

Discovery Report

FEMA Region IX

Carson River Watershed, HUC 16050201, 16050202, 16050203

Alpine County, California
Douglas County, Churchill County,
Lyon County, Carson City,
and Storey County, Nevada



FEMA

October 2018

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1 EXECUTIVE SUMMARY

The Federal Emergency Management Agency (FEMA) Risk Mapping, Assessment, and Planning (Risk MAP) projects begin with Discovery. This Discovery Report discusses risk for the Carson River Watershed in Alpine County, California, and Carson City, Douglas County, Churchill County, Lyon County, and Storey County, Nevada. A Discovery Report has two goals: to inform communities of their risks related to natural hazards, and to enable communities to take actions to reduce their risk. The data provided here assists communities become more resilient by updating a variety of local plans, communicating risk, informing the modification of development standards, identifying mitigation projects, and ultimately taking action to reduce risk.

The Discovery process for the Carson River Watershed contacted community stakeholders and collected data. The data collected were reviewed, and discussions were held about recent flood events, areas of new growth, floodplain mapping needs, and desired mitigation projects. The Discovery process is the first of many collaborative steps toward implementation of actions that lead to reduction of risk to life and property.

2 GENERAL INFORMATION

The Carson River watershed is comprised of approximately 3,965 square miles and includes portions of six counties and two states in east-central California and west-central Nevada, extending for a distance of about 184 miles (Figure 1). The geographic units of the Carson River watershed are:

- Alpine County, California
- Carson City, Nevada
- Churchill County, Nevada
- Douglas County, Nevada
- Lyon County, Nevada
- Storey County, Nevada

The headwaters of the Carson River lie at altitudes of 10,000 to 11,000 feet in the Sierra Nevada Mountain Range (Alpine County). The East and West Forks of the river join to form the main stem of the Carson River in Carson Valley (Douglas County). The river then flows through the Carson River Basin until its terminus at the Carson Sink (3,970 ft) (Churchill County). The Carson River Watershed has become increasingly urbanized, with an increase in both alluvial fan and riverine flooding events over the past few decades. Many communities and flooding sources in the Carson River Watershed have been prioritized in the past for detailed flood studies, and much progress has occurred to identify and mitigate flood hazards. This report is intended to summarize the information gathered as part of the updated Discovery process for the Carson River Watershed.

The U.S. Geological Survey (USGS) defines the Carson River as three separate hydrologic unit codes (HUC) as follows:

16050201 Upper Carson
16050202 Middle Carson
16050203 Lower Carson

Annual streamflow of the Carson River is extremely variable, ranging from a low of about 26,000 acre-ft in 1977 to slightly more than 926,000 acre-ft in water year 2017 near Fort Churchill. Flooding occurs often in the Carson River Basin. Floods in the basin are categorized as main channel flooding, localized (flash) flooding, or debris flows. The majority of main channel flooding is caused by rain-on-snow events in the higher elevations. Rapid snow melt causes the river channel to fill quickly and overflow its banks. Localized flooding, on the other hand, generally occurs in alluvial fans during the summer months, and is caused by intense rainfall during thunderstorms. Debris flows occur when water from rapid snowmelt or intense rainfall mixes with sediment. Flooding in 2017 was a result of repeated large precipitation events followed by nearly continual runoff events.

Approximately 606 square miles of the watershed are located in Alpine County, California, while the remaining 3,359 square miles of the watershed are located in Nevada.

The five hydrographic areas in the Nevada portion of the watershed are:

1. Carson Valley (Minden, Gardnerville, Genoa – Douglas County)
2. Eagle Valley (Carson City)
3. Dayton Valley (Dayton, Virginia City – Lyon County)
4. Churchill Valley (Fallon – Churchill County)
5. Carson Desert (Fallon, Stillwater – Churchill County)

The Clear Creek sub-watershed in Douglas County/Carson City, Nevada is within the geographic boundaries of the Carson River Watershed.

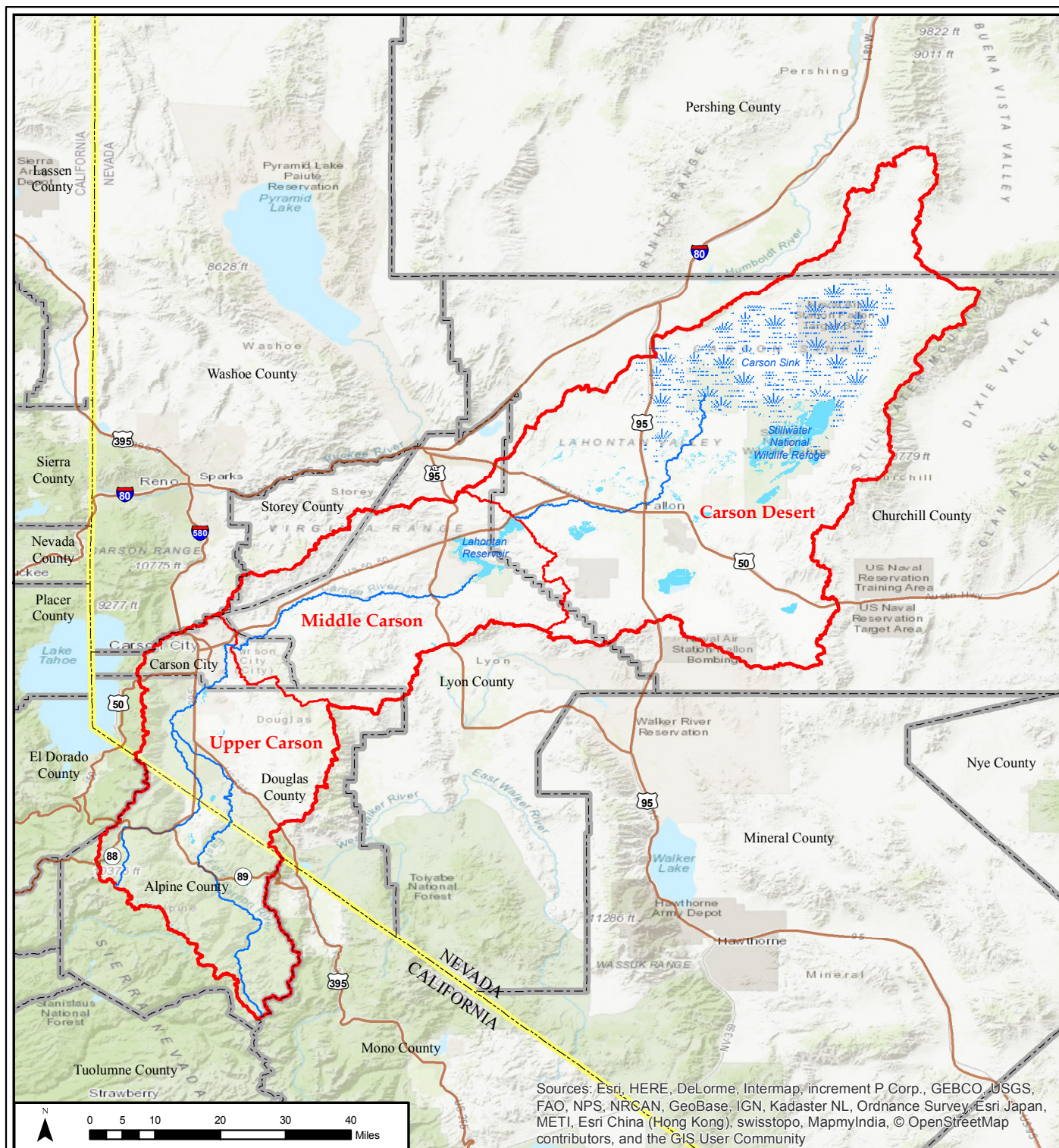
The sub-watersheds in Alpine County, California are designated as follows:

- A. Wolf Creek
- B. East Fork Carson River
- C. Markleeville Creek
- D. West Fork Carson River

Segments of the river have been remapped over the past several years using detailed mapping procedures which updated their previous Zone A (BFE Unknown) designation. over the past several years. These projects were identified in the previous Discovery Report (2012) and Regional Floodplain Management Plan (2008, 2013).

The flood mapping as part of FEMA Mapping Activity Statement (MAS) #1 and #2 with the Carson Water Subconservancy District was completed in December 2012 (MAS #1) and 2014 (MAS #2), and included the portions of the Carson River through Lyon County and Carson City. MAS #3, completed in 2015, included hydraulic modeling of the Carson River in Carson Valley, and MAS #4 included floodplain mapping in the Carson Valley was completed in 2016. MAS #5 mapped alluvial fan watersheds in Douglas County, and Eagle Valley Golf Courses A&B Drainages in Carson City, also completed in 2016. Non-regulatory projects included Identification and Mitigation studies in Douglas and Churchill County; Public Outreach and Education; and Inundation flood maps of the Upper Carson River. MAS # 6 mapped alluvial fan watersheds in Carson City and Lyon County. Non-regulatory projects completed were an Identification and

Mitigation project in Douglas County, Public Outreach and Education; and creation of Carson City Inundation maps. These MAS #6 projects were completed by September 2017. MAS #7 is in progress (9/25/2015-6/30/2019) and will update map the Saliman / Voltaire alluvial fan drainage; create a Johnson Area Drainage Master Plan in Douglas County; update the 2012 Discovery Report and 2013 Watershed Floodplain Management Plan. It also funded Public Outreach and Education. MAS #8, which has just gotten underway (9/1/2017-8/31/2019), will create a Dayton Valley Area Drainage Master Plan in portions of Lyon and Storey Counties; update floodplain ordinances in Alpine County in California, and Douglas, Carson City, and Lyon Counties in Nevada; and work with state and federal partners to continue Flood Outreach and Education.



MAP SYMBOLOLOGY

	Project Area		State Boundary
	Watershed		County Boundary
	Water Body		Major Road
	Carson Sink		
	Waterway		

PROJECT LOCATOR



FIGURE 1.

NATIONAL FLOOD INSURANCE PROGRAM Project Area Map

Carson River Watershed

HUC-8 Codes

16050201
16050202
16050203



Discovery Report Release Date: 12/01/2017

3 WATERSHED STAKEHOLDER COORDINATION

Current efforts of the 2017 watershed stakeholder coordination phase of Discovery seek to expand and update the information obtained in the 2012 Discovery process. Extensive flooding has occurred since the 2012 Discovery; therefore, community needs and concerns are focused on addressing these additional and unique flood hazards.

The project team (Appendix A) conducted two outreach meetings with community officials and stakeholders as part of this process. In addition to the six jurisdictions within the Carson River Watershed, additional stakeholders were identified, generally consisting of associations and government agencies that are involved with the Carson River Watershed and the Carson River Coalition (CRC). The list of community and stakeholder contacts was gathered is included in Appendix B to this document.

In July 2017, community and additional stakeholders were invited to attend Discovery meetings as part of the CRC's Floodplain and River Management Working Group (formerly CRC River Corridor Working Group) meeting. On August 1, 2017, the communities and stakeholders were sent a memorandum that identified the upcoming meetings and data to be collected.

The Discovery Meetings were hosted by the Carson Water Subconservancy District (CWSD) as follows:

Tuesday, August 15, 2017, 1:00-3:00 pm
State of Nevada Governor's Mansion, Nevada Room
606 Mountain Street, Carson City, NV 89703

Tuesday, October 24, 2017, 3:00-5:00 pm
Sierra Room at Carson City Community Center
850 E. William Street, Carson City, NV 89703

The goals of the meetings were to:

- Provide an overview of the project
- Introduce new members and stakeholder agencies to the process
- Discuss the project scope
- Collect community feedback on:
 - Areas of growth
 - Need for additional flood studies
 - Areas where mitigation projects are needed
- Discuss ways in which flood risk can be reduced in the watershed
- Gather available technical data to support hydraulic and hydrologic studies; and
- Discuss the project timeline

August 15, 2017 Discovery Meeting:

An introduction to Risk MAP was presented and followed by discussion sessions with each jurisdiction. The presentation described Risk MAP program goals and objectives, the Discovery meeting goals and objectives, and the timeline moving forward. This meeting

introduced attendees new to the Discovery process to the type of information sought and outcomes to be expected. Stakeholders were given the opportunity to complete and discuss with project team members the Community Questionnaire and Community Fact Sheets (Appendix C); review maps; potential mitigation projects; and identify new areas of concern during break out session

Stakeholders unable to attend the meetings were also given additional time to review and comment on Discovery data collected. On September 1, 2017, digital copies of the Community Questionnaires filled out at the August 15 meeting were sent to each jurisdiction for review. Additional information was requested because of the stakeholder input. Proposed, current, and completed project information was also requested in an effort to update the lists for each community.

October 24, 2017 Discovery Meeting:

At the second Discovery meeting, individual jurisdictions reviewed the summaries from the first meeting. Next, they reviewed, updated and ranked potential flood mitigation projects with project team members for each county. Collected information is provided throughout this report. A list of Discovery meeting attendees, agenda, and handouts are provided in Appendix D.

4 DATA ANALYSIS

A list of the data collected is provided in Table 1. Table 1 outlines the data types, a short description, the source and how the data was delivered. The following sections (4.1 - 4.4) provide additional details about how the data can be used.

Table 1. Data Collection for the Carson River Watershed.

Data Types	Description	Source	Deliverable
Community Assistance Visits	Community Fact Sheet	Nevada Division of Water Resources, Local Agencies	Updated Fact Sheets
Community Boundaries	Location of jurisdictional boundaries	Prior Discovery maps	Discovery Map; Geodatabase
Community Rating System	Community Fact Sheet	FEMA's Community Rating System Communities and their Classes"	Updated Fact Sheets
County Boundaries	Location of County Boundaries	Prior Discovery maps	Discovery Map; Geodatabase
Dams	Location of dams	NDWR Inventory	Discovery Map; Geodatabase
Declared Disasters	Community Fact Sheet	NDEM	Updated Fact Sheets
Demographics, Industry	Community Fact Sheet	US Census Bureau QuickFacts, and American Fact Finder	Updated Fact Sheets
HUC 8 Watersheds	Watershed boundary	USGS Watershed Boundary Dataset	Discovery Map; Geodatabase
Insurance Policies and Claims	Community Fact Sheet	FEMA database	Updated Fact Sheets
Letters of Map Change (LOMCs)	Number and locations of letters of map change	FEMA National Flood Hazard Layer	Discovery Map; Geodatabase
Mitigation Plans Status	Community Fact Sheet	Community Website	Updated Fact Sheet
Mitigation Projects Obligated	Community Fact Sheet	Data.gov: FEMA Hazard Mitigation Program Summary	
Mitigation Projects: Recent, ongoing, planned, Desired		Community information, Discovery Meetings	Discovery Map; Geodatabase
Repetitive Loss	Community Fact Sheet	NDWR, Local Agencies	Updated Fact Sheet
Streams and Rivers	Stream centerlines based on USGS topo	USGS Watershed Boundary Dataset	Discovery Map; Geodatabase
Stream Gages		USGS	Discovery Map; Geodatabase
Major Roads	Location of interstates and major highways	TIGER, Data.gov	Discovery Map; Geodatabase
Special Flood Hazard Areas	Location of FEMA flood hazard areas	FEMA Digital Flood Insurance Rate Maps	Discovery Map; Geodatabase
Stream Gages	Location of stream gages operated by USGS	USGS National Hydrography Dataset	Discovery Map; Geodatabase
Study Needs: FEMA			
Topographic Availability	LiDAR	CWSD	Discovery Map; Geodatabase
Wetland	Wetland delineations	U.S. Fish and Wildlife Service	Discovery Map; Geodatabase

4.1 DATA THAT CAN BE USED FOR FLOOD RISK PRODUCTS

The Flood Risk Products available to a community are a Flood Risk Map (FRM), Flood Risk Report (FRR) or Flood Risk Database (FRD). These products are non-regulatory resources that supplement the flood hazard information produced by the regulatory Flood Insurance Rate Map (FIRM), Flood Insurance Study (FIS) and FIRM database products.

A Flood Risk Report presents:

- Background (purpose, methods, risk reduction practices)
- Project Results (changes since Last FIRM, Depth & Analysis Grids, Flood Risk Assessment, Enhanced Analyses), and
- Summarized by locations - communities and watersheds.

A FRM visually promotes risk awareness by showing results of Risk MAP project non-regulatory datasets, and promotes additional flood risk data not shown but located within the FRD.

A FRD shows:

- Changes Since Last FIRM
- Depth and Analysis Map
- Flood Risk Assessment (HAZUS)
- Areas of Mitigation Interest

Flood risk products help community members and officials view and visualize their local flood risk, allowing communities to make informed decisions about reducing flood loss and mitigating potential damage from flood hazards. These individuals may include property owners, emergency management officials, community planners and developers, real estate and insurance specialists and other professionals and community decision-makers.

4.1.1 Topographic Data

Local jurisdictions have worked diligently to improve flood risk data throughout the entire watershed; therefore, LiDAR has been collected on a flood-study-based effort (individual segments of the Carson River). LiDAR has been processed for areas shown in the Discovery Map (Appendix F). At the current time, LiDAR data is being processed for data collected in Lyon County, and will be available in 2018.

The topographic data that can be used for flood risk products in the Carson River watershed consists of the following LiDAR segments collected between 2011 and 2017 (Table 2).

Table 2. LiDAR Status for the Carson River Watershed.

Segment/Detailed Study Mapping	Date Acquired
Churchill County	2013
Lyon County	2011, 2017
Carson City	2011, 2017
Douglas County	2013

4.1.2 USGS Gages

The USGS stream gaging network is vital to the National Weather Service's river forecast and warning program and the goal to reduce flood damages and loss of life. The locations of USGS stream gages in the watershed are shown on the Discovery Maps and listed in Table 3. The seven sites that are active National Weather Service River Forecast sites are indicated. A number of sites have been discontinued since the 2012 Discovery, and are listed at the bottom of the table.

Table 3. USGS Stream Gages

No.	Gage Number	Station Name and Location	Forecast
1	10308783	LEVIATHAN C AB MINE NR MARKLEEVILLE, CA	
2	10308785	LEVIATHAN MINE PIT FLOW NR MARKLEEVILLE, CA	
3	10308784	LEVIATHAN MINE ADIT DRAIN NR MARKLEEVILLE, CA	
4	103087891	ASPEN C ABV LEVIATHAN MINE NR MARKLEEVILLE, CA	
5	103087887	LEVIATHAN MINE POND 4 NR MARKLEEVILLE, CA	
6	103087885	LEVIATHAN C CHANNEL UNDERDRAIN NR MARKLEEVILLE, CA	
7	103087889	4L C NR MARKLEEVILLE, CA	
8	103087892	ASPEN C OVERBURDEN SEEP NR MARKLEEVILLE, CA	
9	10308200	E.F. CARSON R BL MARKLEEVILLE C NR MARKLEEVILLE, CA	CEMC1
10	10308789	LEVIATHAN C AB ASPEN C NR MARKLEEVILLE, CA	
11	10308794	BRYANT CK BL MOUNTAINEER C NR MARKLEEVILLE, CA	
12	10308792	LEVIATHAN C AB MOUNTAINEER C NR MARKLEEVILLE, CA	
13	10310000	WEST FORK CARSON RIVER AT WOODFORDS, CA	WOOC1
14	10309000	EAST FORK CARSON RIVER NEAR GARDNERVILLE, NV	
15	10310400	DAGGETT CREEK NEAR GENOA, NV	
16	10310447	AMBROSETTI POND NR GENOA, NV	
17	10311000	CARSON RIVER NR CARSON CITY, NV	STWN2
18	10310500	CLEAR CREEK NR CARSON CITY, NV	
19	10311100	KINGS CANYON CREEK NR CARSON CITY, NV	
20	10311090	NORTH FORK KINGS CANYON CREEK NR CARSON CITY, NV	
21	10311200	ASH CANYON CK NR CARSON CITY, NV	
22	10311300	EAGLE VALLEY CREEK AT CARSON CITY, NV	
23	10311400	CARSON RIVER AT DEER RUN ROAD NR CARSON CITY, NV	
24	10311750	CARSON RIVER ABV SIXMILE CYN CK BLW DAYTON, NV	
25	10312000	CARSON RIVER NR FORT CHURCHILL, NV	FTCN2
26	10312150	CARSON RIVER BLW LAHONTAN RESERVOIR NR FALLON, NV	CBLN2
27	10351400	TRUCKEE CA NR HAZEN, NV	
28	103122190	S-LINE DIVERSION CANAL NEAR STILLWATER, NV	
29	10312275	CARSON RIVER AT TARZYN ROAD NR FALLON, NV	
30	10312277	PAIUTE DRAIN BL TJ DRAIN NR STILLWATER, NV	
31	10310407	CARSON R NR GENOA, NV (Daily data only)	
32	10311700	CARSON RIVER AT DAYTON, NV (Winter operations only)	
DISCONTINUED GAUGES (SINCE 2012 DISCOVERY)			
	10308800	BRYANT C NR GARDNERVILLE, NV	
	10312210	STILLWATER POINT RESERVOIR DIV CANAL NR FALLON, NV	

4.2 OTHER DATA AND INFORMATION

4.2.1 Mitigation Plans/Status, Mitigation Projects

Hazard Mitigation Plans (HMPs) are prepared to help communities reduce long-term risk to life and property from natural hazards. The plans include comprehensive mitigation strategies intended to promote flood-resilient communities. Table 4 lists the HMPs, their status, and their availability for review.

Table 4. HMPs Status and Availability

Jurisdiction	HMP	Issue Date	Expiration Date	Available for Review
Alpine County	Natural Hazard Mitigation Plan	2017	2022	Yes
Carson City	Hazard Mitigation Plan	August 4, 2016	August, 2021	Yes
Churchill County, City of Fallon	Multi-Jurisdictional Hazard Mitigation Plan	2012	2017	Yes
Douglas County	Hazard Mitigation Plan	2013	2018	Yes
Lyon County, City of Fernley, City of Yerington	Multi-Jurisdictional Hazard Mitigation Plan	July, 2013	July, 2018	Yes
Storey County	Hazard Mitigation Plan	2015	2020	Yes

4.2.2 Coordinated Needs Mapping Study (CNMS) and National Flood Insurance Program (NFIP) Mapping Study Needs

FEMA organizes, stores, and analyzes flood hazard mapping information for identifying and managing flood hazard mapping needs. The CNMS inventory contributes to the identification of risk in two important ways. The first is by indicating where the depiction of flood hazards on the FIRMs has been validated through detailed assessment. The second is by showing which previously studied or unstudied flooding sources inadequately represent flood hazards. In this way, CNMS leads to the improvement of flood hazard data.

For this Discovery update, flood hazard mapping needs data was provided to FEMA for inclusion in the CNMS database. These data both validate flood hazards with adequate detailed assessments, and flooding sources that are either unstudied or inadequate and require improvement of the flood hazard data.

4.2.3 Socio-Economic Analysis

Table 5 used US Census QuickFacts updated as of 2015. Community fact sheets for each jurisdiction containing more detailed demographic information are provided in Appendix C.

Table 5. Socio-economic analysis.

Jurisdiction	Population	Median Age	Median Household Income	Top Industry
Alpine County	1,071	39.3	\$52,917	Educational services
Carson City	54,742	41.1	\$47,668	Educational services
Churchill County	24,198	29	\$47,415	Trade, transportation
Douglas County	48,020	47.4	\$58,535	Educational services
Lyon County	53,179	40.9	\$47,255	Retail trade
Storey County	4,051	44.5	\$64,832	Manufacturing

4.2.4 Community Rating System (CRS)

The communities of Carson City, Douglas County, and Storey County participate in the CRS program as of October 1, 2017, as shown in Table 6.

Table 6. CRS Rating of participating communities.

Community	CRS Rating
Carson City	6
Douglas County	6
Storey County	8

4.2.5 Flood Control Structures

1. Levees

According to the 2012 Discovery Map, there are 9 levees, located in Carson City and Lyon County, as identified in Table 7. Lyon County levees are not identified on the FIRM panels, and none are certified as USACE levees or accredited by FEMA. According to the Lyon County FIS (2016), approximate analyses of “behind levee” flooding were conducted for all the levees in Table 7 to indicate the extent of the “behind levee” floodplains. The approximate levee analysis was conducted using information from existing hydraulic models (where applicable) and USGS topographic maps.

Table 7. Levees identified on FEMA FIRM panels.

Community	Flood Source	FIRM Panel
Carson City	Eagle Valley Creek	32001C0083F
Carson City	Eagle Valley Creek/Combs Canyon Creek	32001C0084F 32001C0092G
Carson City	H Tributary	32001C0092G
Lyon County	Unnamed Wash at Silver Springs	32019C0211E 32019C0213E
Lyon County	Unnamed Wash at Silver Springs	32019C0214E 32019C0212E
Lyon County	Carson River	32019C0289F
Lyon County	Carson River	32019C0452F
Lyon County	Undetermined	32019C0452F

2. Dams

The 2012 Discovery Report details the Lahontan Dam and Reservoir in Churchill County, and Eagle Valley Golf Course Dam and the Shenandoah Detention Basin in Carson City. According to the Nevada Division of Water Resources (NDWR), all High and Significant Hazard dams located within the Carson River Watershed are listed in Table 9. Dams for which an Emergency Action Plan (EAP) is active are also indicated in the table. High hazard dams indicate potential loss of life and economic damage; significant indicates economic damage.

Table 8. Hazard Potential Classification System for Dams (2004, Federal Guidelines for Dam Safety)

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None expected	Low and generally limited to owner
Significant	None expected	Yes
High	Probable. One or more expected.	Yes (but not necessary for this classification)

In the State of Nevada, the State Engineer is charged with dam safety pursuant to Nevada Revised Statutes (NRS) 535. The goal of Nevada's dam safety program is to avoid dam failure and thus prevent loss of life and destruction of property. This is accomplished by careful review of new dam applications, on-site inspection of the dams being built, review of as-built drawings and QA/QC reports and finally, through periodic visual inspections of the structures themselves. In each jurisdiction's CRS Annual Report is a section confirming that the State has in fact inspected the dams. While there are 26 dams in Alpine County, only three are within the Carson River Watershed boundary that are considered significant or high hazard.

Table 9. Dams considered significant or high hazard.

National ID	State ID	Name	Stream	Owner	Hazard	EAP
Alpine County						
CA01222	1062.003	Harvey Place		South Tahoe PUD	S	
CA00894	1062.000	Indian Creek		South Tahoe PUD	S	
CA00631	1.090	Red Lake		California Dept. of Fish and Wildlife (CDFW)	S	
CA00641	1.083	Heenan Lake		CDFW	L	
CA00634	513.000	Kinney Meadows		Alpine Land and Reservoir Company	L	
CA00635	513.002	Lower Kinney Lake		Alpine Land and Reservoir Company	L	
CA00638	513.006	Upper Kenny Lake		Alpine Land and Reservoir Company	L	
CA00640	513.008	Wet Meadows		Alpine Land and Reservoir Company	L	
CA00636	513.003	Lower Sunset		Alpine Land and Reservoir Company	L	
CA00639	513.007	Upper Sunset		Alpine Land and Reservoir Company	L	
CA00632	512.000	Lost Lake East		Carson Water Subconservancy District	L	
CA00633	512.002	Lost Lake West		Carson Water Subconservancy District	L	
Carson City						
NV00223	J-228	Carson City Treated Effluent Dam	Carson River-Tr	Carson City	H	Y
NV00231	J-244	Carson City Golf Course Detention Basin	Carson River-Tr	Carson City	S	Y
NV10635		Shenandoah Detention Basin	Eagle Creek-Tr	Carson City	H	Y
	Js-099	Vicee Canyon Infiltration Dams	Vicee Canyon Creek	Carson City	L	
	Js-162	V&T S23 Detention Basin	Carson River-Tr	TBD	L	
	Js-163	V&T Detention Basin 30	Carson River-Tr	TBD	L	
	Js-208	Tahoe Golf Club Interchange Detention Basin	Clear Creek-Os	Nevada DOT	L	
NV10623		Carson City Treatment Plant Drying Beds	Eagle Creek-Os	Carson City	L	
NV10624		Carson City South Storage Ponds	Clear Creek-Os	Carson City	L	

National ID	State ID	Name	Stream	Owner	Hazard	EAP
Churchill County						
NV10120		Carson River Diversion	Carson River	BOR*	S	Y
NV10123		Lahontan	Carson River	BOR	H	Y
NV00214		Sheckler Dam	Carson River-Os	BOR	S	
NV00085	XNV00085	Desert Gun Club	Carson Sink-Tr	Desert Gun Club	L	
NV00087		S Line Dam	Carson River-Os	Truckee-Carson Irrigation District	L	
NV10133		Stillwater Point Dam	Carson River-Os	U.S. Fish & Wildlife Service	L	
NV10466		Ollie's Pond	Carson River-Os	Truckee-Carson Irrigation District	L	
NV10467		Harmon Reservoir	Carson River-Os	Truckee-Carson Irrigation District	L	
NV10468		Sagouspie Diversion Dam	Carson River	Truckee-Carson Irrigation District	L	
Douglas County						
NV10441	XJ-187	Veta Grande Tails Dam	Carson River-Tr	Precious Metal Recovery System	H	
NV10469	XNV10469	Allerman #2 Dam	Carson River-Os	Allerman Upper Virginia Irrigation Co Inc	H	
NV10829	XNV10829	Ruhenstroth Power Dam	Carson River	Hussman, George G.	H	
NV10175	J-229	Sierra Springs	Carson River-Os	Sierra Reflections	S	
NV00092		Allerman #1 Dam	Carson River-Os	Allerman Upper Virginia Irrigation Co Inc	H	Y
NV00227	J-238	Minden-Gardnerville Sanitation District	Carson River-Os	Minden-Gardnerville Sanitation District	S	Y
NV10166	J-380	Buckeye Creek Lower Effluent Storage Pond	Buckeye Creek-Os	Douglas County Sewer Improvement Dist. #1	H	Y
NV10168	J-350	Indian Hills Effluent Pond #5	Carson River-Os	Indian Hills G. I. D.	S	Y
NV10435	J-411	Indian Hills Effluent Pond #6	Carson River-Os	Indian Hills G. I. D.	S	Y
NV10605	J-551	Bently Reservoir	Buckeye Creek-Tr	Bently Family Limited Partnership	H	Y
NV10665	J-594	North Carson Valley Treated Effluent Storage Dam	Carson River-Os	Douglas County	S	Y
NV10686	J-380	Buckeye Creek Middle Effluent Storage Pond	Buckeye Creek-Os	Douglas County Sewer Improvement Dist. #1	H	Y
NV10687	J-380	Buckeye Creek Upper Effluent Storage Pond	Buckeye Creek-Os	Douglas County Sewer Improvement Dist. #1	H	Y
NV00234	J-257	East Peak Lake	Daggett Creek	Heavenly Valley Limited Partnership	H	Y
NV10439	J-515	Mud Lake	Indian Creek-Os	West Fork Water Company	H	Y
NV10605	J-551	Bently Reservoir	Buckeye Creek-Tr	Bently Family Limited Partnership	H	Y
NV00091	XNV00091	Allerman #4 Dam	Carson River-Os	/-H Ranch	L	
NV10169	J-389	Lippincott Ski Dam	Carson River-Os	Lippincott, Doug H.	L	
NV10171	XJ-362	Mid-Valley WWTP	Carson River-Os	Bently Family Trust	L	
NV10455	J-419	Lippincott Ski Dam II	Carson River-Os	Lippincott, Doug H.	L	
NV10544	J-505	Ambrosetti Pond	Carson River-Os	Carson City	L	

National ID	State ID	Name	Stream	Owner	Hazard	EAP
	Js-005	Virginia Ditch/Rocky Slough Diversion	East Fork Carson River	TBD	L	
	Js-007	Allerman Diversion Dam	East Fork Carson River	Allerman Ditch Company	L	
	Js-109	Mulligan Reservoir	Carson River-Os	TBD	L	
	Js-144	Page Private Pond	West Fork Carson River-Os	NV ENERGY	L	
	Js-213	LIPPINCOTT SKI POND #3	Carson River-Os	Lippincott, Doug	L	
	Js-214	LIPPINCOTT SKI POND #4	Carson River-Os	Lippincott, Doug	L	
Lyon County						
NV00150	J-086	Eldorado Canyon Dam	Eldorado Canyon Creek	Wade Development Company Inc	H	Y
NV10313	Xj-264	North Dayton Valley Primary Pond 1	Carson River-Os	Lyon County Utilities	S	
NV10638		Sheep Camp Detention Dam	Carson River-Tr	Chase Property Group, LLC	H	
NV10727	Xj-264	North Dayton Valley Primary Pond 2	Carson River-Os	Lyon County Utilities	S	
NV10728	Xj-264	North Dayton Valley Secondary Pond	Carson River-Os	Lyon County Utilities	S	
NV10729	Xnv10729	North Dayton Valley Storage Pond	Carson River-Os	Lyon County Utilities	S	
NV10782	J-654	Rolling A WWTP Sludge Pond	Carson River-OS	Lyon County	L	

*U.S. Department of the Interior Bureau of Reclamation (BOR)

4.2.6 Floodplain Management/Community Assistance Visits (CAVs)

As the state coordinating agency for the National Flood Insurance Program, the NDWR conducts CAVs as part of their floodplain management programs. A CAV typically consists of a tour of the floodplain to assess any recent construction activities, a review of the local permitting process, and evaluation of the local floodplain ordinance. A meeting with the local floodplain official is held to discuss the NFIP, the local permitting process, any recent flood events, training opportunities, and any program deficiencies. Table 10 lists the communities in the watershed and the date of their latest CAV.

While CRS reviews are conducted annually, staff visits generally only occur every few years.

Table 10. Recent CAVs and CRS visits.

Community	CAV Meeting Date	CRS Meeting Date
Carson City	07/21/2011	2011
Douglas County	02/23/2012	Update
Lyon County	10/20/2009	Update
Storey County	9/20/2012	Update

4.2.7 Regulatory Mapping

As part of the CWSD's ongoing efforts to update the watershed FIRMs, many maps have been updated since the 2012 Discovery. The most recent FIRM updates for the communities in the Carson River Watershed became effective as shown in Table 11:

Table 11. FIRM updates through 2017 Discovery.

<u>Jurisdiction</u>	<u>Effective Date</u>	<u>Description</u>
Alpine County		No changes to FIRMs effective 11/19/1987
Carson City		
3200010083F 3200010084F 3200010091F	2/19/2014	Ash Canyon Creek, Kings Canyon Creek, Vicee Canyon Creek, Combs Canyon Creek, Eagle Valley Creek
3200010092G 3200010094F 3200010111G 3200010113F	12/22/2016	Combs Canyon Creek, Ash Canyon Creek, Kings Canyon Creek, Saliman Road Tributary, Voltaire Canyon Creek, H Tributary, I Tributary
Douglas County		
32005C0070H 32005C0090H 32005C0093H 32005C0232H 32005C0234H 32005C0235H 32005C0251H 32005C0252H 32005C0253H 32005C0254H 32005C0256H 32005C0258H 32005C0259H	6/15/2016	Remapping using detailed methods of 30 streams, five two-dimensional study areas (Airport Tributary Wash, Airport Wash, Buckbrush Wash, Johnson Lane Wash, Sunrise Pass Wash; and redelineations of 5 stream/river segments on the: Carson River, Clear Creek, Pine Nut Road Wash, Rocky Slough, and Smelter Creek
Churchill County		No changes to FIRMs effective 9/28/2008
Lyon County		
32019C0289F 32019C0291F 32019C0292F 32019C0293F 32019C0294F 32019C0311F 32019C0312F 32019C0316F 32019C0320F 32019C0340F 32019C0345F 32019C0350F 32019C0434F 32019C0451F 32019C0452F 32019C0453F	10/20/2016	Floodplain redelineation of the Carson River in Lyon County
Storey County		No changes to FIRMs effective 1/16/2009

4.3 DISCOVERY MEETINGS

Before and during Discovery meetings the 2012 Discovery Report projects were reviewed for accuracy. Completed projects and projects that were no longer a priority were removed. New projects were identified based on recent flooding or changes in priority by representatives from Carson River Watershed stakeholders.

August 15, 2017 Discovery Meeting:

A Community Questionnaire was used to help jurisdictions identify areas where flood risk data is outdated. The following observations were made:

- Carson City identified numerous watersheds for which an area drainage master plan or flood study needs to be conducted. Many are subject to alluvial fan/flash flooding as a result of summertime cloudburst events.
- Churchill County's FIRM maps are from the 1970s, and new FIRMs are needed to show modern growth, new plans, and new water spillways (created as a result of the overwhelming 2017 inputs of the Carson River to Lahontan Reservoir).
- Lyon County is subject to flash flood potential and alluvial fan flooding from the surrounding steep hillslopes.
- Douglas County needs detailed flood studies for Pinenut Creek – from Jo Lane to Orchard Road (A flood zone), Sierra Country Estates, and the Ruhenstroth area (Smelter Creek).

October 24, 2017 Meeting:

Individual project staff members worked with each jurisdiction to fine-tune the information contained in the Community Fact Sheets, and potential mitigation projects. Potential projects were derived from the 2012 Discovery list, the 2017 draft Update of the Carson River Watershed plan, and discussions with jurisdiction staff.

4.4 DISCOVERY MAP

A Discovery Map (Appendix F) presents the current floodplain mapping extents, LiDAR coverage boundaries, and locations of potential mitigation projects within each jurisdiction. The content was derived by each jurisdiction at the Discovery meetings and follow-up. It is evident that the impacts due to flooding, the need for better or revised floodplain mapping, and the importance of project implementation are at the forefront of each jurisdiction's priorities. Alluvial fan and wash flash-flooding are increasingly a concern for jurisdictions. These are recognized by the number of such potential projects in each jurisdiction list.

4.5 MITIGATION PROJECTS

Community stakeholders identified locations where mitigation projects could reduce the impacts of flooding. Topics of mitigation interest included upstream storage, roads that frequently flood, and recent/future growth or development. Appendix E provides lists of projects identified for potential mitigation for each community.

5 APPENDICES

List of Appendices

Appendix A	Project Team Contact Information
Appendix B	Stakeholder Contact Information
Appendix C	Discovery Interviews <ul style="list-style-type: none">• Community Fact Sheets• Community Interview Notes
Appendix D	Discovery Meetings <ul style="list-style-type: none"><u>August 15 Meeting</u><ul style="list-style-type: none">a. <u>Notice</u>b. <u>Agenda</u>c. <u>Community Questionnaire</u>d. <u>List of Attendees</u>e. <u>Risk MAP Presentation</u><u>October 24 Meeting</u><ul style="list-style-type: none">a. <u>Notice</u>b. <u>Agenda</u>c. <u>August Meeting Notes</u>d. <u>List of Attendees/Sign-in sheet</u>e. <u>Individual Jurisdiction Maps</u>
Appendix E	Community-wide Mitigation Projects
Appendix F	Discovery Map
	Discovery Geodatabase (to be completed)

3 WATERSHED STAKEHOLDER COORDINATION

This portion of the Discovery Report details the activities that occurred during the 2017 watershed stakeholder coordination phase of Discovery. The current effort seeks to expand and update the information obtained in the 2012 Discovery process. Notably, extensive flooding has occurred since the 2012 Discovery, bringing a focus on additional new and different flood hazards and community needs or issues.

The Discovery process includes outreach to community officials and stakeholders, a component conducted on two occasions by the project team (Appendix A). In addition to the six jurisdictions within the Carson River watershed, additional stakeholders were identified, generally consisting of associations and government agencies that are involved with the Carson River watershed. A list of community and stakeholder contacts was gathered and kept current throughout the Discovery process. This list is included in Appendix B to this document.

Communities and the additional identified stakeholders were contacted in July of 2017 to apprise appropriate individuals of the upcoming Discovery meetings to be held in conjunction with the Floodplain and River Management Working Group (formerly Carson River Coalition) meeting. On August 1, 2017, the communities and stakeholders were sent a memorandum that identified the upcoming meetings and data to be collected. During this time, Lyon County submitted its Multi-Jurisdictional Hazard Mitigation Plan.

The Discovery Meetings were hosted by the Carson Water Subconservancy District (CWSD) as follows:

Tuesday, August 15, 2017, 1:00-3:00 pm
State of Nevada Governor's Mansion, Nevada Room
606 Mountain Street
Carson City, NV 89703

Tuesday, October 24, 2017, 3:00-5:00 pm
Sierra Room at Carson City Community Center
William Street, Carson City, NV 89703

The goals of the meetings were to:

- Provide an overview of the project
- Introduce new staff and stakeholder agencies to the process
- Discuss the project scope
- Collect community feedback on:
 - Areas of growth
 - Need for additional flood studies
 - Areas where mitigation projects are needed
- Discuss ways in which flood risk can be reduced in the watershed
- Gather available technical data to support hydraulic and hydrologic studies; and
- Discuss the project timeline

The first Discovery Meeting consisted of an introductory Risk MAP presentation followed by discussion sessions with each jurisdiction. The presentation was given describing Risk MAP program goals and objectives, the Discovery meeting goals and objectives, and the timeline moving forward. A break-out session was held where maps were available for review with CWSD personnel at hand to answer questions. This meeting was intended to introduce attendees new to the Discovery process to the type of information sought and outcomes to be expected. Stakeholders were given the opportunity to complete and discuss with project team members the Community Questionnaire and Community Fact Sheets (Appendix C), review maps, potential mitigation projects, and identify new areas of concern.

A comment period was made available for stakeholders unable to attend the meetings. On September 1, 2017, digital copies of the Community Questionnaires filled out at the August 15 meeting were sent to each jurisdiction, with a subsequent request for additional information as a result of the information provided by the attending stakeholders. Information was sought to also update the proposed, current, and completed projects lists for each community.

The second Discovery meeting provided individual jurisdictions with time to review the summaries of information obtained in the first meeting, and review and update potential mitigation projects with project team members. The information collected is provided throughout this report. A list of meeting attendees, agenda, and handouts are provided in Appendix D, for both Discovery meetings.

4 DATA ANALYSIS

A list of the data collected, the deliverable or product in which the data are included, the source of the data, and any pertinent comments are provided in Table 1. Following Table 1, the information received is categorized by data that can be used for flood risk products and additional data that benefit the project.

Table 1. Data Collection for the Carson River Watershed.

Data Types	Description	Source	Deliverable
Community Assistance Visits	Community Fact Sheet	Nevada Division of Water Resources, Local Agencies	Updated fact sheets
Community Boundaries	Location of jurisdictional boundaries	Prior Discovery maps	Discovery Map; Geodatabase
Community Rating System	Community Fact Sheet	FEMA's Community Rating System Communities and their Classes"	Updated fact sheets
County Boundaries	Location of County Boundaries	Prior Discovery maps	Discovery Map; Geodatabase
Dams	Location of dams	NDWR Inventory	Discovery Map; Geodatabase
Declared Disasters	Community Fact Sheet	NDEM	Updated Fact Sheets
Demographics, Industry	Community Fact Sheet	US Census Bureau QuickFacts, and American Fact Finder	Updated Fact Sheets
HUC 8 Watersheds	Watershed boundary	USGS Watershed Boundary Dataset	Discovery Map; Geodatabase
Insurance Policies and Claims	Community Fact Sheet	FEMA database	Updated Fact Sheets
Letters of Map Change (LOMCs)	Number and locations of letters of map change	FEMA National Flood Hazard Layer	Discovery Map; Geodatabase
Mitigation Plans Status	Community Fact Sheet	Community Website	Updated Fact Sheet
Mitigation Projects Obligated	Community Fact Sheet	Data.gov: FEMA Hazard Mitigation Program Summary	
Mitigation Projects: Recent, ongoing, planned, Desired		Community information, Discovery Meetings	Discovery Map; Geodatabase
Repetitive Loss	Community Fact Sheet	NDWR, Local Agencies	Updated Fact Sheet
Streams and Rivers	Stream centerlines based on USGS topo	USGS Watershed Boundary Dataset	Discovery Map; Geodatabase
Stream Gages		USGS	Discovery Map; Geodatabase
Major Roads	Location of interstates and major highways		Discovery Map; Geodatabase
Special Flood Hazard Areas	Location of FEMA flood hazard areas	FEMA Digital Flood Insurance Rate Maps	Discovery Map; Geodatabase
Stream Gages	Location of stream gages operated by USGS	USGS National Hydrography Dataset	Discovery Map; Geodatabase
Study Needs: FEMA			
Topographic Availability	LiDAR	CWSD,	Discovery Map: Geodatabase
Wetland	Wetland delineations		Discovery Map; Geodatabase

4.1 DATA THAT CAN BE USED FOR FLOOD RISK PRODUCTS

4.1.1 Topographic Data

As a result of an intense focus on improving flood risk data across the entire watershed, LiDAR has been collected on a flood-study-based effort (individual segments of the Carson River). LiDAR has been processed for areas shown in the Discovery Map (Appendix F). At the current time, LiDAR data is being processed for data collected in Lyon County, and will be available in 2018.

The topographic data that can be used for flood risk products in the Carson River watershed consists of the following LiDAR segments collected between 2011 and 2017 (Table 2).

Table 2. LiDAR Status for the Carson River Watershed.

Segment/Detailed Study Mapping	Date Acquired
Churchill County	2013
Lyon County	2011, 2017
Carson City	2011
Douglas County	2013

4.1.2 USGS Gages

The locations of USGS stream gages in the watershed are shown on the Discovery Maps and listed in Table 3. The seven sites that are active National Weather Service River Forecast sites are indicated. A number of sites have been discontinued since the 2012 Discovery, and are listed at the bottom of the table.

Table 3. USGS Stream Gages

No.	Gage Number	Station Name and Location	Forecast
1	10308783	LEVIATHAN C AB MINE NR MARKLEEVILLE CA	
2	10308785	LEVIATHAN MINE PIT FLOW NR MARKLEEVILLE CA	
3	10308784	LEVIATHAN MINE ADIT DRAIN NR MARKLEEVILLE CA	
4	103087891	ASPEN C ABV LEVIATHAN MINE NR MARKLEEVILLE CA	
5	103087887	LEVIATHAN MINE POND 4 NR MARKLEEVILLE CA	
6	103087885	LEVIATHAN C CHANNEL UNDERDRAIN NR MARKLEEVILLE CA	
7	103087889	4L C NR MARKLEEVILLE CA	
8	103087892	ASPEN C OVERBURDEN SEEP NR MARKLEEVILLE CA	
9	10308200	E.F. CARSON R BL MARKLEEVILLE C NR MARKLEEVILLE CA	YES
10	10308789	LEVIATHAN C AB ASPEN C NR MARKLEEVILLE CA	
11	10308794	BRYANT CK BL MOUNTAINEER C NR MARKLEEVILLE CA	
12	10308792	LEVIATHAN C AB MOUNTAINEER C NR MARKLEEVILLE CA	
13	10310000	WEST FORK CARSON RIVER AT WOODFORDS, CA	YES
14	10309000	EAST FORK CARSON RIVER NEAR GARDNERVILLE, NV	
15	10310400	DAGGETT CREEK NEAR GENOA, NV	
16	10310447	AMBROSETTI POND NR GENOA, NV	
17	10311000	CARSON RIVER NR CARSON CITY, NV	YES
18	10310500	CLEAR CREEK NR CARSON CITY, NV	
19	10311100	KINGS CANYON CREEK NR CARSON CITY, NV	
20	10311090	NORTH FORK KINGS CANYON CREEK NR CARSON CITY, NV	
21	10311200	ASH CANYON CK NR CARSON CITY, NV	
22	10311300	EAGLE VALLEY CREEK AT CARSON CITY, NV	

No.	Gage Number	Station Name and Location	Forecast
23	10311400	CARSON RIVER AT DEER RUN ROAD NR CARSON CITY, NV	YES
24	10311750	CARSON RIVER ABV SIXMILE CYN CK BLW DAYTON NV	
25	10312000	CARSON RIVER NR FORT CHURCHILL, NV	YES
26	10312150	CARSON RIVER BLW LAHONTAN RESERVOIR NR FALLON, NV	YES
27	10351400	TRUCKEE CA NR HAZEN, NV	
28	103122190	S-LINE DIVERSION CANAL NEAR STILLWATER, NV	
29	10312275	CARSON RIVER AT TARZYN ROAD NR FALLON, NV	YES
30	10312277	PAIUTE DRAIN BL TJ DRAIN NR STILLWATER, NV	
DISCONTINUED GAUGES (SINCE 2012 DISCOVERY)			
	10308800	BRYANT C NR GARDNERVILLE NV	
	10310407	CARSON R NR GENOA, NV	
	10311700	CARSON RIVER AT DAYTON, NV	
	10312210	STILLWATER POINT RESERVOIR DIV CANAL NR FALLON, NV	

4.2 OTHER DATA AND INFORMATION

4.2.1 Mitigation Plans/Status, Mitigation Projects

Hazard Mitigation Plans (HMPs) are prepared to help communities reduce long-term risk to life and property from natural hazards. The plans include comprehensive mitigation strategies intended to promote flood-resilient communities. Table 4 lists the HMPs, their status, and their availability for review.

Table 4. HMPs Status and Availability

Jurisdiction	HMP	Issue Date	Expiration Date	Available for Review
Alpine County	Natural Hazard Mitigation Plan	2017	2022	Yes
Carson City	Hazard Mitigation Plan	August 4, 2016	August, 2021	Yes
Churchill County, City of Fallon	Multi-Jurisdictional Hazard Mitigation Plan	2012	2017	Yes
Douglas County	Hazard Mitigation Plan	2013	2018	Yes
Lyon County, City of Fernley, City of Yerington	Multi-Jurisdictional Hazard Mitigation Plan	July, 2013	July, 2018	Yes
Storey County	Hazard Mitigation Plan	2015	2020	Yes

4.2.2 CNMS and NFIP Mapping Study Needs

FEMA organizes, stores, and analyzes flood hazard mapping needs information for identifying and managing flood hazard mapping needs. The CNMS inventory contributes to the identification of risk in two important ways. The first is by indicating where the depiction of flood hazards on the FIRMs has been validated through detailed assessment. The second is by showing which previously studied or unstudied flooding sources inadequately represent flood hazards. In this way, CNMS leads to the improvement of flood hazard data.

For this Discovery update, flood hazard mapping needs data was provided to FEMA for inclusion in the CNMS database. These data both validate flood hazards with adequate detailed assessments, and flooding sources that are either unstudied or inadequate and require improvement of the flood hazard data.

4.2.3 Socio-Economic Analysis

The US Census QuickFacts (updated as of 2015) were used for this research and can be found in Table 5. Community fact sheets for each jurisdiction containing more detailed information are provided in Appendix C.

Table 5. Socio-economic analysis.

Jurisdiction	Population	Median Age	Median Household Income	Top Industry
Alpine County	1,071	39.3	\$52,917	Educational services
Carson City	54,742	41.1	\$47,668	Educational services
Churchill County	24,198	29	\$47,415	Trade, transportation
Douglas County	48,020	47.4	\$58,535	Educational services
Lyon County	53,179	40.9	\$47,255	Retail trade
Storey County	4,051	44.5	\$64,832	Manufacturing

4.2.4 Community Rating System (CRS)

The communities of Carson City, Douglas County, and Storey County participate in the CRS program as of October 1, 2017, as shown in Table 6.

Table 6. CRS Rating of participating communities.

Community	CRS Rating
Carson City	6
Douglas County	6
Storey County	8

4.2.5 Flood Control Structures

a. Levees

According to the 2012 Discovery Map, there are 9 levees, located in Carson City and Lyon County, as identified in Table 7. Lyon County levees are not identified on the FIRM panels, and none are certified as USACE levees. According to the Lyon County FIS (2016), approximate analyses of “behind levee” flooding were conducted for all the levees in Table 7 to indicate the extent of the “behind levee” floodplains. The approximate levee analysis was conducted using information from existing hydraulic models (where applicable) and USGS topographic maps.

Table 7. Levees identified on FEMA FIRM panels.

Community	Flood Source	FIRM Panel
Carson City	Eagle Valley Creek	32001C0083F
Carson City	Eagle Valley Creek/Combs Canyon Creek	32001C0084F 32001C0092G
Carson City	H Tributary	32001C0092G
Lyon County	Unnamed Wash at Silver Springs	32019C0211E 32019C0213E
Lyon County	Unnamed Wash at Silver Springs	32019C0214E 32019C0212E
Lyon County	Carson River	32019C0289F
Lyon County	Carson River	32019C0452F
Lyon County	Undetermined	32019C0452F

b. Dams

The 2012 Discovery Report details the Lahontan Dam and Reservoir in Churchill County, and Eagle Valley Golf Course Dam and the Shenandoah Detention Basin in Carson City. According to the Nevada Division of Water Resources, all High and Significant Hazard dams located within the Carson River watershed are listed in Table 8. Dams for which an Emergency Action Plan (EAP) is active are also indicated in the table. High hazard dams indicate potential loss of life and economic damage; significant indicates economic damage.

Table 8. Dams considered significant or high hazard.

National ID	State ID	Name	Stream	Owner	Hazard	EAP
Carson City						
NV00223	J-228	Carson City Treated Effluent Dam	Carson River-Tr	Carson City	H	Y
NV00231	J-244	Carson City Golf Course Detention Basin	Carson River-Tr	Carson City	S	Y
NV10635		Shenandoah Detention Basin	Eagle Creek-Tr	Carson City	H	Y
Churchill County						
NV10120		Carson River Diversion	Carson River	BOR*	S	Y
NV10123		Lahontan	Carson River	BOR	H	Y
NV00214		Sheckler Dam	Carson River-Os	BOR	S	
Douglas County						
NV10441	XJ-187	Veta Grande Tails Dam	Carson River-Tr	Precious Metal Recovery System	H	
NV10469	XNV10469	Allerman #2 Dam	Carson River-Os	Allerman Upper Virginia Irrigation Co Inc	H	
NV10529	XJ-305	Bodie Dam	East Fork Carson River	Carson Water Subconservancy District	H	
NV10829	XNV10829	Ruhenstroth Power Dam	Carson River	Hussman, George G.	H	
NV10175	J-229	Sierra Springs	Carson River-Os	Sierra Reflections	S	
NV00092		Allerman #1 Dam	Carson River-Os	Allerman Upper Virginia Irrigation Co Inc	H	Y
NV00227	J-238	Minden-Gardnerville Sanitation District	Carson River-Os	Minden-Gardnerville Sanitation District	S	Y
NV10166	J-380	Buckeye Creek Lower Effluent Storage Pond	Buckeye Creek-Os	Douglas County Sewer Improvement Dist. #1	H	Y
NV10168	J-350	Indian Hills Effluent Pond #5	Carson River-Os	Indian Hills G. I. D.	S	Y
NV10435	J-411	Indian Hills Effluent Pond #6	Carson River-Os	Indian Hills G. I. D.	S	Y
NV10605	J-551	Bently Reservoir	Buckeye Creek-Tr	Bently Family Limited Partnership	H	Y
NV10665	J-594	North Carson Valley Treated Effluent Storage Dam	Carson River-Os	Douglas County	S	Y
NV10686	J-380	Buckeye Creek Middle Effluent Storage Pond	Buckeye Creek-Os	Douglas County Sewer Improvement Dist. #1	H	Y
NV10687	J-380	Buckeye Creek Upper Effluent Storage Pond	Buckeye Creek-Os	Douglas County Sewer Improvement Dist. #1	H	Y
Lyon County						

National ID	State ID	Name	Stream	Owner	Hazard	EAP
NV00150	J-086	Eldorado Canyon Dam	Eldorado Canyon Creek	Wade Development Company Inc	H	Y
NV10313	Xj-264	North Dayton Valley Primary Pond 1	Carson River-Os	Lyon County Utilities	S	
NV10638		Sheep Camp Detention Dam	Carson River-Tr	Chase Property Group, LLC	H	
NV10727	Xj-264	North Dayton Valley Primary Pond 2	Carson River-Os	Lyon County Utilities	S	
NV10728	Xj-264	North Dayton Valley Secondary Pond	Carson River-Os	Lyon County Utilities	S	
NV10729	Xnv10729	North Dayton Valley Storage Pond	Carson River-Os	Lyon County Utilities	S	

*U.S. Department of the Interior Bureau of Reclamation (BOR)

4.2.6 Floodplain Management/Community Assistance Visits (CAVs)

As the state coordinating agency for the National Flood Insurance Program, the Nevada Division of Water Resources conducts Community Assistance Visits (CAVs) as part of their floodplain management programs. A CAV typically consists of a tour of the floodplain to assess any recent construction activities, a review of the local permitting process, and evaluation of the local floodplain ordinance. A meeting with the local floodplain official is held to discuss the NFIP, the local permitting process, any recent flood events, training opportunities, and any program deficiencies. Table 9 lists the communities in the watershed and the date of their latest CAV.

While Community Rating System reviews are conducted annually, a visit by staff generally only occurs every few years.

Table 9. Recent CAVs and CRS visits.

Community	CAV Meeting Date	CRS Meeting Date
Carson City	2014	2011
Douglas County	February 23, 2012 (update?)	
Lyon County	October 20, 2009 (update?)	
Storey County		

4.2.7 Regulatory Mapping

As part of the CWSD's ongoing efforts to update the watershed FIRMs, many maps have been updated since the 2012 Discovery. The most recent FIRM updates for the communities in the Carson River Watershed became effective as shown in Table 10:

Table 10. FIRM updates through 2017 Discovery.

Jurisdiction	Effective Date	Description
Douglas County		
32005C0070H 32005C0090H 32005C0093H 32005C0232H 32005C0234H 32005C0235H 32005C0251H 32005C0252H 32005C0253H 32005C0254H 32005C0256H 32005C0258H 32005C0259H	6/15/2016	Remapping using detailed methods of 30 streams, five two-dimensional study areas (Airport Tributary Wash, Airport Wash, Buckbrush Wash, Johnson Lane Wash, Sunrise Pass Wash; and redelineations of 5 stream/river segments on the: Carson River, Clear Creek, Pine Nut Road Wash, Rocky Slough, and Smelter Creek,
Carson City		
3200010083F 3200010084F 3200010091F	2/19/2014	Ash Canyon Creek, Kings Canyon CreekVicee Canyon Creek, Combs Canyon Creek, Eagle Valley Creek,
3200010092G 3200010094F 3200010111G 3200010113F	12/22/2016	Combs Canyon Creek, Ash Canyon Creek, Kings Canyon Creek, Saliman Road Tributary, Voltaire Canyon Creek, H Tributary, I Tributary,
Churchill County		
No changes to FIRMS effective 9/28/2008		
Lyon County		
32019C0289F 32019C0291F 32019C0292F 32019C0293F 32019C0294F 32019C0311F 32019C0312F 32019C0316F 32019C0320F 32019C0340F 32019C0345F 32019C0350F 32019C0434F 32019C0451F 32019C0452F 32019C0453F	10/20/2016	Floodplain redelineation of the Carson River in Lyon County
Alpine County		
No changes to FIRM effective 11/19/1987		

4.3 DISCOVERY MEETINGS

For the Discovery meetings, projects listed for each jurisdiction within the watershed as part of the 2012 Discovery Report and other sources were first reviewed for accuracy. Projects completed were removed from the list. Other projects that may have changed in status as no longer a priority were also removed. More importantly, however, new projects were identified based on recent flooding or changes in priority. These projects were identified through direct coordination with representatives from the various stakeholders in the Carson River watershed.

During the first Discovery meeting, the Community Questionnaire was used to help jurisdictions identify areas where flood risk data is outdated. In particular, the following observations were made:

- Carson City has identified numerous watersheds for which an area drainage master plan or flood study needs to be conducted. Many are subject to alluvial fan/flash flooding as a result of summertime cloudburst events.
- Churchill County's FIRM maps are from the 1970s, and new FIRMs are needed to show modern growth, new plans, and new water spillways (created as a result of the overwhelming inputs of the Carson River to Lahontan Reservoir).
- Lyon County is also subject to flash flood potential, alluvial fan flooding from the surrounding steep hillslopes.
- Douglas County needs detailed studies for Pinenut Creek – from Jo Lane to Orchard (A zone), as well as Sierra Country Estates, and the Ruhenstroth area (Smelter Creek).

At the second meeting, individual project staff members worked with each jurisdiction to fine-tune the information that is contained in the Community Fact Sheets, and potential mitigation projects. Potential projects were derived from the 2012 Discovery list, the Adaptive Stewardship Plan, and discussions with jurisdiction staff.

4.4 DISCOVERY MAP

A Discovery Map has been included as Appendix F that presents the current floodplain mapping extents, LiDAR coverage boundaries, and locations of potential mitigation projects within each jurisdiction, as identified by each jurisdiction at the Discovery meetings and follow-up. Please note: additional follow-up may occur during the final distribution of this Discovery Report; this will be incorporated in the Report and Map as applicable. It is evident that the impacts due to flooding, the need for better or revised floodplain mapping, and the importance of project implementation are at the forefront of each jurisdiction's priorities. Alluvial fan and wash flash-flooding are increasingly a concern for jurisdictions. These are recognized by the number of such potential projects in each jurisdiction list.

4.5 MITIGATION PROJECTS

In the Discovery meetings, community stakeholders were asked to identify locations in which mitigation projects could reduce the impacts of flooding. Topics of mitigation interest included upstream storage, roads that frequently flood, and recent/future growth or development. Appendix E provides lists of projects Identified for potential mitigation for each community.

Project identification initially consisted of a review of those identified in the 2012 Discovery process, the Stewardship Plan, and any new projects identified during the 2017 Discovery meetings.

5 APPENDICES

List of Appendices

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APPENDIX A

PROJECT TEAM CONTACT INFORMATION

AGENCY	NAME	PHONE	EMAIL
Carson Water Subconservancy District	Brenda Hunt	(775) 887-9005	brenda@cwsd.org
	Debbie Neddenriep	(775) 887-1260	debbie@cwsd.org
	Ed James	(775) 887-7456	edjames@cwsd.org
Michael Baker International	Geoff Brownell	(775) 722-4713	gbrownell@mbakerintl.com
	Karin Peternel	(775) 412-4605	Karin.peternel@mbakerintl.com
FEMA	Bob Bezek	(510) 627-7274	Robert.Bezek@fema.dhs.gov

Carson Water Subconservancy District

777 E. William Street, Suite 110A
Carson City, NV 89701

Michael Baker International

5470 Kietzke Lane, Suite 208
Reno, NV 89511

Federal Emergency Management Agency (FEMA)

Region 9

1111 Broadway, Suite 1200
Oakland, CA 94607

APPENDIX B

STAKEHOLDER CONTACT INFORMATION

JURISDICTION	CONTACT	TITLE	PHONE	EMAIL
Alpine County	Brian Peters	Dir. Community Development	(530) 694-2140 x425	bpeters@alpinecountyca.gov
Carson City	Robb Fellows	Floodplain Manager	(775) 283-7370	rfellows@carson.org
Churchill County	Michael Johnson	Planning Manager	(775) 423-7627	Planning-director@churchillcounty
	Michael Heidemann	Emergency Manager	(775) 423-4188	mheidemann@churchillcounty.org
	Preston Denney	GIS Manager	(775) 423-7627	Planning-gis@churchillcounty.org
Nevada Division of Emergency Management	Caleb Cage	Chief – Homeland Security	(775) 687-0300	cscage@dps.state.nv.us
Nevada Division of Water Resources	Bunny Bishop	State Floodplain Manager	(775) 684-2834	bbishop@water.nv.gov
Dayton Valley Conservation District	Robert Holley	Manager	(775) 246-1999	Rholley.dvcd@yahoo.com
	Leah Hoover	Administrative Asst.	(775) 246-1999	Lkniffen.dvcd@yahoo.com
Douglas County	Mimi Moss	Floodplain Manager	(775) 782-6230	mmoss@douglasnv.us
	Erik Nilssen	County Engineer	(775) 782-9063	enilssen@douglasnv.us
	Courtney Walker	Stormwater Program Manager	(775) 782-6215	cwalker@douglasnv.us
Fallon	Mike Miller	Public Works Engineer	(775) 423-3040	mmiller@fallonnevada.gov
Federal Emergency Management Agency	Bob Bezek	CTP Lead	(510) 627-7274	Robert.bezek@fema.dhs.gov
Lyon County	Rob Pyzel	Planner	(775) 463-6535	rpyzel@lyon-county.org
	Chuck Reno	County Engineer	(775) 463-6535	chuck@farrwestengineering.com
Storey County	Austin Osborne	Senior Planner	(775) 847-0968	aosborne@storeycounty.org
Truckee Carson Irrigation District	Kate Rutan	Office Manager	(775) 423-2141	kate@tcid.org
U.S. Army Corps of Engineers	Kristine Ceragioli	Senior Project Manager	(775) 784-5304	Kristine.s.hansen@usace.army.mil
U.S. Bureau of Reclamation	Terri Edwards	Area Manager	(775) 884-8353	tedwards@usbr.gov
U.S. Geological Survey	Steven Berris	Data Chief	(775) 887-7693	snberris@usgs.gov

APPENDIX C

COMMUNITY INFORMATION

1. Community Fact Sheets

- a. Alpine County
- b. Carson City
- c. Churchill County
- d. Douglas County
- e. Lyon County
- f. Storey County

2. Community Interview Notes

- a. Alpine County
- b. Carson City
- c. Churchill County
- d. Douglas County
- e. Lyon County
- f. City of Fallon

Region 9 Discovery 2017: Carson River Watershed
Fact Sheet: Alpine County, California

CID:	60632	FIS/FIRM	Effective Date	11/19/1987
NFIP Participation Status:	Participating		Level of Study:	Zone D - Undetermined
			Last Community Meeting:	

LOMCs: **Last CAV/CAC Date:**

CRS Status

Class: SFHA Discount:
Effective: Non-SFHA Discount:

Demographics (US 2016 Census Data)

Population 1,071
Median Age 39.3
Elderly (65+): 23.2%
Native: 96.6%

Social Characteristics

Non-English Speakers: 14.0%
High School + Education: 89.5%
Bachelor's + Education 27.5%

Industrial (2015)

Population in labor force: 49.0%
Median income: \$52,917
Top 5 Industries: 1 Educational services, health care and social assistance
2 Public Administration
3 Arts, entertainment, recreation, accomodation and food services
4 Professional, scientific and management, administrative, waste management
5 Other services exempt from public administration

Presidentially-Declared Disasters

Flood related total:
Recent flood related:
Other hazards:

Insurance

Total Premiums: Variances
Total Coverage: Repetitive Losses:
Total Policies: 98 Total Claims:
A Zone Policies: BXC Zone claims:
BCX Policies:

Mitigation Projects and Other Grants

Approved Mitigation Projects

Funding:

Pending Mitigation Projects

Mitigation Plans: Alpine County Natural Hazard Mitigation Plan **Effective Date:** 2017

Other Plans

Alpine County General Plan 2009
Carson River Watershed Regional Floodplain Management Plan 2013
Floodplain Development Standards Code 2013

Region 9 Discovery 2017: Carson River Watershed
Fact Sheet: Carson City, Nevada

CID:	320001	FIS/FIRM	Effective Date	12/22/2016
NFIP Participation Status:	Participating		Level of Study:	Detailed
			Last Community Meeting:	
LOMCs:	8		Last CAV/CAC Date:	7/21/2011
CRS Status				
Class:	6		SFHA Discount:	20%
Effective:	10/1/2009		Non-SFHA Discount:	10%
Demographics (US 2016 Census Data)		Social Characteristics		
Population	54,742		Non-English Speakers:	8.2%
Median Age	41.1		High School + Education:	86.8%
Elderly (65+):	20.3%		Bachelor's + Education	20.7%
Native:	88.3%			
Industrial (2015)				
Population in labor force:	59.7%			
Median income:	\$47,668			
Top 5 Industries:		1 Educational services, health care and social assistance 2 Public Administration 3 Arts, entertainment, recreation, accomodation and food services 4 Retail trade 5 Manufacturing		
Presidentially-Declared Disasters				
Flood related total:	\$3,099,910	(2012 Discovery Report)		
Recent flood related:	2/28/1986; 1/3/1997; 2/3/2006; 1/13/2017; 2/x/2017			
Other hazards:	8/27/2004	Waterfall Fire		
Insurance				
Total Premiums:	\$301,195		Variances	0
Total Coverage:	\$133,923,700		Repetitive Losses:	X
Total Policies:	638		Total Claims:	\$578,249
A Zone Policies:	451		BXC Zone claims:	
BCX Policies:	187			
Mitigation Projects and Other Grants				
Approved Mitigation Projects		Funding:		
Pending Mitigation Projects	Eagle Valley Golf Course Shenandoah Basin Silver Oak Golf Course Basins Timberline/Combs Basins Eagle Valley Creek Basins Vicee Canyon Basin			
Mitigation Plans:	Carson City Hazard Mitigation Plan		Effective Date:	2016
Other Plans	Carson City Sandbagging Plan			2010
	Carson River Watershed Regional Floodplain Management Plan			2013
	Community Wildfire Protection Plan			2009
	Carson City Master Plan			2006
	Carson City Parks and Recreation Plan			2006
	Carson City Open Space Plan			2000
	Carson River Master Plan			1996

Region 9 Discovery 2017: Carson River Watershed
Fact Sheet: Churchill County, Nevada

CID:	320002, 320030	FIS/FIRM	Effective Date	9/26/2008
NFIP Participation Status:	Participating		Level of Study:	Detailed
			Last Community Meeting:	

LOMCs: 4 **Last CAV/CAC Date:**

CRS Status

Class: SFHA Discount:
Effective: Non-SFHA Discount:

Demographics (US 2016 Census Data)

Population 24,198
Median Age 29
Elderly (65+): 18.7%
Native: 93.6%

Social Characteristics

Non-English Speakers: 11.7%
High School + Education: 89.6%
Bachelor's + Education 15.9%

Industrial (2015)

Population in labor force: 55.0%
Median income: \$47,415
Top 5 Industries:
1 Trade, transportation (26%)
2 Education and health services (20.7%)
3 Leisure and hospitality (12.7%)
4 Government (9.8%)
5 Professional services (7.3%)

Presidentially-Declared Disasters

Flood related total: \$30,149 (2012 Discovery Report)
Recent flood related: 1/3/1997
Other hazards:

Insurance

Total Premiums:	\$262,700	Variances	
Total Coverage:	\$145,569,200	Repetitive Losses:	1
Total Policies:	487	Total Claims:	\$9,850
A Zone Policies:	56	BXC Zone claims:	
BCX Policies:			

Mitigation Projects and Other Grants

Approved Mitigation Projects

Funding:

Pending Mitigation Projects

Mitigation Plans: Churchill County and City of Fallon Hazard Mitigation Plan **Effective Date:** 2016

Other Plans

Churchill County Master Plan	2015
Carson River Watershed Regional Floodplain Management Plan	2013
Carson River Geographic Response Plan	
Lahontan Dam Tabletop Flood Exercise	2009
Design, Estimating and Construction Review Truckee Canal Risk Assessment	2008

Region 9 Discovery 2017: Carson River Watershed
Fact Sheet: Douglas County, Nevada

CID:	320008	FIS/FIRM	Effective Date	6/15/2016
NFIP Participation Status:	Participating		Level of Study:	Detailed
			Last Community Meeting:	
LOMCs:	43		Last CAV/CAC Date:	2/23/2012
CRS Status				
Class:	6		SFHA Discount:	20
Effective:	10/1/2004		Non-SFHA Discount:	10
Demographics (US 2016 Census Data)		Social Characteristics		
Population	48,020		Non-English Speakers:	10.2%
Median Age	47.4		High School + Education:	92.8%
Elderly (65+):	26.5%		Bachelor's + Education	25.2%
Native:	92.5%			
Industrial (2015)				
Population in labor force:	56.3%			
Median income:	\$58,535			
Top 5 Industries:		1 Educational services, health care and social assistance 2 Public Administration 3 Arts, entertainment, recreation, accomodation and food services 4 Construction 5 Manufacturing		
Presidentially-Declared Disasters				
Flood related total:	\$969,760	(2012 Discovery Report)		
Recent flood related:	2/28/1986; 1/3/1997; 2/3/2006; 2/15/2008			
Other hazards:				
Insurance				
Total Premiums:	\$771,827		Variances	0
Total Coverage:	\$145,569,200		Repetitive Losses:	4
Total Policies:	1,139		Total Claims:	\$3,644,170
A Zone Policies:	640		BXC Zone claims:	
BCX Policies:	436			
Mitigation Projects and Other Grants				
Approved Mitigation Projects	US Highway 395 Culvert (Cottonwood Slough)	Funding:	FEMA	\$875,916
			Douglas County	\$41,972
			NDOT	\$250,000
Pending Mitigation Projects	State Route 88 Flood Mitigation	Funding:	FEMA	\$1,605,500
Mitigation Plans:	Douglas County Natural Hazard Mitigation Plan		Effective Date:	2013
Other Plans	Douglas County Master Plan			2012
	Carson River Watershed Regional Floodplain Management Plan			2013
	Douglas County Open Space and Agricultural Lands Preservation Implementation Plan			2004
	Douglas County Code Title 20 Zoning Ordinance of Douglas County			1996

Region 9 Discovery 2017: Carson River Watershed
Fact Sheet: Lyon County, Nevada

CID:	320016, 320029, 320038	FIS/FIRM	Effective Date	10/20/2016
NFIP Participation Status:	Participating		Level of Study:	Detailed
			Last Community Meeting:	

LOMCs:	13	Last CAV/CAC Date:	10/20/2009
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CRS Status

Class:	SFHA Discount:
Effective:	Non-SFHA Discount:

Demographics (US 2016 Census Data)

Population	53,179
Median Age	40.9
Elderly (65+):	21.1%
Native:	92.9%

Social Characteristics

Non-English Speakers:	13.6%
High School + Education:	84.9%
Bachelor's + Education	16.6%

Industrial (2015)

Population in labor force:	56.2%
Median income:	\$47,255
Top 5 Industries:	1 Retail trade 2 Educational services, healthcare and social assistance 3 Manufacturing 4 Arts, entertainment, recreation, accomodation and food services 5 Construction

Presidentially-Declared Disasters

Flood related total:	\$1,044,838	(2012 Discovery Report)
Recent flood related:	2/28/1986; 1/3/1997; 2/3/2006; 2/15/2008	
Other hazards:		

Insurance

Total Premiums:	\$198,143	Variances	
Total Coverage:	\$75,185,300	Repetitive Losses:	
Total Policies:	320	Total Claims:	\$386,144
A Zone Policies:		BXC Zone claims:	
BCX Policies:			

Mitigation Projects and Other Grants

Approved Mitigation Projects

Funding:

Pending Mitigation Projects

<u>Mitigation Plans:</u>	Lyon County Multi-Jurisdictional Hazard Mitigation Plan	Effective Date:	2013
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<u>Other Plans</u>	Lyon County Comprehensive Master Plan	2010
	Carson River Watershed Regional Floodplain Management Plan	2013

Region 9 Discovery 2017: Carson River Watershed
Fact Sheet: Storey County, Nevada

CID:	320033	FIS/FIRM	Effective Date	1/16/2009
NFIP Participation Status:	Participating		Level of Study:	Detailed
			Last Community Meeting:	4/23/2008

LOMCs:	13	Last CAV/CAC Date:	9/6/2007
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CRS Status

Class:	8	SFHA Discount:	10%
Effective:	10/1/1999	Non-SFHA Discount:	5%

Demographics (US 2016 Census Data)

Population	4,051
Median Age	44.5
Elderly (65+):	30.1%
Native:	97.7%

Social Characteristics

Non-English Speakers:	4.3%
High School + Education:	92.4%
Bachelor's + Education	21.4%

Industrial (2015)

Population in labor force:	56.2%
Median income:	\$64,832
Top 5 Industries:	1 Manufacturing 2 Educational services, healthcare and social assistance 3 Construction 4 Arts, entertainment, recreation, accomodation and food services 5 Professional, scientific, management, Administrative and waste managemen

Presidentially-Declared Disasters

Flood related total:	\$1,171,546	(2012 Discovery Report)
Recent flood related:	2/28/1986; 1/3/1997; 2/3/2006; 2/15/2008	
Other hazards:		

Insurance

Total Premiums:	\$107,652	Variances	
Total Coverage:	\$41,354,100	Repetitive Losses:	0
Total Policies:	216	Total Claims:	\$40,962
A Zone Policies:		BXC Zone claims:	
BCX Policies:			

Mitigation Projects and Other Grants

Approved Mitigation Projects

Funding:

Pending Mitigation Projects

<u>Mitigation Plans:</u>	Storey County Hazard Mitigation Plan	Effective Date:	2015
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Other Plans

Emergency Operations Plan	
Carson River Watershed Regional Floodplain Management Plan	2013

APPENDIX C

COMMUNITY INTERVIEW NOTES

APPENDIX C

ALPINE COUNTY - Community Questionnaire			
Request		August 15, 2017 Discovery Meeting Response	Additional Comments
<i>PRESENT POTENTIAL FLOOD RISK PROJECTS FOR DISCOVERY UPDATE</i>			
1	List any existing planned projects		
2	Provide any feedback regarding potential flood risk projects		
3	Discuss areas of growth in your community and state whether new flood hazard analyses is warranted for these areas		
4	Discuss areas where flood risk data may be outdated		Where do Zone D maps need to be updated?
5	Discuss any new flood risk projects you are considering:	Washington Fire area, especially along Highway 89 Analysis of Post-Fire Flood Mitigation Erosion Zone Analysis EF Carson River LIDAR Markleeville Creek LIDAR Map Markleeville Creek Drainage. Flooding at Markleeville Creeks blocks Public Works Access to Lift Station; explore flood mitigation options Potential Impact Analysis; Number & Location of residents with flood insurance as way to focus efforts.	
6	Briefly describe your mitigation capabilities		
7	Briefly describe any hazard risk assessments your community has completed since the last Discovery		
8	Describe any current or future mitigation activities planned in your community		
<i>DATA REQUESTS</i>			
9	Do you have any high-water marks or photos from recent flood events?		
10	Will you be providing any storm water or floodplain data generated since the last Discovery?		
11	Has your community acquired any new aerial topography or LIDAR data since the last Discovery?		
12	Who should we contact for any community demographic data?		
13	Has your community recently completed a hazard mitigation plan, and if so whom should we contact?		
14	Do you know of any other flood hazard mitigation data not previously listed?		
<i>PLEASE ADD ANY ADDITIONAL COMMENTS OR CONCERNS RELATIVE TO YOUR JURISDICTION:</i>			

APPENDIX C

CARSON CITY - Community Questionnaire			
	Request	August 15, 2017 Discovery Meeting Response	Additional Comments
	<i>PRESENT POTENTIAL FLOOD RISK PROJECTS FOR DISCOVERY UPDATE</i>		
1	List any existing planned projects	None – all projects are being considered	
2	Provide any feedback regarding potential flood risk projects	What method should be used to add projects to the plan in between the update process	
3	Discuss areas of growth in your community and state whether new flood hazard analyses is warranted for these areas	Current growth in the city is on the Schulz, Lompa and Anderson Ranches. These proposed developments are required to analyze and mitigate their flood impacts. Lompa Ranch development requires the realignment of existing flood channels within the proposed site. The channel design is currently going through the CLOMR process.	
4	Discuss areas where flood risk data may be outdated	Data within the Clear Creek watershed including Prison Hill area. Data within the Pinion Hills area from Deer Run bridge south to the city boundary and east of the Carson River.	
5	Discuss any new flood risk projects you are considering:	Look at the feasibility to adding flood control facilities to the Goni Canyon watershed as well as Prison Hill, Kings and Ash Canyons per Hazard Mitigation goal 5A (including maintenance costs).	Area Drainage Master Plans for several areas of Carson City: Eagle Valley A & B; Goni Wash; Area Between Goni Wash & Eagle Valley Creek (North of Highway 50, East of Highway 395, West of Goni); Ash Canyon; Kings Canyon; H & I tributary; Prison Hill Area; Pinion Hills Area (East of River & South of Deer Run Road) New projects to be considered which come out of any conducted Area Drainage Master Plan (sediment transport / flood mitigation projects/ costs) Future flood studies in the Clear Creek Watershed area.
	<i>FLOOD RISK REDUCTION</i>		
6	Briefly describe your mitigation capabilities	Currently the City has over 50% of the SFHA in open space. The City continues to find ways to expand their open space ownership to coincide with the SFHA. The City has developed a city-wide sand bagging plan that provides setup guidance prior to and during a flood event. Also, the City has constructed flood control facilities in different parts of the City. Detention and retention basins.	
7	Briefly describe any hazard risk assessments your community has completed since the last Discovery	The City has updated their Hazard Mitigation Plan in 2016. The document addresses all mitigation plans. Goni Canyon Wash Floodplain study; Eagle Valley Golf Course A&B Drainage/Floodplain Restudy/Remapping	
8	Describe any current or future mitigation activities planned in your community	The City's current effort involves feasibility studies for various future detention and sediment basins around the city, then looking for grant funds to construct the basins.	With so much open space in City, are there any studies / plan/ projects needed regarding trail's impacts during flood events? Is there language in policy's / ordinances to ensure trail infrastructure does not create flood hazards?
	<i>DATA REQUESTS</i>		
9	Do you have any high-water marks or photos from recent flood events?	Public works has flood photos	
10	Will you be providing any storm water or floodplain data generated since the last Discovery?	None	
11	Has your community acquired any new aerial topography or LiDAR data since the last Discovery?	None	

APPENDIX C

CARSON CITY - Community Questionnaire			
	Request	August 15, 2017 Discovery Meeting Response	Additional Comments
12	Who should we contact for any community demographic data?	Lee Plemel – Planning Director	
13	Has your community recently completed a hazard mitigation plan, and if so whom should we contact?	Yes, the document is on the City website at www.carson.org	
14	Do you know of any other flood hazard mitigation data not previously listed?	None known	
	PLEASE ADD ANY ADDITIONAL COMMENTS OR CONCERNS RELATIVE TO YOUR JURISDICTION:		

APPENDIX C

CHURCHILL COUNTY - Community Questionnaire		
Request	August 15, 2017 Discovery Meeting Response	Additional Comments
PRESENT POTENTIAL FLOOD RISK PROJECTS FOR DISCOVERY UPDATE		
1	List any existing planned projects	No current projects listed
2	Provide any feedback regarding potential flood risk projects	New projects to be considered are: 1. Revised FIRM study 2. Carson River clearing and snagging program
3	Discuss areas of growth in your community and state whether new flood hazard analyses is warranted for these areas	
4	Discuss areas where flood risk data may be outdated	The old FIRM maps are from the 1970s, we need a revised FIRM to show modern growth, new plans, and new water spillways
5	Discuss any new flood risk projects you are considering:	Consider mapping and providing mitigation for areas at greater risk for flooding. Any plans to identify and maintain floodplain lands as open space or agricultural production? Any plans to elevate/buy back high flood hazard and/or repetitive loss properties within the floodplain?
6	Briefly describe your mitigation capabilities	Precautionary releases in accordance with the BOR Lahontan Dam Emergency Action Plan
7	Briefly describe any hazard risk assessments your community has completed since the last Discovery	None
8	Describe any current or future mitigation activities planned in your community	Are any studies/plans/projects to improve Bafford Lane Bridge to reduce flood hazard? Has community considered developing floodplain ordinances which recognize importance of floodplains and implementing flood mitigation ordinances and building standards within the floodplain? Has community considered transfer of development rights (TDRs), conservation easements, or other alternative to preserve floodplain?
DATA REQUESTS		
9	Do you have any high-water marks or photos from recent flood events?	Yes, City of Fallon and TCID
10	Will you be providing any storm water or floodplain data generated since the last Discovery?	See TCID and BOR concerning Churchill County
11	Has your community acquired any new aerial topography or LIDAR data since the last Discovery?	Yes, see Preston Denney (GIS Coordinator for Churchill County)
12	Who should we contact for any community demographic data?	Rex Massey is a consultant for Churchill County on demographics
13	Has your community recently completed a hazard mitigation plan, and if so whom should we contact?	Mike Heidemann, updated in 2016/2017.
14	Do you know of any other flood hazard mitigation data not previously listed?	Contact BOR and TCID – they should have more data based upon 2017 events
PLEASE ADD ANY ADDITIONAL COMMENTS OR CONCERNS RELATIVE TO YOUR JURISDICTION:		
Completed projects: 1. Sagousi Dam Debris/Sediment Removal Flood Control and River Rehabilitation 2. Carson River Lahontan Dam Carson Sink – Debris Removal Flood Control		

APPENDIX C

DOUGLAS COUNTY - Community Questionnaire			
Request		August 15, 2017 Discovery Meeting Response	Additional Comments
	<i>PRESENT POTENTIAL FLOOD RISK PROJECTS FOR DISCOVERY UPDATE</i>		
1	List any existing planned projects	Stephanie Way Detention Basin (may be included in JLADMP); Old Ruhenstroth Dam removal	
2	Provide any feedback regarding potential flood risk projects	Maintenance costs; timeline for building Smelter Creek Detention Basin may be long	
3	Discuss areas of growth in your community and state whether new flood hazard analyses is warranted for these areas	**Need to ask Planning or County Engineer	
4	Discuss areas where flood risk data may be outdated	Pinenut Creek - from Jo Lane to Orchard is A zone - needs a detailed study. Also Sierra Country Estates, Smelter Creek in Ruhenstroth.	What are creek names? Are there other alluvial drainages which need additional study in West Carson Valley, East Valley, or South Valley?
5	Discuss any new flood risk projects you are considering:	Floodplain Ordinances update; Area Drainage Master Plans for other areas of Douglas County; New projects to be considered will come out of JLADMP	
6	Briefly describe your mitigation capabilities	Building code is 1' higher than FEMA regulations. Updated maps coming soon for Carson River Floodplain. Limitations for land division in SFHA. No parcels less than 19 acres unless . . (DC Code)	
7	Briefly describe any hazard risk assessments your community has completed since the last Discovery	Floodway is being remapped in Carson River floodplain. East Valley Washes FIRMs updated. LOMRS. Douglas County Flood Management Guide (12/28/2015)	
8	Describe any current or future mitigation activities planned in your community	Carson River Floodplain re-mapping in review; Johnson Lane ADMP; Smelter Creek Detention Basin; Alpine View Estates LOMR in review; SR88 Culvert expansion at Cottonwood Slough and East Fork of Carson River	TDRs? Conservation Easements? Open Space Plans? Data requests?
9	Do you have any high-water marks or photos from recent flood events?	Yes, and HDR, weather service do as well	
10	Will you be providing any storm water or floodplain data generated since the last Discovery?	Yes, new FIRMs, JLADMP should be completed in mid-2018	
11	Has your community acquired any new aerial topography or LiDAR data since the last Discovery?	LiDAR of Johnson Lane area for ADMP; ask GIS when it was last done **	
12	Who should we contact for any community demographic data?	GIS? Assessor??	
13	Has your community recently completed a hazard mitigation plan, and if so whom should we contact?	Last one completed in 2013; contact Tod Carlini.	
14	Do you know of any other flood hazard mitigation data not previously listed?		
	<i>PLEASE ADD ANY ADDITIONAL COMMENTS OR CONCERNS RELATIVE TO YOUR JURISDICTION:</i>		

APPENDIX C

LYON COUNTY - Community Questionnaire			
Request		August 15, 2017 Discovery Meeting Response	Additional Comments
<i>PRESENT POTENTIAL FLOOD RISK PROJECTS FOR DISCOVERY UPDATE</i>			
1	List any existing planned projects		
2	Provide any feedback regarding potential flood risk projects	USA Parkway impacts to Silver Springs	
3	Discuss areas of growth in your community and state whether new flood hazard analyses is warranted for these areas	Silver Springs	"Dayton Valley, Moundhouse, & Stagecoach is expected to grow; Suggest listing ADMP projects for 1) Highway 50 Corridor from Moundhouse through Silver Springs for areas of current/planned future growth; and 2) