek	Jackson County Unincorporated Areas	Confluence with Rogue River	Approximately 9,100 ft upstream of Butte Falls Highway/Highway 62 intersection	17100307	3.5	*	N	A	2015
Rogue River	City of Shady Cove, Jackson County Unincorporated Areas	Just downstream of Little Butte Creek Intersection	From Lost Creek Dam	17100307, 17100308	25.9	*	Y	AE	2015

Table 11: Flooding Sources Included in the Sixth Revision (con't)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
South Fork Little Butte Creek	Jackson County Unincorporated Areas	Confluence with North Fork Little Butte Creek	Approximately 7,300 feet upstream of the confluence with Lost Creek	17100307	5.4	*	N	A	2015
South Fork Reese Creek	Jackson County Unincorporated Areas	Confluence with Reese Creek	Approximately 5,000 feet downstream from the intersection of Butte Falls Road/closest unnamed road	17100307	1.1	*	N	A	2015
Sugarpine Creek	Jackson County Unincorporated Areas	Confluence with Elk Creek	Approximately 3,500 feet downstream from the intersection of Sugar Pine Road/ Elkhorn Ridge Road	17100307	1.4	*	N	A	2015
Trail Creek	Jackson County Unincorporated Areas	Confluence with Rogue River	Approximately 200 feet downstream from start of Old Trail Creek Road	17100307	1.2	*	N	A	2015
Tributary to Antelope Creek	Jackson County Unincorporated Areas	Confluence with Antelope Creek	Approximately 1,800 feet south of the intersection of Brownsboro Meridian Road/Meridian Road	17100307	2.3	*	N	A	2015

Table 11: Flooding Sources Included in the Sixth Revision (con't)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Unnamed Tributary	Jackson County Unincorporated Areas	Confluence with Dry Creek	Approximately 3,100 ft upstream from the intersection of Dry Creek Road/Old Dry Creek Road	17100307	0.6	*	N	A	2015
Yankee Creek	Jackson County Unincorporated Areas	Confluence with Antelope Creek	From Yankee Creek Reservoir	17100307	2.6	*	N	A	2015

*Not calculated for this project

d. 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 16 in the Hydraulic Analyses sub-section. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

For this PMR, the peak discharge-frequency relationships for approximate streams were estimated from analysis of gages and regional regression equations (USGS, 2005). Discharges on the Rogue River from Lost Creek Dam to its confluence with Little Butte Creek were based on USACE analysis of regulated and unregulated flow on the Rogue River downstream of Lost Creek Reservoir (USACE, 2013). Discharges on Little Butte Creek were based on the analysis of USGS gages 14341500, 14347000, and 14348000. The gage data was analyized by Bulletin 17B (WRC, 1981) methodology and the log-Pearson Type III distribution, using the USGS PeakFQ computer program (Flynn, et al, 2006). Gage data showed no significant eveidence of mixed population.

Stream gage information is provided in Table 12 and the summary of the discharges used for this revision is provided in Table 13. Frequency Discharge-Drainage Area Curves used to develop the hydrologic models may also be shown in Figure 4 for selected flooding sources.

Table 12: Stream Gage Information Used to Determine Discharges for the Sixth Revision

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (square miles)	Period of Record	
					From	To
Elk Creek	14338000	USGS, Water Resources Division	Elk Creek, near Trail, Oregon	129	12/28/1945	3/30/2012
Elk Creek	14337800	USGS, Water Resources Division	Elk Creek, near Cascade Gorge, Oregon	79	1/15/1974	1/10/2000
Little Butte Creek	14348000	USGS, Water Resources Division	Little Butte Creek, Black Eagle Point, Oregon	293	12/26/1907	1/18/1950
Little Butte Creek	14347000	USGS, Water Resources Division	Little Butte Creek, above Eagle Point, Oregon	269	5/17/1917	4/14/1929
North Fork Little Butte	14344500	USGS, Water Resources Division	North Fork Little Butte Creek, Canal Lake Creek, Oregon	52	1/12/1918	6/16/1931
North Fork Little Butte	14343000	USGS, Water Resources Division	North Fork Little Butte Creek, North Lake Creek, Oregon	44	2/17/1912	11/20/1984
Rogue River	14335075	USACE, Lost Creek Dam	Rogue River at McLeod, Oregon	697	1/1/1932	1/1/1990
Rogue River	14339000	USACE, Lost Creek Dam	Rogue River at Dodge Bridge, near Eagle Point, Oregon	1,215	1/1/1939	1/1/1990
Rogue River	14359000	USACE, Lost Creek Dam	Rogue River at Raygold, near Central Point, Oregon	2,053	1/1/1906	1/1/2012
South Fork Little Butte	14341500	USGS, Water Resources Division	South Fork Little Butte Circle, North Lakecreek ,Oregon	138	5/20/1922	12/19/1981

