CHAPTER 8
FLOODING ISSUES

The following summary presents a list of identified flood problems within the Ahtanum and Wide Hollow Creek watersheds, based on the following information:

- four public workshops (Chapter 2);
- steering committee and Committee meetings (Chapter 2);
- flood facilities and structural inventory (Appendix E, Golder); and,
- research of basin flood history (Chapter 7).

Additional data on specific flooding problems for this chapter comes from historical flood-related information, including:

- Personal accounts of flooding in 1995 and 1996;
- Road Damage Assessment and Damage Survey Reports from 1995 and 1996;
- High-water-marks from the February 1996 flood event;,
- Oral histories, newspaper articles, photographs, and videos of past flooding.

Local governments and the public provided a wealth of first- and second-hand flood history information. Several people provided copies of newspaper articles, photographs of flood damage, and video tapes of flood events covered by the television news. A detailed flood history of the Ahtanum and Wide Hollow Creek basins based on these sources is presented in the following sections. Appendices C and E contain this information in tables.

Road Damage Logs – Floods of 1995 and 1996

The Yakima County Public Works Department provided detailed damage reports for flood events in February 1995 and February 1996. These reports indicate dates and extent of water over a roadway, road closures and damage to roads or conveyance structures. See Figures 7-1 thru 7-6 for each geographic area including delineations of roads impacted in these ways by either or both flood events.

High Water Marks from the February 1996 Flood Event

Yakima County Public works surveyed locations of identified high water marks along Ahtanum Creek, Bachelor Creek, and Hatton Creek. These points were incorporated into the GIS database and are marked on the road damage maps (Figures 8-1 thru 8-6).

Oral Histories, Photographs and Videos

Numerous people provided personal accounts of flooding on their property and elsewhere. Many area residents provided original photographs (digital and/or print) or newspaper clippings. Prints were scanned to create digital images and all images were digitally catalogued. Numbers of the photo locations for the structural survey are listed on Tables 2 and 3 in Appendix E along with the corresponding comments.

Figure 8-1

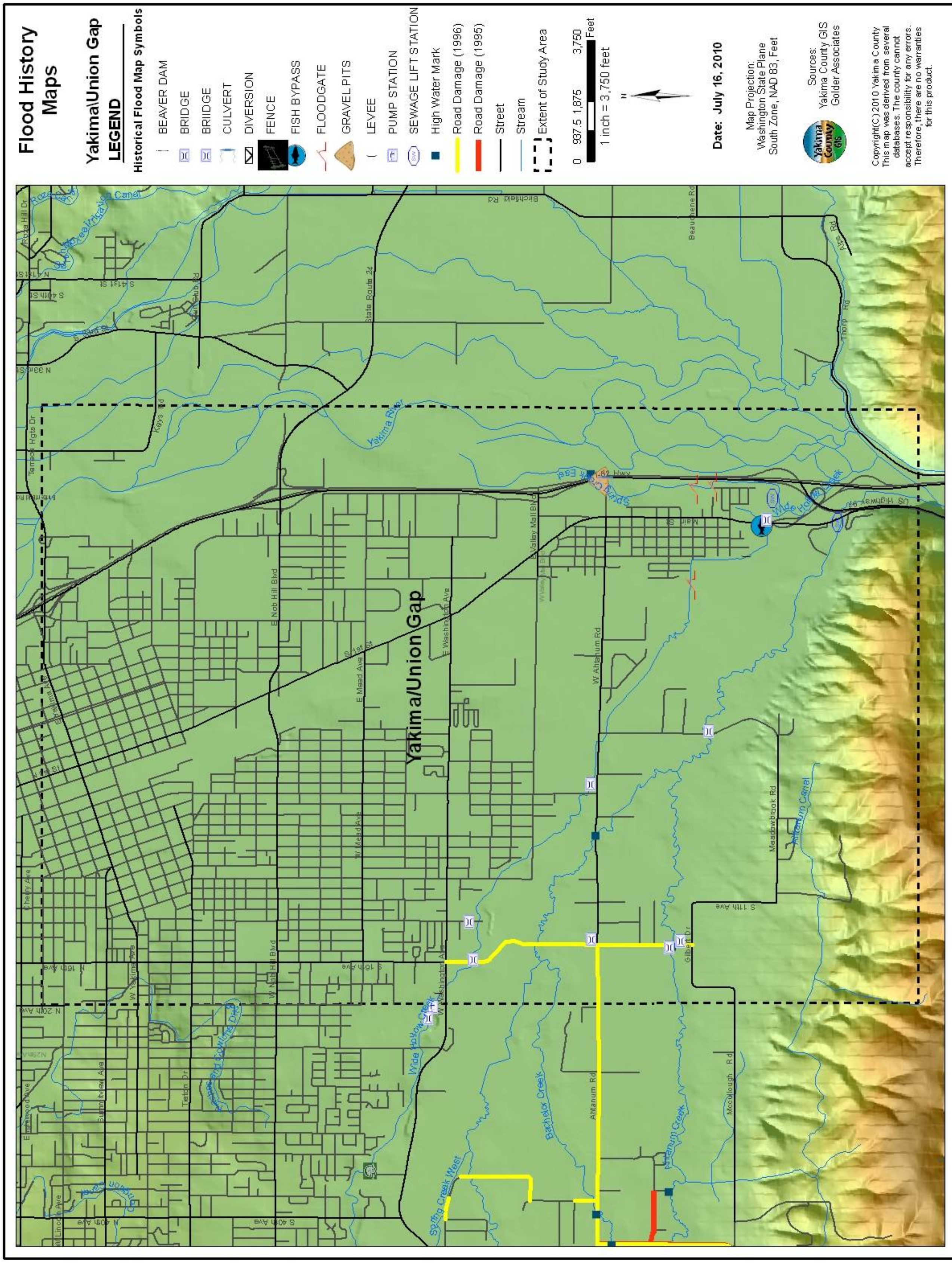

Flood History Maps
Yakima\Union Gap
LEGEND
Historical Flood Map Symbols
BEAVER DAM
BRIDGE
BRIIDGE
CULVERT
DIVERSION
FENCE
FISH BYPASS
FLOODGATE
GRAVEL PITS
LEVEE
PUMP STATION
SEWAGE LIFT STATION
High Water Mark
Road Damage (1996)
Road Damage (1995)
Street
Stream
Extent of Study Area
0 937.5 1,875 3,750 Feet
1 inch = 3,750 feet
Date: July 16, 2010
Map Projection: Washington State Plane South Zone, NAD 83, Feet
Sources: Yakima County GIS Golder Associates
Copyright(C) 2010 Yakima County This map was derived from several databases. The county cannot accept responsibility for any errors. Therefore, there are no warranties for this product.
Yakima/Union Gap

