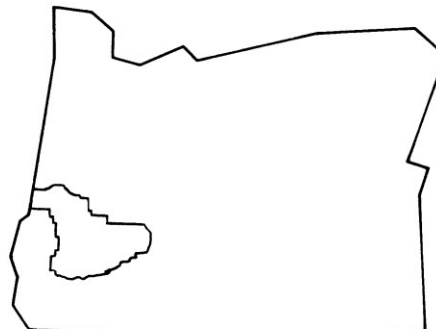


FLOOD INSURANCE STUDY



DOUGLAS COUNTY, OREGON AND INCORPORATED AREAS VOLUME 1 OF 3

COMMUNITY NAME	COMMUNITY NUMBER
CANYONVILLE, CITY OF	410060
DRAIN, CITY OF	410061
ELKTON, CITY OF	410062
GLENDALE, CITY OF	410063
MYRTLE CREEK, CITY OF	410064
OAKLAND, CITY OF	410271
REEDSPORT, CITY OF	410065
RIDDLE, CITY OF	410066
ROSEBURG, CITY OF	410067
SUTHERLIN, CITY OF	410275
WINSTON, CITY OF	415593
YONCALLA, CITY OF	410069
DOUGLAS COUNTY UNINCORPORATED AREAS	410059



**REVISED:
MARCH 23, 2021**



Federal Emergency Management Agency

**Flood Insurance Study Number
41019CV001B**

**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.

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

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

Part or all of this may be revised and republished at any time. In addition, part of this FIS may be revised by a Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS report components.

This FIS report was revised on March 23, 2021. Users should refer to Section 10, Revision Descriptions, for further information. Section 10 is intended to present the most up-to-date information for specific portions of this FIS report. Therefore, users of this FIS report should be aware that the information presented in Section 10 supersedes information in Sections 1.0 through 9.0 of this FIS report. Volume 2 of this FIS Report pertains to the Physical Map Revision for Douglas County, Oregon.

Initial Countywide FIS Effective Date: February 17, 2010

Revised Date: March 23, 2021

TABLE OF CONTENTS – VOLUME 1 - MARCH 23, 2021

	Page
1.0 INTRODUCTION	1
1.1 Purpose of Study	1
1.2 Authority and Acknowledgements	1
1.3 Coordination	2
2.0 AREA STUDIED	4
2.1 Scope of Study	4
2.2 Community Description	6
2.3 Principle Flood Problems	12
2.4 Flood Protection Measures	16
3.0 ENGINEERING METHODS	17
3.1 Hydrologic Analyses	18
3.2 Hydraulic Analyses	24
3.3 Vertical Datum	30
4.0 FLOODPLAIN MANAGEMENT APPLICATIONS	31
4.1 Floodplain Boundaries	31
4.2 Floodways	34
5.0 INSURANCE APPLICATION	76
6.0 FLOOD INSURANCE RATE MAP	77
7.0 OTHER STUDIES	79
8.0 LOCATION OF DATA	79
9.0 BIBLIOGRAPHY AND REFERENCES	80
10.0 REVISION DESCRIPTIONS	85
10.1 Pre-Countywide Revisions	85
10.2 Countywide Revision	86

Figures

Figure 1 – Floodway Schematic	35
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TABLE OF CONTENTS - MARCH 23, 2021 (Continued)

Tables

Table 1 – Initial, Intermediate, and Final CCO Meetings	3
Table 2 – Flooding Sources Studied by Detailed Methods	4
Table 3 – Flooding Sources Studied by Approximate Methods	6
Table 4 – Summary of Discharges	21
Table 5 – Range of Manning’s Roughness Values	29
Table 6 – Vertical Datum Conversion Factors	30
Table 7 – Floodway Data	36
Table 8 – Flood Insurance Zones Within Each Community	76
Table 9 – Community Map History	78
Table 10 – Revised Study Descriptions	85

VOLUME 2

10.0 REVISION DESCRIPTIONS (Continued)

10.3 Second Countywide Revision	88
---------------------------------	----

Figures

Figure 2: FIRM Panel Index	97
Figure 3: FIRM Notes to Users	98
Figure 4: Map Legend for FIRM	101
Figure 5: 1% Annual Chance Total Stillwater Elevations for Coastal Areas	114

Tables

Table 11: Listing of NFIP Jurisdictions	88
Table 12: Flooding Sources Included in this FIS Report	92
Table 13: Summary of Non-Coastal Stillwater Elevations	106
Table 14: Summary of Hydrologic and Hydraulic Analyses	108
Table 15: Summary of Coastal Analyses	113
Table 16: Tide Gage Analysis Specifics	114
Table 17: Summary of Contracted Studies Included in this FIS Revision	117
Table 18: Map Repositories	118
Table 19: Bibliography and References	120

TABLE OF CONTENTS - MARCH 23, 2021 (Continued)

VOLUME 3

Exhibits

Exhibit 1 – Flood Profiles

Canyon Creek	Panels	01P-03P
Cow Creek	Panels	04P-13P
Lower Cow Creek	Panels	14P-15P
Deer Creek	Panels	16P-23P
Elk Creek	Panels	24P-25P
Myrtle Creek	Panel	26P
North Myrtle Creek	Panel	27P
South Myrtle Creek	Panel	28P
Newton Creek	Panels	29P-32P
Pass Creek	Panels	33P-34P
Scholfield Creek	Panels	35P-36P
School Creek	Panels	37P-39P
Smith River	Panels	40P-44P
Umpqua River	Panels	45P-67P
North Umpqua River	Panels	68P-75P
South Umpqua River	Panels	76P-86P

PUBLISHED SEPARATELY

Flood Insurance Rate Map Index

Flood Insurance Rate Map

FLOOD INSURANCE STUDY

DOUGLAS COUNTY, OREGON AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study revises and updates information on the existence and severity of flood hazards in the geographic area of Douglas County, including the Cities of Canyonville, Drain, Elkton, Glendale, Myrtle Creek, Oakland, Reedsport, Riddle, Roseburg, Sutherlin, Winston, Yoncalla; and the unincorporated areas of Douglas County (referred to collectively herein as Douglas 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 and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal 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 Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for Douglas County Unincorporated Areas, the City of Myrtle Creek, and the City of Roseburg were performed by the U.S. Geological Survey (USGS), for FEMA, under Inter-Agency Agreement No. IAA-H-17-75, Project Order No. 7. These studies were completed in February 1977, October 1976, and December 1975, respectively.

For the City of Glendale, hydrologic and hydraulic analyses were performed by the USGS, Water Resources Division, Portland District, for the FIA, under Inter-Agency Agreement No. IAA-H-8-76, Project Order No. 19, Amendment No. 1 and was completed in July 1977.

For the Cities of Canyonville, Elkton, and Riddle, hydrologic and hydraulic analyses for this study were performed by the USGS, Water Resources Division, for FEMA, under Inter-Agency Agreement No. IAA-H-9-77, Project Order No. 9. This work, was completed in September 1977, April 1978, and February 1978, respectively.

Hydrologic and hydraulic analyses for the City of Drain were performed by the USGS, Water Resources Division, Portland, Oregon for FEMA, under Inter-Agency Agreement No. IAA-339-R, Project Order No. 17. This work was completed in April 1978.

The hydrologic and hydraulic analyses for the Umpqua River and Scholfield Creek were performed by the USGS for the Douglas County Planning Commission in 1975. Conversion of the USGS Study for this report was performed by CH2M HILL

NORTHWEST, INC, for FEMA, under Contract No. EMW-C-0283. This study was completed in April 1981.

The revised hydraulic analysis for the Umpqua River from the Pacific Ocean to U.S. Highway 101 was performed by the U.S. Geological Survey. This work was completed in October 1984.

The hydrologic and hydraulic analyses for Newton Creek were performed by the USACE, Portland District, for FEMA, under Interagency Agreement No. EMW-89-E-2968, Project Order No. 9. This restudy was completed in May 1989.

The hydrologic and hydraulic analyses for the restudy of Cow Creek were performed by the U.S. Army Corps of Engineers (USACE), Portland District, for FEMA, under Interagency Agreement No. No. EMW-89-E-2978, Project Order No. 17. This restudy was completed in December 19, 1991.

The hydrologic and hydraulic analyses for the reach of the South Umpqua River in the vicinity of Newton Creek and the lower reach of Newton Creek were performed by the USACE, Portland District, under Interagency Agreement No. EMW-89-E-2978, Project Order No. 10, Amendment No. 1. This restudy was completed in December 1994.

The countywide update was performed by WEST Consultants, Inc. for FEMA under Contract No. EMS-20010-CO-0068. Work on the countywide update was completed in February 2009.

The digital base mapping information was provided by the Oregon Geospatial Enterprise Office (<http://www.oregon.gov/DAS/EISPD/GEO/index.shtml>), Oregon Parks and Recreation Department (<http://www.oregon.gov/OPRD/>), and the United States Fish and Wildlife Service Portland Office, 911 NE 11th Avenue, Portland, OR 97232-4181. This information was compiled from Oregon Water Resources Department (2006), OR/WA Bureau of Land Management (2000), U.S. Fish and Wildlife Service (2008), Oregon Parks and Recreation Department (2008), National Geodetic Survey (2007), the U.S. Census Bureau (2007), and the U.S. Department of Agriculture Farm Service Agency (2005) at a scale of 1:24,000. The coordinate system used for the production of the FIRM is Universal Transverse Mercator, North American Datum of 1983, Geodetic Reference System 1980. Differences in the datum and spheroid used in the production of FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of information shown on this FIRM.

1.3 Coordination

The dates of the initial, intermediate, and final CCO meetings held for the previous FIS reports for Douglas County and the incorporated communities within its boundaries are shown in Table 1, “Initial, Intermediate, and Final CCO Meetings”. They were attended by representatives of FEMA, the U.S. Geological Survey, the communities, and the study contractor.

Table 1. Initial, Intermediate, and Final CCO Meetings

<u>Community</u>	<u>Initial CCO Date</u>	<u>Intermediate CCO Date</u>	<u>Final CCO Date</u>
Canyonville , City of	January, 1976	May, 1976	December 8, 1977
Douglas County Unincorporated Areas	March 20, 1975	-- ¹	March 15-16, 1977 September 23, 1997 September 17, 2018
Drain, City of	March 16, 1977	-- ¹	August 9, 1978
Elkton, City of	March, 1977	-- ¹	August 9, 1978
Glendale, City of	January 19, 1976 May 13, 1976	March, 1977	December 8, 1977 November 25, 1996 September 23, 1976
Myrtle Creek, City of	March 1975	-- ¹	
Oakland, City of	-- ¹	-- ¹	-- ¹
Reedsport, City of	May, 1979	-- ¹	September 17, 2018 August 9, 1978
Riddle, City of	March 15, 1977	February 22, 1978	September 23, 1997
Roseburg, City of	March 20, 1975	-- ¹	May 13, 1976 September 23, 1997
Sutherlin, City of	-- ¹	-- ¹	-- ¹
Winston, City of	-- ¹	-- ¹	-- ¹
Yoncalla, City of	-- ¹	-- ¹	-- ¹

¹ Information not available

The initial community coordination meetings were held and attended by representatives of FEMA, USGS, Douglas County Planning Department, Douglas County Water Resources Survey, city officials, the study contractor, and the community. The purpose of the initial coordination meetings was to identify stream reaches to be studied, explain the study concepts, identify data sources, and establish communication and coordination procedures.

Intermediate coordination meetings were held between FEMA, local officials and the study contractor to review plan and profile drawings showing water-surface profiles, floodway delineations, and flooded-area outlines. The dates of the Intermediate coordination dates are listed in Table 1.

Final community coordination meetings were held and attended by representatives of FEMA, local officials, the study contractor, and the community. All problems and concerns raised at the final meetings have been addressed in this study. The dates of the Final coordination dates are listed in Table 1.

The results of the City of Riddle restudy were reviewed at the final Consultation Coordination Officer meeting held on November 25, 1996, and attended by representatives of FEMA, the USACE, the Douglas County Planning Department, the City of Riddle, and Douglas County Natural Resources. All problems raised at the meeting have been addressed in this restudy.

Countywide Update

An initial community coordination meeting for Douglas County was held on March 13, 2006. This meeting was attended by representatives of the Cities of Drain, Glendale, Myrtle Creek, Reedsport, Douglas County, Oregon Department of Land Conservation and Development, FEMA, and WEST Consultants, Inc. The results of the study were

reviewed at the final Consultation Coordination Officer [CCO] meeting held on June 3, 2009, and attended by representatives of Douglas County, Cities of Drain, Glendale, Myrtle Creek, Winston and FEMA. All problems raised at that meeting have been addressed in this study. A separate final CCO meeting for the City of Reedsport was held on June 4, 2009 and was attended by representatives of the City and FEMA. All problems raised at that meeting have been addressed in this study.

2.0 AREA STUDIED

2.1 **Scope of Study**

This Flood Insurance Study covers the geographic area of Douglas County, Oregon, including the incorporated communities listed in Section 1.1.

The flooding sources studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development or proposed construction for the City of Myrtle Creek through 1981, the Cities of Canyonville and Glendale through 1982, the Cities of Drain and Elkton through 1983, the City of Reedsport through 1986, and Douglas County unincorporated areas through 1989. Table 2 lists the flooding sources studied in detail and the included segments.

Table 2. Flooding Sources Studied by Detailed Methods

<u>Flooding Source</u>	<u>Limits of Detailed Study</u>
Canyon Creek	Within the corporate limits of Canyonville
Cow Creek	From approximately 2,800 feet below Totten Creek upstream to Snow Creek. Approximately 20 miles, from 2,800 feet below Totten Creek to Galesville Dam, was restudied in 1999.
Lower Cow Creek	From its confluence with the South Umpqua River to the gaging station near Riddle. Restudied in 1999.
Deer Creek	From its confluence with the South Umpqua River to Tucker Creek
Elk Creek	From its confluence with the Umpqua River to 200 feet upstream of the eastern corporate limit of Elkton; and from the western corporate boundary of Drain to 300 feet upstream of the southern corporate boundary of Drain
Myrtle Creek	From its confluence with the South Umpqua River to the confluence of the North Myrtle Creek and South Myrtle Creek
North Myrtle Creek	From its confluence with South Myrtle Creek to a distance of approximately two miles upstream
South Myrtle Creek	From its confluence with North Myrtle Creek to a distance of approximately two miles upstream
Newton Creek	From its confluence with the South Umpqua River to approximately 1,200 feet upstream of Parker Road
Pass Creek	From its confluence with Elk Creek upstream to the northern corporate limit of Drain

Table 2. Flooding Sources Studied by Detailed Methods (continued)

Scholfield Creek	From its mouth in Reedsport to its confluence with Wind Creek
School Creek	Within the corporate limits of the City of Canyonville
Smith River	From its confluence with the Umpqua River to the confluence with Sulphur Springs
Umpqua River	From the Pacific Ocean to the confluence with the North and South Umpqua Rivers.
North Umpqua River	From its confluence with the South Umpqua River to Idleyld Park
South Umpqua River	From its confluence with the North Umpqua River to Clough Gulch, 3 miles downstream from Days Creek

Subsequent study of flood flows in School Creek indicated supercritical stream velocities would occur in many areas due to the steep channel gradient. Encroachment on such flood plain was considered inadvisable, and the USGS recommended floodways not be delineated within the City of Canyonville. This action was approved by the U.S. Department of Housing and Urban Development and by City of Canyonville officials.

Flooding caused by Mill and Section Creeks in the City of Glendale was studied in detail. Preliminary investigation of Mill and Section Creeks revealed that most of the flooding would be contained in channel; therefore, the final study of these streams was approximate.

This study was revised on April 21, 1999, to show modifications to flood hazards along an approximate 27-mile reach of Cow Creek. The creek was studied from its confluence with the South Umpqua River, upstream through the City of Riddle, Oregon, to USGS Stream Gage No. 1431000, a distance of approximately 7 miles, and from approximately 2,800 feet downstream of the confluence with Totten Creek to the Galesville Dam, a distance of approximately 20 miles. This restudy also shows modifications to flood hazards along Newton Creek and the South Umpqua River. Newton Creek was studied by detailed methods from its mouth to approximately 1,200 feet upstream of Parker Road, approximately 3.5 river miles. The South Umpqua River was studied by detailed methods from 1 mile downstream of the confluence of Newton Creek to just downstream of Interstate Highway 5, approximately 2.55 miles (Reference 1). The Douglas County Planning Department provided copies of orthophoto topographic maps of Cow Creek for use in this restudy (Reference 2).

This study was also revised to reflect the results of a Letter of Map Revision (LOMR) issued on June 8, 1993, affecting the identified flood hazards for Deer Creek. A hydraulic analysis was performed and revisions were made to reflect a revised floodway boundary along Deer Creek from the confluence with the South Umpqua River to Douglas Avenue.

Approximate analyses were used to study flooding sources in areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Douglas County. Table 3 lists the flooding sources, grouped by watershed, which were studied by approximate methods.

Table 3. Flooding Sources Studied by Approximate Methods

1. South Umpqua River, from Clough Gulch to Tiller
2. Confluence of North Umpqua River and South Umpqua River
3. Lookingglass Creek, Olalla Creek, Tenmile Creek
4. Elk Creek, Yoncalla Creek
5. Rice Creek, Willis Creek
6. Calapooya Creek
7. Section Creek, Mill Creek
8. Galesville Reservoir

2.2 Community Description

Douglas County is located in southwestern Oregon. It is bounded by Coos County, the Pacific Ocean, and the Coast Range on the west, Curry County on the southwest, Lane County and the Coast and Cascade Ranges on the north, Jackson and Josephine Counties and the Klamath Mountains on the south, and Klamath County and the Western Cascade and High Cascade Ranges on the east.

Most of the county is mountainous and densely forested. Central valleys of broad floodplains and gently rolling upland hills extend from Days Creek northerly to Drain. The valleys along the Umpqua and South Umpqua Rivers are generally from 0.75 to 1.5 miles wide and are connected by fairly narrow canyons.

Elevations range from sea level at Reedsport, to approximately 3,000 feet at the summit of the Coast Range, and to approximately 8,000 feet along the crest of the Cascade Range. The elevation at Roseburg is less than 500 feet; the elevation at Glendale on upper Cow Creek is 1,400 feet.

The Umpqua, North Umpqua, and South Umpqua Rivers are the largest streams in Douglas County. The South Umpqua River heads in the Western Cascade Range and flows through the Klamath Mountains to join the North Umpqua in Garden Valley. The Western Cascade Range is composed of deeply dissected, moderately permeable rocks. The Klamath Mountains have steep slopes and poorly permeable rocks. The North Umpqua River heads in the highly permeable volcanic rocks of the High Cascade Range and flows through the Western Cascade Range to join the South Umpqua River. Above Garden Valley, the North Umpqua River is deeply entrenched and flows through canyons that connect narrow valleys. The Umpqua River, which heads at the confluence of the North Umpqua and South Umpqua Rivers, flows through the Coast Range, which is characterized by steep slopes and poorly permeable rocks. The Umpqua River empties into the Pacific Ocean near Reedsport.

The climate of Douglas County, like that of western Oregon in general, is characterized by mild, wet winters and hot, dry summers. The pattern of annual precipitation reflects the orographic barriers of the Coast and Cascade Ranges. Average annual precipitation in the Coast Range varies from 50 to 110 inches; in the central valleys, from 25 to 50 inches; and, in the Cascade Range, from 50 to 75 inches (Reference 3). At high elevations, much of the winter precipitation occurs as snow.

Average temperatures at Roseburg range from an average daily minimum of 33°F in January to an average daily maximum of 84°F in July and August. The corresponding average daily minimum and daily maximum temperatures at Reedsport range from 37°F in January to 70°F in August (Reference 3).

The population of Douglas County was 93,748 in 1980 (Reference 4). The population was estimated to be 105,117 in 2000 (Reference 5). The majority of the population is concentrated along the Interstate 5 corridor between the Cities of Canyonville and Yoncalla. The economy of Douglas County is dependent primarily on forest products and agriculture. The floodplains of the South Umpqua and Umpqua Rivers are primarily agricultural land, although the community of Dillard is almost entirely on the floodplain of the South Umpqua River.

City of Canyonville

Canyonville is a small community that was founded in 1901, and is located in the southern part of Douglas County. The city is 20 miles south of Roseburg and is situated between the Coast Range to the west and the Cascade Range (which is higher) to the east. The population of the city was 1,255 in 1975 (Reference 6). The population was estimated to 1,293 in 2000 (Reference 5).

The economy of the area depends primarily on timber and related byproducts. Agriculture, mining, and recreational activities are also important.

The area has an average annual temperature of 54°F, with historic extremes ranging from -3°F in January 1962 to 110°F in August 1935 (Reference 7). The average annual precipitation is 35 inches, although rainfall patterns vary greatly due to orographic barriers. A large part of the Canyon Creek drainage is in a moderate rain shadow formed by Silver Butte and Canyon Mountain.

Most of the commercial area and the older residential structures are located on the west bank of Canyon Creek, well above the floodplain. Developing residential areas are on the surrounding hillsides and on creek frontage property east of Canyon Creek. Floodplain development along School Creek is very limited and consists of an occasional house, garage, or outbuilding.

The elevation of Canyonville is 747 feet. The elevation of Silver Butte, 7 miles southwest of the city, is 3,483 feet. Canyon Creek originates in this mountainous area and flows northward in a very steep canyon until it reaches the narrow valley occupied by the community. The drainage area is 39.4 square miles at the mouth. The only well-defined tributary to Canyon Creek within the city is School Creek. School Creek drains an area of 1.13 square miles and enters Canyon Creek from the west, near the center of town.

The Canyon Creek and School Creek drainage basins are heavily forested except for clear-cut areas where timber has been harvested. Hydrologic soil classifications (primarily in the Josephine Association) indicate low to medium water-holding capacities (Reference 8).

Within the city, Canyon Creek is a deeply entrenched watercourse, with moderate to dense bank vegetation. The channel has areas of exposed irregular bedrock, but the primary bed material is rounded boulders, rocks, and gravel. Stream banks are stable due

to the vegetation; large debris obstructions appear to be minimal.

The School Creek channel meanders through west Canyonville, and stream flows are severely obstructed by dense brush in some areas. Flood flows encounter eight small culvert systems within the city before reaching Canyon Creek.

City of Drain

The City of Drain was incorporated in 1887. It is located in northern Douglas County, near the confluence of Pass Creek and Elk Creek, 32 miles north of Roseburg, 4 miles north of Yoncalla, and 13 miles east of Elkton, at the upper end of a valley 2 miles long and 0.33 to 0.5 miles wide. The elevation at the railroad depot is 296 feet.

The population of Drain was 1,250 in 1976 (Reference 6) and has decreased to an estimated 1,021 in 2000 (Reference 5). The economy of the area is dependent on forest products and agriculture.

Elk Creek heads at an elevation of about 1,200 feet in the Calapooya Mountains, which are foothills to the western Cascade Range. These hills are characterized by volcanic, pyroclastic, and sedimentary rocks of low permeability (Reference 9). The slopes are steep and densely forested. Valley areas are small and are used for pasture rather than for cultivated crops.

Pass Creek heads in the Coast Range at an elevation of approximately 700 feet. The mountains are of estuarine and marine sediments of low permeability (Reference 9). The slopes are steep and densely forested. The creek flows through a valley generally less than 0.25 miles wide.

Normal annual precipitation is 49 inches. Temperatures at Drain range from an average minimum of 42°F to an average maximum of 66°F. Extreme temperatures have ranged from -1°F to 108°F (Reference 7).

The commercial and residential development of Drain is partly on the floodplain and partly on the terrace and slopes above the floodplain. Upstream from the railroad, Elk Creek is confined between high banks in an undeveloped canyon.

The upstream segment of the Pass Creek floodplain near the northern corporate limit is rural in character. There are a few houses, with undeveloped pasture between them.

City of Elkton

Elkton is a small community, incorporated in 1948, and is located in the northern part of Douglas County. The city is located 40 miles southwest of Eugene and is situated on the north bank of Umpqua River at the confluence of Elk Creek. To the east of Elkton lies the City of Drain, approximately 13 miles away. The population of the city was 126 in 1975 (Reference 6), increasing to a population of 147 in the 2000 census (Reference 5).

The average annual rainfall in the vicinity of Elkton is 49 inches, with maximum monthly accumulations usually occurring in December. The average annual temperature is 54°F with historic extremes ranging from -1°F in December 1924 to 108°F in July 1946 (Reference 7). The elevation of Elkton is 140 feet. The maximum elevation of the Elk Creek basin is 2,400 feet. Storm runoff seldom includes snowmelt because of these relatively low elevations (Reference 10).

The Elk Creek basin is densely forested in the mountainous areas; farm communities occupy the upland valley terraces. Hydrologic soils (primarily in the Nekia-Jory and Blachly-Bohannon Associations) indicate fair to good water-holding capacities (Reference 8).

City of Glendale

The City of Glendale, founded in 1901, is located in southern Douglas County. The city is situated on the toe of a densely forested ridge lying between the Rogue River and Cow Creek. The crest of the ridge, a few miles south of the city, is approximately 3,000 feet. The elevation at the Southern Pacific Railroad depot is 1,420 feet.

Cow Creek heads in the Klamath Mountains at an altitude of approximately 4,000 feet and runs along the northern boundary of the City of Glendale. Its tributaries in the City of Glendale are Mill Creek, which forms the eastern corporate limits, and Section Creek, which runs through the western end of the city.

The Glendale-Azalea Valley is approximately 0.5 miles wide, with a flat floodplain. The channel is quite wide and relatively shallow with the channel slope ranging from 8 to 21 feet per mile. The bottom is generally loose, well-graded gravel, with a few rock outcrops. The primary banks are from 6 to 10 feet high.

In alluvial valleys, such as the Glendale-Azalea Valley, channel-bank erosion and movement of bed material occur during every high-water season. The natural process is for the stream to cut away its bank on the outside of sharp bends and deposit fine material on the inside of bends. Eddies and crosscurrents affect the movement and deposition of material within the stream channel. Aerial photographs of the valley show evidence of old stream channels that were abandoned in years past, when new channels were cut during a flood. Small meanders and braiding of the low-water channel between the primary banks show the looseness of the bed material. Erosion of the primary banks and cutting of new channels can be expected to continue as part of the natural geomorphic process.

The temperature at Riddle, 15 miles north of Glendale, ranges from an average minimum of 41°F to an average maximum of 68°F. Extreme temperatures at Riddle have ranged from -3°F to 110°F (Reference 7).

The population of Glendale was 760 in 1974 (Reference 11). The population was estimated to be 855 in the 2000 census (Reference 5). The economy, thus the population, of the area is dependent on forest products and agriculture.

Most of the commercial establishments of Glendale are located on Pacific Avenue, on the south side of the Southern Pacific Railway yards. Few residences are on the flood plain of Cow Creek. Much of the land north of Montgomery Street is undeveloped pasture, except for one block of Sether Avenue, which is residential development.

City of Myrtle Creek

The City of Myrtle Creek, incorporated in 1893, is in the southern part of Douglas County. The city is located at the confluence of Myrtle Creek and the South Umpqua River. It is approximately 15 miles south of Roseburg, the county seat. In 1974, the population of Myrtle Creek was 2,945 (Reference 11). The population has increased to 3,419 in 2000 (Reference 5). The economy of the area is predominately logging; a large mill is located in the city. Interstate Highway 5, a segment of U.S. Highway 99, and the

Southern Pacific Railroad are the main traffic arteries in a north and south direction; county roads follow eastward and upstream along North and South Myrtle Creeks. Floodplain development includes log storage, warehouses, some residential development, a city park, and agriculture.

Myrtle Creek begins at the confluence of North and South Myrtle Creeks, near the southeast corporate boundary of the city. The drainage area at the mouth of Myrtle Creek is 117 square miles. North and South Myrtle Creeks drain parts of the western foothills of the Cascade Range.

The local terrain rises steeply from a wide floodplain on Myrtle Creek and from narrow floodplains on North and South Myrtle Creeks. The wedge-shaped area between North and South Myrtle Creeks, and just above their confluence, is low and slopes westward.

City of Oakland

The City of Oakland is a small community that was founded in 1878, and is located in the north-central portion of Douglas County. The city is approximately 20 miles north of Roseburg and 2 miles east of Interstate 5. The population was estimated to be 954 in 2000 (Reference 5). The western corporate boundary lies along the east bank of Calapooya Creek.

City of Reedsport

The City of Reedsport is located in the northwest portion of Douglas County and was incorporated in 1919. Reedsport is situated on the south bank of the Umpqua River, 11 miles upstream from the river mouth on the Pacific Ocean, and is entirely surrounded by unincorporated areas of Douglas County. The city lies approximately 20 miles south of Florence and 27 miles north of the City of Coos Bay. The elevation varies from less than 10 feet in the flat areas near the river to over 300 feet in the steeper portions of the city. The population of Reedsport was estimated at 5,010 in 1980 (Reference 12) and was estimated to be 4,378 in 2000 (Reference 5). The economy depends primarily on the wood products industry, commercial fishing, and tourism.

Total land area within the corporate limits of Reedsport is 1,331 acres. A total of 40 acres of vacant lands lie in the floodplain and are classified as unbuildable (Reference 13). Development in the floodplain is single-family residences, mobile homes, and commercial businesses. U.S. Highway 101, State Highway 38, and the Southern Pacific Railroad serve the Reedsport area.

The City of Reedsport has a temperate marine climate, with temperatures ranging from an average of 60°F in August to 44°F in January. Rainfall averages 77 inches per year, with more than 10 inches per month in the period of November through February (Reference 14). Sand, silty loams, sandstone, and siltstone are the predominant soil and rock types found in the area (Reference 14).

Scholfield Creek flows north through the central portion of Reedsport to its confluence with the Umpqua River. It has a length of 15 miles and drains an area of 22 square miles.

City of Riddle

The City of Riddle is in southern Douglas County, 2 miles upstream from the mouth of Cow Creek and 25 miles south of Roseburg. The City is situated on a terrace above the Cow Creek floodplain at the lower end of a 6-mile-long and 1- to 1.5-mile wide valley. The elevation at the railroad depot is 710 feet.

The population of the City of Riddle was 1,215 in 1976 (Reference 6). The population was 1,014 in 2000 (Reference 5). Normal annual precipitation is 32 inches. Temperatures in the City of Riddle range from an average minimum of 41°F to an average maximum of 68°F. Extreme temperatures have ranged from -3°F to 110°F (Reference 7). The economy of the area is dependent on agriculture, forest products, and mining.

Cow Creek heads in the Klamath Mountains at an altitude of approximately 4,000 feet and flows through these mountains for its entire length. The Klamath Mountains are composed of relatively impervious rocks (Reference 9). The slopes are steep, deeply dissected, and densely forested.

City of Roseburg

The City of Roseburg, the county seat of Douglas County, was incorporated in 1872. The city is on the South Umpqua River, 12 miles upstream from the confluence of the North Umpqua River and South Umpqua River, and at the mouth of Deer Creek. In 1974, the population of Roseburg was 15,530 (Reference 15), and has increased to 20,017 according to the 2000 census (Reference 5). Roseburg is the largest city in Douglas County, having 20 percent of the population of the county, more than three times the population of the second largest city. Interstate Highway 5 and the Southern Pacific Railroad are the main traffic arteries and lead in a north-south direction. Only local traffic moves in an east-west direction.

The weather records at Roseburg show the normal annual precipitation to be 33 inches; the maximum annual precipitation was 46.0 inches in 1891. The greatest 24-hour precipitation was 4.8 inches in November 1961.

The temperatures at Roseburg range from an average minimum of 33°F to an average maximum of 84°F. The maximum recorded temperature was 109°F in July 1946; the minimum recorded temperature was -6°F in January 1888. The normal annual snowfall is less than 6 inches; the greatest 24-hour snowfall was 13.5 inches in January 1969. Snow seldom remains on the ground for more than a week.

Most of the floodplain of the South Umpqua River in Roseburg contains residential development. There is a park, a school, and some commercial development along Harvard Boulevard in west Roseburg. The area along Newton Creek in northwest Roseburg is residential and park land. There is a great deal of commercial development along the lower 1/3 mile of Deer Creek, but upstream the floodplains are devoted mainly to residential development.

City of Sutherlin

The City of Sutherlin was incorporated in 1911, and is located in the north-central portion of Douglas County along the Interstate 5 corridor. The city is approximately 12 miles north of Roseburg. The population was estimated to be 6,669 in 2000 (Reference 5). Portions of the northern and western corporate boundaries lie along the east bank of Calapooya Creek.

City of Winston

The City of Winston was incorporated in 1955, and is located in the central portion of Douglas County. The city is located approximately 9 miles southeast of Roseburg. The population was estimated to be 4,613 in 2000 (Reference 5). The confluence of Lookingglass Creek and the South Umpqua River is within the corporate limits. The

eastern corporate boundary lies along the west bank of the South Umpqua River.

City of Yoncalla

The City of Yoncalla, is located in the northeastern Douglas County approximately 30 miles north of Roseburg. The city was incorporated in 1901. The population was estimated to be 1,052 in 2000 (Reference 5). Portions of the eastern corporate boundary lie along the west bank of Yoncalla Creek.

2.3 Principal Flood Problems

The highest stream flows in the Umpqua River basin usually occur during November through March as a result of heavy winter rains augmented by snowmelt. Most of the flooding occurs in the valley areas of the South Umpqua and Umpqua Rivers, although the tributary streams of Cow Creek, Calapooya Creek, and Elk Creek also have extensive flood plains. Most of the land subject to flooding along the South Umpqua River is below Days Creek. Because these valleys are the most densely populated and intensively developed in Douglas County, the principal flood problems occur along this stream. A flood potential also exists along the Umpqua River between Elkton and the confluence of the North and South Umpqua Rivers. In the Glendale-Azalea valley of Cow Creek, much bank erosion and channel shifting occurs during floods.

The valleys of the Umpqua River basin have a history of frequent flooding. Major flooding occurred in 1861, 1890, 1927, 1953, 1955, 1964, and 1971 (References 16, 17, 18, and 19). The flood of December 1964 was a widespread, outstanding flood throughout the entire basin, although it has been exceeded by storms concentrated in tributary basins. The primary cause of the flood was a 10-day period of sustained rainfall and mild temperatures which melted snow in the upper Cascade Mountain range. The flood of December 1964 had a recurrence interval of approximately 100 years on the Umpqua, North Umpqua, and South Umpqua Rivers. In the vicinity of Elkton, the flood was estimated to have a recurrence interval of 65 years (a 1.5-percent chance of occurring in any given year). In the Reedsport area, the flood that occurred in December 1964 was equal to the 100-year flood, with an estimated flow of 329,000 cfs (Reference 18). Water was 4 feet deep in most areas, flooding 300 homes, 177 commercial and industrial structures, and most of the public buildings (Reference 20).

The flood of December 1964 caused damage totaling \$25,732,000. Of this total, more than \$5 million was for agricultural damage, approximately \$6.5 million for residential damage, nearly \$3 million for commercial, nearly \$2 million for industrial, nearly \$3 million for utility, and more than \$6 million for highway damages (Reference 21).

Major flooding occurred in January 1974. Flow in the Umpqua River was estimated to be 262,000 cfs, with a return period of 28 years (Reference 18). Levees were constructed in 1970 in order to protect the low lying areas of the City of Reedsport previously flooded in 1964. The levee system prevented significant flood damages that could have occurred during this flood.

Very little is known about the floods of 1861 and 1890. At the gaging station on the Umpqua River near Elkton, local residents in 1935 pointed out a high-water mark of the 1861 flood, which was equaled by the December 1955 flood, and exceeded only by the flood of December 1964.

The flood of December 22, 1964, was the highest since at least 1890 on the South

Umpqua River. A statistical analysis of the streamflow records shows the 1964 flood to be a 100-year flood. During this flood, a large area in the western part of Roseburg was inundated and many homes and commercial structures along the riverbanks suffered flood damage.

At the gaging station on the South Umpqua River near Brockway, the flood of February 1890 was 1.9 feet higher than the flood of February 1927, according to a resident who lived nearby at the time of both floods. The flood of 1890 was exceeded only by the flood of December 1964. It is difficult to determine the discharge of the floods of 1861 and 1890 because of probable changes in the hydraulic carrying capacity of the river channel over an extended period of time

The largest Cow Creek flood of record since 1928 occurred on January 15, 1974, exceeding the 100-year flood level. The 10-year flood level has been exceeded several other times since streamflow records began in 1928 at the gaging station near Azalea, located 17 miles east of Glendale. These flood levels occurred on October 29, 1950, December 22, 1964, December 6, 1981, and February 17, 1983. A comparison of historic floods is difficult because bank erosion and movement of alluvial material within the channel can cause two floods of the same discharge to reach different elevations. Cow Creek has been regulated by Galesville Dam at RM 60.0 since 1985.

The highest peak flow recorded on Elk Creek occurred in February 1961. An analysis of records collected at gaging station near Drain, indicated the event had a recurrence interval of 60-years (a 1.6-percent annual chance of occurring once in any given year). The second largest flood event was recorded in November, 1996. An analysis of records collected at gaging station near Elkhead, indicated the event had a recurrence interval of 50-years (a 2-percent annual chance of occurring once in any given year). Elk Creek's contribution to the flooding in Elkton during the 1964 flood is unknown, but probably was negligible. Floods emanating from the Elk Creek drainage will reach elevations considerably lower than historic flood stages of the Umpqua River.

In the City of Drain, the flood of 1961 inundated a large area north of Applegate Street in west Drain, and the area south of B Street west of the Southern Pacific Railroad. The low areas along Pass Creek were also flooded. Flooding east of Cedar Street was aggravated by a debris jam in the bridge over Elk Creek. Subsequent to the flood of 1961, a new and larger bridge over Elk Creek was built in the City of Drain, replacing the old span. Flood elevations shown in this report are based on the current conditions. The 1-percent-annual-chance flood level east of Cedar Street is lower than the debris-affected flood level of 1961.

Major flooding in the City of Myrtle Creek results primarily from high stages on the South Umpqua River, causing Myrtle Creek to back up and inundate lowlands along the creek. The effect of this backwater diminishes upstream from the confluence of North and South Myrtle Creeks.

Flooding along the lower 2,300 feet of North Myrtle Creek, or almost to the North East Johnson Street Bridge, is influenced by backwater from South Umpqua River. Usually, the same flood events occur in Myrtle Creek and the South Umpqua River drainage basins; however, frequently, the intensity of the flood events differs on each stream. As an example, on the South Umpqua River, the December 1964 flood was probably the highest since at least 1890; whereas, on North Myrtle Creek, the highest peak flow was in December, 1981.

Upstream from the North East Johnson Street Bridge, flooding along North Myrtle Creek is entirely the result of high flows on the creek, and is not influenced by backwater from South Umpqua River. Downstream from the Division Street Bridge, at a sharp bend in the channel, high flows frequently overtop the east bank of the creek; and the overflow water moves along at an elevation higher than the water surface in the main creek channel. This water inundates property along Short Street, west of North East Chestnut Avenue, before returning to the main channel at the North East Johnson Street Bridge.

Peak flow data were collected at a gaging station on Canyon Creek during 1951 and from 1953 to 1965. The gage was located 0.4 mile upstream from the city; the highest peak recorded was 3,810 cubic feet per second (cfs) on December 21, 1955. It is estimated that this flow was equivalent to a flood that would occur on the average of once every 35 years (a 2.9 percent chance of occurring in any given year). Flooding was primarily limited to the east campus of the Canyonville Bible Academy.

In 1974, a mudslide temporarily obstructed the flow in Canyon Creek approximately 1 mile upstream from the city. Nine men working in the area were buried; one was never found. When the water suddenly released, surging flows of undetermined magnitude exceeded all previous flood elevations in south Canyonville, but attenuated greatly before reaching the South Umpqua River.

School Creek is ungaged, but the highest flows ever observed resulted from a small dam failure in the upper basin. In the City of Canyonville, flooding occurred on the south bank of the creek between Leland Avenue and Hill Drive and at the entrances of most of the culverts within the city.

Shallow flooding sometimes occurs in the James Street area in southeast Canyonville. The source of this flooding is sheet runoff from a steep hillside and overflow from a diversion canal located above the base of the hill. Because water depths are shallow and the direction of flow is unpredictable, this flooding was determined by approximate methods.

High flows in Scholfield Creek are usually the result of coastal storms. Because of its proximity to the ocean, Reedsport is also affected by extreme high tides and strong onshore winds, which increase flood levels above those caused by high riverine discharges alone.

The floodplain of Deer Creek is generally 300 feet to 800 feet wide in the City of Roseburg. Backwater from a 1-percent-annual-chance flood on the South Umpqua River will affect the stages of Deer Creek for almost a mile upstream from the mouth. Similarly, flooding along lower Newton Creek is primarily caused by backwater from the South Umpqua River

In the vicinity of Glendale, the 1-percent-annual-chance flood on Mill Creek has a discharge of 220 cfs. A Mill Creek discharge greater than 100 cfs overflows a 5-foot diameter pipe culvert under Pacific Avenue. The overflow spreads west almost to Molly Street, with depths probably not exceeding 1 foot. The overflow area slopes northward through the Peewee Rodeo grounds, which is an empty block except for the arena. Some of this overflow will return to the creek channel via a ditch along the railroad, and some can cross Molly Street and flow northwesterly through several backyards toward Gilbert Avenue. The division of overflow is not known, but it is estimated that enough flow will

escape from the channel to prevent the 1-percent-annual-chance flood from overflowing the Sether Avenue culvert downstream. Some of this water may pond south of Gilbert Avenue near Third Street, where Gilbert Avenue slopes downward away from Mill Creek for approximately two blocks and then rises slightly to meet Third Street. Depths will probably not exceed 1 foot. The excess water will escape northward across Gilbert Avenue onto the Cow Creek floodplain, which is several feet lower than Gilbert Avenue.

The 8-foot by 5.5-foot box culvert under the railroad mainline has adequate capacity to carry all Mill Creek flood flows. The 5-foot diameter pipe culvert under the railroad spur will carry a discharge of 125 cfs before some overflow will escape to the east between the railroad mainline and spur. This overflow spillage has the effect of further reducing flood flows in the creek downstream from the railroad. The 5-foot diameter pipe culvert under Sether Avenue, between the church and the Shell gas station, has a discharge capacity of 160 cfs. The 100-year flood is estimated to not exceed this discharge at Sether Avenue. A box culvert is located north of Sether Avenue, under a private driveway which has a 5.5-foot by 3.8-foot opening with a 180cfs discharge capacity. This culvert is not likely to overflow because its capacity is greater than that of the Sether Avenue culvert. A 5-foot pipe culvert is located under a driveway leading to the railroad yards downstream from the aforementioned private driveway. The discharge capacity of this culvert is 125 cfs. A flow in excess of 125 cfs would create an overflow on the west side of the channel, and would spread west and north onto the Cow Creek floodplain.

In the vicinity of Glendale , the 1-percent-annual-chance flood discharge on Section Creek is 370 cfs. Section Creek discharges of greater than 210 cfs overflow the east bank above Willis Avenue and start to overflow Willis Avenue at an elevation 0.6 foot lower than the roof of the Willis Avenue box culvert. As a result, the full capacity of the Willis Avenue culvert will not be reached. The overflow crosses Willis Avenue, flows northward along Sixth Street, crosses Pacific Avenue, the railroad yards and tracks, and reenters the Section Creek channel at the Montgomery Street bridge. Some of this overflow may return to the channel above Pacific Avenue.

The Pacific Avenue bridge has adequate capacity for all Section Creek flood flows, although most of the Willis Avenue overflow will bypass the bridge to the east. The 8-foot by 5-foot box culvert under the railroad has adequate capacity to carry 1-percent-annual-chance flood. The Montgomery Street bridges will pass the 1-percent-annual-chance flood, but will be overflowed by the 0.2-percent-annual-chance flood. At the downstream, or north, side of Montgomery Street, the 1-percent-annual-chance flood will overflow the east bank, where the overflow will spread, most of it escaping the channel before it reaches the downstream Decker Avenue crossing. From Montgomery Street to Decker Avenue, the channel becomes progressively more shallow. At Decker Avenue, the channel makes a sharp curve to the west. The overflow flows to the north, downslopes toward Cow Creek, passes residential development, spreads onto pastureland, and, finally, flows into Section Creek. The northward slope of the floodplain at Decker Avenue is 2.2 percent. The westward slope of the channel downstream from the downstream Decker Avenue crossing is 1.3-percent.

The discharge of Section Creek at its mouth is limited to the capacity of the channel at the downstream Decker Avenue crossing because the overflow escapes and flows to the north toward Cow Creek.

Within in the City of Roseburg, flooding along Newton Creek upstream of Stewart Parkway is not affected by South Umpqua River flooding, but it is greatly affected by a

number of other factors. This includes increased urbanization with more runoff from developed lands, heavy trees, and blackberry bushes in the stream bed, and inadequate culvert sizes that constrict flow and serve as collectors of stream debris. Because the drainage basin for Newton Creek is quite steep, floods may rise quickly following a rainstorm and last 6 or more hours in constricted areas such as Garden Valley Boulevard. In the upper study reaches near North Park Lane and Stephens Street, floods may last 3 hours and peak in 1 hour. Constrictive culverts with heavy debris accumulation can easily affect and increase the time of flooding.

An additional flooding problem along Newton Creek is split flows caused by watershed divide overtopping at three locations along the 3.5-mile study reach. Those locations pertain to the left bank just upstream of Stewart Parkway, the area just upstream of the box culvert crossing Mulholland Drive and Interstate 5, and the area just upstream of the box culvert under Roseburg Municipal airport. In addition, flood flows from the main tributary, Sweetbriar Creek, may enter Newton Creek at several upstream locations where constrictive culverts are located.

Flooding along Newton Creek downstream of Stewart Parkway is usually not affected by coincident flooding on the South Umpqua River, although a recent Newton Creek flood in December 1981 was affected by backwater from the South Umpqua River. One complication that can aggravate flood problems is that during severe flood conditions, the South Umpqua River flood water-surface elevations would be superelevated on its right bank near the confluence with Newton Creek due to the tight curve through this reach.

It is believed that the December 22, 1964, flood on the South Umpqua River followed this course of action. Extensive flooding of property occurred on the left bank of Newton Creek in the 0.8-mile reach downstream of Stewart Parkway. It was originally thought that South Umpqua River flood waters left the main flow along the right bank and flowed into the lower reach of Newton Creek to rejoin the South Umpqua River. Analyses performed during this restudy discount that scenario. December 1964 flood photos do not prove conclusively that the flooding in the lower reach of Newton Creek occurred due to overflow from the South Umpqua River upstream. Douglas County and the City of Roseburg personnel stated that the historic flooding may have been high backwater up Newton Creek combined with numerous depressed areas in the golf course, which intense rainfall would have turned into a virtual lake.

No major floods occurred on Newton Creek during the 3-year period from 1982 to 1984 when the USGS operated two continuous-recording stream-flow gages. However, the USGS estimated a peak discharge of approximately 495 cfs for the December 5, 1981, flood at the Sterling Drive gage. This is equivalent to a 20-year-recurrence-interval flood on the stream. The flood caused considerable nuisance flooding along the study reach, with roads closed along Garden Valley Boulevard and Stephens Street. In addition, some property damage and isolation for many residents occurred at Roseville apartments and at the Rachel Court area. High flood stages on the South Umpqua River affected flooding problems on Newton Creek downstream of Stewart Parkway.

2.4 Flood Protection Measures

A permanent levee was constructed by the USACE in 1970 along the Umpqua River and Scholfield Creek in Reedsport and protects the commercial and residential areas flooded in December 1964. This levee project was designed to protect against a 0.5-percent-annual-chance (200 year) flood with 3 feet of freeboard (Reference 22). This study shows

that the levee also protects against a 0.2-percent-annual-chance flood, but wave action may cause overtopping because of minimal freeboard resulting at that event. Interior drainage is provided by a storm sewer system with four pumping stations. In 1982, a levee was constructed around an area in the southern portion of Reedsport adjacent to the Southern Pacific Railroad. This levee was constructed to have the minimum freeboard required by FEMA to be considered as protection from the 1-percent-annual-chance flood. This levee system is currently undergoing accreditation. As of June 6, 2007, this levee system was categorized as a Provisionally Accredited Levee (PAL) as shown on the February 17, 2010 FIRM. However, the PAL agreement expired on July 26, 2009. Given that the city is pursuing levee assessments and certification, FEMA has not initiated a re-mapping process to de-accredit the levee; therefore, the PAL area continues to be shown on the FIRMs within the City of Reedsport limits.

In 1977, a levee was constructed around the industrial park area in the northern portion of Reedsport. This levee, although constructed at or near the 1-percent-annual-chance flood elevation, does not have the minimum freeboard required by FEMA to be considered as protection from the 1-percent-annual-chance flood.

There are old levees along the lower 7 miles of the Smith River, but these are overtopped by a 10-percent-annual-chance flood.

A private levee was built around one property on Pass Creek. This levee will protect against a 10-percent-annual-chance flood, but will be overtopped by a 2-percent-annual-chance flood. This levee has only a small effect on the elevation of a 1-percent-annual-chance flood. Assessment of the structural adequacy of this levee is beyond the scope of this report.

There are no levees, dikes, or flood-control structures in the Canyon Creek basin. Property owners have improved channel capacities in some areas by removing vegetation. The east bank of Canyon Creek upstream from First Street was improved to reduce flooding on the Canyonville Bible Academy campus.

No structural measures exist to control flooding on Cow Creek. The City of Glendale plans to do some excavation on Section Creek to increase the channel capacity between Montgomery Street and Decker Avenue (Reference 23).

Although no structural flood-protection measures exist on Newton Creek, the City of Roseburg and Douglas County are jointly considering some channel improvements along the study reach using their combined storm-drainage master plan as a basis.

The Cities of Canyonville, Drain, Elkton, Glendale, Myrtle Creek, Oakland, Reedsport, Riddle, Roseburg, Sutherlin, Winston, Yoncalla, and Douglas County participate in the National Flood Insurance Program and each have a floodplain ordinance approved by FEMA for controlling development in flood hazard areas.

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 that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

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.

A regional analysis for the Smith River and Scholfield Creek was done by the USACE in 1969 (Reference 23).

A regional flood-frequency analysis was done to determine the flood discharges for Elk Creek and Pass Creek. Flood peak records at 22 gaging stations representative of the Elk Creek Drainage basin were analyzed by the log-Pearson Type III method (Reference 19). These 22 log-Pearson curves were related by multiple-regression techniques to several basin characteristics, and the resulting equations were used to compute the flood discharges for Elk Creek and Pass Creek. The basin characteristics statistically most significant are drainage area, rainfall intensity, percentage of forest cover, and percentage of lake area. These characteristics explain 94 percent of the variation of the 1-percent-annual-chance flood; the standard error of estimate is 44 percent.

A regional flood-frequency analysis by the USACE was used for determining flood discharges for Section Creek and Mill Creek (Reference 23). Results of this analysis agree within approximately 7 percent with a log-Pearson Type III flood-frequency curve (Reference 24) based on 12 years of peak-flow data at Beaver Creek near Drew, which is of comparable drainage area. Discharges for the 500-year (0.2-percent-annual-chance) floods were determined by extrapolation of the frequency graph above 200 years.

A regional regression analysis was performed to determine the flood discharges for School Creek. Peak flow data collected at five gaging stations in equally small basins (within a radius of 30 miles) were used in separate log-Pearson probability distributions. The results of the five hydrologic analyses were converted to basin yields, averaged for each recurrence interval, and then applied to the School Creek drainage area.

The frequency discharges for Newton Creek were developed using the regional analysis presented in USGS Open-File Report 79-553, "Magnitude and Frequency of Floods in Western Oregon" (Reference 25). The frequency discharges developed by this procedure were checked for reasonableness of results. Three alternative methods were used for the check. The first alternative procedure was another approximate method using the USACE, Portland District, report "Procedures for Determination of Maximum Annual Flood Peak and Volume Frequencies," dated February 1969 (Reference 23). The second procedure was a regression analysis using four nearby stream gages, with three gages being crest gages and one gage being a continuous recorder gage. The third procedure was a direct correlation to the Sutherlin Creek stream gage, using drainage area and normal annual precipitation as direct adjustments to develop flows for Newton Creek.

Results of the comparison for the 1-percent-annual-chance flood indicate that the third and fourth methods compare closely with the recommended first method. The second method using the USACE, Portland District, report (Reference 23) produced a lower 1-percent-annual-chance discharge.

For all other streams studied in detail, the annual peak discharge data were analyzed by the standard log-Pearson Type III method, as described in the U.S. Water Resources Council Bulletin 15 (Reference 26). Discharges for the 500-year (0.2-percent-annual-chance) floods were determined by extrapolation of the frequency graph defined to 200 years. Unless otherwise noted, these frequency analyses were done during the period from 1971 to 1974, as part of flood profile studies for Douglas County.

Flood flows for the Umpqua River are based on statistical analysis of streamflow records for the gaging station Umpqua River near Elkton (USGS No. 14321000). Sixty-seven years of peak flow data was available for the frequency analysis. Flows were transferred by the USGS downstream to Reedsport based on a drainage-area ratio.

Stream gage records for the North Umpqua River at Winchester (USGS No. 14319500) were analyzed by the USGS. Thirty-one years of peak flow data was available for the frequency analysis.

Flood flows for the South Umpqua River were developed using peak discharge data from USGS Gage No. 14312000, South Umpqua River near Brockway, Oregon. Forty-two years of peak flow data were used in the analysis.

Flood flows for Deer Creek were developed by using peak discharge data from USGS Gage No. 14312200, Deer Creek near Roseburg, Oregon. Eighteen years of peak discharge data was available for the analysis.

Stream gage records for North Myrtle Creek and South Myrtle Creek were statistically analyzed utilizing the standard log-Pearson Type III distribution as outlined by the U.S. Water Resources Council (Reference 13). The analysis performed using stream flow records from the gaging station North Myrtle Creek near Myrtle Creek, Oregon (USGS No. 14311000), using 18 years of peak flow data and the gaging station South Myrtle Creek near Myrtle Creek, Oregon (USGS No. 14310700), using 17 years of peak flow data.

To determine the magnitude of flood flows for Canyon Creek, 15 years of peak data collected at the USGS Gage No. 14308900, Canyon Creek at Canyonville, were used in a log-Pearson Type III probability distribution. The generalized skew coefficient determined from the U.S. Water Resources Council's Bulletin 17 (Reference 24). The USGS computer program J-407 (Reference 27) detected one low outlier which was subsequently dropped. The resultant peak discharges for the selected recurrence intervals were not adjusted for expected probability. The hydrologic analysis of Canyon Creek could not be applied to the ungaged School Creek basin because the basin yield of Canyon Creek is greatly influenced by a moderate rain shadow formed by Silver Butte and Canyon Mountain. Also, the School Creek basin is very small compared to Canyon Creek.

The hydrologic analysis performed for Cow Creek, previously studied in 1974, was revised by a restudy on April 21, 1999. For the restudy, a hydrologic analysis was completed to establish annual peak discharge frequency relationships for floods of

selected recurrence intervals for Cow Creek. Discharge-frequency relationships were developed for three specific locations in the downstream reach. These locations were chosen where there were major changes in drainage areas, usually where tributaries enter Cow Creek. Cow Creek has been regulated by Galesville Dam since October 7, 1985. For this reason, both natural (unregulated) and regulated discharge-frequency relationships were developed.

Maximum annual discharges at two USGS stream-gaging stations were available for the restudy: Cow Creek near Azalea, Oregon (USGS Gaging Station No. 143090000) at River Mile (RM) 58.2, and Cow Creek near Riddle, Oregon (USGS Gaging Station No. 14310000) at RM 6.7. The gage at Riddle has 31 years of unregulated peak-flow data, from 1955 through 1985. The gage at Azalea has 57 years of unregulated peak-flow data, from 1928 through 1985. Natural discharge-frequency relationships were developed at these two gage sites using Version 1 of the USACE "Flood Flow Frequency Analysis Computer Program" (Reference 28). The log-Pearson Type III distribution for computed probability is used by the program. Methods employed by the computer program reflect techniques described in U.S. Water Resources Council Bulletin No. 17B, "Guidelines for Determining Flood Flow Frequency" (Reference 29).

Regulated discharge-frequency data were then developed for the two gaging stations. A numerical model of Cow Creek flood regulations by Galesville Dam was set up using the USACE HEC-5 computer program (Reference 30). Seven historical floods and different multiples of these floods were routed through Galesville Dam and then downstream to the mouth of Cow Creek with this model. The output data were used to develop a relationship between natural and regulated flows at each gage site. Flood discharges computed for the gaging station were transferred to Glendale by drainage-area ratio.

Peak discharge-drainage area relationships for each stream studied in detail are shown in Table 4, "Summary of Discharges".

Table 4. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	10-percent- annual-chance	Peak Discharges (cfs)		
			2-percent- annual-chance	1-percent- annual chance	0.2-percent- annual chance
Canyon Creek					
At Confluence with School Creek	38.8	3,500	4,268	4,574	5,291
At Gaging Station	36.9	3,360	4,050	4,320	4,940
Cow Creek					
At Confluence with South Umpqua River	494.0	34,200	48,500	54,300	69,100
At Glenbrook Loop Road Bridge	463.0	32,500	45,500	51,000	65,000
At USGS Gage No. 14310000, Near Riddle	456.0	32,000	45,500	51,000	65,000
Upstream of Southern Pacific Railroad Bridge	188.0	7,900	14,400	17,400	25,200
Downstream of Windy Creek	181.0	7,600	13,800	16,700	24,440
At State Staff Gage at Glendale	157.0	6,300	11,900	14,500	21,600
Downstream of Quines Creek	131.0	4,880	9,660	12,000	18,400
Downstream of Starveout Creek	108.0	3,580	7,660	9,800	15,400
Downstream of Whitehorse Creek	88.3	2,450	5,960	7,800	12,900
At USGS Gage No. 14309000,Near Azalea	78.0	1,830	5,000	6,700	11,500
At Galesville Dam	74.3	1,830	5,000	6,700	11,500
Deer Creek					
Near Roseburg	53.2	6,820	8,760	9,520	11,500
Elk Creek					
At Confluence with Umpqua River	290.0	39,000	59,500	67,700	93,000
Below Pass Creek	168.0	17,000	26,000	30,400	41,600
Above Pass Creek	105.0	12,000	18,500	21,100	28,600
Mill Creek					
At Pacific Avenue	1.33	106	180	220	320
North Myrtle Creek					
At Mouth	54	3,260	4,440	4,950	6,100

Table 4. Summary of Discharges (continued)

<u>Flooding Source and Location</u>	<u>Drainage Area (Square Miles)</u>	<u>Peak Discharges (cfs)</u>			
		<u>10-percent- annual-chance</u>	<u>2-percent- annual-chance</u>	<u>1-percent- annual chance</u>	<u>0.2-percent- annual chance</u>
South Myrtle Creek					
1 Mile Above Mouth	44	2,950	3,930	4,350	5,300
Newton Creek					
At Mouth	7.5	853	1,269	1,440	1,920
Just Upstream of Stewart Parkway	6.1	715	1,055	1,200	1,600
Just Downstream of Stewart Parkway	5.8	680	1,005	1,140	1,510
Downstream Sweetbriar Creek	5.4	645	950	1,080	1,430
Upstream Sweetbriar Creek	4.1	505	740	840	1,110
At Southern Pacific Railroad	3.9	480	705	800	1,060
At Sterling Drive	3.3	410	600	680	900
At Parker Road	3.1	390	570	645	850
Study Limits, 1,200 Feet Upstream of Parker Road	2.9	375	545	620	810
Pass Creek					
At B Street	61.9	6,900	9,900	11,400	14,900
Scholfield Creek					
Upstream of Oar Creek	15.5	1,600	2,000	2,300	2,900
School Creek					
At Confluence with Canyon Creek	1.13	140	218	254	351
Section Creek					
At Willis Avenue	2.29	180	310	370	540
Smith River					
Below Confluence with North Fork	350	33,000	44,000	50,000	65,000
Above Confluence with North Fork	230	24,000	33,000	38,000	50,000
Umpqua River					
At Mouth of Elk Creek	4,003	192,000	282,000	324,000	423,000
Upstream of Smith River	4,192	196,000	287,000	329,000	430,000

Table 4. Summary of Discharges (continued)

<u>Flooding Source and Location</u>	<u>Drainage Area (Square Miles)</u>	<u>10-percent- annual-chance</u>	<u>Peak Discharges (cfs)</u>		
			<u>2-percent- annual-chance</u>	<u>1-percent- annual chance</u>	<u>0.2-percent- annual chance</u>
Umpqua River (continued)					
At Mary Beckly Bridge, Upstream of Elk Creek	3,713	175,000	256,000	294,000	385,000
Near Elkton	3,683	175,000	256,000	294,000	385,000
North Umpqua River					
At Winchester	1,344	76,900	120,000	142,000	200,000
Near Glide	1,210	72,000	114,000	135,000	191,000
South Umpqua River					
Approximately 7.62 Miles Upstream of Mouth	-- ¹	91,700	127,000	142,000	175,000
Near Brockway	1,670	90,300	116,000	124,000	139,000
At Tiller	449	36,30020	59,600	71,600	105,000

¹ Data Not Available

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 Flood Insurance Rate Map (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 this 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.

The profiles and supporting data for the Cow Creek, Deer Creek, Myrtle Creek, North Myrtle Creek, South Myrtle Creek, Scholfield Creek, Smith River Umpqua River, North Umpqua River, and South Umpqua River detailed study areas were prepared during the period from 1971 to 1975 by the USGS as part of the flood profile studies for the Douglas County Planning Department (References 16, 17, and 18). Water-surface elevations of floods of the selected recurrence intervals were computed using the USGS step-backwater computer program (Reference 31). Channel geometry data required for the model were furnished by a commercial photogrammetry firm (Reference 32). Cross section locations were located on aerial photographs (Reference 32) by the USGS at intervals of approximately 1,000 feet along the channel, and were extended across the flood plain by the photogrammetry contractor. Water-depth soundings made in the field by the USGS were used to complete the photogrammetric cross sections. All bridges were examined in the field. The dimensions of those judged to have a significant constricting effect on flood flows were measured and included in the profile computations.

Cross sections for the backwater analysis of the Umpqua River in the vicinity of Reedsport and Scholfield Creek were obtained from 1" = 400' orthophoto work maps with 5-foot contour intervals (Reference 18). The below-water sections were obtained in the field by depth soundings. Bridges were examined in the field and those judged to have a significant effect of flood flows were measured. Water-surface elevations of floods of the selected recurrence intervals were computed through use of the USGS E-431 step-backwater computer program (Reference 33). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Starting water-surface elevations for the Umpqua River and Scholfield Creek were based on the stage-frequency curve by the USACE for the design of the levees in Reedsport (References 18 and 22). Because of uncertainties of flow distribution and discharge downstream from the Smith River, flood profiles were projected downstream based on observed high-water marks of the December 1964 and January 1974 floods, and channel configuration and predicted high-tide data (Reference 34). Upstream from the Smith River, flood profiles were computed by the step-backwater method. For the Umpqua River, below the Smith River, in Reedsport and Gardiner, flood profiles were established based on tidal elevations for the Pacific Ocean. Channel geometry was not available for this reach and, therefore, was not shown on the flood profiles.

In the vicinity of Elkton, detailed studies on the Umpqua River and Elk Creek required

developing hydraulic models in which the design flood flows (determined from the hydrologic analyses) were introduced at the downstream end of each reach. Flood elevations resulting from these flows were then computed at selected points throughout the reach by using the conservation-of-energy theory. These water-surface elevations were computed by using the USGS computer program E-431 (Reference 33).

This computation procedure requires accurate measurements of channel and bridge geometries, as well as proper evaluation of the flow-resisting characteristics such as channel bed material, brush, and trees. To determine these properties, cross sections were surveyed by the transit-stadia method in July 1977.

The Umpqua River profiles originally published in the Douglas County Flood Insurance Study (Reference 35) started at the Scottsburg Bridge, located 20.3 river miles downstream from the city of Elkton. The flood profiles for Elk Creek started at the confluence with the Umpqua River. The water-surface elevations for the Elk Creek channel reflect the Umpqua River flood stages.

The starting water-surface elevations used for the Elk Creek were determined by synthesizing 6,000 feet of channel downstream from cross section A. Four cross sections having the averaged properties of sections A, B, and D were spaced at 1,500-foot intervals within the segment. The fall between sections was based on the average channel gradient between A and E. The 1-percent-annual-chance M-2 curves converged at a point 1,500 feet downstream from cross section A, thus providing an initial starting point for the floodway.

At the confluence of the North Umpqua and South Umpqua Rivers, hydraulic conditions are not suitable for computation of profiles because of the very sharp horseshoe meander of the South Umpqua River, the wide overflow across the meander, and the mingling of the overflow of the two streams. For this area, the 1-percent-annual-chance profile was estimated from high-water marks.

In the vicinity of Roseburg, the South Umpqua River profiles computed in 1971 were revised between cross sections O and T to bring them into closer agreement with a profile based on high-water marks of the historic flood of December 1964. Also, on Deer Creek, the profiles prepared for the present study revise those of the previous study between cross sections L and N, based on additional high-water mark information which was not available in 1971. The flood elevations at the mouth of Deer Creek are higher than the elevations at Deer Creek's confluence point on the South Umpqua River. This is due to the pileup (super-elevation) along the outside of the sharp bend in the South Umpqua River near cross section S. The profile elevations computed for the river are the mean elevations between banks and do not reflect dynamic differences from one bank to the other. Deer Creek elevations at the mouth are not supposed to reflect the mean elevations of South Umpqua River (Reference 18).

The left bank of Deer Creek upstream from Douglas Avenue has changed significantly since 1971. The vegetated floodplain between Section I and the bridge has been filled to an elevation higher than Douglas Avenue and, therefore, will not be inundated by the 1-percent-annual-chance flood. The change has no significant effect of the water-surface profiles.

In the City of Drain, five cross sections on Elk Creek and seven on Pass Creek were surveyed in 1968 as part of a flood-mapping study on Elk Creek and selected tributaries (Reference 36). In 1977, these cross sections were extended, and six additional cross sections were surveyed for this Flood Insurance Study. Also, ground-elevation profiles of First, Third, and Fourth Streets and at Anna Drain Park were surveyed to help define flood boundaries between cross sections.

Step-backwater computations on Elk Creek in the City of Drain began at Hayhurst Road, 1.2 miles downstream from Fir Street, using cross section data surveyed in 1968 and starting elevations derived from the computations of 1968. The USGS computer program E-431 was used for the step-backwater computations (Reference 33).

Flood profile computations on Pass Creek began by assuming concordant flood elevations from Elk Creek. That is, the 1-percent-annual-chance flood elevation on Elk Creek was used to begin the 1-percent-annual-chance flood profile on Pass Creek. However, the floodway and natural elevations on Elk Creek were computed assuming a lower than 1-percent-annual-chance elevation on Elk Creek. This assumption makes the floodway and natural 1-percent-annual-chance elevations on the Floodway Data Table for Pass Creek lower than the elevations on the Pass Creek flood profiles.

Detailed studies on Canyon and School Creeks required developing hydraulic models in which the design flood flows (determined from the hydrologic analyses) were introduced at the downstream end of each reach. These flows were then mathematically routed upstream using the conservation-of-energy theory, thus producing water-surface elevations at specific points throughout the reach. The flood profiles are based on elevations computed by using the USGS computer program E-431 (Reference 33). This computation procedure requires accurate measurements of channel, bridge, and culvert geometries, as well as proper evaluation of the flow-resisting characteristics of the channel bed material, brush, and trees (roughness coefficients). To determine these channel properties, cross sections were surveyed by transit-stadia method in August and September 1976.

The flood profiles for Canyon Creek started at an initial cross section (cross section A) at the sewage-treatment plant at the mouth of the creek. The initial water-surface elevations at cross section A were determined from the original Douglas County Flood Insurance Study (Reference 35).

The flood profiles for School Creek began at the culvert on Canyon Avenue, the first point where energy controls could be readily identified (cross section C). Cross sections A and B were used to estimate flood elevations downstream from the energy control. The initial water-surface elevations at cross section C were determined from a composite stage-discharge relation at the culvert entrance. A composite stage-discharge relation is a graphic presentation that combines the amount of water flowing through the culvert with the amount flowing over the road, and relates the total flow to an upstream water-surface elevation. Flow through the School Creek culverts was computed by using the USGS computer program A-526 (Reference 37). The Main Avenue culvert was the only culvert that carried all prescribed flows without overflowing the roadway.