Table 13: Summary of Discharges for the Sixth Revision

Flooding Source	Location	Drainage Area (square miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Antelope Creek	At Confluence With Little Butte Creek	75.7	1,430	1,905	2,282	2,662	*	3,634
Antelope Creek	Just Upstream of Confluence With Dry Creek	57.8	1,182	1,577	1,890	2,207	*	3,014
Antelope Creek	Just Upstream of Confluence With Yankee Creek	40	924	1,237	1,484	1,734	*	2,372
Antelope Creek	Approximately 9.81 miles Upstream Of The Confluence With Little Butte Creek	36.7	875	1,172	1,406	1,644	*	2,249
Big Butte Creek	At Confluence With Rogue River	248.1	4,117	5,255	6,169	7,079	*	9,432
Big Butte Creek	Just Upstream of Confluence With Crowfeet Creek	237.7	3,871	4,938	5,795	6,650	*	8,858
Big Butte Creek	Just Upstream of Confluence With McNeil Creek	198.9	3,129	3,986	4,673	5,361	*	7,136
Dry Creek	At Confluence With Antelope Creek	16.9	225	298	355	414	*	562
Dry Creek	At Agate Reservoir	13.4	199	264	316	369	*	503
Dry Creek	Just Upstream of Confluence With Unnamed Tributary	10.2	157	210	252	294	*	401
Elk Creek 2	At Confluence With Rogue River	133.4	9,750	12,706	15,036	17,481	*	23,631
Elk Creek 2	Just Upstream of Confluence With Berry Creek	130.1	9,427	12,258	14,489	16,828	*	22,707
Elk Creek 2	Just Upstream of Confluence With West Branch Elk Creek	109.3	7,481	9,578	11,229	12,950	*	17,260
Elk Creek 2	Just Upstream of Confluence With Tributary G	106.2	7,197	9,191	10,761	12,396	*	16,487

Table 13: Summary of Discharges for the Sixth Revision (con't)