Figure 8-2

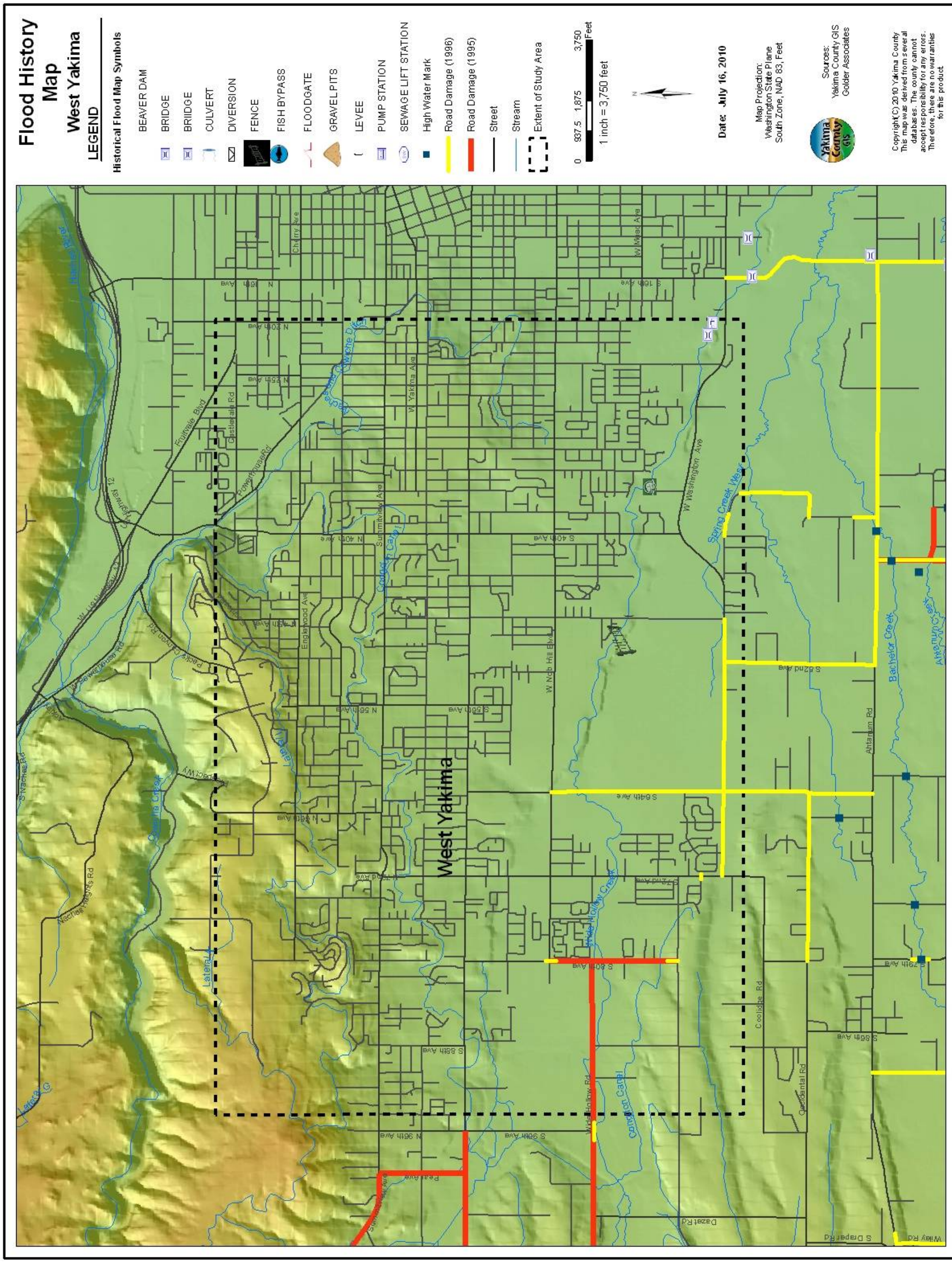

Flood History Map
West Yakima
LEGEND
Historical Flood Map Symbols
BEAVER DAM
BRIDGE
BRIDGE
CULVERT
DIVERSION
FENCE
FISH BYPASS
FLOODGATE
GRAVEL PITS
LEVEE
PUMP STATION
SEWAGE LIFT STATION
High Water Mark
Road Damage (1996)
Road Damage (1995)
Street
Stream
Extent of Study Area
0 937.5 1,875 3,750 Feet
1 inch = 3,750 feet
Date: July 16, 2010
Map Projection: Washington State Plane South Zone, NAD 83, Feet
Sources: Yakima County GIS Golder Associates
West Yakima

Figure 8-3

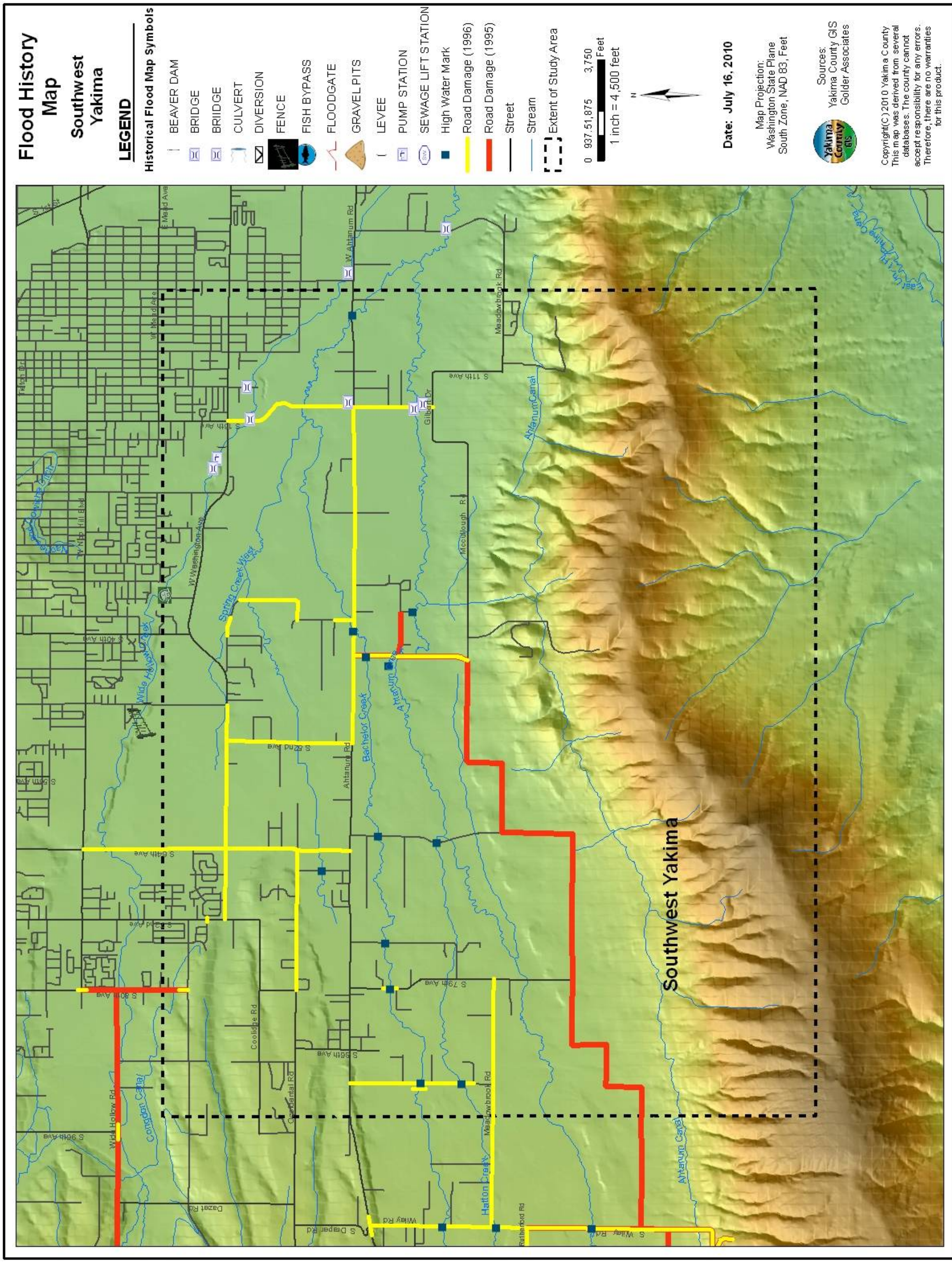
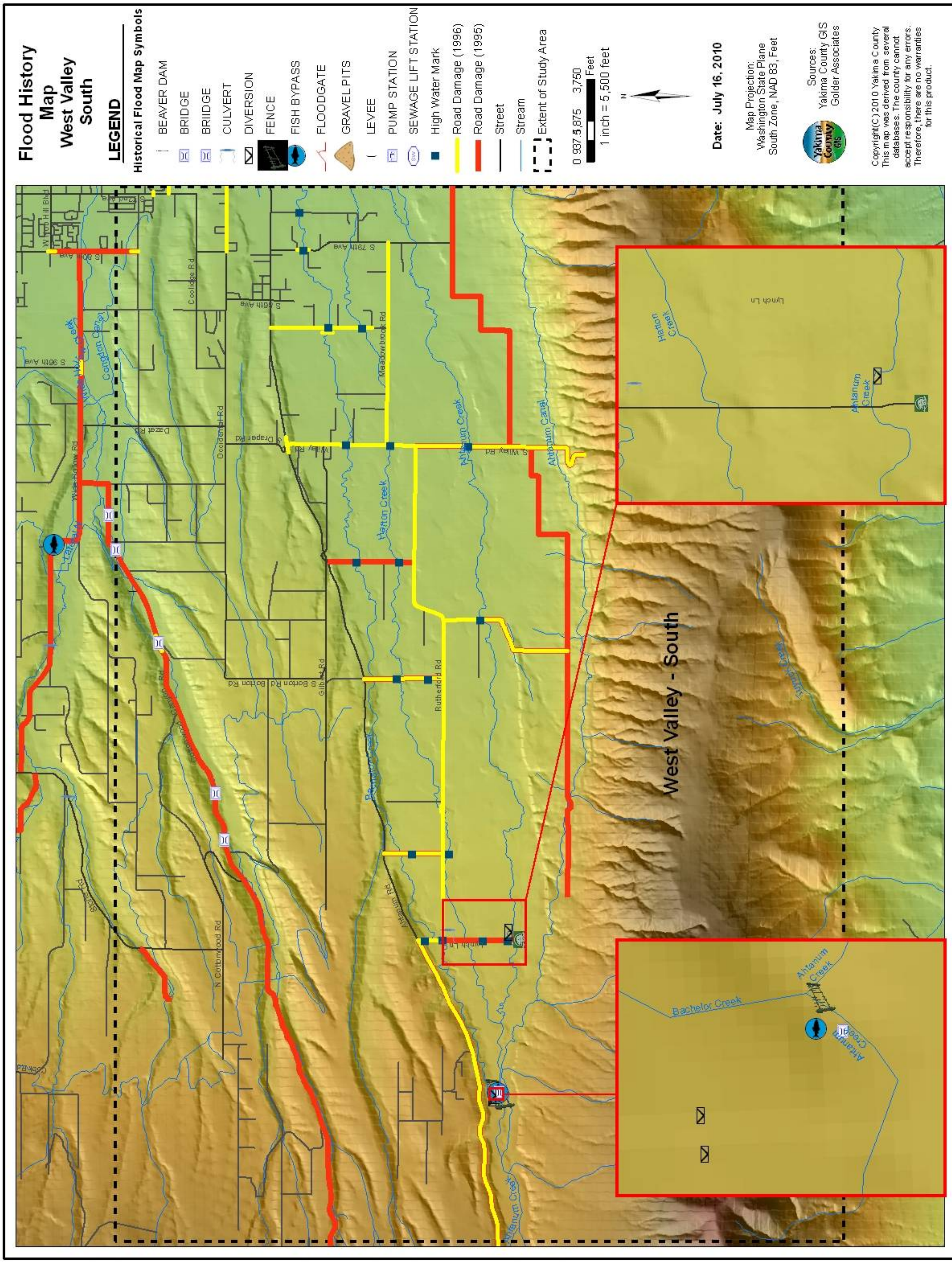