For Myrtle Creek, North Myrtle Creek, and South Myrtle Creek cross sections used in the step-backwater computations were obtained by photogrammetric methods at intervals of

approximately 1,000 feet along the stream. Data on two additional cross sections and on bridge geometry were obtained by ground survey. Profiles defined by step-backwater methods were calibrated using actual documented flood levels. Home construction and fill along North Myrtle Creek just north of Riverside Drive, near Northeast Bond Street, had altered the floodplain slightly since original USGS flood study. A ground survey was made in that area to adjust profiles developed from earlier photogrammetric studies (References 16 and 32).

Starting flood elevations for Myrtle Creek are the coincident flood elevations on the South Umpqua River, based on flood-frequency data used in previous flood-profile studies on the river. Starting flood elevations on North and South Myrtle Creeks are the coincident elevations on Myrtle Creek. The base flood profiles presented in this report agree within 0.1 feet of the profiles presented in the 1972 report (Reference 16), except along North Myrtle Creek. On North Myrtle Creek, profiles were adjusted slightly where recent fill material has altered the floodplain. Also, adjustments were made based on evidence of high water recently found just downstream from the Division Street Bridge.

Cross section data for Mill Creek and Section Creek were obtained by field survey during the summer of 1976. The pertinent dimensions of six culverts on Mill Creek and two culverts and two bridges on Section Creek were also measured.

Headwater elevations for the culverts of Mill Creek and Section Creek were computed using the USGS computer program A-526 (Reference 37). Stage-discharge rating curves, which include the effect of road overflow, were drawn for these culvert headwater computations and were used to start step-backwater computations upstream from the culverts. The USGS computer program E-431 was used for the step-backwater computations (Reference 33).

A hydraulic analysis for Newton Creek was performed using the USACE HEC-2 computer program (Reference 38). Starting water-surface elevations were determined using the slope-area method. Along the South Umpqua River near the confluence of Newton Creek, a HEC-2 water-surface profile computer model was set up for the study reach using cross-section data from the former USGS study (Reference 38). Starting water-surface elevations were taken from a rating curve for the starting cross section, derived from the USGS study.

Channel cross sections for Newton Creek were field surveyed by the USACE and orthophoto topographic maps at a scale of 1"=100', with a contour interval of 2 feet (Reference 39), were developed by the City of Roseburg. The mapping scale was reduced to 1"=200' to use for base workmaps. Cross-section locations along the channel and overbank areas were determined using a combination of field-survey and photogrammetry methods. Field surveys were taken of the channel area and at least 50 feet to each side of the channel. The surveys were conducted in July 1984 and updated at selected locations in March 1989. All bridges and culverts were surveyed to obtain elevation data and structural geometry. A total of 57 cross sections were field surveyed, including 34 channel cross sections and 23 bridges and culverts. The two bridges in the study reach that were not modeled in the USGS study were added based on measurements taken in the field. Debris accumulation of 1 foot in width on each side of each pier was assumed.

The high roughness coefficients along Newton Creek are partially due to heavy vegetation throughout the study reach in the form of trees and blackberry bushes and the fact that Newton Creek is a high-gradient stream with an average stream slope of 0.009 (Reference 40). Several high-water marks and flood photographs verify these high roughness coefficients. In addition, very high roughness coefficients were used to model the Rachel Court area. Several high-water marks of the December 5, 1981, flood were obtained in this very-dense mobile home complex and these high roughness factors were required to calibrate the HEC-2 computer model to the high-water marks.

Due to the split flows caused by watershed divide at three locations as mentioned earlier, a divided flow analysis technique was used to determine the percentage of the original flows along Newton Creek. The split-flow analysis determined that the 2-, 1-, and 0.21-percent-annual-chance discharges would be reduced at the mouth to account for the independent flows lost to the South Umpqua River so that they are attenuated through these reaches to the extent that they reenter Newton Creek after its peak has passed. At the mouth of Newton Creek, the 0.2-percent-annual-chance flood for Newton Creek would be reduced from 1,440 to 1,130 cfs and the 2-percent-annual-chance flood would be reduced from 1,270 to 1,080 cfs due to split flows.

An accurate analysis of flood depths and flooded-area outlines outside the drainage basin would require the development of flood hydrographs for Newton Creek in order to determine the volume of water that would inundate areas outside the Newton Creek Basin. Hence, flood boundaries of the 1986 USACE approximate study for Newton Creek (Reference 41) are generally used for areas outside the Newton Creek drainage basin. However, the 0.2-percent-annual-chance flooded-area outlines for the reach upstream of the Roseburg Municipal Airport box culvert for this restudy are similar to those used for the 1-percent-annual-chance flooded-area outlines in the referenced 1986 approximate study.

For the entire 3.5-mile reach along Newton Creek, the large number of cross sections with a small rise in water-surface is due to either high top of bank elevations or sensitive upstream cross sections that denote a full 1-foot rise in water surface.

The hydraulic analysis of Cow Creek was revised on April 21, 1999. Most of the cross-section data for the revision were obtained from the original USGS study published 1975 (Reference 18). In the original study, the USGS developed cross-section data for the overbank areas of Cow Creek using orthophoto work maps at a scale of 1"=400'. Water-depth soundings were made in the field to obtain data for the main channel portions of the cross sections. Flood profile data were then developed by the USGS using the E-431 computer program (Reference 33).

For the restudy, cross-section data from the original study were converted to the USACE HEC-2 format. Bridge data for 14 bridges in the Glendale reach were surveyed in September 1990. The HEC-2 computer program (Reference 38) was used for the hydraulic analysis. The model for the reach of Cow Creek between the City of Glendale and Galesville Dam contains 154 cross sections; 124 of these cross sections were obtained from the USGS, 14 were surveyed at bridges, and the remainder were estimated cross sections associated with the bridges. Locations of most of the cross sections used in the hydraulic analysis are shown on the Flood Profiles. The average slope of the streambed of Cow Creek is approximately 0.0034 throughout the study reach.

Channel roughness coefficients (Manning's "n") required in the hydraulic computations were selected in the field for sub-reaches through each cross section. Written descriptions of the bed material and color-slide photographs of the channel were used to aid in the office review of the coefficients selected. The aerial photographs were used as aids in the selection of roughness coefficients for the floodplain (Reference 32). The range of roughness values used for all floods is shown in Table 5.

Table 5. Range of Manning's Roughness Values

<u>Flood Source</u>	<u>Main Channel</u>	<u>Flood Plain</u>
Canyon Creek	0.032-0.060	0.030-0.091
Cow Creek	0.035-0.040	0.07
Deer Creek	0.030-0.055	0.035-0.125
Elk Creek	0.032-0.055	0.032-0.150
Mill Creek	0.040-0.070	0.035-0.125
Myrtle Creek	0.030-0.055	0.035-0.125
North Myrtle Creek	0.040	0.040-0.100
South Myrtle Creek	0.040	0.040-0.100
Newton Creek	0.045-0.125	0.065-0.150
Pass Creek	0.032-0.055	0.032-0.150
Scholfield Creek	0.015-0.030	0.035-0.125
School Creek	0.032-0.060	0.030-0.091
Section Creek	0.040-0.070	0.035-0.125
Smith River		
Lower Reach	0.015-0.030	0.035-0.125
Upper Reaches	0.030-0.055	0.035-0.125
Umpqua River		
Lower Reach	0.015-0.030	0.035-0.125
Upper Reaches	0.030-0.055	0.035-0.125
North Umpqua River	0.030-0.055	0.035-0.125
South Umpqua River	0.030-0.055	0.035-0.125

Several streams were studied by approximate methods using the various data available. For Elk Creek and Yoncalla Creek, in the vicinity of Drain, a USGS flood profile study was extended to estimate the 1-percent-annual-chance profile (Reference 36). For Calapooya Creek, cross sections and profiles data were obtained from unpublished data collected by the U.S. Soil Conservation Service. For the South Umpqua River, approximate elevations were determined using an approximate increment of flood elevation above median low water.

Approximate elevations for Newton, Lookingglass, Rice, Olalla, Tenmile, and Willis Creeks were determined by field reconnaissance, with the help and concurrence of the Douglas County Water Resources Survey. The Douglas County Water Resources Survey also furnished the location of many high-water marks, which were used to verify the computed profiles.

In the City of Canyonville, an approximate study based on information obtained from local residents was used to estimate the inundation resulting from side-hill runoff in the James Street area. A small diversion canal near the base of the hill originates at a diversion dam at the site of the former gaging station on Canyon Creek. The rusted intake manifold structure is difficult to regulate; flows in the canal are unpredictable. The canal has an abrupt reduction in carrying capacity behind the residence at 287 James Street. The source of flooding was assumed to begin at that point.

Locations of selected cross sections used in the hydraulic analyses are shown on the

Flood Profiles. For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Insurance Rate Map published separately.

With the exception of Newton Creek, the hydraulic analyses for this study 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, there are no significant changes made to the existing drainage structures or to other physical features of the channels (such as changes in alignment and vegetation).

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 used for newly created or revised FIS reports and FIRMS was the National Geodetic Vertical Datum of 1929 (NGVD 29). With the completion of the North American Vertical Datum of 1988 (NAVD 88), many FIS reports and FIRMS are now prepared using NAVD 88 as the referenced vertical datum.

To accurately convert flood elevations for the streams and rivers in Douglas County from the NGVD 29 datum to the newer NAVD 88 datum, the following procedure was implemented. Locations at the upstream and downstream ends of each flooding source, as well as at an intermediate location between these two end points, were evaluated using the USACE CORPSCON vertical datum conversion software. At each of the three points CORPSCON calculated the difference between NGVD 29 and NAVD 88 elevations. These three conversion factors were averaged to develop an average conversion factor for each flooding source. The final NAVD 88 elevations reported herein were computed by adding the calculated average conversion factor to the existing NGVD 29 elevation data. Table 6 shows the conversion factor for each stream studied in detail. The maximum offset reported in Table 6 is the greatest difference between the average conversion factor and either the minimum or maximum conversion factor.

Table 6. Vertical Datum Conversion Factors

Conversion from NGVD 29 to NAVD 88 (feet)				
<u>Stream Name</u>	<u>Minimum Conversion</u>	<u>Maximum Conversion</u>	<u>Average Conversion¹</u>	<u>Maximum Offset</u>
Canyon Creek	3.37	3.39	3.38	0.01
Cow Creek	3.36	3.51	3.42	0.09
Deer Creek	3.48	3.51	3.50	0.02
Elk Creek	3.61	3.63	3.61	0.02
North Myrtle Creek	3.42	3.43	3.42	0.01
South Myrtle Creek	3.42	3.42	3.42	0.00
Newton Creek	3.47	3.51	3.48	0.03
Pass Creek	3.61	3.62	3.62	0.01
Scholfield Creek	3.59	3.63	3.61	0.02
School Creek	3.38	3.40	3.39	0.01
Smith River	3.54	3.57	3.56	0.13
Umpqua River	3.45	3.59	3.54	0.09
North Umpqua River	3.45	3.63	3.54	0.09
South Umpqua River	3.37	3.45	3.43	0.06

¹ Used to convert elevation data from NGVD 29 to NAVD 88.

Flood elevations shown in this FIS report and on the FIRMs are referenced to NAVD 88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the NGVD and the NAVD, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242
(301) 713-4172 (fax)

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 the FIRMs for this community. Interested individuals may contact FEMA to access these data.

To obtain current elevation, description and/or location information for benchmarks shown on the FIRMs, please contact information services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS report provides 1-percent annual-chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent-annual-chance flood elevations; delineations of the 1-percent-annual-chance and 0.2-percent-annual-chance floodplains; and 1-percent-annual-chance floodway. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data tables and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS report as well as additional information that may be available at the local community 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 (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance (500-year) flood is employed to indicate additional areas of flood 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 a contour interval of 5 feet (Reference 32).

For the area in the vicinity of Winchester Bay, flood boundaries were determined photogrammetrically using aerial photography at a scale of 1:12,000 (Reference 43).

In the vicinity of Reedsport, the boundaries were interpolated between cross sections using topographic maps at a scale of 1:4,800 with a contour interval of 2 feet (Reference 43).

For the Umpqua River below The Point, flood boundaries were interpolated using topographic maps at a scale of 1:62,500 with a contour interval of 80 feet (Reference 44).

Between cross sections, the boundaries were interpolated photogrammetrically for Elk Creek and Pass Creek, using aerial photographs at a scale of 1:4,800 (Reference 45). In the City of Drain, additional topography was surveyed to help delineate the flood boundaries at Anna Drain Park and at First, Third, and Fourth Streets.

In the western portion of the City of Roseburg, the boundaries were further refined using maps with a contour interval of 2 feet (Reference 39).

In Canyonville, the boundaries were shaped on the basis of random topographic elevations determined during the field surveys. Therefore, the boundaries may not show local variations of either higher or lower terrain between points of definition.

The 1-percent-annual-chance flood boundaries shown for School Creek in the City of Canyonville do not show a bypass-flow condition at the intersection of Frontage Road and First Street. Pondered backwater extends from the School Creek channel to that intersection in a drainage ditch designed to drain surface runoff into the channel. When flood elevations exceed the crown of the intersection, part of the bypass flow will enter three street-level storm drains; the remainder will flow eastward on First Street and possibly divide and flow southward at the intersection of Main Avenue. Flows in the storm sewers re-enter School Creek near the end wall of the Interstate Highway 5 culvert. Shallow bypass flows would be contained by street curbs until eventually entering storm drains in downtown Canyonville, and eventually, Canyon Creek.

The flooding at the Frontage Road intersection may be augmented by flow in a small ditch on the south side of First Street. Such flow would originate as bypass flow from an upstream culvert system at First Street and Hill Drive. A composite rating at the Interstate Highway 5 culvert was estimated assuming ponded ditch flows would develop critical depths as they flowed into the Frontage Road intersection. Flow lost due to bypass was considered to be negligible in the channel downstream from Interstate Highway 5.

For Mill Creek above Pacific Avenue, the 1-percent-annual-chance flood was found to be confined to the channel. At Pacific Avenue, Mill Creek overflows at less than 1-foot depth. Approximate boundaries for the area of overflow were outlined on the basis of field reconnaissance. Enough floodwater is estimated to escape from Mill Creek in the vicinity of the railroad to confine the 1-percent-annual-chance flood to the channel downstream, or north, of the railroad. The area of shallow overflow was designated as Zone X on the maps.

For Section Creek above Willis Avenue, the 1-percent-annual-chance flood was found to be confined to the channel. Section Creek overflows its east bank at Willis Avenue. The

overflow water crosses Willis Avenue, runs north down Sixth Street, crosses Pacific Avenue and the railroad, and returns to the channel at Montgomery Street. The overflow is estimated to be less than 1 foot deep. North of Montgomery Street, Section Creek again overflows its east bank at shallow depths. The overflow water leaves the channel and flows northward onto the Cow Creek floodplain. Approximate boundaries of the overflow areas were determined by field reconnaissance and designated as Zone X on the maps.

The approximate flood boundaries in Canyonville, the vicinity of James Street, were shaped on the basis of information from people living in the area. The ultimate direction of flow near Elliott Street is unpredictable and is, therefore, not shown

For those areas studied by approximate methods, the flood boundaries were plotted on USGS topographic maps, enlarged to a scale of 1:24,000 (Reference 44).

For the South Umpqua River from Days Creek to Tiller, the approximate boundaries were plotted on a topographic map at a scale of 1:24,000, with a contour interval of 5 feet, obtained from the USACE (Reference 46).

Approximate 1-percent-annual-chance floodplain boundaries in some portions of the study area were taken directly from the Flood Hazard Boundary Map for the City of Riddle, Oregon (Reference 47).

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), 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 Flood Insurance Rate Map.

Countywide Update

The detailed study area floodplain boundaries for Newton Creek, 4.2 miles of Deer Creek, 8.4 miles of the South Umpqua River, and 3.1 miles of the North Umpqua River were revised with new topographic mapping with a contour interval of 2 feet (Reference 48). Newton Creek floodplain boundaries were revised within the corporate limit of Roseburg. The floodplain boundaries of Deer Creek were revised from the confluence with the South Umpqua River to 4.2 miles upstream to the southeast corporate limit of Roseburg. The South Umpqua River floodplain boundaries were revised from approximately three miles downstream of the western corporate limit of Roseburg to 3,500 feet upstream of the southern corporate limit of Roseburg. The North Umpqua River floodplain boundaries were revised from approximately River Mile 6.5 upstream to River Mile 9.6.

The effective detailed study area (pre-reservoir) of Cow Creek inundated by the pool of Galesville Reservoir was replaced with an approximate “A” zone designation. The USACE provided an elevation-outflow curve for Galesville reservoir which was used to approximate the reservoir elevation for the base-flood (Reference 49). The A zone was delineated using 1:24,000 USGS topographic map with a contour interval of 40 feet (Reference 50).

The remaining floodplain boundaries were digitized from the effective FIRM and Floodway panels. Aerial photography (Reference 51) and USGS topographic maps (Reference 50) were used to adjust floodplain and floodway boundaries where appropriate.

In accordance with FEMA Procedure Memorandum 36 (Reference 52), profile baselines have been included in all areas of detailed study. Profile baselines are shown in the location of the original stream centerline or original profile baseline without regard to the adjusted floodplain position on the new base map. This was done to maintain the relationship of distances between cross sections along the profile baseline.

LOMR 03-10-0263P, which affects City of Roseburg floodplain mapping, has been superseded by the redelineation of the South Umpqua River floodplain boundaries using topographic mapping with a contour intervals of 2 feet (Reference 48).

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 results of the floodway computations at selected stream cross sections are shown Table 8, “Floodway Data”.

The floodways presented in this study 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. The results of the floodway computations are tabulated for selected cross sections. In cases where the floodway and 1-percent-annual chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

The floodway for Elk Creek within the City of Drain was computed assuming no encroachment downstream from the west city corporate limits. This results in zero surcharge at cross section D even though there is much encroachment. Upstream from the Southern Pacific Railroad, the flood flows are confined between high banks; no encroachment on the channel was computed. On Pass Creek, the floodway was

computed without considering backwater from Elk Creek. This assumption results in zero surcharge at cross section K even though there is encroachment to the channel banks. The floodways were computed assuming the present level of development of the flood plains. Therefore, a damaged structure in the floodway could be restored to existing conditions without exceeding the conditions assumed for this study.

The conveyance of a channel is a measure of the channel's ability to transmit flows. Ideally, a floodway should be computed on the basis of equal conveyance reduction from each side of the flood plain. However, this is not possible where flood flows are totally contained by one of the banks, which is the case in most of Canyon Creek. In the course of this study, it was determined that full encroachment to the main banks of Canyon Creek would result in surcharges well below the minimum standard of 1 foot. The floodway depicted on the Flood Insurance Rate Map reflects this condition.

The flood flow of Elk Creek is well contained by one of the banks upstream of the City of Elkton. Thus, the floodway could not be calculated by the equal conveyance reduction methodology. The floodway was developed assuming no backwater effect from the Umpqua River.

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 water-surface elevation of the 1-percent-annual-chance flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

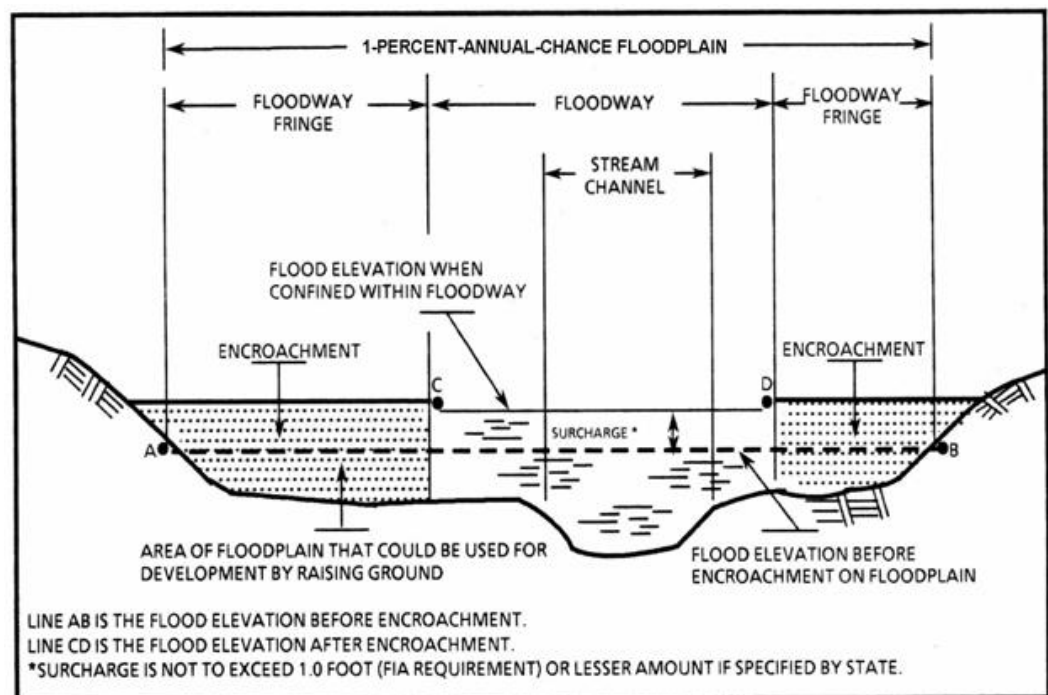


Figure 1. Floodway Schematic

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Canyon Creek								
A	2,280	105	499	9.2	710.4	710.4	710.6	0.2
B	2,938	130	747	6.1	716.9	716.9	717.2	0.3
C	2,972	100	457	10.0	717.7	717.7	717.7	0.0
D	3,047	120	846	5.4	719.4	719.4	719.4	0.0
E	3,658	80	399	11.5	721.4	721.4	721.7	0.3
F	4,183	100	634	7.2	728.2	728.2	728.9	0.7
G	4,222	110	632	7.2	728.9	728.9	728.9	0.0
H	4,300	95	524	8.7	730.0	730.0	730.0	0.0
I	4,431	85	569	7.6	730.5	730.5	731.0	0.5
J	4,761	65	405	10.7	733.0	733.0	733.6	0.6
K	4,801	50	360	12.0	734.3	734.3	734.3	0.0
L	4,856	95	808	5.4	735.9	735.9	736.2	0.3
M	5,386	95	600	7.2	737.5	737.5	737.5	0.0
N	5,447	90	517	8.4	737.9	737.9	737.9	0.0
O	5,567	75	353	12.3	740.4	740.4	740.7	0.3
P	6,069	75	610	7.1	747.4	747.4	747.6	0.2
Q	6,439	75	554	7.8	749.1	749.1	749.4	0.3
R	6,491	90	595	7.3	749.5	749.5	749.5	0.0
S	6,616	85	518	8.3	750.2	750.2	750.6	0.4
T	7,358	75	492	8.8	756.4	756.4	756.7	0.3
U	7,927	70	577	7.5	760.9	760.9	760.9	0.0
V	8,307	85	449	9.6	764.1	764.1	764.1	0.0

¹ Feet above confluence with South Umpqua River

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

CANYON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Cow Creek								
A	12,045	170	1,755	9.9	1,368.7	1,368.7	1,369.5	0.8
B	14,895	135	1,918	9.1	1,378.8	1,378.8	1,379.1	0.3
C	16,355	250	3,327	5.2	1,380.7	1,380.7	1,381.4	0.7
D	17,305	270	2,684	6.5	1,381.3	1,381.3	1,382.3	1.0
E	17,535	272	2,626	6.6	1,381.9	1,381.9	1,382.7	0.8
F	18,745	548	3,737	4.7	1,383.6	1,383.6	1,384.5	0.9
G	19,670	560	3,939	4.4	1,384.7	1,384.7	1,385.5	0.8
H	21,215	560	2,499	7.0	1,386.3	1,386.3	1,387.1	0.8
I	23,325	270	1,934	8.6	1,389.8	1,389.8	1,390.6	0.8
J	24,365	599	3,580	4.7	1,392.7	1,392.7	1,393.5	0.8
K	25,610	1,000	3,200	5.2	1,394.6	1,394.6	1,395.0	0.4
L	26,540	485	2,508	6.7	1,396.0	1,396.0	1,396.7	0.7
M	27,999	300	2,276	7.3	1,399.8	1,399.8	1,400.0	0.2
N	29,124	210	1,750	8.3	1,401.9	1,401.9	1,402.0	0.1
O	29,569	235	2,306	6.3	1,403.8	1,403.8	1,403.8	0.0
P	30,619	464	2,551	5.7	1,404.9	1,404.9	1,405.9	1.0
Q	33,019	170	1,443	8.3	1,412.2	1,412.2	1,413.0	0.8
R	35,979	280	1,656	7.2	1,418.3	1,418.3	1,418.4	0.1
S	36,969	300	1,923	6.2	1,420.6	1,420.6	1,420.7	0.1
T	38,644	248	1,664	7.2	1,423.6	1,423.6	1,423.8	0.2
U	40,629	302	2,149	5.6	1,428.4	1,428.4	1,428.7	0.3
V	42,214	251	1,573	7.6	1,431.0	1,431.0	1,431.3	0.3
W	43,404	176	1,359	8.8	1,435.1	1,435.1	1,435.3	0.2
X	43,729	160	1,305	9.2	1,435.9	1,435.9	1,436.2	0.3
Y	45,369	268	1,626	7.4	1,442.9	1,442.9	1,443.2	0.3
Z	47,059	526	2,226	5.4	1,445.5	1,445.5	1,445.9	0.4

¹Feet above confluence with Rattlesnake Creek

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	COW CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Cow Creek (Con't)								
AA	47,699	281	1,570	7.6	1,447.3	1,447.3	1,447.5	0.2
AB	49,604	166	1,156	10.4	1,453.6	1,453.6	1,453.6	0.0
AC	50,449	265	2,270	5.3	1,455.9	1,455.9	1,456.5	0.6
AD	51,839	181	1,193	10.1	1,458.5	1,458.5	1,458.6	0.1
AE	52,489	170	1,380	8.7	1,461.2	1,461.2	1,461.2	0.0
AF	53,899	300	1,880	6.4	1,464.8	1,464.8	1,465.1	0.3
AG	55,469	485	2,901	4.1	1,470.7	1,470.7	1,470.8	0.1
AH	56,169	277	1,611	7.4	1,471.6	1,471.6	1,471.6	0.0
AI	57,234	400	2,160	5.6	1,476.4	1,476.4	1,476.8	0.4
AJ	58,229	625	2,723	4.4	1,479.4	1,479.4	1,480.2	0.8
AK	59,229	390	1,525	7.9	1,483.1	1,483.1	1,483.1	0.0
AL	61,264	215	1,656	7.2	1,489.0	1,489.0	1,489.5	0.5
AM	61,974	280	1,654	7.3	1,491.0	1,491.0	1,491.1	0.1
AN	63,514	253	1,613	7.4	1,495.4	1,495.4	1,495.8	0.4
AO	64,734	350	1,877	6.4	1,499.1	1,499.1	1,499.7	0.6
AP	65,684	395	2,223	5.4	1,501.9	1,501.9	1,502.6	0.7
AQ	68,604	200	1,290	9.3	1,512.8	1,512.8	1,513.3	0.5
AR	69,404	180	1,296	9.3	1,515.7	1,515.7	1,516.4	0.7
AS	71,434	238	1,716	7.0	1,523.6	1,523.6	1,524.0	0.4
AT	72,564	157	1,139	10.5	1,526.1	1,526.1	1,526.9	0.8
AU	73,514	158	1,476	8.1	1,529.9	1,529.9	1,530.6	0.7
AV	74,494	130	1,010	11.9	1,532.5	1,532.5	1,532.9	0.4
AW	76,504	274	1,776	6.8	1,541.0	1,541.0	1,541.1	0.1
AX	77,624	170	1,066	11.3	1,544.0	1,544.0	1,544.0	0.0
AY	79,929	222	1,605	7.5	1,554.4	1,554.4	1,555.3	0.9
AZ	81,533	98	660	14.8	1,559.7	1,559.7	1,559.7	0.0

¹Feet above confluence with Rattlesnake Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

COW CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Cow Creek (Con't)								
BA	82,508	153	1,592	6.2	1,564.3	1,564.3	1,564.7	0.4
BB	83,498	165	1,083	9.0	1,565.6	1,565.6	1,566.1	0.5
BC	84,428	136	952	10.3	1,569.9	1,569.9	1,570.3	0.4
BD	85,948	440	2,619	3.7	1,575.7	1,575.7	1,576.0	0.3
BE	86,628	161	1,012	9.7	1,576.4	1,576.4	1,576.9	0.5
BF	88,218	225	1,613	6.1	1,583.0	1,583.0	1,583.2	0.2
BG	88,998	200	957	10.2	1,584.5	1,584.5	1,585.1	0.6
BH	90,238	146	998	9.8	1,591.7	1,591.7	1,592.0	0.3
BI	92,108	160	773	12.7	1,600.2	1,600.2	1,600.2	0.0
BJ	94,058	200	1,599	4.9	1,609.8	1,609.8	1,609.8	0.0
BK	95,021	250	1,372	5.7	1,611.1	1,611.1	1,611.2	0.1
BL	96,181	95	612	12.7	1,613.2	1,613.2	1,613.8	0.6
BM	97,371	133	1,096	7.1	1,619.8	1,619.8	1,619.8	0.0
BN	98,331	91	747	10.4	1,621.7	1,621.7	1,621.7	0.0
BO	100,706	435	1,083	7.2	1,640.6	1,640.6	1,640.9	0.3
BP	102,566	450	2,038	3.8	1,649.2	1,649.2	1,649.6	0.4
BQ	103,256	252	997	7.8	1,650.9	1,650.9	1,651.0	0.1
BR	104,196	248	1,463	5.3	1,655.4	1,655.4	1,655.9	0.5
BS	105,486	180	967	8.1	1,659.2	1,659.2	1,660.2	1.0
BT	105,936	190	1,192	6.5	1,662.0	1,662.0	1,662.7	0.7
BU	107,963	80	644	12.1	1,670.2	1,670.2	1,670.8	0.6
BV	109,023	98	827	9.4	1,682.9	1,682.9	1,683.4	0.5
BW	110,063	145	810	9.6	1,688.4	1,688.4	1,689.2	0.8
BX	111,093	122	761	10.3	1,697.3	1,697.3	1,697.3	0.0
BY	112,455	96	951	7.0	1,704.5	1,704.5	1,705.2	0.7
BZ	114,235	112	972	6.9	1,706.4	1,706.4	1,707.2	0.8

¹Feet above confluence with Rattlesnake Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

COW CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Cow Creek (Con't)								
CA	115,620	76	689	9.7	1,709.2	1,709.2	1,709.7	0.5
CB	116,470	159	1,297	5.2	1,712.2	1,712.2	1,712.4	0.2
CC	117,410	63	443	15.1	1,713.8	1,713.8	1,713.8	0.0
CD	118,360	144	1,153	5.8	1,720.5	1,720.5	1,720.5	0.0
CE	119,290	91	664	10.1	1,722.3	1,722.3	1,722.4	0.1
CF	119,910	74	627	10.7	1,725.6	1,725.6	1,725.6	0.0
CG	120,788	86	883	7.6	1,732.2	1,732.2	1,732.2	0.0
CH	122,118	97	726	9.2	1,735.9	1,735.9	1,735.9	0.0
CI	124,033	74	647	10.4	1,744.2	1,744.2	1,744.2	0.0
CJ	125,138	80	572	11.7	1,750.0	1,750.0	1,750.0	0.0
CK	125,838	92	828	8.1	1,755.5	1,755.5	1,755.9	0.4
CL	157,260	170	1,200	6.3	1,898.8	1,898.8	1,898.8	0.0
CM	159,125	100	830	9.0	1,905.5	1,905.5	1,905.7	0.2
CN	160,240	136	1,020	7.4	1,909.2	1,909.2	1,909.4	0.2
CO	163,695	116	800	9.4	1,921.1	1,921.1	1,921.1	0.0
CP	164,520	140	870	8.6	1,925.0	1,925.0	1,925.0	0.0
CQ	166,005	100	805	9.3	1,931.8	1,931.8	1,932.1	0.3

¹Feet above confluence with Rattlesnake Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

COW CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Lower Cow Creek								
A	1,675	365	7,820	6.9	661.2	661.2	662.0	0.8
B	2,540	292	5,993	9.1	661.7	661.7	662.4	0.7
C	4,160	401	8,424	6.4	663.6	663.6	664.1	0.5
D	5,965	364	6,201	8.6	664.6	664.6	665.2	0.6
E	7,225	493	6,131	8.7	666.2	666.2	666.8	0.6
F	9,570	1,264	11,055	4.8	670.7	670.7	671.7	1.0
G	11,625	1,550	12,486	4.3	674.0	674.0	675.0	1.0
H	14,430	1,795	9,735	5.5	678.5	678.5	679.3	0.8
I	15,410	1,686	10,759	5.0	681.2	681.2	682.1	0.9
J	16,330	2,262	14,801	3.6	683.2	683.2	684.2	1.0
K	17,535	1,850	11,400	4.7	684.7	684.7	685.6	0.9
L	18,535	1,100	9,714	5.5	686.2	686.2	687.2	1.0
M	19,670	1,356	8,836	6.1	688.8	688.8	689.4	0.6
N	21,330	1,012	9,616	5.6	691.2	691.2	692.1	0.9
O	21,870	1,200	8,431	6.3	691.8	691.8	692.6	0.8
P	22,950	1,100	8,553	6.2	693.7	693.7	694.5	0.8
Q	24,320	680	7,693	6.8	695.5	695.5	696.5	1.0
R	25,305	700	8,198	6.3	698.0	698.0	698.6	0.6
S	27,606	1,485	12,495	4.1	703.2	703.2	704.1	0.9
T	28,661	850	8,383	6.2	705.2	705.2	706.1	0.9
U	30,111	550	6,282	8.1	707.9	707.9	708.8	0.9
V	32,091	446	6,564	7.8	710.4	710.4	711.3	0.9
W	32,966	543	7,292	7.0	712.1	712.1	713.0	0.9
X	35,116	346	6,792	7.5	716.3	716.3	717.3	1.0
¹ Feet above mouth								
TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY		FLOODWAY DATA					
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS		LOWER COW CREEK					

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Deer Creek								
A	185	96	1,200	9.2	453.2	441.8 ²	442.8	1.0
B	635	132	1,350	8.2	453.2	443.7 ²	444.3	0.6
C	1,185	98	1,250	8.9	453.2	445.5 ²	445.9	0.4
D	1,705	108	1,240	8.9	453.2	447.6 ²	447.7	0.1
E	2,790	85	906	12.2	453.2	451.5 ²	452.1	0.6
F	3,740	137	1,540	7.2	456.2	456.2	456.6	0.4
G	4,790	92	993	11.2	458.6	458.6	459.1	0.5
H	6,640	225	1,990	5.6	464.7	464.7	465.7	1.0
I	7,070	229	2,870	3.9	465.4	465.4	466.4	1.0
J	7,750	192	1,680	6.6	465.9	465.9	466.9	1.0
K	8,075	157	1,480	7.7	466.9	466.9	467.7	0.8
L	8,360	164	950	11.7	469.7	469.7	470.3	0.6
M	10,110	500	2,790	4.0	477.3	477.3	477.9	0.6
N	11,180	160	1,350	8.2	480.6	480.6	481.2	0.6
O	12,295	280	2,600	4.3	484.0	484.0	484.8	0.8
P	14,045	105	1,090	10.2	488.9	488.9	489.7	0.8
Q	15,390	320	2,250	4.2	492.8	492.8	493.8	1.0
R	15,950	150	1,320	7.2	493.6	493.6	494.3	0.7
S	17,980	107	1,210	7.8	498.0	498.0	498.6	0.6
T	19,625	77	849	11.2	507.9	507.9	507.9	0.0
U	20,215	205	1,190	8.0	510.6	510.6	510.9	0.3
V	20,830	260	854	11.2	514.1	514.1	514.2	0.1
W	22,045	204	1,230	7.8	518.5	518.5	519.4	0.9
X	24,545	93	717	13.3	525.2	525.2	525.5	0.3
Y	25,455	210	1,410	6.7	529.4	529.4	530.4	1.0
Z	27,820	222	1,570	6.0	534.4	534.4	535.0	0.6

¹Feet above mouth

²Elevations computed without consideration of backwater effects from South Umpqua River

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	DEER CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Deer Creek (Con't)								
AA	30,120	205	1,800	5.3	537.3	537.3	537.9	0.6
AB	30,905	119	1,130	8.4	538.3	538.3	538.7	0.4
AC	33,980	100	1,020	9.4	554.9	554.9	555.4	0.5
AD	35,315	133	723	13.2	566.1	566.1	566.1	0.0
AE	36,365	252	1,950	4.9	572.2	572.2	572.5	0.3
AF	37,275	108	747	8.3	573.4	573.4	574.0	0.6
AG	40,360	108	660	9.4	586.7	586.7	587.2	0.5
AH	42,900	203	1,380	4.5	598.1	598.1	598.8	0.7
AI	44,705	99	682	9.1	607.3	607.3	607.3	0.0
AJ	45,820	202	910	6.8	612.1	612.1	612.1	0.0
AK	46,740	94	510	12.2	616.7	616.7	616.7	0.0
AL	48,075	186	1,100	5.6	624.2	624.2	624.2	0.0
AM	50,550	76	456	13.6	638.3	638.3	638.3	0.0
¹ Feet above mouth								
TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY		FLOODWAY DATA					
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS		DEER CREEK					

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Elk Creek								
A	300 ¹	320	8,090	8.4	123.2	118.9 ³	119.9	1.0
B	670 ¹	305	8,250	8.2	123.4	119.4 ³	120.3	0.9
C	770 ¹	265	7,680	8.8	123.5	119.4 ³	120.3	0.9
D	1,050 ¹	330	8,890	7.6	123.8	120.0 ³	120.9	0.9
E	1,740 ¹	290	6,450	10.5	123.9	120.4 ³	121.3	0.9
F	6,050 ²	390	3,500	8.7	290.9	290.9	290.9	0.0
G	7,050 ²	367	3,730	8.2	292.9	292.9	293.4	0.5
H	8,000 ²	350	3,170	9.6	294.7	294.7	295.7	1.0
I	8,660 ²	260	2,180	9.7	296.8	296.8	297.8	1.0
J	9,260 ²	450	4,390	4.9	299.3	299.3	300.3	1.0
K	9,670 ²	190	2,320	9.1	299.7	299.7	300.5	0.8
L ⁴								
¹ Feet above confluence with Umpqua River					² Distance in feet above Hayhurst Road			
³ Elevations shown without consideration of backwater from Umpqua River					⁴ Floodway not shown for this cross section			

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	ELK CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Myrtle Creek								
A	1,335 ¹	140	3,110	3.1	611.3	611.3	611.8	0.5
B	2,050 ¹	145	2,620	3.7	611.5	611.5	612.0	0.5
C	2,580 ¹	160	2,580	3.8	611.5	611.5	612.3	0.8
D	3,430 ¹	165	2,620	3.7	611.7	611.7	612.6	0.9
North Myrtle Creek								
A	1,035 ²	230	3,359	1.5	612.2	612.2	613.2	1.0
B	1,615 ²	248	2,494	2.0	612.4	612.4	613.4	1.0
C	2,295 ²	94	743	6.7	612.9	612.9	613.9	1.0
D	2,475 ²	90	628	7.9	613.8	613.8	614.5	0.7
E	3,135 ²	70	659	7.5	618.6	618.6	618.7	0.1
F	3,255 ²	60	563	8.8	619.1	619.1	619.2	0.1
G	4,145 ²	220	1,060	4.7	623.1	623.1	623.6	0.5
H	5,670 ²	75	463	10.7	631.5	631.5	631.9	0.4
I	8,280 ²	86	723	6.8	646.3	646.3	647.0	0.7
J	9,400 ²	110	777	6.4	651.3	651.3	651.9	0.6
K	10,770 ²	100	775	6.4	657.4	657.4	657.7	0.3
South Myrtle Creek								
A	1,155 ²	193	1,870	2.3	612.2	612.2	613.2	1.0
B	3,590 ²	72	573	7.6	616.7	616.7	617.3	0.6
C	5,510 ²	141	883	4.9	626.2	626.2	626.4	0.2
D	6,330 ²	75	423	10.3	630.8	630.8	630.8	0.0
E	7,300 ²	156	887	4.9	638.4	638.4	638.4	0.0
F	8,210 ²	62	573	7.6	641.7	641.7	641.8	0.1
G	10,120 ²	66	593	7.3	650.3	650.3	651.0	0.7

¹Feet above confluence with South Umpqua River

²Feet above mouth

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	MYRTLE CREEK, NORTH MYRTLE CREEK, SOUTH MYRTLE CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Newton Creek								
A	780	30	216	5.2	436.8	419.7 ²	419.9	0.2
B	1,387	24	169	6.7	436.8	423.7 ²	424.1	0.4
C	2,667	28	225	5.0	436.8	431.0 ²	431.6	0.6
D	3,262	32	174	6.5	436.8	435.1 ²	435.8	0.7
E	3,612	100	309	3.7	438.3	438.3	439.1	0.8
F	4,377	76	297	3.6	443.3	443.3	443.7	0.4
G	5,282	433	631	1.6	446.1	446.1	447.1	1.0
H	5,767	250	432	2.3	449.3	449.3	449.9	0.6
I	7,173	27	94	10.7	454.0	454.0	454.0	0.0
J	7,894	67	322	3.1	461.4	461.4	462.3	0.9
K	9,069	81	323	3.1	469.9	469.9	470.9	1.0
L	9,719	79	318	3.0	474.3	474.3	475.3	1.0
M	10,184	39	208	3.4	477.6	477.6	478.3	0.7
N	10,869	36	185	3.8	483.8	483.8	484.4	0.6
O	11,747	8	104	6.8	498.3	498.3	498.9	0.6
P	12,224	29	246	3.4	499.8	499.8	500.8	1.0
Q	12,584	17	184	4.6	502.7	502.7	503.3	0.6
R	14,150	45	122	6.5	529.3	529.3	529.7	0.4
S	14,326	31	153	5.2	534.1	534.1	534.9	0.8
T	14,606	48	218	3.7	536.3	536.3	536.9	0.6
U	15,168	26	136	5.9	544.2	544.2	544.8	0.6
V	15,544	18	140	5.7	549.2	549.2	549.9	0.7
W	16,134	41	234	2.9	553.8	553.8	554.4	0.6
X	16,390	29	134	5.1	554.8	554.8	555.2	0.4
Y	17,493	26	83	7.8	568.4	568.4	568.4	0.0
Z	18,618	18	121	5.1	587.0	587.0	587.5	0.5

¹Feet above confluence with South Umpqua River ²Elevations computed without consideration of backwater effects from South Umpqua River

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	NEWTON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Pass Creek								
A	530	130	1,060	10.7	295.8	291.4 ²	291.4	0.0
B	1,210	300	1,580	7.2	297.0	294.5 ²	294.7	0.2
C	1,770	110	1,120	10.2	297.5	295.9 ²	296.5	0.6
D	1,940	100	1,230	9.2	299.3	296.9 ²	297.5	0.6
E	3,050	395	3,600	3.2	301.2	299.9 ²	300.3	0.4
F	4,170	145	1,840	6.2	301.6	300.6 ²	301.2	0.6
G	4,440	120	1,490	7.7	301.8	300.8 ²	301.4	0.6
H	5,760	240	2,530	4.5	303.3	302.7 ²	303.7	1.0
I	6,440	285	2,480	4.6	303.8	303.2 ²	304.2	1.0
J	7,160	624	5,010	2.3	304.3	303.8 ²	304.8	1.0
Scholfield Creek								
A	24,200	176 ³	1,390	1.7	14.2	14.2	15.2	1.0
B	25,105	332 ³	2,560	0.9	14.3	14.3	15.3	1.0
C	27,050	111 ³	1,060	2.2	14.3	14.3	15.3	1.0
D	28,725	388 ³	2,660	0.9	14.4	14.4	15.4	1.0
E	30,525	459 ³	1,510	1.5	14.5	14.5	15.5	1.0
F	31,650	349 ³	1,710	1.3	14.6	14.6	15.6	1.0
G	32,810	522 ³	3,230	0.7	14.7	14.7	15.7	1.0
H	34,730	354 ³	1,580	1.5	14.9	14.9	15.8	0.9
I	35,520	84 ³	330	7.0	15.4	15.4	16.2	0.8
J	36,925	135 ³	765	3.0	18.6	18.6	19.6	1.0
K	37,385	438 ³	2,590	0.9	19.7	19.7	20.5	0.8
L	38,030	192 ³	934	2.5	19.8	19.8	20.7	0.9
M	39,870	73 ³	451	5.1	23.0	23.0	23.5	0.5
N	40,455	463 ³	2,600	0.9	24.7	24.7	25.1	0.4
¹ Feet above mouth ² Elevations computed without consideration of the 1-percent-annual-chance confluence elevation from Elk Creek ³ Widths differ from the 2010 FDT due to redelineation or re-measurement								
TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY		FLOODWAY DATA					
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS		PASS CREEK, SCHOLFIELD CREEK					

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET) ²	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Smith River								
A	6,710	847	15,900	3.1	15.4	15.4	16.4	1.0
B	8,400	526	12,300	4.1	15.4	15.4	16.4	1.0
C	10,175	434	11,100	4.5	15.4	15.4	16.4	1.0
D	12,205	1,167	20,700	2.4	15.6	15.6	16.6	1.0
E	14,795	890	17,000	3.0	15.6	15.6	16.6	1.0
F	16,705	498	10,100	5.0	15.6	15.6	16.6	0.9
G	18,090	883	13,700	3.6	15.9	15.9	16.8	0.9
H	19,155	724	11,300	4.4	15.9	15.9	16.8	0.9
I	20,155	487	10,700	4.7	15.9	15.9	16.8	0.9
J	21,515	905	18,700	2.7	16.2	16.2	17.1	0.9
K	24,490	615	13,400	3.7	16.2	16.2	17.1	0.9
L	25,665	805	13,100	3.8	16.2	16.2	17.1	0.9
M	26,645	724	12,900	3.9	16.2	16.2	17.1	0.9
N	28,420	787	13,500	3.7	16.3	16.3	17.2	0.9
O	30,655	530	10,200	4.9	16.3	16.3	17.2	0.9
P	32,855	354	7,420	6.7	16.3	16.3	17.2	0.9
Q	33,835	435	9,010	5.6	16.7	16.7	17.5	0.8
R	35,985	388	8,680	5.8	16.8	16.8	17.7	0.9
S	37,105	295	7,640	6.5	16.8	16.8	17.7	0.9
T	39,175	424	8,660	5.8	17.2	17.2	18.0	0.8
U	40,355	298	7,390	6.8	17.3	17.3	18.0	0.7
V	42,985	364	7,830	6.4	17.6	17.6	18.5	0.9
W	46,050	346	7,630	6.6	18.0	18.0	18.8	0.8
X	48,360	271	6,190	8.1	18.2	18.2	19.0	0.8
Y	50,670	346	8,640	5.8	19.0	19.0	19.8	0.8
Z	52,815	315	7,060	7.1	19.4	19.4	20.0	0.6

¹Feet above mouth ²Widths differ from the 2010 FDT due to redelineation or re-measurement

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	SMITH RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET) ²	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Smith River (Con't)								
AA	55,475	237	6,610	7.6	19.9	19.9	20.6	0.7
AB	57,640	340	8,210	6.1	20.5	20.5	21.2	0.7
AC	59,325	330	7,960	6.3	20.8	20.8	21.5	0.7
AD	60,220	288	7,070	7.1	20.9	20.9	21.6	0.7
AE	62,155	416	7,880	6.4	21.4	21.4	22.2	0.8
AF	63,075	307	7,180	7.0	21.6	21.6	22.3	0.7
AG	67,240	346	7,910	6.3	22.7	22.7	23.4	0.7
AH	69,390	235	6,580	7.6	23.0	23.0	23.8	0.8
AI	72,080	245	8,790	5.7	24.0	24.0	24.8	0.8
AJ	74,335	322	7,380	6.8	24.4	24.4	25.1	0.7
AK	76,660	253	7,640	6.5	25.1	25.1	26.0	0.9
AL	78,080	328	8,580	5.8	25.6	25.6	26.5	0.9
AM	79,235	309	7,790	6.4	25.9	25.9	26.7	0.8
AN	81,730	710	13,400	3.7	26.7	26.7	27.6	0.9
AO	83,445	503	11,000	3.4	26.9	26.9	27.8	0.9
AP	84,650	238	5,830	6.5	27.0	27.0	27.8	0.8
AQ	85,740	464	9,740	3.9	27.4	27.4	28.2	0.8
AR	89,105	218	5,860	6.5	28.4	28.4	29.3	0.9
AS	91,185	358	8,040	4.7	29.0	29.0	30.0	1.0
AT	93,015	424	9,570	4.0	29.6	29.6	30.6	1.0
AU	93,900	307	6,590	5.8	29.7	29.7	30.7	1.0
AV	95,370	349	6,930	5.5	30.2	30.2	31.2	1.0
AW	96,590	597	9,950	3.8	30.6	30.6	31.6	1.0
AX	98,520	264	6,820	5.6	31.4	31.4	32.4	1.0
AY	99,580	602	13,400	2.8	31.8	31.8	32.8	1.0
AZ	100,565	243	6,180	6.1	32.0	32.0	33.0	1.0
¹ Feet above mouth		² Widths differ from the 2010 FDT due to redelineation or re-measurement						
TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY		FLOODWAY DATA					
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS		SMITH RIVER					

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET) ²	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Smith River (Con't)								
BA	101,940	294	6,680	5.7	32.4	32.4	33.4	1.0
BB	103,895	219	5,690	6.7	33.0	33.0	34.0	1.0
BC	105,020	450	8,800	4.3	33.6	33.6	34.6	1.0
BD	107,140	946	12,200	3.1	34.5	34.5	35.5	1.0
BE	108,265	201	5,470	7.0	34.6	34.6	35.6	1.0
BF	109,895	507	10,500	3.6	35.7	35.7	36.7	1.0
BG	111,300	473	10,700	3.6	36.0	36.0	36.9	0.9
BH	112,965	585	9,530	4.0	36.3	36.3	37.2	0.9
BI	113,965	474	7,890	4.8	36.4	36.4	37.4	1.0
¹ Feet above mouth ² Widths differ from the 2010 FDT due to redelineation or re-measurement								
TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY		FLOODWAY DATA					
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS		SMITH RIVER					

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET) ²	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Umpqua River A - B ³								
C	66,165	3,084	54,600	6.0	15.5	15.5	16.5	1.0
D	68,055	2,719	47,900	6.9	15.6	15.6	16.6	1.0
E	71,205	2,105	52,600	6.3	16.4	16.4	17.4	1.0
F	72,885	2,625	55,000	6.0	16.6	16.6	17.6	1.0
G	74,745	2,078	48,700	6.8	16.9	16.9	17.8	0.9
H	76,455	1,274	37,100	8.9	16.9	16.9	17.8	0.9
I	79,135	1,089	33,200	9.9	17.4	17.4	18.3	0.9
J	82,655	1,251	39,100	8.4	18.6	18.6	19.3	0.7
K	84,485	1,359	39,600	8.3	18.8	18.8	19.5	0.7
L	86,805	1,751	40,400	8.1	19.2	19.2	19.9	0.7
M	88,830	2,345	48,400	6.8	19.8	19.8	20.5	0.7
N	92,590	1,956	46,800	7.0	20.4	20.4	21.0	0.6
O	94,190	1,990	47,500	6.9	20.6	20.6	21.2	0.6
P	98,385	2,219	51,900	6.3	21.3	21.3	22.0	0.7
Q	100,010	1,654	42,900	7.7	21.4	21.4	22.1	0.7
R	102,850	1,647	40,700	8.1	21.9	21.9	22.5	0.6
S	104,985	1,318	34,200	9.6	22.1	22.1	22.6	0.5
T	106,720	1,028	29,700	11.1	22.3	22.3	22.8	0.5
U	107,925	1,156	35,900	9.2	23.0	23.0	23.6	0.6
V	110,625	1,555	38,000	8.6	23.7	23.7	24.3	0.6
X	112,760	1,393	42,100	7.8	24.4	24.4	25.0	0.6
X	115,175	883	30,000	11.0	24.6	24.6	25.2	0.6
Y	117,120	1,195	40,500	8.1	25.7	25.7	26.4	0.7
Z	119,335	1,053	37,000	8.9	26.3	26.3	26.9	0.6
¹ Feet above mouth ² Widths differ from the 2010 FDT due to redelineation or re-measurement ³ Floodway not shown for these cross sections								
TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY		FLOODWAY DATA					
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS		UMPQUA RIVER					

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Umpqua River (Con't)								
AA	121,765	879 ²	27,200	12.1	26.4	26.4	27.0	0.6
AB	122,835	1,038 ²	32,500	10.1	27.2	27.2	28.1	0.9
AC	125,305	878 ²	32,000	10.3	28.0	28.0	28.9	0.9
AD	127,545	602 ²	25,200	13.1	28.2	28.2	29.1	0.9
AE	128,590	749 ²	30,600	10.8	29.4	29.4	30.3	0.9
AF	129,540	707 ²	28,700	11.5	29.5	29.5	30.3	0.8
AG	130,885	560	22,100	14.9	29.5	29.5	30.3	0.8
AH	132,030	645	26,300	12.5	30.9	30.9	31.7	0.8
AI	135,000	822	28,700	11.5	32.6	32.6	33.4	0.8
AJ	135,905	749	26,100	12.6	33.0	33.0	33.8	0.8
AK	136,660	831	30,100	10.9	34.5	34.5	35.2	0.7
AL	138,825	656	25,700	12.8	36.4	36.4	37.1	0.7
AM	139,465	942	33,100	10.0	37.9	37.9	38.7	0.8
AN	141,280	851	30,900	10.7	39.4	39.4	40.1	0.7
AO	142,410	905	31,200	10.5	40.4	40.4	41.1	0.7
AP	144,860	709	28,700	11.5	42.4	42.4	43.1	0.7
AQ	145,765	744	30,100	10.9	43.1	43.1	44.1	1.0
AR	146,350	687	30,500	10.8	43.7	43.7	44.7	1.0
AS	148,805	624	27,400	12.0	45.2	45.2	46.1	0.9
AT	149,665	685	29,000	11.4	46.2	46.2	47.1	0.9
AU	150,600	619	26,200	12.6	46.9	46.9	47.7	0.8
AV	151,845	813	28,000	11.8	48.2	48.2	49.1	0.9
AW	153,610	654	28,200	11.6	50.1	50.1	51.0	0.9
AX	154,730	749	32,000	10.3	51.5	51.5	52.5	1.0
AY	155,820	618	25,000	13.2	52.4	52.4	53.3	0.9
AZ	157,785	543	24,800	13.3	55.2	55.2	56.0	0.8

¹Feet above mouth ²Widths differ from the 2010 FDT due to redelineation or re-measurement

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Umpqua River (Con't)								
BA	158,760	612	25,400	13.0	57.2	57.2	57.9	0.7
BB	160,125	790	32,100	10.1	60.4	60.4	61.4	1.0
BC	162,665	928	32,900	9.8	61.7	61.7	62.5	0.8
BD	164,045	814	31,800	10.2	62.1	62.1	63.0	0.9
BE	165,380	1,221	25,200	12.8	62.3	62.3	63.1	0.8
BF	166,630	1,007	32,100	10.1	64.0	64.0	64.9	0.9
BG	168,950	940	32,900	9.8	65.1	65.1	66.0	0.9
BH	171,362	768	29,300	11.0	66.1	66.1	67.1	1.0
BI	172,362	1,050	34,900	9.3	67.0	67.0	68.0	1.0
BJ	173,427	997	32,900	9.8	67.5	67.5	68.4	0.9
BK	174,517	1,209	37,200	8.7	68.2	68.2	69.2	1.0
BL	176,737	826	30,600	10.6	69.1	69.1	69.9	0.8
BM	177,717	937	31,200	10.4	69.6	69.6	70.4	0.8
BN	178,280	594	26,700	12.1	69.7	69.7	70.5	0.8
BO	179,193	1,134	30,500	10.6	70.5	70.5	71.3	0.8
BP	180,450	710	29,000	11.2	71.3	71.3	72.2	0.9
BQ	182,468	564	27,600	11.7	72.3	72.3	73.1	0.8
BR	183,673	713	32,500	10.0	73.1	73.1	73.9	0.8
BS	185,563	606	26,900	12.0	73.3	73.3	74.1	0.8
BT	187,788	553	24,100	13.4	74.3	74.3	74.9	0.6
BU	189,013	770	28,200	11.5	75.3	75.3	75.9	0.6
BV	190,143	1,210	31,800	10.2	76.3	76.3	76.8	0.5
BW	192,343	700	28,400	11.4	76.8	76.8	77.5	0.7
BX	193,393	614	29,700	10.9	77.5	77.5	78.0	0.5
BY	194,533	800	28,700	11.3	77.7	77.7	78.3	0.6
BZ	196,473	742	36,500	8.9	79.0	79.0	79.7	0.7

¹Feet above mouth

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Umpqua River (Con't)								
CA	197,460	654	27,300	11.9	79.0	79.0	79.7	0.7
CB	199,485	800	33,800	9.6	80.3	80.3	81.0	0.7
CC	200,435	739	27,200	11.9	80.4	80.4	81.2	0.8
CD	202,435	852	29,200	11.1	82.3	82.3	83.0	0.7
CE	204,735	744	24,600	13.2	84.1	84.1	84.6	0.5
CF	207,125	617	24,100	13.4	86.3	86.3	86.9	0.6
CG	208,025	773	25,800	12.6	87.6	87.6	88.1	0.5
CH	208,852	714	24,000	13.5	87.8	87.8	88.2	0.4
CI	210,147	1,356	27,300	11.9	88.8	88.8	89.3	0.5
CJ	211,582	574	21,100	15.4	90.0	90.0	90.4	0.4
CK	213,005	650	23,200	14.0	92.0	92.0	92.4	0.4
CL	215,522	554	22,800	14.2	93.6	93.6	94.1	0.5
CM	218,255	584	24,000	13.5	95.8	95.8	96.3	0.5
CN	219,255	886	32,600	10.0	97.9	97.9	98.7	0.8
CO	222,340	623	26,600	12.2	98.8	98.8	99.6	0.8
CP	225,290	850	32,000	10.1	101.3	101.3	101.9	0.6
CQ	226,905	1,005	30,500	10.6	102.5	102.5	103.1	0.6
CR	228,175	583	25,800	12.6	103.2	103.2	104.0	0.8
CS	229,010	527	21,800	14.9	103.7	103.7	104.5	0.8
CT	229,960	631	27,600	11.7	105.9	105.9	106.5	0.6
CU	230,640	566	26,700	12.1	106.1	106.1	106.6	0.5
CV	231,570	1,160	41,500	7.8	107.1	107.1	107.8	0.7
CW	232,575	1,481	43,400	7.5	107.4	107.4	108.1	0.7
CX	233,895	1,859	43,900	7.4	107.8	107.8	108.4	0.6
CY	235,015	613	24,700	13.1	107.8	107.8	108.4	0.6
CZ	236,755	728	25,700	12.6	108.9	108.9	109.8	0.9

¹Feet Above Mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Umpqua River (Con't)								
DA	238,640	924	27,500	11.8	110.4	110.4	111.1	0.7
DB	240,815	700	28,500	11.4	111.8	111.8	112.5	0.7
DC	241,990	570	25,200	12.9	112.1	112.1	112.7	0.6
DD	243,225	837	32,400	10.0	113.3	113.3	113.9	0.6
DE	244,685	631	24,700	13.1	113.8	113.8	114.4	0.6
DF	245,965	898	27,500	11.8	114.5	114.5	115.1	0.6
DG	247,115	850	31,400	10.3	115.7	115.7	116.4	0.7
DH	248,475	1,300	36,900	8.8	116.3	116.3	117.1	0.8
DI	250,835	800	35,900	9.0	117.6	117.6	118.4	0.8
DJ	253,570	714	35,800	9.1	120.6	120.6	121.4	0.8
DK	254,265	900	33,900	9.6	121.2	121.2	122.1	0.9
DL	256,215	1,759	37,700	7.8	123.3	123.3	124.3	1.0
DM	256,542	2,094	45,400	6.5	123.8	123.8	124.8	1.0
DN	257,479	2,365	47,700	6.2	124.1	124.1	125.1	1.0
DO	258,312	2,525	47,500	6.2	124.3	124.3	125.3	1.0
DP	259,829	1,386	32,800	9.0	124.5	124.5	125.5	1.0
DQ	262,362	968	29,900	9.8	125.4	125.4	126.4	1.0
DR	263,472	1,096	30,100	9.8	126.0	126.0	127.0	1.0
DS	264,717	1,539	40,300	7.3	127.2	127.2	128.2	1.0
DT	265,730	2,450	46,100	6.4	127.5	127.5	128.5	1.0
DU	266,693	2,250	38,100	7.7	127.7	127.7	128.7	1.0
DV	267,698	2,700	40,200	7.3	128.3	128.3	129.3	1.0
DW	269,690	2,120	37,500	7.8	128.7	128.7	129.7	1.0
DX	270,765	1,335	34,700	8.5	129.3	129.3	130.2	0.9
DY	271,773	1,781	30,800	9.5	129.8	129.8	130.7	0.9
DZ	271,784	2,261	39,000	7.5	130.8	130.8	131.7	0.9

¹Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Umpqua River (Con't)								
EA	273,855	1,779	34,100	8.6	131.5	131.5	132.4	0.9
EB	274,835	2,500	52,400	5.6	132.4	132.4	133.4	1.0
EC	276,175	2,429	50,800	5.8	133.3	133.3	134.3	1.0
ED	278,295	2,074	32,000	9.2	133.9	133.9	134.8	0.9
EE	280,220	2,241	33,300	8.8	135.4	135.4	136.4	1.0
EF	282,220	2,600	46,600	6.3	137.0	137.0	137.9	0.9
EG	283,345	3,479	62,600	4.7	137.8	137.8	138.7	0.9
EH	285,830	2,759	42,200	7.0	138.3	138.3	139.3	1.0
EI	287,950	1,443	31,100	9.5	139.4	139.4	140.1	0.7
EJ	289,255	1,059	28,400	10.4	140.0	140.0	140.7	0.7
EK	291,825	482	19,800	14.9	140.6	140.6	141.3	0.7
EL	294,780	586	25,800	11.4	144.2	144.2	145.1	0.9
EM	297,415	714	29,200	10.1	146.2	146.2	147.1	0.9
EN	300,260	595	26,100	11.3	148.0	148.0	148.9	0.9
EO	301,985	786	32,500	9.0	150.0	150.0	150.7	0.7
EP	302,885	690	28,300	10.4	150.3	150.3	151.1	0.8
EQ	304,980	760	29,000	10.1	151.9	151.9	152.6	0.7
ER	307,280	613	22,600	13.0	153.5	153.5	154.2	0.7
ES	308,480	650	24,900	11.8	155.7	155.7	156.2	0.5
ET	309,730	547	24,400	12.0	156.7	156.7	157.2	0.5
EU	312,100	619	25,700	11.4	158.9	158.9	159.3	0.4
EV	314,570	708	26,500	11.1	160.3	160.3	160.7	0.4
EW	316,890	609	34,000	12.3	161.5	161.5	161.9	0.4
EX	319,090	566	24,000	12.2	162.9	162.9	163.3	0.4
EY	320,035	803	28,300	10.4	164.1	164.1	164.6	0.5
EZ	321,220	670	27,000	10.9	164.6	164.6	165.1	0.5

¹Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Umpqua River (Con't)								
FA	323,920	711	26,700	11.0	166.1	166.1	166.6	0.5
FB	325,140	541	21,700	13.5	166.7	166.7	167.2	0.5
FC	325,995	755	29,900	9.8	168.7	168.7	169.2	0.5
FD	327,210	693	25,700	11.4	169.3	169.3	169.8	0.5
FE	329,405	821	27,500	10.7	171.2	171.2	171.6	0.4
FF	331,565	708	24,300	12.1	172.4	172.4	172.9	0.5
FG	332,575	985	32,200	9.1	174.2	174.2	174.6	0.4
FH	333,630	1,318	42,600	6.9	175.7	175.7	176.1	0.4
FI	334,680	1,206	38,800	7.6	176.6	176.6	176.8	0.2
FJ	335,625	680	25,300	11.6	177.2	177.2	177.5	0.3
FK	336,655	730	26,500	11.1	178.7	178.7	179.2	0.5
FL	337,715	624	25,100	11.7	179.7	179.7	180.2	0.5
FM	338,860	697	24,300	12.1	180.9	180.9	181.4	0.5
FN	340,935	607	25,100	11.7	183.5	183.5	183.9	0.4
FO	342,200	530	22,400	13.2	184.3	184.3	184.6	0.3
FP	344,035	602	25,000	11.7	186.7	186.7	186.9	0.2
FQ	344,845	681	27,000	10.9	187.6	187.6	187.8	0.2
FR	346,090	593	24,100	12.2	188.2	188.2	188.5	0.3
FS	346,960	685	25,400	11.6	188.9	188.9	189.0	0.1
FT	347,870	837	29,900	9.8	189.7	189.7	190.0	0.3
FU	349,545	653	26,700	11.0	190.3	190.3	190.7	0.4
FV	350,535	1,003	29,200	10.1	191.1	191.1	191.6	0.5
FW	351,500	609	25,500	11.5	191.7	191.7	192.1	0.4
FX	352,465	574	21,900	13.4	192.0	192.0	192.5	0.5
FY	353,475	708	26,500	11.1	193.5	193.5	194.0	0.5
FZ	356,580	650	25,200	11.7	194.9	194.9	195.3	0.4

¹Feet above mouth

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Umpqua River (Con't)								
GA	359,675	534	22,500	13.0	197.5	197.5	197.9	0.4
GB	361,230	679	23,700	12.4	199.3	199.3	199.7	0.4
GC	362,435	861	26,800	11.0	201.0	201.0	201.5	0.5
GD	364,675	775	27,800	13.6	203.3	203.3	203.9	0.6
GE	365,770	707	23,900	12.3	203.9	203.9	204.5	0.6
GF	367,880	825	28,800	10.2	206.6	206.6	207.3	0.7
GG	370,180	601	25,300	11.6	207.9	207.9	208.7	0.8
GH	371,590	691	28,300	10.4	209.2	209.2	210.0	0.8
GI	372,935	1,666	36,700	8.0	210.7	210.7	211.4	0.7
GJ	375,110	1,057	29,100	10.1	211.8	211.8	212.5	0.7
GK	376,375	833	28,800	10.2	212.7	212.7	213.4	0.7
GL	378,870	638	26,000	11.3	214.0	214.0	214.8	0.8
GM	380,400	850	33,400	8.8	215.4	215.4	216.3	0.9
GN	381,515	690	27,600	10.6	215.7	215.7	216.5	0.8
GO	382,470	1,155	31,400	9.4	216.1	216.1	217.0	0.9
GP	384,215	2,300	39,800	7.4	217.4	217.4	218.3	0.9
GQ	385,535	2,470	37,900	7.8	217.7	217.7	218.7	1.0
GR	386,755	2,015	32,900	8.9	218.2	218.2	219.1	0.9
GS	388,208	1,125	37,400	10.7	219.0	219.0	219.9	0.9
GT	391,175	615	27,100	10.9	221.6	221.6	222.4	0.8
GU	393,830	853	35,300	8.3	223.7	223.7	224.7	1.0
GV	395,010	974	38,200	7.7	224.3	224.3	225.2	0.9
GW	395,470	860	33,500	8.8	224.4	224.4	225.3	0.9
GX	397,715	572	21,600	13.6	226.5	226.5	227.1	0.6
GY	399,975	983	37,100	10.8	229.2	229.2	229.6	0.4
GZ	401,805	805	26,200	11.2	230.2	230.2	230.6	0.4

¹Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Umpqua River (Con't)								
HA	405,035	640	23,900	12.3	232.1	232.1	232.8	0.7
HB	406,909	770	30,600	9.6	234.2	234.2	234.8	0.6
HC	409,079	682	27,200	10.8	234.8	234.8	235.5	0.7
HD	411,123	500	22,600	13.0	236.4	236.4	237.0	0.6
HE	412,118	610	23,000	12.8	237.3	237.3	237.8	0.5
HF	413,458	836	27,800	10.6	238.9	238.9	239.8	0.9
HG	415,665	586	23,700	12.4	240.3	240.3	241.0	0.7
HH	417,125	677	25,600	11.5	242.0	242.0	242.7	0.7
HI	419,482	923	31,300	9.4	246.1	246.1	246.6	0.5
HJ	420,477	720	23,000	12.8	246.6	246.6	246.9	0.3
HK	421,474	793	27,100	10.8	248.1	248.1	248.7	0.6
HL	422,504	1,080	39,400	7.5	250.1	250.1	250.8	0.7
HM	423,664	1,234	46,500	6.3	251.6	251.6	252.2	0.6
HN	424,914	620	24,900	11.8	251.8	251.8	252.5	0.7
HO	426,849	538	22,100	13.3	253.1	253.1	253.7	0.6
HP	427,924	737	27,100	10.8	254.8	254.8	255.5	0.7
HQ	429,037	1,054	27,900	10.5	256.0	256.0	256.5	0.5
HR	430,159	688	25,100	11.7	256.9	256.9	257.5	0.6
HS	431,159	524	23,000	12.8	257.7	257.7	258.3	0.6
HT	433,007	695	27,200	10.8	260.5	260.5	261.0	0.5
HU	435,442	1,462	38,500	7.6	262.8	262.8	263.3	0.5
HV	436,497	1,582	37,600	7.8	263.3	263.3	263.8	0.5
HW	438,907	892	32,600	9.0	265.1	265.1	265.7	0.6
HX	440,037	1,160	33,200	8.9	266.3	266.3	267.1	0.8
HY	441,245	1,035	35,600	8.2	267.7	267.7	268.3	0.6
HZ	443,600	657	25,500	11.5	269.4	269.4	269.9	0.5
¹ Feet above mouth								
TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY		FLOODWAY DATA					
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS		UMPQUA RIVER					

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Umpqua River (Con't)								
IA	445,545	552	22,000	13.4	270.5	270.5	271.0	0.5
IB	448,278	687	24,000	12.2	273.3	273.3	273.7	0.4
IC	451,273	667	22,900	12.8	276.1	276.1	276.6	0.5
ID	452,753	660	22,800	12.9	277.7	277.7	278.3	0.6
IE	454,827	702	23,000	12.8	279.8	279.8	280.7	0.9
IF	455,927	920	25,600	11.5	281.7	281.7	282.4	0.7
IG	456,887	880	26,200	11.2	283.1	283.1	283.7	0.6
IH	458,751	600	26,000	11.3	284.9	284.9	285.4	0.5
II	459,896	665	22,300	13.2	285.5	285.5	286.0	0.5
IJ	460,746	544	20,600	14.3	286.3	286.3	286.7	0.4
IK	462,683	785	24,400	12.1	289.1	289.1	289.6	0.5
IL	464,960	611	23,800	12.4	290.9	290.9	291.6	0.7
IM	465,803	570	23,500	12.5	291.5	291.5	292.2	0.7
IN	467,488	1,070	33,400	8.8	293.9	293.9	294.6	0.7
IO	468,488	745	26,000	11.3	294.1	294.1	294.7	0.6
IP	469,525	1,430	32,700	9.0	295.0	295.0	295.6	0.6
IQ	470,565	1,510	30,800	9.6	295.5	295.5	296.1	0.6
IR	471,532	2,044	32,700	9.0	295.9	295.9	296.5	0.6
IS	472,817	883	24,800	11.3	296.6	296.6	297.3	0.7
IT	474,602	722	25,000	11.1	298.1	298.1	298.7	0.6
IU	476,352	805	30,100	9.3	299.9	299.9	300.7	0.8
IV	478,512	547	19,700	14.2	301.5	301.5	302.1	0.6
IW	479,752	718	24,400	11.4	304.4	304.4	304.9	0.5
IX	481,687	637	24,700	11.3	307.1	307.1	307.5	0.4
IY	484,039	642	24,400	11.4	308.9	308.9	309.3	0.4
IZ	485,314	745	24,200	11.5	310.3	310.3	310.7	0.4

¹Feet above mouth

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Umpqua River (Con't)								
JA	486,469	656	23,900	11.7	311.4	311.4	311.7	0.3
JB	487,524	800	26,000	10.7	312.7	312.7	313.0	0.3
JC	488,524	678	26,200	10.6	313.7	313.7	313.9	0.2
JD	490,249	760	22,100	12.6	314.7	314.7	315.0	0.3
JE	492,924	560	20,800	13.4	317.9	317.9	318.3	0.4
JF	494,069	690	24,500	11.4	319.7	319.7	320.3	0.6
JG	496,272	570	23,000	12.1	321.4	321.4	322.0	0.6
JH	497,097	675	27,000	10.4	322.5	322.5	323.1	0.6
JI	498,327	600	24,100	11.6	323.0	323.0	323.5	0.5
JJ	500,656	660	24,300	11.5	325.1	325.1	325.5	0.4
JK	502,943	780	31,100	9.0	327.2	327.2	327.8	0.6
JL	505,538	900	31,000	9.0	329.0	329.0	329.7	0.7
JM	506,368	790	26,000	10.7	329.3	329.3	330.1	0.8
JN	508,669	660	25,400	11.0	330.9	330.9	331.5	0.6
JO	511,582	646	21,500	13.0	333.1	333.1	333.6	0.5
JP	513,175	550	18,600	15.0	334.9	334.9	335.3	0.4
JQ	514,210	612	21,300	13.1	337.0	337.0	337.4	0.4
JR	515,875	920	33,200	8.4	339.5	339.5	340.2	0.7
JS	517,333	605	22,500	12.4	339.8	339.8	340.5	0.7
JT	519,130	670	25,000	10.6	343.0	343.0	344.0	1.0
JU	520,240	963	32,300	8.2	344.7	344.7	345.6	0.9
JV	521,130	788	26,300	10.0	345.2	345.2	346.1	0.9
JW	522,130	1,157	29,700	8.9	347.1	347.1	348.1	1.0
JX	524,130	789	25,500	10.4	350.8	350.8	351.5	0.7
JY	525,130	1,089	34,000	7.8	352.5	352.5	353.3	0.8
JZ	525,890	1,272	41,500	6.4	353.0	353.0	353.8	0.8

¹Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Umpqua River (Con't)								
KA	527,130	2,144	51,400	5.1	353.5	353.5	354.3	0.8
KB	529,130	3,199	50,900	5.2	353.9	353.9	354.7	0.8
KC	530,760	3,519	52,200	5.1	354.4	354.4	355.2	0.8
KD	532,530	2,601	37,200	7.1	354.5	354.5	355.4	0.9
KE	535,430	3,442	44,800	5.9	356.3	356.3	357.3	1.0
KF	537,550	4,206	46,300	5.7	357.3	357.3	358.3	1.0
KG	539,270	4,943	43,600	6.1	358.3	358.3	359.2	0.9
KH	541,375	5,950	44,800	5.4	359.9	359.9	360.9	1.0
KI	543,405	7,650	58,700	4.1	360.7	360.7	361.7	1.0
KJ	545,490	2,995	27,200	8.9	360.9	360.9	361.9	1.0
KK	546,865	1,049	23,100	10.5	361.7	361.7	362.6	0.9
KL	548,610	639	22,000	11.1	362.7	362.7	363.5	0.8
KM	551,630	422	18,700	13.0	366.6	366.6	367.0	0.4
KN	552,730	696	25,600	9.5	368.8	368.8	369.4	0.6
KO	553,730	1,138	32,000	7.6	370.0	370.0	370.6	0.6
KP	555,530	1,307	39,700	6.1	372.0	372.0	372.5	0.5
KQ	556,530	872	27,900	8.7	372.5	372.5	372.9	0.4
KR	557,830	551	18,200	13.4	373.6	373.6	374.1	0.5
KS	560,430	705	25,300	9.6	379.1	379.1	379.5	0.4
KT	562,925	930	22,600	10.7	380.9	380.9	381.4	0.5
KU	564,580	562	18,300	13.3	382.0	382.0	382.7	0.7
KV	566,305	1,222	30,800	7.9	385.3	385.3	385.8	0.5
KW	568,585	2,559	29,100	8.4	387.3	387.3	387.7	0.4
KX	571,470	4,654	44,100	5.5	390.0	390.0	390.7	0.7
KY	572,580	5,570	44,700	5.4	390.5	390.5	391.4	0.9
KZ	573,880	5,420	38,500	6.3	391.5	391.5	392.1	0.6

¹Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Umpqua River (Con't)								
LA	575,535	4,969	32,300	7.5	393.5	393.5	394.0	0.5
LB	577,285	4,000	44,000	5.5	396.3	396.3	396.7	0.4
LC	578,740	2,825	29,100	8.4	397.3	397.3	397.6	0.3
LD	580,275	2,538	26,800	9.1	398.7	398.7	399.3	0.6
LE	581,755	1,800	22,200	11.0	399.8	399.8	400.6	0.8
LF	583,390	1,660	25,800	9.4	402.2	402.2	402.9	0.7
LG	584,970	1,795	31,600	7.7	404.2	404.2	404.9	0.7
LH	586,195	2,458	40,300	6.0	405.1	405.1	405.9	0.8

¹Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
North Umpqua River								
A	5,425	1,750	20,000	7.1	407.9	407.9	408.9	1.0
B	6,065	1,900	20,200	7.0	408.2	408.2	409.2	1.0
C	7,490	1,200	18,800	7.6	409.0	409.0	410.0	1.0
D	8,685	780	15,500	9.2	409.6	409.6	410.5	0.9
E	9,650	1,070	15,300	9.3	410.7	410.7	411.7	1.0
F	10,200	1,110	21,300	6.7	411.8	411.8	412.8	1.0
G	12,105	969	19,700	7.2	415.1	415.1	416.0	0.9
H	13,295	764	17,800	8.0	416.6	416.6	417.5	0.9
I	15,630	573	14,400	9.9	419.1	419.1	419.8	0.7
J	20,950	460	12,900	11.0	428.4	428.4	429.1	0.7
K	22,975	690	14,500	9.8	430.8	430.8	431.6	0.8
L	23,975	843	16,700	8.5	433.3	433.3	433.6	0.3
M	26,135	638	14,300	9.9	436.1	436.1	436.8	0.7
N	29,565	581	13,600	10.5	441.0	441.0	441.9	0.9
O	30,415	783	16,100	8.8	442.1	442.1	442.9	0.8
P	31,900	452	11,900	11.9	442.9	442.9	443.8	0.9
Q	34,230	625	12,600	11.2	448.2	448.2	448.6	0.4
R	35,095	855	15,900	8.9	450.0	450.0	450.7	0.7
S	36,220	607	15,600	9.1	450.9	450.9	451.7	0.8
T	36,610	590	13,600	10.2	456.9	456.9	457.9	1.0
U	39,155	420	11,000	12.3	459.8	459.8	460.5	0.7
V	40,755	600	13,500	10.3	462.3	462.3	463.0	0.7
W	41,691	876	17,100	8.1	463.6	463.6	464.5	0.9
X	43,259	530	11,600	12.0	465.1	465.1	465.6	0.5
Y	44,105	757	18,500	7.5	467.5	467.5	468.3	0.8
Z	45,779	539	12,800	10.9	469.0	469.0	469.8	0.8

¹Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

NORTH UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
North Umpqua River (Con't)								
AA	48,035	817	16,300	8.5	475.3	475.3	475.6	0.3
AB	48,787	510	14,700	9.4	476.3	476.3	476.6	0.3
AC	50,472	662	13,400	10.4	478.7	478.7	478.9	0.2
AD	51,589	550	10,900	12.8	481.5	481.5	481.7	0.2
AE	53,044	883	19,100	7.3	486.5	486.5	486.8	0.3
AF	54,135	1,079	19,800	7.0	488.4	488.4	488.6	0.2
AG	54,899	758	15,500	9.0	489.4	489.4	489.5	0.1
AH	56,084	629	14,300	9.7	491.6	491.6	491.8	0.2
AI	58,754	541	13,500	10.3	496.3	496.3	496.9	0.6
AJ	61,214	429	11,400	12.2	500.0	500.0	500.7	0.7
AK	63,729	692	14,500	9.6	505.3	505.3	506.3	1.0
AL	65,659	503	10,300	13.5	508.7	508.7	509.6	0.9
AM	67,934	485	11,600	12.0	514.2	514.2	515.2	1.0
AN	70,174	596	13,100	10.6	518.7	518.7	519.4	0.7
AO	71,544	535	12,900	10.7	521.9	521.9	522.6	0.7
AP	73,592	409	10,700	13.0	525.9	525.9	526.5	0.6
AQ	76,177	640	14,600	9.5	531.2	531.2	532.1	0.9
AR	77,391	441	10,800	12.8	534.0	534.0	534.6	0.6
AS	79,800	583	13,300	10.4	540.5	540.5	541.1	0.6
AT	81,315	706	15,600	8.9	542.1	542.1	542.9	0.8
AU	83,880	460	9,720	14.3	544.4	544.4	544.9	0.5
AX	85,028	670	11,100	12.5	546.6	546.6	547.6	1.0
AW	86,358	440	9,560	14.5	548.9	548.9	549.4	0.5
AX	89,205	730	13,164	10.6	554.3	554.3	554.9	0.6
AY	90,153	550	9,680	14.4	555.8	555.8	556.2	0.4
AZ	91,493	680	14,500	9.6	560.6	560.6	560.7	0.1

¹Feet above mouth

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	NORTH UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
North Umpqua River (Con't)								
BA	92,340	480	8,170	17.0	561.6	561.6	561.7	0.1
BB	93,175	580	11,400	12.2	567.3	567.3	567.3	0.0
BC	94,975	470	12,100	11.5	571.0	571.0	571.1	0.1
BD	97,951	600	13,600	10.2	578.1	578.1	579.0	0.9
BE	100,071	500	12,500	11.1	581.1	581.1	582.1	1.0
BF	102,199	920	18,700	7.2	586.8	586.8	587.6	0.8
BG	103,259	600	16,800	8.0	588.5	588.5	589.2	0.7
BH	104,591	707	13,600	9.9	591.5	591.5	592.1	0.6
BI	106,591	510	11,300	11.9	596.0	596.0	596.3	0.3
BJ	109,101	601	14,300	9.5	603.3	603.3	604.1	0.8
BK	110,081	631	13,600	9.9	605.5	605.5	606.1	0.6
BL	112,266	532	12,200	11.1	610.7	610.7	610.9	0.2
BM	113,248	670	16,100	8.4	613.4	613.4	613.6	0.2
BN	114,415	359	9,200	14.6	615.3	615.3	615.4	0.1
BO	115,547	708	15,300	8.8	620.6	620.6	621.2	0.6
BP	117,100	301	11,800	11.4	623.1	623.1	623.4	0.3
BQ	118,385	727	17,200	7.8	625.4	625.4	625.9	0.5
BR	120,040	429	10,300	13.0	627.9	627.9	628.1	0.2
BS	122,145	477	12,600	10.7	633.4	633.4	633.8	0.4
BT	123,075	668	14,300	9.5	635.4	635.4	635.8	0.4
BU	124,340	546	11,600	11.6	637.4	637.4	637.6	0.2
BV	126,090	670	14,500	9.3	641.9	641.9	642.0	0.1
BW	128,245	641	15,000	9.0	645.2	645.2	645.2	0.0
BX	131,429	594	13,300	10.1	651.9	651.9	652.0	0.1
BY	133,869	393	9,470	14.3	656.1	656.1	656.3	0.2
BZ	136,099	800	16,200	8.3	661.4	661.4	662.2	0.8
¹ Feet above mouth								
TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY		FLOODWAY DATA					
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS		NORTH UMPQUA RIVER					

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
North Umpqua River (Con't)								
CA	137,119	500	12,200	11.1	662.4	662.4	663.0	0.6
CB	137,994	630	13,000	10.4	663.9	663.9	664.7	0.8
CC	139,020	526	12,800	10.6	665.6	665.6	666.3	0.7
CD	141,042	705	13,800	9.8	668.6	668.6	669.4	0.8
CE	142,257	755	15,500	8.7	670.9	670.9	671.5	0.6
CF	144,202	512	10,200	13.2	675.8	675.8	676.0	0.2
CG	145,849	405	10,200	13.3	679.5	679.5	679.7	0.2
CH	149,023	580	13,400	10.1	686.2	686.2	686.3	0.1
CI	150,343	289	9,600	14.0	688.2	688.2	688.3	0.1
CJ	151,363	496	12,500	10.8	691.5	691.5	691.5	0.0
CK	152,258	381	8,470	13.1	696.3	696.3	696.5	0.2
CL	153,999	378	9,230	12.0	700.9	700.9	701.1	0.2
CM	155,734	458	9,860	11.3	704.3	704.3	704.4	0.1
CN	157,358	372	10,400	10.6	706.8	706.8	706.9	0.1
CO	159,918	519	13,000	8.5	710.6	710.6	710.6	0.0
CP	162,112	357	9,680	11.5	712.8	712.8	712.8	0.0
CQ	162,857	467	9,870	11.2	714.0	714.0	714.1	0.1
CR	164,465	310	7,620	14.6	717.3	717.3	717.3	0.0
CS	166,585	394	11,600	9.6	723.7	723.7	723.7	0.0
CT	167,890	321	8,650	12.8	725.0	725.0	725.0	0.0
CU	169,675	416	10,000	11.1	729.9	729.9	729.9	0.0
CV	171,587	256	8,000	13.9	735.8	735.8	735.8	0.0
CW	173,138	432	12,100	9.2	739.9	739.9	739.9	0.0
CX	174,205	341	10,300	10.8	741.3	741.3	741.4	0.1
CY	175,095	391	9,980	11.1	742.4	742.4	742.4	0.0
CZ	177,385	297	9,180	12.1	746.8	746.8	746.9	0.1

¹Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

NORTH UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
North Umpqua River (Con't) DA	180,480	381	9,940	11.2	752.9	752.9	753.0	0.1
¹ Feet above mouth								
TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY		FLOODWAY DATA					
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS		NORTH UMPQUA RIVER					

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
South Umpqua River								
A	17,900	4,830	28,600	4.6	405.6	405.6	406.0	0.4
B	20,435	4,650	17,700	7.4	406.6	406.6	406.8	0.2
C	22,185	3,330	14,400	9.1	407.8	407.8	408.3	0.5
D	24,640	2,800	19,000	6.9	410.1	410.1	411.1	1.0
E	25,620	1,300 ²	18,400	7.1	411.4	411.4	412.3	0.9
F	25,890	2,580	19,800	6.6	412.0	412.0	413.0	1.0
G	27,120	2,220	25,200	5.2	414.1	414.1	414.8	0.7
H	28,010	1,650	21,900	6.0	415.0	415.0	415.6	0.6
I	29,180	1,330	22,700	5.8	416.3	416.3	416.8	0.5
J	31,380	500	12,800	10.3	418.3	418.3	419.0	0.7
K	32,480	670	15,500	8.4	420.1	420.1	420.8	0.7
L	33,595	470	12,500	10.5	421.0	421.0	421.7	0.7
M	34,575	676	17,100	7.7	422.7	422.7	423.3	0.6
N	35,555	400	12,300	10.6	423.2	423.2	423.8	0.6
O	36,555	500	12,400	10.6	424.4	424.4	425.2	0.8
P	38,425	418	10,600	12.3	428.0	428.0	428.5	0.5
Q	39,250	481	12,200	10.7	429.8	429.8	430.5	0.7
R	40,230	800	20,614	6.9	432.0	432.0	433.03	1.0
S	41,185	476	13,715	10.4	432.4	432.4	433.33	0.9
T	42,065	439	13,590	10.4	433.2	433.2	434.13	0.9
U	43,165	749	19,506	7.3	435.0	435.0	435.93	0.9
V	45,370	493	15,405	9.2	436.6	436.6	437.5	0.9
W	46,750	459	13,831	10.3	437.6	437.6	438.5	0.9
X	47,530	466	14,388	9.9	438.5	438.5	439.4	0.9
Y	48,405	789	19,069	7.4	440.0	440.0	441.0	1.0
Z	49,315	800	17,153	8.3	440.9	440.9	441.7	0.8

¹Feet above mouth ²This width does not include islands ³Elevations computed without consideration of backwater effects

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	SOUTH UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
South Umpqua River (Con't)								
AA	49,865	700	17,625	8.1	441.2	441.2	442.2	1.0
AB	50,590	1,294	16,446	8.6	441.5	441.5	442.5	1.0
AC	51,500	1,084	15,039	9.4	442.4	442.4	443.4	1.0
AD	52,760	400	12,541	11.3	444.2	444.2	445.2	1.0
AE	53,720	547	14,352	9.9	445.9	445.9	446.8	0.9
AF	55,210	485	15,700	8.3	448.3	448.3	448.8	0.5
AG	56,120	628	16,800	7.8	449.7	449.7	450.3	0.6
AH	56,890	763	23,400	5.6	451.1	451.1	451.6	0.5
AI	57,955	1,527	29,300	4.5	451.4	451.4	452.0	0.6
AJ	59,335	1,085	29,200	4.2	451.8	451.8	452.8	1.0
AK	60,810	688	17,500	7.1	452.4	452.4	453.3	0.9
AL	62,185	722	17,300	7.2	453.7	453.7	454.5	0.8
AM	63,180	613	16,300	7.6	454.4	454.4	455.1	0.7
AN	64,015	402	13,000	9.5	454.8	454.8	455.6	0.8
AO	64,830	538	14,800	8.4	455.7	455.7	456.6	0.9
AP	65,840	566	16,400	7.6	456.7	456.7	457.5	0.8
AQ	68,030	635	17,300	7.2	458.5	458.5	459.0	0.5
AR	69,125	576	12,700	9.8	459.0	459.0	459.6	0.6
AS	70,945	320	9,140	13.6	461.3	461.3	461.8	0.5
AT	73,345	500	14,200	8.7	467.5	467.5	467.9	0.4
AU	75,625	836	22,900	5.4	470.4	470.4	470.7	0.3
AV	76,845	564	15,700	7.9	470.8	470.8	471.1	0.3
AW	78,535	1,000	25,000	5.0	472.2	472.2	472.6	0.4
AX	79,770	466	12,800	9.7	472.4	472.4	472.8	0.4
AY	81,170	372	10,400	11.9	474.2	474.2	474.6	0.4
AZ	83,670	632	16,000	7.8	477.6	477.6	478.0	0.4

¹Feet above mouth

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	SOUTH UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
South Umpqua River (Con't)								
BA	84,710	783	16,100	7.7	478.7	478.7	479.2	0.5
BB	86,030	417	12,700	9.8	480.1	480.1	480.6	0.5
BC	87,335	600 ²	15,600	7.9	481.8	481.8	482.5	0.7
BD	88,725	1,100 ²	30,100	4.1	483.6	483.6	484.4	0.8
BE	90,220	1,443	28,800	4.3	484.3	484.3	485.2	0.9
BF	91,195	806	19,500	6.4	484.9	484.9	485.8	0.9
BG	91,895	675	16,600	7.4	485.5	485.5	486.4	0.9
BH	92,935	1,728	26,300	4.7	486.8	486.8	487.7	0.9
BI	94,050	1,550	21,200	5.8	487.6	487.6	488.4	0.8
BJ	94,615	550	14,200	8.8	487.8	487.8	488.6	0.8
BK	95,845	891	15,700	7.9	488.9	488.9	489.7	0.8
BL	97,750	1,113	18,600	6.7	490.4	490.4	491.3	0.9
BM	99,160	677	15,200	8.1	491.1	491.1	492.0	0.9
BN	100,770	1,319	18,900	6.6	492.1	492.1	493.0	0.9
BO	101,715	1,727	19,900	6.2	492.6	492.6	493.5	0.9
BP	102,685	1,763	24,800	5.0	493.5	493.5	494.5	1.0
BQ	104,490	1,237	19,600	6.3	494.0	494.0	495.0	1.0
BR	106,445	2,019	22,400	5.5	495.6	495.6	496.6	1.0
BS	108,800	2,089	20,300	6.1	498.9	498.9	499.9	1.0
BT	109,310	2,194	24,800	5.0	499.8	499.8	500.8	1.0
BU	110,700	2,394	27,629	4.5	503.3	503.3	503.9	0.6
BV	111,935	2,914	32,408	3.8	503.8	503.8	504.5	0.7
BW	113,115	2,867	27,107	4.6	504.4	504.4	505.0	0.6
BX	114,180	2,695	27,592	4.5	505.4	505.4	506.0	0.6
BY	115,860	2,116	25,258	4.9	506.8	506.8	507.5	0.7
BZ	118,220	1,066	15,687	7.9	508.7	508.7	509.5	0.8

¹Feet above mouth ²This width does not include islands

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	SOUTH UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
South Umpqua River (Con't)								
CA	120,130	1,517	20,433	6.1	511.4	511.4	512.4	1.0
CB	121,355	1,190	24,338	5.1	512.7	512.7	513.6	0.9
CC	123,340	1,106	20,127	6.2	514.2	514.2	515.2	1.0
CD	124,325	1,213	17,592	7.0	514.8	514.8	515.7	0.9
CE	125,460	2,034	26,075	4.8	516.2	516.2	517.0	0.8
CF	126,380	1,600	22,243	5.6	517.1	517.1	518.0	0.9
CG	127,140	1,523	21,591	5.7	518.2	518.2	519.2	1.0
CH	128,960	2,713	40,420	3.1	520.7	520.7	521.3	0.6
CI	129,825	2,847	40,148	3.1	521.2	521.2	521.8	0.6
CJ	130,745	2,720	36,800	3.4	521.8	521.8	522.4	0.6
CK	131,980	2,302	27,400	3.9	522.6	522.6	523.6	1.0
CL	135,385	2,312	22,100	4.8	524.8	524.8	525.8	1.0
CM	136,350	2,416	19,600	5.4	525.4	525.4	526.4	1.0
CN	138,315	2,032	19,000	5.6	527.3	527.3	528.2	0.9
CO	140,165	500	10,700	9.9	529.0	529.0	530.0	1.0
CP	142,495	390	11,000	9.6	535.0	535.0	536.0	1.0
CQ	145,475	335	9,460	11.2	538.1	538.1	538.9	0.8
CR	149,485	400	11,100	9.6	544.2	544.2	545.0	0.8
CS	151,420	640	14,800	7.2	546.7	546.7	547.4	0.7
CT	152,475	416	10,700	9.9	548.0	548.0	548.5	0.5
CU	154,825	528	13,700	7.7	551.2	551.2	552.0	0.8
CV	156,780	1,086	18,400	5.8	553.7	553.7	554.6	0.9
CW	157,635	1,950	22,900	4.6	554.3	554.3	555.3	1.0
CX	160,170	2,150	24,800	4.3	555.9	555.9	556.7	0.8
CY	160,970	1,930	22,700	4.7	556.3	556.3	557.1	0.8
CZ	162,645	986	22,000	4.8	557.6	557.6	558.3	0.7
¹ Feet above mouth								
TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY		FLOODWAY DATA					
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS		SOUTH UMPQUA RIVER					

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
South Umpqua River (Con't)								
DA	163,285	413	11,200	9.5	557.8	557.8	558.5	0.7
DB	165,740	452	11,800	9.0	561.4	561.4	562.1	0.7
DC	166,440	638	14,500	7.3	562.6	562.6	563.6	1.0
DD	167,375	467	12,400	8.5	563.4	563.4	564.3	0.9
DE	168,835	1,065	22,700	4.7	564.9	564.9	565.9	1.0
DF	170,025	940	18,800	5.6	565.4	565.4	566.4	1.0
DG	171,715	1,763	17,200	6.2	566.5	566.5	567.5	1.0
DH	173,300	1,308	12,700	8.3	567.7	567.7	568.7	1.0
DI	174,740	549	13,000	8.2	569.6	569.6	570.6	1.0
DJ	176,125	850	18,800	5.6	570.9	570.9	571.9	1.0
DK	177,705	521	13,300	8.0	572.1	572.1	573.1	1.0
DL	178,225	375	9,730	10.9	573.2	573.2	574.0	0.8
DM	180,810	509	12,900	8.2	577.8	577.8	578.5	0.7
DN	182,140	462	12,100	8.7	579.1	579.1	579.8	0.7
DO	182,740	642	13,800	7.7	580.1	580.1	581.0	0.9
DP	184,295	317	10,500	10.1	582.0	582.0	582.6	0.6
DQ	185,520	473	13,400	7.9	583.8	583.8	584.6	0.8
DR	191,710	328	10,100	10.5	592.7	592.7	593.3	0.6
DS	192,940	565	12,300	8.6	594.9	594.9	595.6	0.7
DT	194,320	335	8,460	12.5	596.9	596.9	597.6	0.7
DU	196,550	407	12,100	8.8	601.3	601.3	602.2	0.9
DV	197,825	600	16,800	6.3	603.3	603.3	604.2	0.9
DW	199,005	500	14,400	7.4	604.0	604.0	604.9	0.9
DX	199,885	340	11,300	9.4	604.5	604.5	605.3	0.8
DY	200,880	395	9,790	10.8	605.2	605.2	606.0	0.8
DZ	202,340	451	11,600	9.1	608.7	608.7	609.3	0.6

¹Feet above mouth

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	SOUTH UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
South Umpqua River (Con't)								
EA	204,405	441	11,300	9.1	613.8	613.8	614.2	0.4
EB	205,920	415	12,300	8.4	616.5	616.5	616.9	0.4
EC	208,325	1,828	30,500	3.4	618.9	618.9	619.3	0.4
ED	209,895	1,061	14,700	7.0	619.3	619.3	619.7	0.4
EE	212,340	700	13,900	7.4	621.3	621.3	621.9	0.6
EF	213,645	1,937	21,800	4.7	622.8	622.8	623.5	0.7
EG	216,270	1,868	19,200	5.4	624.5	624.5	625.4	0.9
EH	217,565	1,103	15,000	6.9	625.5	625.5	626.4	0.9
EI	218,580	1,438	16,400	6.3	626.4	626.4	627.3	0.9
EJ	220,115	719	14,600	7.1	627.9	627.9	628.8	0.9
EK	222,145	1,150	14,800	7.0	629.6	629.6	630.6	1.0
EL	225,140	1,300	14,800	7.0	633.3	633.3	633.9	0.6
EM	226,915	1,276	14,400	7.2	635.3	635.3	635.9	0.6
EN	229,105	1,507	14,600	7.0	638.2	638.2	638.6	0.4
EO	229,980	979	13,000	7.9	639.0	639.0	639.4	0.4
EP	230,865	636	12,500	8.3	640.2	640.2	640.6	0.4
EQ	233,810	457	11,600	8.9	643.0	643.0	643.4	0.4
ER	235,975	790	15,400	6.7	646.8	646.8	647.3	0.5
ES	237,685	384	8,730	11.8	649.0	649.0	649.7	0.7
ET	239,940	1,032	14,100	7.3	653.8	653.8	654.4	0.6
EU	240,805	1,256	18,300	5.6	654.9	654.9	655.8	0.9
EV	241,915	1,012	16,600	6.2	656.1	656.1	656.9	0.8
EW	243,225	753	16,700	6.2	657.1	657.1	658.0	0.9
EX	245,775	994	19,800	5.2	659.5	659.5	660.4	0.9
EY	247,670	926	17,300	4.6	662.3	662.3	662.9	0.6
EZ	248,670	764	10,000	8.0	663.0	663.0	663.4	0.4

¹Feet above mouth

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	DOUGLAS COUNTY, OR AND INCORPORATED AREAS	SOUTH UMPQUA RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
South Umpqua River (Con't)								
FA	250,175	917	15,900	5.0	667.4	667.4	668.2	0.8
FB	251,735	572	9,570	8.4	668.8	668.8	669.4	0.6
FC	252,675	780	14,500	5.5	670.6	670.6	671.0	0.4
FD	253,930	713	11,800	6.8	671.7	671.7	672.1	0.4
FE	257,240	536	8,500	9.4	680.7	680.7	681.6	0.9
FF	258,535	700	12,200	6.6	684.5	684.5	685.5	1.0
FG	259,765	586	10,600	7.6	687.0	687.0	687.8	0.8
FH	261,780	826	12,400	6.5	690.7	690.7	691.2	0.5
FI	263,010	574	9,870	8.1	692.2	692.2	692.7	0.5
FJ	263,960	1,015	12,700	6.3	694.1	694.1	694.6	0.5
FK	265,550	1,119	12,300	6.5	696.8	696.8	697.7	0.9
FL	266,350	919	11,500	7.0	698.1	698.1	698.9	0.8
FM	267,570	670	8,650	9.1	700.5	700.5	701.4	0.9
FN	270,000	1,070	12,900	6.1	706.0	706.0	706.9	0.9
FO	272,505	1,100	13,300	5.9	710.2	710.2	710.5	0.3
FP	277,255	950	9,420	8.4	717.1	717.1	718.0	0.9
FQ	278,350	1,350	16,200	4.8	720.2	720.2	720.8	0.6
FR	280,970	1,000	10,600	7.4	723.2	723.2	723.8	0.6
FS	283,690	930	11,000	7.1	729.6	729.6	730.0	0.4
FT	284,605	556	7,050	11.2	731.2	731.2	731.6	0.4
FU	285,545	1,477	13,800	5.7	735.4	735.4	736.3	0.9

¹Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

DOUGLAS COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

SOUTH UMPQUA RIVER

5.0 INSURANCE APPLICATION

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

Zone A

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

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate 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 depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

Table 8 lists the flood insurance zones that each community is responsible for regulating.

Table 8. Flood Insurance Zones Within Each Community

<u>Community</u>	<u>Flood Zone(s)</u>
Canyonville , City of	AE, X
Douglas County Unincorporated Areas	A, AE, X, D
Drain, City of	A, AE, X
Elkton, City of	AE, X
Glendale, City of	A, AE, X
Myrtle Creek, City of	AE, X
Oakland, City of	A
Reedsport, City of	AE, X
Riddle, City of	AE
Roseburg, City of	AE, X
Sutherlin, City of	A
Winston, City of	A, AE, X
Yoncalla, City of	A, D

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map 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 floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The countywide Flood Insurance Rate Map presents flooding information for the entire geographic area of Douglas County. Previously, Flood Insurance Rate Maps were prepared for each incorporated community and the unincorporated areas of the County identified as flood-prone. This countywide Flood Insurance Rate Map also includes flood-hazard information that was presented separately on Flood Boundary and Floodway Maps, where applicable. Historical data relating to the maps prepared for each community are presented in Table 9, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISION DATE(S)	FLOOD INSURANCE RATE MAP EFFECTIVE DATE	FLOOD INSURANCE RATE MAP REVISION DATE(S)
Canyonville , City of	June 7, 1974	February 6, 1976	November 1, 1978	
Douglas County Unincorporated Areas	December 15, 1978	----	December 15, 1978	March 4 1986 December 18, 1986 April 21, 1999
Drain, City of	April 5, 1974	July 30, 1976	August 1, 1979	
Elkton, City of	September 13, 1974	December 5, 1975 August 16, 1977	September 5, 1979	
Glendale, City of	December 28, 1973	April 23, 1976	September 29, 1978	February 18, 1998
Myrtle Creek, City of	October 12, 1973	May 28, 1976	February 15, 1978	December 28, 1982
Oakland, City of	November 22, 1974	----	June 19, 1985	
Reedsport, City of	June 21, 1974	April 23, 1976 January 28, 1977 August 23, 1977	April 3, 1984	
Riddle, City of	June 7, 1974	December 5, 1975	August 1, 1979	February 18, 1998
Roseburg, City of	June 7, 1974	April 23, 1976	June 1, 1977	January 5, 1982 December 18, 1986 April 21, 1999
Sutherlin, City of ¹	-----	----	-----	-----
Winston, City of	September 14, 1973	----	September 14, 1973	July 1, 1974 August 22, 1975 October 20, 1981
Yoncalla, City of ¹	-----	-----	-----	-----

¹This community did not have a FIRM prior to the first countywide FIRM for Douglas County

TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

**DOUGLAS COUNTY, OR
AND INCORPORATED AREAS**

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

In 1966, the USACE released a Flood Plain Information report (Reference 21) that covers the Umpqua River in Coles Valley and Garden Valley; Calapooya Creek, from its mouth to Fair Oaks; the North Umpqua River, from its mouth to Winchester; the South Umpqua River, from its mouth to above Days Creek; and Cow Creek, from its mouth to Cornutt Siding. This report shows the approximate areas covered by the floods of December 1955 and December 1964, but does not show any profiles. This study supersedes the COE report because of the more detailed nature of the analysis.

The base flood discharge used for the South Umpqua River profile was within 2 percent of that used by the USACE in its Umpqua River review report of 1971 (Reference 3); for the Umpqua River, the base flood discharge was within 6 percent of the COE figure. These discharges were different because different methods of analysis and data base. Values in this Flood Insurance Study are valid.

In 1968, the USGS prepared a flood-profile study on Elk Creek, Yoncalla Creek and selected tributaries, which included Elk Creek and Pass Creek in Drain (Reference 36 and 53). That study presented profiles of the 50-percent-annual-chance flood, the 10-percent-annual-chance flood, and the 1961 flood, which was greater than 2-percent-annual-chance recurrence interval. Because of additional data and changes in the method of frequency analysis, the 10-percent-annual-chance flood of the present Flood Insurance Study is less than the 10-percent-annual-chance flood as used in 1968. The frequency analysis of 1968 was not extended to the 1-percent-annual-chance recurrence interval.

In 1972, 1973, and 1975 the USGS released flood profile studies (References 17, 18, and 19) that provide the basic cross section and profile data used for the reaches studied in detail for this report.

The Federal Insurance Administration previously published a Flood Hazard Boundary Map for the City of Reedsport (Reference 54). The present FIS is more detailed and, thus, supersedes the area of Reedsport covered by the earlier map.

The USACE at the Waterways Experiment Station, Vicksburg, Mississippi, determined flood levels on the Pacific coast caused by tsunami (Reference 55). The tsunami flood elevations are lower than the elevations determined in this FIS.

This Flood Insurance Study is in agreement with the Flood Insurance Studies published for the Cities of Canyonville (Reference 56), Drain (Reference 57), Elkton (Reference 58), Glendale (Reference 59), Myrtle Creek (Reference 60), Reedsport (Reference 61), Riddle (Reference 62), Roseburg (Reference 63), Winston (Reference 64), and Douglas County Unincorporated Areas (Reference 65).

8.0 LOCATION OF DATA

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

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<u>Map Name</u>	<u>Date</u>	<u>Scale</u>	<u>Contour Interval</u>
Callahan	1990	1:24,000	40 ft
Canyonville	1986	1:24,000	40 ft
Cedar Springs Mountain	1986	1:24,000	40 ft
Curtin	1987	1:24,000	40 ft
Days Creek	1986	1:24,000	40 ft
Deer Head Point	1985	1:24,000	40 ft
Devils Graveyard	1990	1:24,000	40 ft
Dixonville	1987	1:24,000	40 ft
Drain	1987	1:24,000	40 ft
Elkton	1990	1:24,000	40 ft
Five Mile Creek	1984	1:24,000	40 ft
Garden Valley	1987	1:24,000	40 ft
Glendale	1986	1:24,000	40 ft
Glide	1987	1:24,000	40 ft
Golden	1986	1:24,000	40 ft
Kellogg	1990	1:24,000	40 ft
McCullough Creek	1986	1:24,000	40 ft
Milo	1986	1:24,000	40 ft
Myrtle Creek	1987	1:24,000	40 ft
Nickel Mountain	1986	1:24,000	40 ft
North Fork	1984	1:24,000	40 ft
Oak Creek Valley	1987	1:24,000	40 ft
Putnam Valley	1987	1:24,000	40 ft
Quines Creek	1986	1:24,000	40 ft
Reedsport	1985	1:24,000	40 ft
Reston	1990	1:24,000	40 ft
Roseburg East	1987	1:24,000	40 ft
Roseburg West	1987	1:24,000	40 ft
Scottsburg	1985	1:24,000	40 ft
Scotts Valley	1987	1:24,000	40 ft
Starvout Creek	1986	1:24,000	40 ft
Sutherlin	1988	1:24,000	40 ft
Tenmile	1990	1:24,000	40 ft
Tiller	1989	1:24,000	40 ft
Tyee	1990	1:24,000	40 ft
Tyee Mountain	1987	1:24,000	40 ft
Winchester	1987	1:24,000	40 ft
Winchester Bay	1985	1:24,000	40 ft
Winston	1987	1:24,000	40 ft
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10.0 **REVISION DESCRIPTIONS**

This section has been added to provide information regarding significant revisions made since the original Flood Insurance Study was printed. Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data located at the address listed below. Please refer to the Douglas County, Oregon FIRM Map Index (41019CIND0A) for other community repositories within Douglas County.

Douglas County Building
Department Courthouse
Building, Room 106 Roseburg,
OR 97470

10.1 **Pre- Countywide Revisions**

Table 10 summarizes the flooding sources updated since the original study was completed.

Table 10. Revised Study Descriptions

<u>Flooding Source</u>	<u>Community</u>	<u>Limits of Study</u>	<u>Revision Date</u>	<u>Panel No.</u>
Deer Creek	City of Roseburg Douglas County	From the confluence with the South Umpqua River to Douglas Avenue	June 8, 1993	41019C1707F 41019C1726F 41019C1727F
Cow Creek	Douglas County City of Riddle City of Glendale	From confluence with South Umpqua River to USGS Gage 14310000 From 2,800 below Totten Creek to Galesville Dam	April 21, 1999	41019C2485F 41019C2495F 41019C2503F 41019C2505F 41019C2515F 41019C2825F 41019C2840F 41019C2845F 41019C2855F 41019C2855F 41019C2865F 41019C3030F 41019C3031F 41019C3035F 41019C3055F
Newton Creek	City of Roseburg Douglas County	Extent of Detailed Study Area	April 21, 1999	41019C1728F 41019C1729F
South Umpqua River	City of Roseburg	1 mile downstream of the confluence with Newton Creek to immediately downstream of the Interstate 5 Bridge	April 21, 1999	41019C1707F 41019C1709F 41019C1726F 41019C1728F
South Umpqua River ¹	City of Roseburg	From Francis Street to immediately downstream of the Interstate 5 Bridge	May 12, 2003	41019C1709F 41019C1728F

¹ Revision has been superseded by redelineation during countywide update.

10.2 Countywide Revision

Countywide Update (February 17, 2010)

The countywide update was completed in February 2009 by WEST Consultants, Inc. for FEMA under Contract No. EMS-2001-CO-0068.

This update combined the Flood Insurance Rate Maps and Flood Insurance Study reports for Douglas County and incorporated communities into the countywide format. Under the countywide format, FIRM panels have been produced using a single layout format for the entire area within the county instead of separate layout formats for each community. The single-layout format facilitates the matching of adjacent panels and depicts the flood-hazard area within the entire panel border, even in areas beyond a community's corporate boundary line. In addition, under the countywide format this single FIS report provides all associated information and data for the entire county area.

As part of this revision, the format of the map panels has changed. Previously, flood-hazard information was shown on both FIRMs and Flood Boundary and Floodway Maps (FBFMs). In the new format, all base flood elevations, cross sections, zone designations, and floodplain and floodway boundary delineations are shown on the FIRM; the FBFM has been eliminated. Some of the flood insurance zone designations were changed to reflect the new format. Areas previously shown as numbered Zone A were changed to Zone AE. Areas previously shown as Zone B were changed to Zone X (shaded). Areas previously shown as Zone C were changed to Zone X (unshaded). In addition, all Flood Insurance Zone Data Tables were removed from the FIS report and all zone designations and reach determinations were removed from the profile panels.

All flood elevations shown in this FIS report and on the FIRM panels were converted from NGVD 29 to NAVD 88. The conversion factor from NGVD to NAVD is shown in Table 6.

The detailed study area floodplain boundaries for Newton Creek, 4.2 miles of Deer Creek, 8.4 miles of the South Umpqua River, and 3.1 miles of the North Umpqua River were revised with new topographic mapping with a contour interval of 2 feet (Reference 48). Newton Creek floodplain boundaries were revised within the corporate limit of Roseburg. The floodplain boundaries of Deer Creek were revised from the confluence with the South Umpqua River to 4.2 miles upstream to the southeast corporate limit of Roseburg. The South Umpqua River floodplain boundaries were revised from approximately three miles downstream of the western corporate limit of Roseburg to 3,500 feet upstream of the southern corporate limit of Roseburg. The North Umpqua River floodplain boundaries were revised from approximately River Mile 6.5 upstream to River Mile 9.6.

The effective detailed study area (pre-reservoir) of Cow Creek inundated by the pool of Galesville Reservoir was replaced with an approximate "A" zone designation. The USACE provided an elevation-outflow curve for Galesville reservoir which was used to approximate the reservoir elevation for the base-flood (Reference 49). The A zone was delineated using 1:24,000 USGS topographic map with a contour interval of 40 feet (Reference 50).

The remaining floodplain boundaries were digitized from the effective FIRM and Floodway panels. Aerial photography (Reference 51) and USGS topographic maps (Reference 50) were used to adjust floodplain and floodway boundaries where appropriate.

In accordance with FEMA Procedure Memorandum 36 (Reference 52), profile baselines have been included in all areas of detailed study. Profile baselines are shown in the location of the original stream centerline or original profile baseline without regard to the adjusted floodplain position on the new base map. This was done to maintain the relationship of distances between cross sections along the profile baseline.

LOMR 03-10-0263P, which affects City of Roseburg floodplain mapping, has been superseded by the redelineation of the South Umpqua River floodplain boundaries using topographic mapping with a contour intervals of 2 feet (Reference 48).