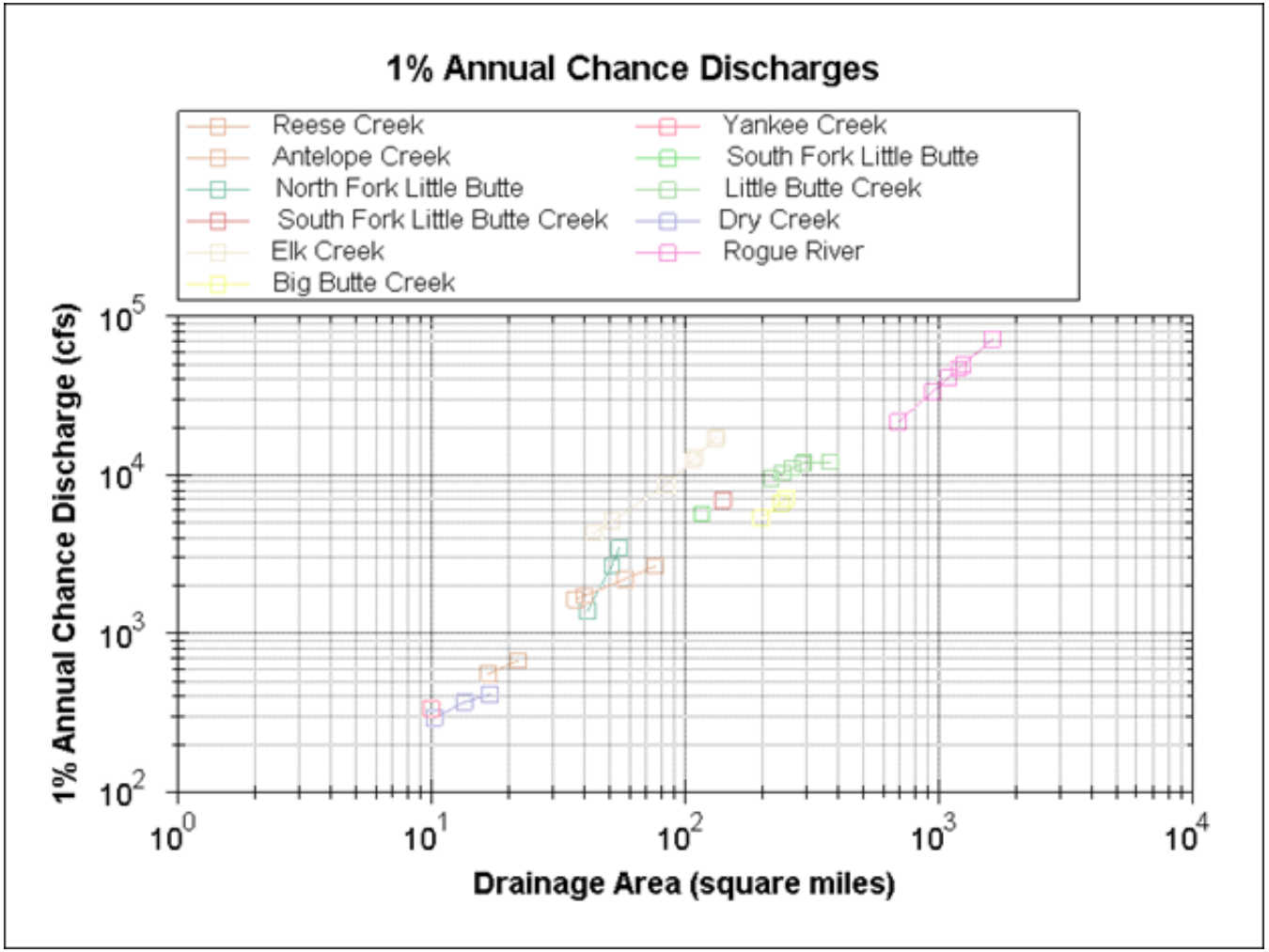
Flooding Source	Location	Drainage Area (square miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Elk Creek 2	Just Upstream of Confluence With Flat Creek	83.8	5,256	6,573	7,610	8,683	*	11,357
Elk Creek 2	Just Upstream of Confluence With Sugarpine Creek	51.2	3,115	3,875	4,472	5,089	*	6,624
Elk Creek 2	Just Upstream of Confluence With Dodes Creek	43.5	2,637	3,280	3,784	4,307	*	5,605
Little Butte Creek	At Confluence With Rogue River	373	6,667	8,740	10,406	12,073	*	16,374
Little Butte Creek	Just Upstream Of The Confluence With Antelope Creek	291.7	6,961	8,861	10,353	11,899	*	15,843
Little Butte Creek	Just Upstream of Confluence With Little Butte Creek Mill Ditch	289.5	6,903	8,798	10,287	11,833	*	15,775
Little Butte Creek	Just Upstream of Confluence With Schoolhouse Creek	264.5	6,252	8,086	9,543	11,067	*	14,995
Little Butte Creek	Just Upstream of Confluence With Charley	241.6	5,660	7,430	8,850	10,348	*	14,251
Little Butte Creek	Just Upstream of Confluence With Osborne Creek	217	5,032	6,721	8,094	9,557	*	13,417
North Fork Little Butte	Just Upstream of Confluence With Medford Canal	54.8	1,516	2,198	2,793	3,467	*	5,372
North Fork Little Butte	Approximately 9,900 Feet Upstream Of The Confluence With South Fork Little Butte Creek	51.1	1,122	1,664	2,167	2,669	*	4,645
North Fork Little Butte Creek	Approximately 21,280 Feet Upstream Of The Confluence With South Fork Little Butte Creek	41	444	706	994	1,389	*	2,969

Table 13: Summary of Discharges for the Sixth Revision (con't)