Flood History Map
Southwest Yakima
LEGEND
Historical Flood Map Symbols
BEAVER DAM
BRIDGE
BRIDGE
CULVERT
DIVERSION
FENCE
FISH BYPASS
FLOODGATE
GRAVEL PITS
LEVEE
PUMP STATION
SEWAGE LIFT STATION
High Water Mark
Road Damage (1996)
Road Damage (1995)
Street
Stream
Extent of Study Area
0 937.5 1,875 3,750 Feet
1 inch = 4,500 feet
N
Date: July 16, 2010
Map Projection: Washington State Plane South Zone, NAD 83, Feet
Sources: Yakima County GIS Golder Associates
Copyright(C) 2010 Yakima County
This map was derived from several databases. The county cannot accept responsibility for any errors. Therefore, there are no warranties for this product.
Southwest Yakima
Ahtanum Rd
Bachelor Creek
Ahtanum Creek
Wide Hollow Creek
Wide Hollow Rd
Congdon Canal
Ahtanum Canal
Hatton Creek
Meadowbrook Rd
Wiley Rd
Coolidge Rd
W Washington Ave
S 64th Ave
S 80th Ave
S 72nd Ave
S 52nd Ave
S 40th Ave
S 16th Ave
S 11th Ave
Gilbert Dr
Mccullough Rd
W Ahtanum Rd

Figure 8-4


Flood History Map
West Valley South
LEGEND
Historical Flood Map Symbols
BEAVER DAM
BRIDGE
BRIIDGE
CULVERT
DIVERSION
FENCE
FISH BYPASS
FLOODGATE
GRAVEL PITS
LEVEE
PUMP STATION
SEWAGE LIFT STATION
High Water Mark
Road Damage (1996)
Road Damage (1995)
Street
Stream
Extent of Study Area
0 937.5 1,875 3,750 Feet
1 inch = 5,500 feet
Date: July 16, 2010
Map Projection: Washington State Plane South Zone, NAD 83, Feet
Sources: Yakima County GIS Golder Associates
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West Valley - South
Ahtanum Creek
Hatton Creek
Bachelor Creek
Ahtanum Canal
Congdon Canal
Wide Hollow Creek
S Wiley Rd
Rutherford Rd
Gilbert Rd
Bolton Rd
Draper Rd
Dazet Rd
Occidental Rd
Coolidge Rd
Meadowbrook Rd
N Cottonwood Rd
Ahtanum Rd
Lynch Ln
S 96th Ave
S 80th Ave
S 88th Ave
S 79th Ave

Figure 8-5

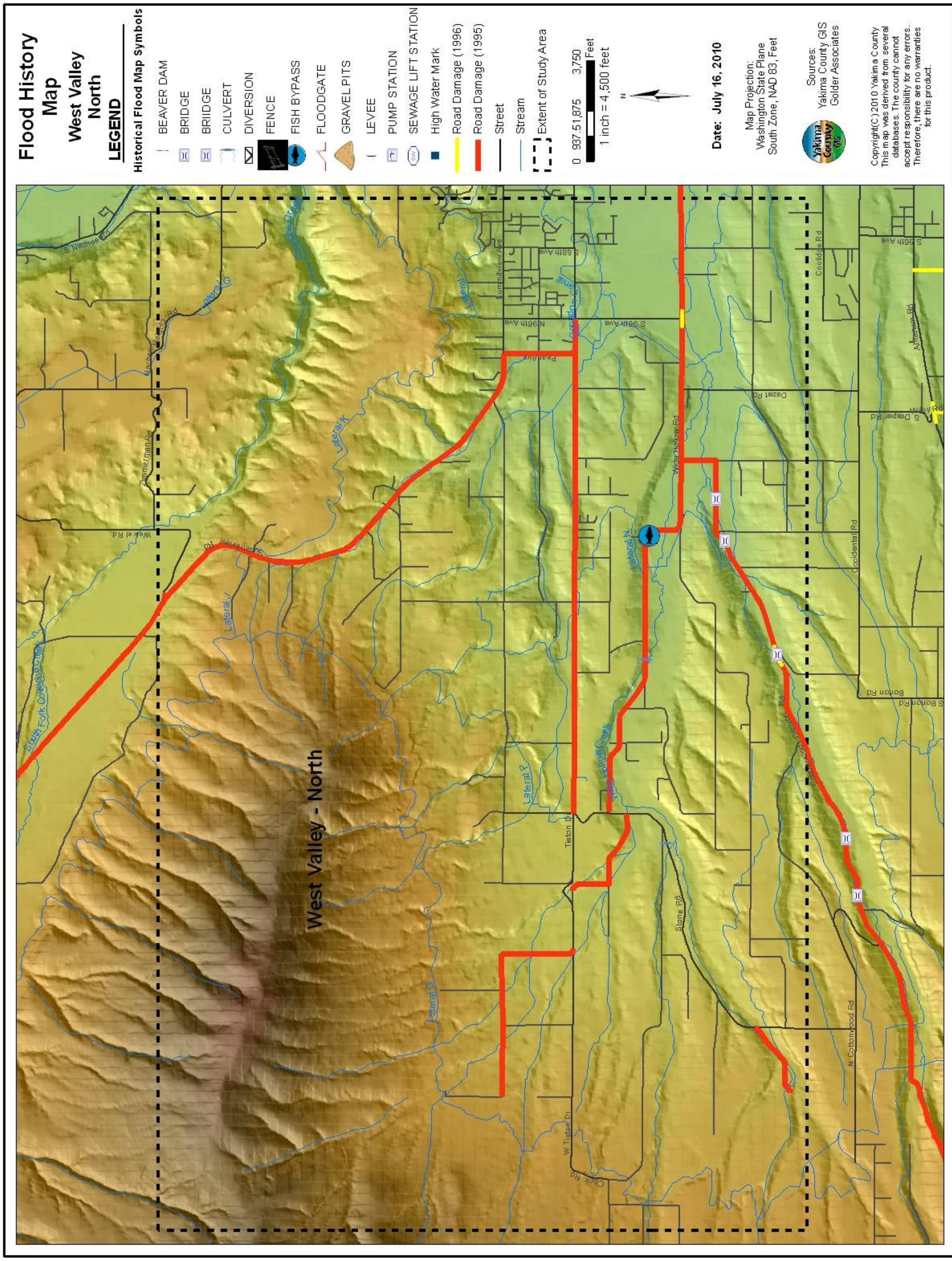
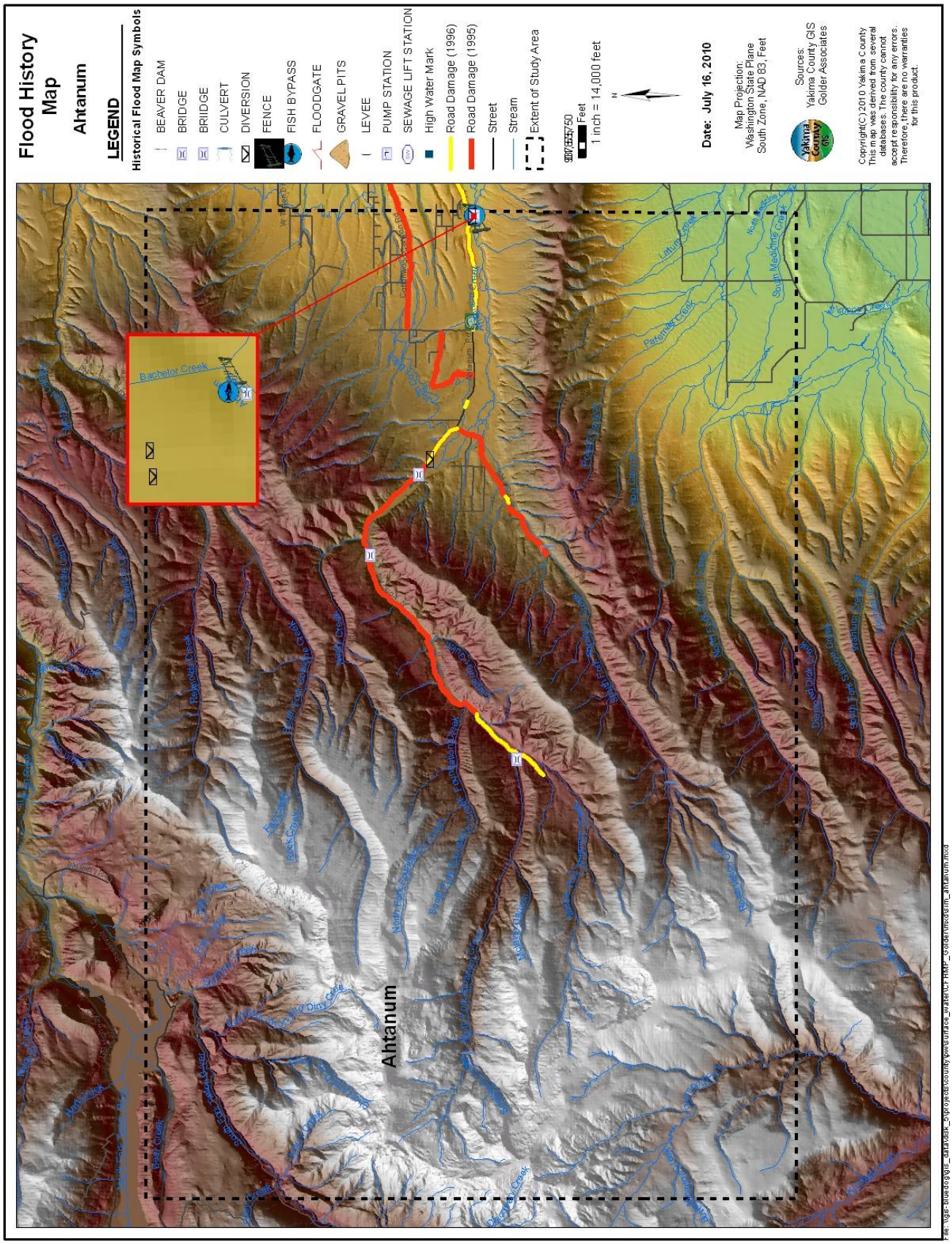

Flood History Map
West Valley North
LEGEND
Historical Flood Map Symbols
BEAVER DAM
BRIDGE
BRIIDGE
CULVERT
DIVERSION
FENCE
FISH BYPASS
FLOODGATE
GRAVEL PITS
LEVEE
PUMP STATION
SEWAGE LIFT STATION
High Water Mark
Road Damage (1996)
Road Damage (1995)
Street
Stream
Extent of Study Area
0 937.51,875 3,750 Feet
1 inch = 4,500 feet
Date: July 16, 2010
Map Projection: Washington State Plane South Zone, NAD 83, Feet
Sources: Yakima County GIS Golder Associates
Copyright(C) 2010 Yakima County
This map was derived from several databases. The county cannot accept responsibility for any errors. Therefore, there are no warranties for this product.
West Valley - North

Figure 8-6


Flood History Map
Ahtanum
LEGEND
Historical Flood Map Symbols
BEAVER DAM
BRIDGE
BRIDGE
CULVERT
DIVERSION
FENCE
FISH BYPASS
FLOODGATE
GRAVEL PITS
LEVEE
PUMP STATION
SEWAGE LIFT STATION
High Water Mark
Road Damage (1996)
Road Damage (1995)
Street
Stream
Extent of Study Area
Feet
1 inch = 14,000 feet
Date: July 16, 2010
Map Projection:
Washington State Plane
South Zone, NAD 83, Feet
Sources:
Yakima County GIS
Golder Associates
Copyright(C) 2010 Yakima County
This map was derived from several databases. The county cannot accept responsibility for any errors. Therefore, there are no warranties for this product.
Ahtanum
Bachelor Creek

In addition to photographs, several area residents provided home videotapes of flooding or of television news programs covering flood events. These have also been cataloged and are archived in the Flood Control Zone District flood history library.

Public Comments Summary of General Flood Problems

Information Gaps

Information gaps generally refer to lack of access to correct information or lack of knowledge in a particular area. More specifically, it includes incorrect topographic information. U.S. Geological Survey (USGS) maps do not correctly represent topography (elevation, berms, etc.). Additionally, small tributaries such as Shaw Creek had not been mapped prior to the beginning of the planning process. Flood Insurance Rate Maps (FIRMs), which illustrate flood levels at various recurrence interval storms, contain outdated and/or incorrect information. Additional information gaps include channel issues, such as knowledge of relocation of streams out of their natural channels, knowledge of manmade impediments to flow, and a lack of understanding of how a stream channel is defined. Undersized bridges and culverts, location and condition of levees, and debris-catching fences are not documented. Finally, there is a lack of knowledge of techniques of creek stabilization. This CFHMP, the CFHMP recommendations in Chapter 10 and the FIS study reduces the information gap.

Errors in FEMA Maps

Several personal comments indicated that Federal Emergency Management Agency (FEMA) floodplain maps should be reviewed and updated as necessary. Some maps were updated after the second-highest peak flows on record in 1996, but others were not immediately updated. The outdated maps were relied upon for sale of real estate and in one case the sale fell through because the maps were determined to be incorrect and the property was partially within the 100-year floodplain. In other locations, changes in streamflow due to diversions, for example, have altered the 100-year floodplain and these changes have not been reflected on the FEMA maps.

Shaw Creek, for example, has been largely diverted because its flow is comprised only of return flow, which is not regulated. Residents downstream whose property is mapped within the 100-year floodplain, may no longer be within the floodplain. Additional errors in FEMA floodplain maps exist area-wide because residents alter their property by building levees, placing fill, etc. Due to the low gradient of much of the Ahtanum and Wide Hollow floodplains, localized property alterations may have a large impact on surrounding areas. See comments No. 155, 103 and 127 in Appendix F, Table 1. The current FEMA restudy was used as direct input to this CFHMP.

Lack of Knowledge and Guidance for Localized Flood Mitigation

Committee members identified a lack of knowledge of best management practices as an important issue. As a result area residents sometimes take matters into their own hands during or after floods and remove debris from creek channels and build levees, only to have these perceived fixes contribute to flooding issues downstream. For example, it was reported that property owners at one point got together to clean out a section of Wide Hollow Creek in the West Valley–North area. Those that resisted experienced overbank flow when there was a flood condition. Cleaning out the creek was perceived positively, even though flood issues were exacerbated for others. A more holistic view of floodplain function and the community's role in managing the floodplain may result in implementation of best management practices.

Inconsistent Regulation Enforcement

Various public comments indicate that State agencies are not adequately enforcing regulations. Development proceeds without correct permitting. Diversion of water or rerouting of stream channels occurs area-wide without proper enforcement. These actions alter the floodplain and alter the paths of flood flows when they occur, making flood prediction difficult. These actions also make FEMA maps incorrect. See Comments No. 24, 36, 80, 98, and 155 in Appendix F, Table 1.

Beaver Management and Public Education

Beavers are common throughout the West Valley area and beaver dams are part of the natural ecosystem. As development has grown, beaver dams are causing increasing flood damage. They also degrade existing levees and dikes and build dams that cause flood damage to numerous properties. Beaver dams help attenuate flood flows in the region, mitigating flooding impacts. They also encourage exchange of nutrients between the stream and floodplain. Lack of education about the benefits of beaver dams to the watershed and proper management strategies, has caused area residents to perceive beavers negatively and as always being harmful to property. Many people want to see beavers removed from their properties. See Comments No. 55, 57, 60, and 62 in Appendix F, Table 1.

Personal Levees Built on Private Property

Numerous public comments and review of LiDAR images confirm residents built levees to keep water from entering parts of the floodplain and to keep water in the streams. Levees built without consideration of the entire floodplain may relieve flooding in one area, but exacerbate flood issues in other areas. Additionally, incomplete knowledge of flood history in the floodplain may encourage poor placement of local levees, which could cause greater trouble if flood waters approach the levee from a different direction and actually prolong flooding because water cannot flow through.

Flood Problem Groups

Flood problem groups were developed in response to the information collected at four public workshops as well as numerous personal interviews and other information

referenced previously. Details of the four public workshops and targeted interviews were compiled by Golder Associates in two Technical Memoranda.

The data, listed in the Appendices, and prior chapters were grouped into the following nine general and six location specific flood problem groups:

In-Stream Debris - includes brush, trees, branches, etc. that become lodged upstream of culverts, bridges, fence lines or road ditches. Due to the relatively large areas of shallow flooding that can occur in these watersheds, even minor plugging or rerouting of flood waters can have an effect across a large area.

Inundation - includes areas where flooding occurs with no cause identified other than high water. These comments mainly refer to water over a roadway, field, or yard which occurs frequently in these watersheds due to the large areas of shallow flooding that can occur with high frequency.

Irrigation Infrastructure – this includes damage to and flooding impacts from irrigation diversions; flood routing along irrigation canals and ditches; and abandoned or unused irrigation infrastructure that effects flood routing or channel conditions.

Vegetation – generally non-native willows and associated debris that reduce channel conveyance.

Fish and Wildlife - includes comments relating to healthy habitats for beavers, muskrats, and fish species.

Flood Fight - includes responses to flooding and discussion of sandbagging efforts, emergency access routes and coordination among agencies and private parties.

Transportation Infrastructure - refers to undersized and/or damaged bridges and culverts; constriction of channels due to roads; flooding and damage to roads and road construction standards; and maintenance associated with the transportation system.

Regulatory/Land Use - includes regulation of development within the floodplain, expansion of urban growth areas and related infrastructure and other long-range planning issues, regulation compliance, flood insurance claims, and problems with floodplain mapping. This category also includes floodplain protection through regulation, easement or purchase.

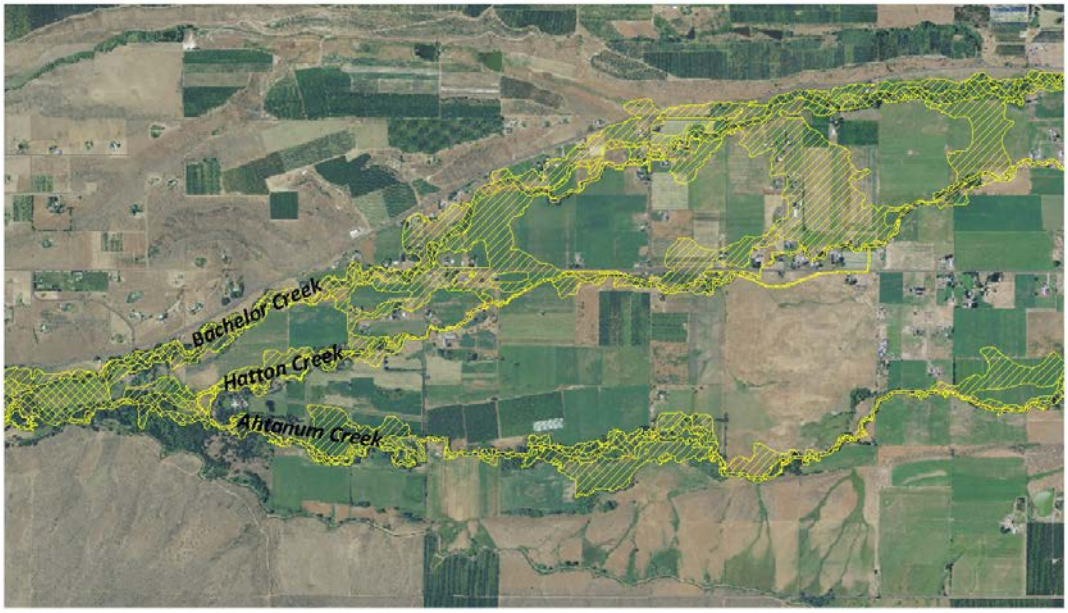
Channel Issues - includes comments relating to streams changing course or alteration of a stream channel due to activity along its banks such as historical modification for irrigation, ongoing changes in land use, and confinement of the channel by fill or levees. This also includes overbank flows, channel erosion, and aggradation.

The following six location specific site or area-specific flood problem areas were:

St. Joseph's Mission at Ahtanum – This area includes the Mission site and adjacent areas where both Bachelor and Hatton Creek distributaries are routed away from Ahtanum Creek. There are significant high frequency flooding and potential avulsion

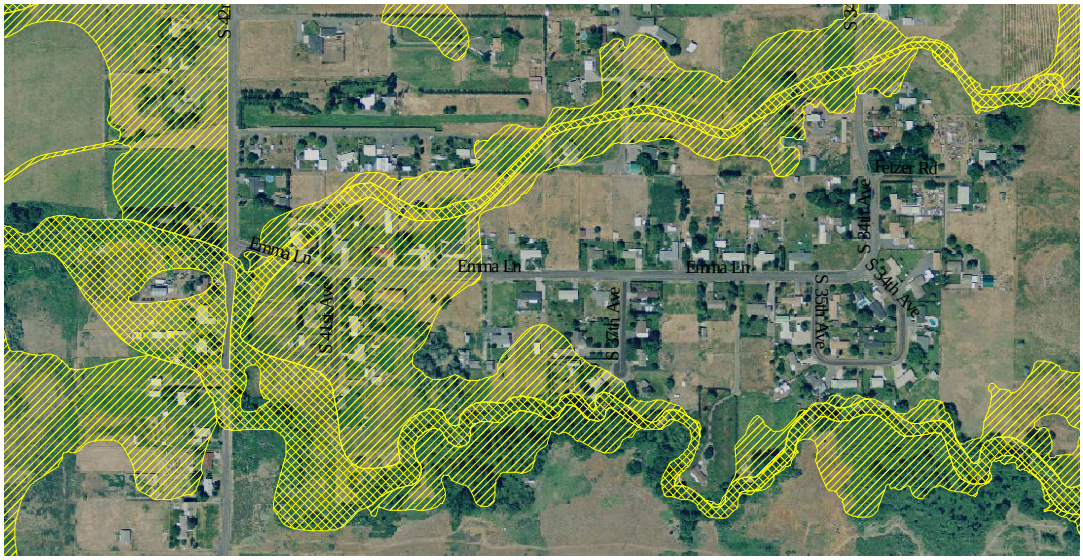
issues at this location, and this area also controls the routing of flood waters down Bachelor and Hatton Creeks, which effects flooding across a large area of the valley downstream. See figures 8-7 below and 4-10.

Figure 8-7 Flood mapping of Bachelor, Hatton & Ahtanum Creeks



Emma Lane/42nd Avenue – This area experiences the highest frequency of out of bank flooding of any location in these watersheds, the current floodplain mapping does not reflect the flooding patterns seen in frequent floods, and this area also has a large influence on downstream flooding patterns (in the cities of Yakima and Union Gap and the airport) during large flood events. See Figure 8-9.

Figure 8-8 – Flood Mapping of Emma Lane Area



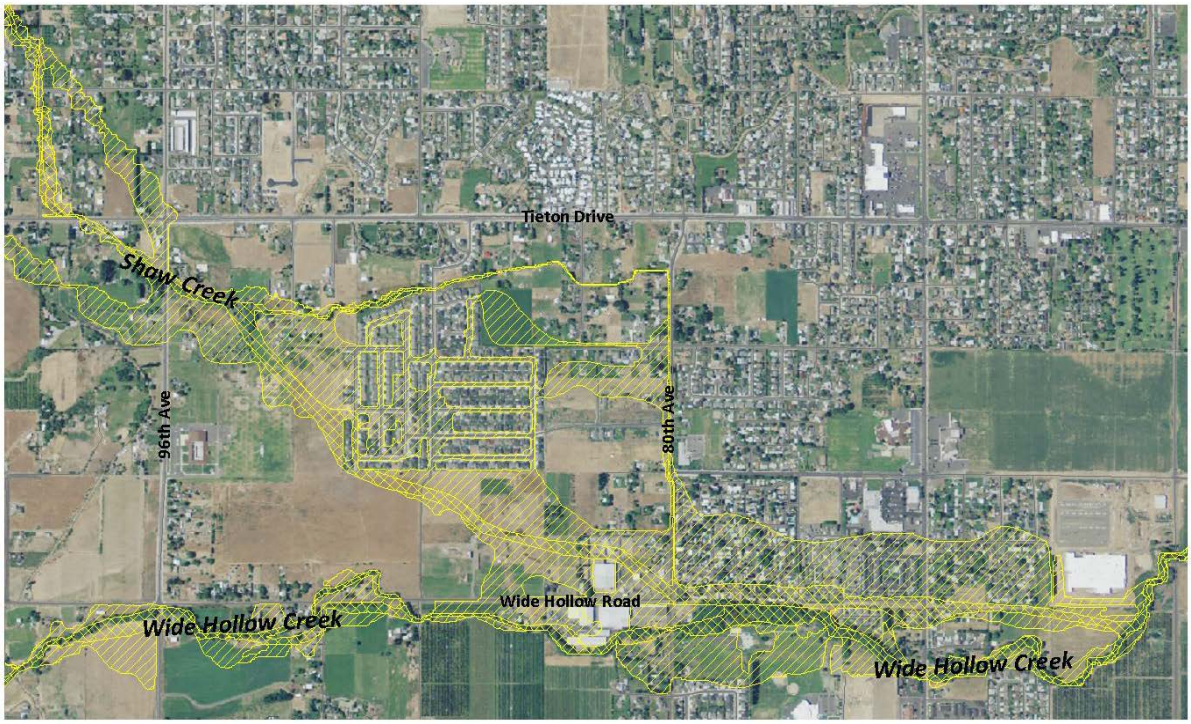
Spring (Chambers) Creek in Union Gap – The creek flows parallel to I-82 in Union Gap. Historically this area was subject to flooding from the Yakima River, a floodgate was installed in 1985 to remove this area from the 100 year floodplain. This category includes management of the flood gate and also other issues associated with flood waters the Yakima River on the lower end of the creek. See Figure 8-9.

Figure 8-9 – Flood Mapping of Spring (Chambers) Creek

Shaw Creek – This area is experiencing rapid residential development in the area between 96th and 80th Avenues, on the east and west, and Tieton Drive and Wide Hollow Road on the North and South. This area has not been mapped as a portion of the 100 year regulatory floodplain, so the large numbers of residential structures in this area are not built to withstand flooding. This area is known to have been repeatedly flooded in 1974, 1995, 1996 (prior to construction of the residences) and in 2003. See Figure 8-10

Union Gap – Wide Hollow Creek has been channelized through the developed portion of Union Gap since the 1870s, the original purpose was to power a flour mill, which still exists today. The combination of channelization and the dam for the mill wheel results in high frequency flooding in lower Union Gap. Additional major flood problems arise due to aggradation of the Yakima River in this reach. See Figure 8-9

Figure 8-10 – Flood Mapping of Shaw Creek



North Fork Ahtanum Bridges (combined with Transportation, #12 on table 9-3) – This area is distinct from other bridge issues in these watersheds since North Fork Ahtanum Creek in this area is quite steep and capable of transporting large amounts of sediment and/or causing bank erosion. The first North Fork Bridge is a chronic area of flooding due to aggradation of the channel underneath the bridge and the presence of the John Cox ditch diversion just upstream, which provides multiple flood paths for overflows. This bridge was closed for several months after the 1996 flood, and the bridge and adjacent road were damaged by flooding in 2003 and 2005.

These fifteen flood problem groups were used for Committee brainstorming sessions where possible flood solutions were proposed. The process and alternatives produced are described in Chapter 9.

New Information from Ongoing FEMA Restudy

The FEMA Mapping Restudy of Ahtanum was authorized in 2004, funded in 2007 and will be complete in 2011. The FEMA Mapping Restudy of Wide Hollow was in 2005 and also could be completed and issued in 2011. The restudy required the collection of stream and bridge survey data plus 2 foot contour interval data for the valley along the stream corridors.

The recent hydraulic studies performed by the FEMA hydraulics consultant on Wide Hollow Creek, identified the significant impacts of vegetation and associated silt build up since the early 1970s on the natural conveyance of the creek channel (see Vegetation in Chapter 4). This loss of conveyance capacity in the channel and in the floodplain immediately adjacent to the channel results in an increase in overbank or nuisance flooding. This nuisance flooding - 10 to 25 year recurrence interval floods that inundate relatively large areas – can produce inordinate amount of structural and economic damage due to inundation of crawl spaces or foundations of buildings, and road closures or road damage. Management or maintenance of channels or vegetation to improve flood water conveyance will probably be necessary to reduce flood hazard, especially in highly urbanized areas. Planning and regulatory agencies should also recognize that where possible, development should occur outside of nuisance flooding areas in order to increase the success of these management and maintenance programs.

The studies have also indicated limited capacities for both Wide Hollow and Ahtanum Creeks' floodplains in containing flooded areas due to their flat unbounded nature. Once out of the channel flood flows can take very divergent paths due to the inclination of these flat valley bottoms.

As noted in Chapter 7 this floodplain characteristic has also led to an inability to design bridges that can pass the 100 year-flood beneath them and large impacts on flooded areas and flow paths from bridges and road fills.

This meant that the initial committee concept of providing larger bridges to fully accommodate the 100-year flood are not realistic, so that a combination of bridge sizing and road approach design would be required. A possible alternative design may be a lesser bridge opening design requirement that minimizes higher frequency flooding, say the 25-year flood, along with other alternate site flood passage measures, particularly on north-south orientated roads, and regular bridge maintenance to accommodate sediment accumulations.

In addition, there are several locations on both creeks where east –west orientated road upgrades, including fill, have led to the blockage of historic pre-existing overflow paths, redirection of flows and relocation of floodplains. The FEMA re-map hydraulic study findings indicate the importance of providing non-standard solutions to bridge, road design and to channel maintenance issues and to concurrent plan development on bridge siting.

The FEMA modeling hydraulic and mapping findings became available towards the end of the Committee process; after the public meetings, after the development of goals and objectives development. The findings have led to an increased emphasis in the recommendations on the Channel Maintenance, Bridge Design and Maintenance and the Regulatory/Land Use flood problem groups within the recommendations. This is discussed further in Chapter 9.

2011 FEMA Preliminary Maps

The extent of 100-year flooding as determined through the FEMA Study is shown in Figures 8-11 through 8-16

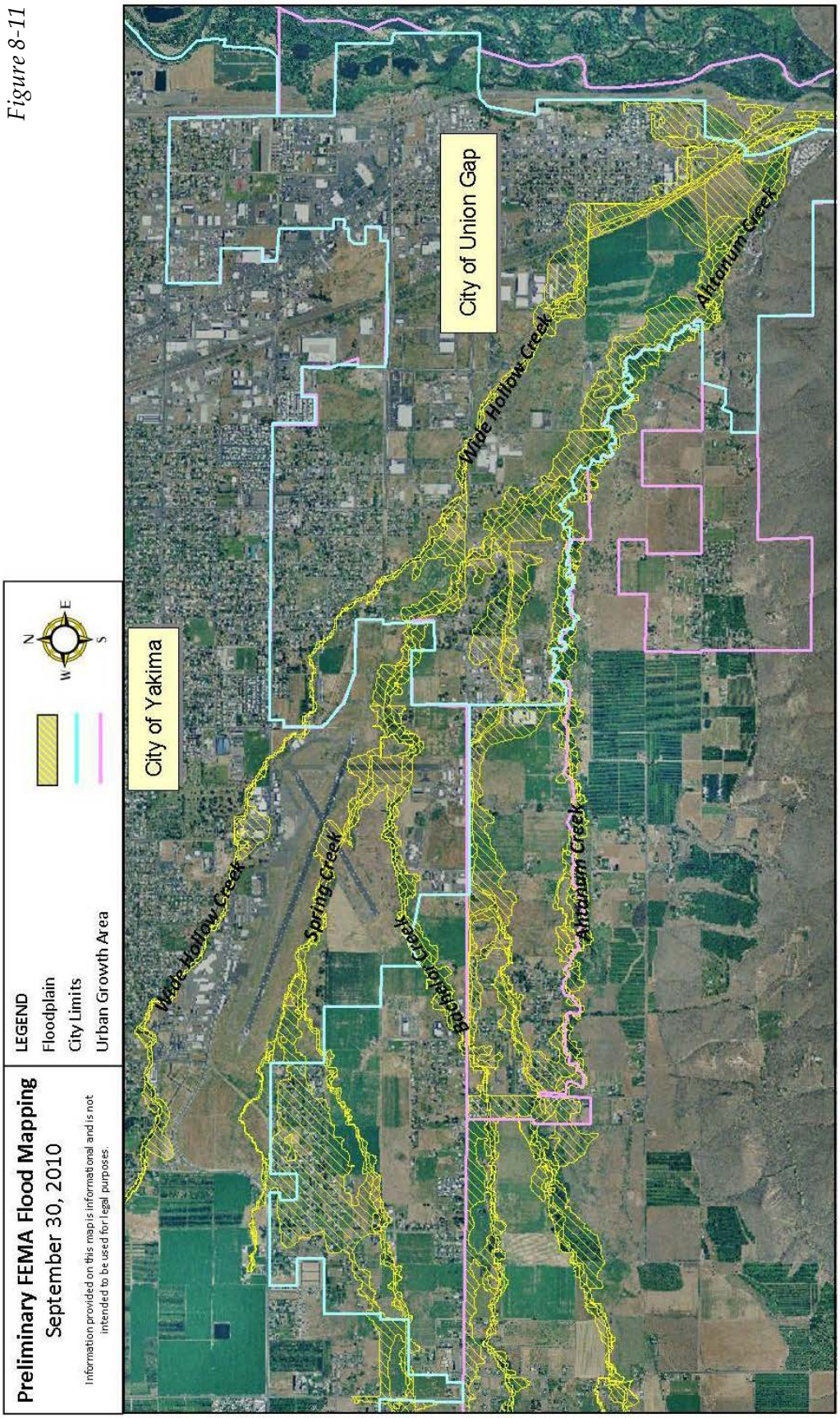

Preliminary FEMA Flood Mapping
September 30, 2010
Information provided on this map is informational and is not intended to be used for legal purposes.
LEGEND
Floodplain
City Limits
Urban Growth Area
N
E
S
W
City of Yakima
City of Union Gap
Wide Hollow Creek
Spring Creek
Buchanan Creek
Ahtanum Creek
Wide Hollow Creek
Ahtanum Creek

Figure 8-11

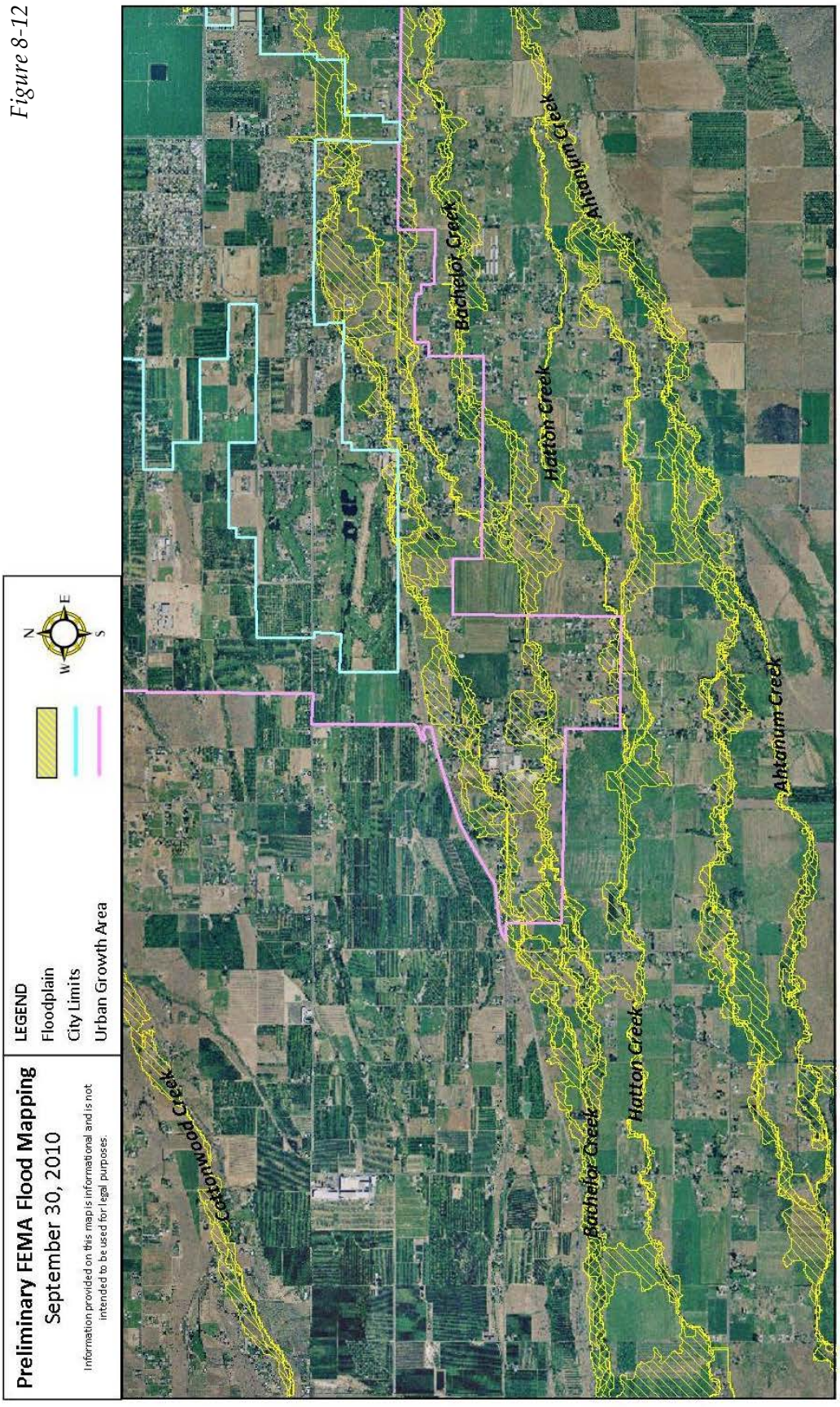

Preliminary FEMA Flood Mapping
September 30, 2010
Information provided on this map is informational and is not intended to be used for legal purposes.
LEGEND
Floodplain
City Limits
Urban Growth Area
N
E
S
W
Cottonwood Creek
Bachelor Creek
Hatton Creek
Ahtanum Creek
Bachelor Creek
Hatton Creek
Ahtanum Creek
DCP

Figure 8-12

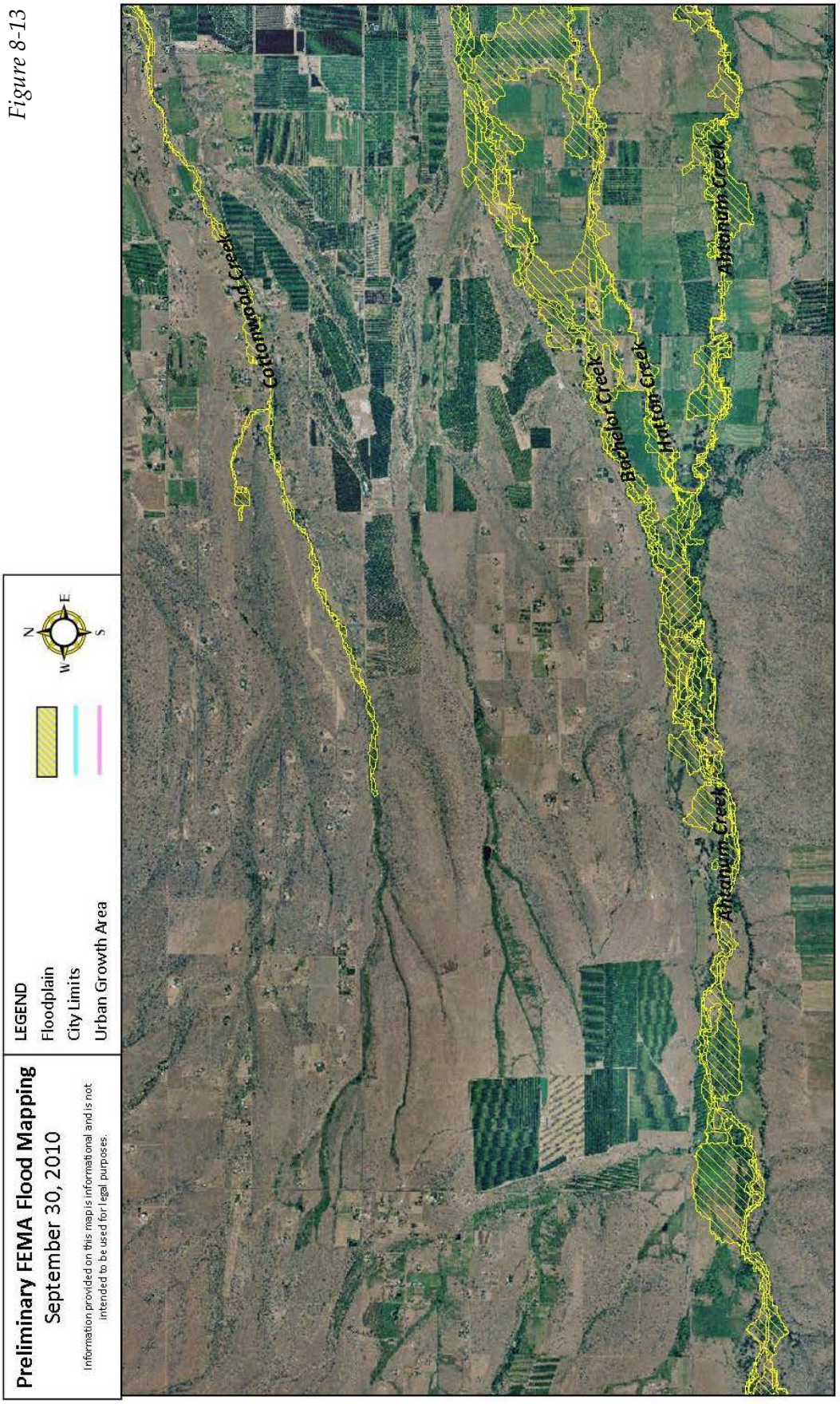

Preliminary FEMA Flood Mapping
September 30, 2010
Information provided on this map is informational and is not intended to be used for legal purposes.
LEGEND
Floodplain
City Limits
Urban Growth Area
N
E
S
W
Cottonwood Creek
Bachelor Creek
Hatton Creek
Ahtanum Creek
Ahtanum Creek

Figure 8-13

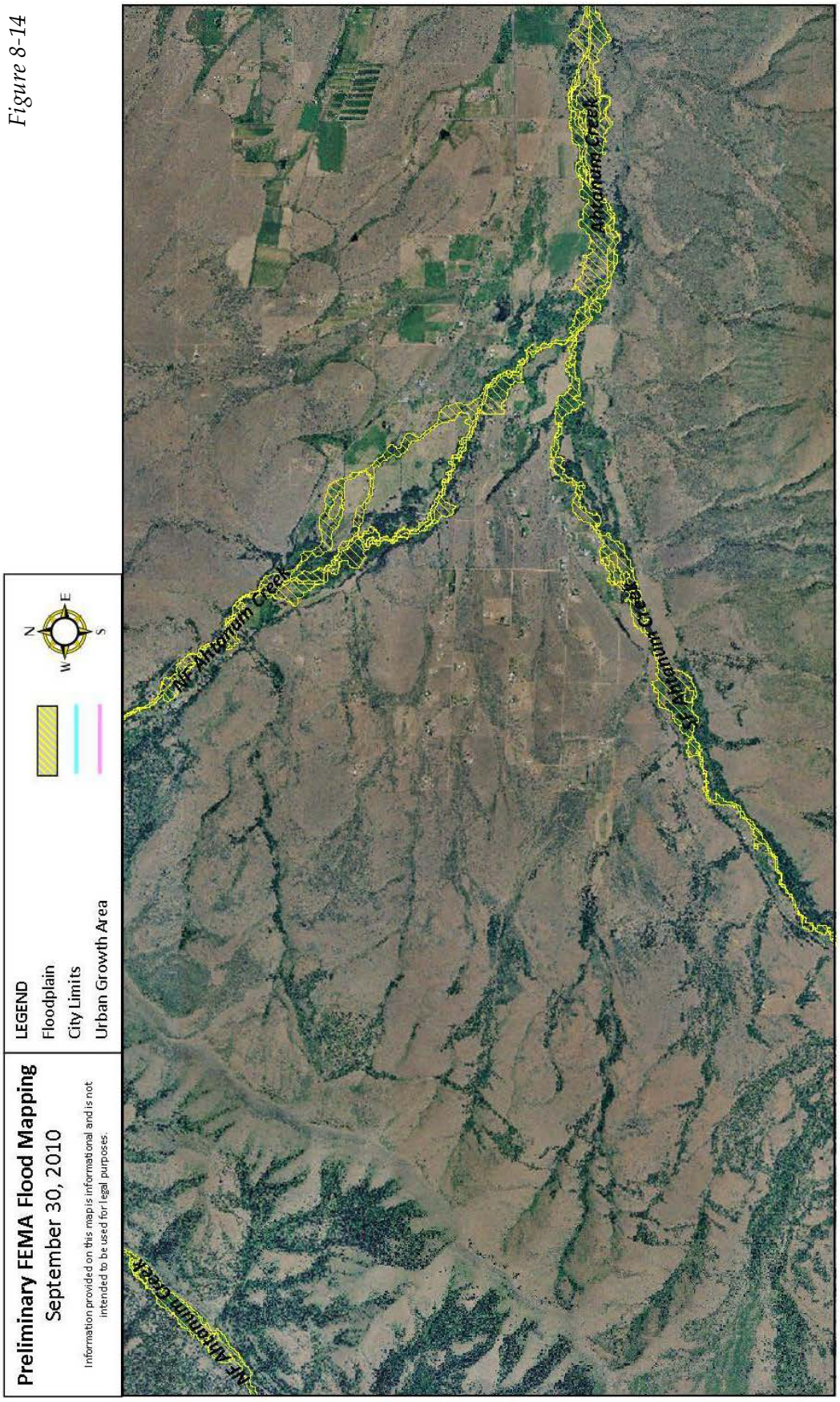

Preliminary FEMA Flood Mapping
September 30, 2010
Information provided on this map is informational and is not intended to be used for legal purposes.
LEGEND
Floodplain
City Limits
Urban Growth Area
N
E
S
W
NF Antanum Creek
NF Antanum Creek
Antanum Creek
Antanum Creek

Figure 8-14

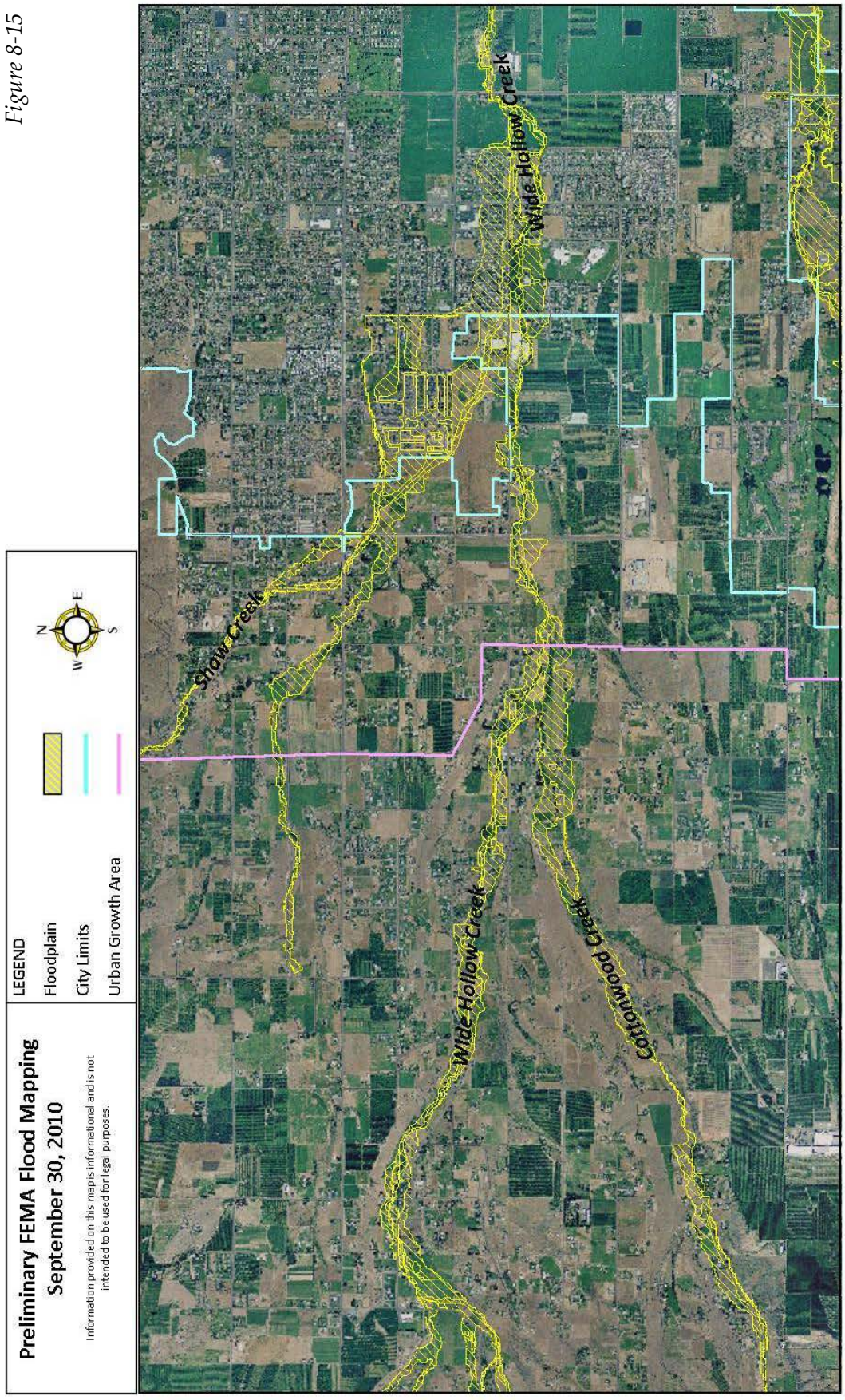

Preliminary FEMA Flood Mapping
September 30, 2010
Information provided on this map is informational and is not intended to be used for legal purposes.
LEGEND
Floodplain
City Limits
Urban Growth Area
N
E
S
W
Snow Creek
Wide Hollow Creek
Wide Hollow Creek
Cottonwood Creek

Figure 8-15

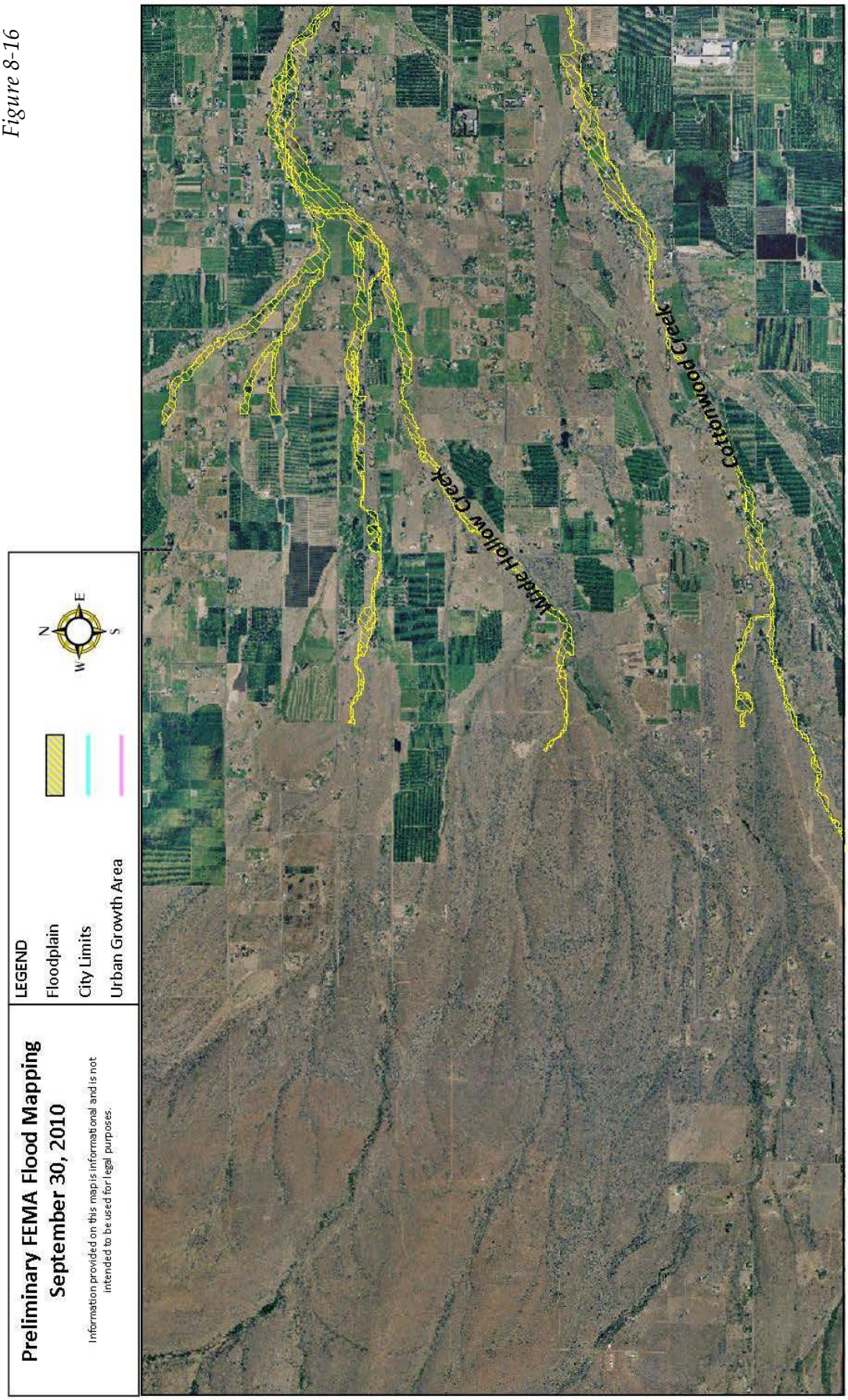

Preliminary FEMA Flood Mapping
September 30, 2010
Information provided on this map is informational and is not intended to be used for legal purposes.
LEGEND
Floodplain
City Limits
Urban Growth Area
N
E
S
W
White Hollow Creek
Cottonwood Creek

Figure 8-16

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