Flooding Source	Location	Drainage Area (square miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Reese Creek	At Confluence With Rogue River	21.9	371	489	582	676	*	915
Reese Creek	Just Upstream of Confluence With Tributary J	16.7	305	403	480	558	*	755
Rogue River	Just Downstream Of The Confluence With Little Butte Creek	1619.8	33,052	39,916	55,590	71,798	*	178,021
Rogue River	Just Upstream Of The Confluence With Little Butte Creek	1242.8	22,970	26,410	33,570	49,454	*	141,287
Rogue River	Just Upstream Of The Confluence With Reese Creek	1194.1	21,744	24,816	31,112	46,752	*	136,451
Rogue River	Just Upstream Of The Confluence With Trail Creek	1089.1	19,162	21,499	26,112	41,073	*	125,924
Rogue River	Just Upstream Of The Confluence With Elk Creek 2	945.2	15,773	17,238	19,938	33,649	*	111,284
Rogue River	Just Upstream Of The Confluence With Big Butte Creek	689.6	10,229	10,543	10,939	21,591	*	84,524
South Fork Little Butte Creek	Just Upstream of Confluence With Little Butte Creek	140.3	3,111	4,474	5,643	6,945	*	10,575
South Fork Little Butte	Just Upstream Of The Confluence With Lost Creek	115.5	2,552	3,669	4,628	5,695	*	8,670
Yankee Creek	At Confluence With Antelope Creek	9.9	177	238	286	335	*	458

*Not calculated for this FIS project

Figure 4: Frequency Discharge - Drainage Area Curves



e. Hydraulic Analyses

For the Sixth Revision, 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, selected cross sections are also listed on Table 5, "Floodway Data."

For this PMR, water surface elevations for the 10-, 4-, 2-, 1-, and 0.2-percent annual chance floods and the 1-percent-plus-annual chance flood on the Rogue River and its tributaries in Jackson County were estimated using the USACE HEC-RAS 4.1 computer program (HEC, 2011). Cross sectional geometries for the detailed analysis of the Rogue River were comprised of field run survey data and a digital terrain model (DTM) generated from LiDAR data from the Oregon Department of Geology and Minerals (DOGAMI, 2014). Cross section geometries were obtained from a combination of field survey and cross section takeoffs from the DTM. Cross section channel bed points were obtained from field survey data, while cross section overbank ground points were obtained from DTM topography. Floodway encroachment stations were establised, first using Method 4. Method 4 encroachment stations were imported and the Method 1 encroachment analysis was then executed to create the final floodway.

Roughness coefficients for the Sixth Revision are provided in Table 14. 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. A summary of the methods used in the hydraulic analyses performed for this project is provided in Table 15.

Table 14: Roughness Coefficients for the Sixth Revision

Flooding Source	Channel "n"	Overbank "n"
Little Butte Creek	0.040 to 0.050	0.035 to 0.100
Rogue River	0.030	0.020 to 0.100

Table 15: Summary of Hydrologic and Hydraulic Analyses for the Sixth Revision

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
Antelope Creek	Confluence with Little Butte Creek	Nearly 4,000 feet downstream of East Antelope Road/Royal Oaks Drive intersection	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations
Big Butte Creek	Confluence with Rogue River	Approximately 5,500 feet upstream of McNeil Creek Rd crossing	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations
Constance Creek	Confluence with Rogue River	Approximately 2,100 feet downstream of Jones Road/Shiloh Road intersection	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations
Dry Creek	Confluence with Antelope Creek	Near start of Dessery Drive	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations
Elk Creek 2	Confluence with Rogue River	Near the intersection of Elk Creek Road and Dodes Creek Road	PEAKFQ 2.4 (April 1998) and up	HEC-RAS 3.1.1 and up	8/26/2015	A	Hydrologic analysis based on USGS gages 14338000 and 14337800
Little Butte Creek 1	Confluence with Rogue River	Confluence with Antelope Creek	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations
Little Butte Creek 2	Confluence with Antelope Creek	Connection with Little Butte Creek 3	PEAKFQ 2.4 (April 1998) and up	HEC-RAS 3.1.1 and up	8/26/2015	AE	Hydrologic analysis based on USGS gages 14348000, 14347000 and 14341500
Little Butte Creek 3	Connection with Little Butte Creek 2	Confluence of North Fork and South Little Butte Creek	PEAKFQ 2.4 (April 1998) and up	HEC-RAS 3.1.1 and up	8/26/2015	A	Hydrologic analysis based on USGS gages 14348000, 14347000 and 14341500
McNeil Creek	Confluence with Big Butte Creek	Nearly 3,800 feet downstream of McNeil Creek Road/Butte Falls Road intersection	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations

Table 15: Flooding Sources Included in the Sixth Revision, con't

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
North Fork Little Butte Creek	Confluence with South Fork Little Butte Creek	Near the intersection of Highway 140 and Wassen Canyon Road	PEAKFQ 2.4 (April 1998) and up	HEC-RAS 3.1.1 and up	8/26/2015	A	Hydrologic analysis based on USGS gages 14344500 and 14343000
North Fork Reese Creek	Confluence with Reese Creek	Nearly 3,750 feet downstream from the start of the closest unnamed road	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations
Reese Creek	Confluence with Rogue River	Nearly 9,100 feet upstream of Butte Falls Highway/ Highway 62 intersection	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations
Rogue River	Just downstream of Little Butte Creek Intersection	From Lost Creek Dam	OTHER	HEC-RAS 3.1.1 and up	8/26/2015	AE	Hydrologic analysis based on USGS gages 14335075, 14339000 and 1433900. Hydraulic model was calibrated to 1997 and 2006 events.
South Fork Little Butte Creek	Confluence with North Fork Little Butte Creek	Nearly 7,300 feet upstream of the confluence with Lost Creek	PEAKFQ 2.4 (April 1998) and up	HEC-RAS 3.1.1 and up	8/26/2015	A	Hydrologic analysis based on USGS gages 14341500
South Fork Reese Creek	Confluence with Reese Creek	Nearly 5,000 feet downstream from the intersection of Butte Falls Road/closest unnamed road	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations
Sugarpine Creek	Confluence with Elk Creek	Nearly 3,500 feet downstream from the intersection of Sugar Pine Road/ Elkhorn Ridge Road	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations

Table 15: Flooding Sources Included in the Sixth Revision, con't

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
Trail Creek	Confluence with Rogue River	Nearly 200 ft downstream from start of Old Trail Creek Road	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations
Tributary to Antelope Creek	Confluence with Antelope Creek	Approximately 1,800 feet south of the intersection of Brownsboro Meridian Road and Meridian Road	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations
Unnamed Tributary	Confluence with Dry Creek	Nearly 3,100 feet upstream from the intersection of Dry Creek Road/Old Dry Creek Road	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations
Yankee Creek	Confluence with Antelope Creek	From Yankee Creek Reservoir	Regression Equations	HEC-RAS 3.1.1 and up	8/26/2015	A	2005 State Regression Equations

For this revision, flood profiles, floodways, and floodway data tables were revised for Little Butte Creek, and the Rogue River.

f. Mapping

The FIRMs and FIS Report for the Sixth Revision 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 Mapping Partners*, Appendix L.

Base map source information shown on the revised FIRM was derived from the sources described in Table 16.

Table 16: Base Map Sources for the Sixth Revision

Data Type	Data Provider	Data Date	Data Scale	Data Description
BLM OR Public Land Survey System	BLM	2014	24:000	*
Jackson County GIS Layers	Jackson County, OR GIS	2015	24:000	*
TIGER/Line Shapefiles 2014	U.S. Census Bureau	2014	24:000	*
Upper Rogue Discovery	FEMA	2011	24:000	*

*Not calculated for this FIS project

g. Floodplain and Floodway Delineation

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 17.

In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% 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 11 indicates the flooding sources for which floodways have been determined for this revision. The results of the floodway computations for those flooding sources have been tabulated for selected cross sections and are shown in Table 5, "Floodway Data."

Table 17: Summary of Topographic Data Used for the Sixth Revision

		Source for Topographic Data			
Community	Flooding Source	Description	Scale	Contour Interval	Citation
City of Eagle Point, City of Shady Cove, Jackson County Unincorporated Areas	Antelope Creek, Big Butte Creek, Constance Creek, Dry Creek, Elk Creek, Little Butte Creek, McNeil Creek, North Fork Little Butte Creek, North Fork Reese Creek, Reese Creek, Rogue River, South Fork Little Butte Creek, South Fork Reese Creek, Sugarpine Creek, Trail Creek, Tributary to Antelope, Unnamed Tributary, Yankee Creek	LiDAR	1:3,000	1	DOGAMI 2011
City of Ashland, City of Central Point, City of Gold Hill, City of Jacksonville, City of Medford, City of Phoenix, City of Rogue River, City of Talent, Jackson County Unincorporated Areas	Little Butte Creek, Rogue River	LiDAR	1:3,000	3	DOGAMI 2009

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

h. 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 to FIS projects 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 19.

Letters of Map Amendment (LOMA)

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. A LOMA cannot be issued for properties located on the PFD (primary frontal dune).

To obtain an application for a LOMA, visit http://www.fema.gov 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 http://www.fema.gov/plan/prevent/fhm/ot_lmreq.shtm.

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

Letter of Map Revision Based on Fill (LOMR-F)

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 http://www.fema.gov 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 Map Information 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
http://www.fema.gov/plan/prevent/fhm/ot_lmreq.shtm

Letters of Map Revision (LOMR)

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 http://www.fema.gov 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 Map Information eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627) to speak to a Map Specialist.

For this revision, no LOMRs were incorporated, however LOMR 12-10-0825P has been superceded, based on revised engineering data.

Physical Map Revision (PMR)

PMRs are 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 http://www.fema.gov and visit the "Flood Map Revision Processes" section.

i. Contracted Studies

Table 18 provides a summary of the contracted studies, listed by flooding source, that are included in the Sixth Revision of this FIS Report.

Table 18: Summary of Contracted Studies for the Sixth Revision

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Antelope Creek	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
Big Butte Creek	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
Constance Creek	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
Dry Creek	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
Elk Creek 2	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
Little Butte Creek 1, 2, and 3	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
McNeil Creek	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
North Fork Little Butte Creek	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
North Fork Reese Creek	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
Reese Creek	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
Rogue River	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
South Fork Little Butte Creek	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
South Fork Reese Creek	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas

Table 18: Summary of Contracted Studies for the Sixth Revision, con't

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Sugarpine Creek	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
Trail Creek	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
Tributary to Antelope	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
Unnamed Tributary	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas
Yankee Creek	To Be Determined	STARR	HSFEHQ-09-D-0370	8/26/2015	Jackson County and Incorporated Areas

j. 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 http://www.fema.gov.

Table 19 lists the locations where FIRMs for Jackson County may 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.

Table 19: Community Map Repositories

Community	Address	City	State	Zip Code
City of Ashland	City Hall 20 East Main Street	Ashland	OR	97520
City of Butte Falls	City Hall 431 Broad Street	Butte Falls	OR	97522
City of Central Point	City Hall 140 South Third Street	Central Point	OR	97502
City of Eagle Point	City Hall 17 Buchanan Avenue	Eagle Point	OR	97524
City of Gold Hill	City Hall 420 6th Avenue	Gold Hill	OR	97525

Table 19: Community Map Repositories, con't

Community	Address	City	State	Zip Code
Jackson County Unincorporated Areas	Jackson County Courthouse 10 South Oakdale Avenue Room 100	Medford	OR	97501
City of Jacksonville	City Hall 110 East Main Street	Jacksonville	OR	97530
City of Medford	City Hall 411 West 8th Street	Medford	OR	97501
City of Phoenix	City Hall 112 2th Street	Phoenix	OR	97535
City of Rogue River	City Hall 133 Broadway Street	Rogue River	OR	97537
City of Shady Cove	City Hall 22451 Highway 62	Shady Cove	OR	97539
City of Talent	City Hall 110 East Main Street	Talent	OR	97539

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 20.

Table 20 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.

Table 20: Additional Information

FEMA and the NFIP	
FEMA and FEMA Engineering Library website	http://www.fema.gov
NFIP website	http://www.fema.gov/business/nfip
NFHL Dataset	http://msc.fema.gov
FEMA Region X	Federal Regional Center, 130 228th Street SW. Bothell, WA 98021-9796 (425) 487-4657
Other Federal Agencies	
USGS website	http://www.usgs.gov
Hydraulic Engineering Center website	http://www.hec.usace.army.mil
State Agencies and Organizations	
State NFIP Coordinator	State National Floodplain Insurance Program (NFIP) Coordinator Christine Shirley, CFM Dept. of Land Conservation & Development 635 Capitol St., NE, Suite 150 Salem, OR 97301-2540 503-373-0050 x250 FAX 503-375-5518 christine.shirley@state.or.us
State GIS Coordinator	State GIS Coordinator Cy Smith, GISP Statewide GIS Coordinator DAS/EISPD Geospatial Enterprise Office 955 Center Street NE, Room 470 Salem, Oregon 97301 Phone: 503-378-6066 cy.smith@state.or.us

k. Bibliography and References for the Sixth Revision

Flynn, K.M., Kirby, W.H., and Hummel, P.R., User's manual for program PeakFQ, Annual Flood Frequency Analysis using 17B Guidelines, U.S. Geological Survey Techniques and Methods Book 4, Chapter B4, 42 pgs., 2006.

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U.S. Geological Survey, Estimation of Peak Discharges for Rural, Unregulated Streams in Western Oregon, Scientific Investigations Report 2005-5116, U.S. Department of the Interior, Oregon Water Resources Department, 2005.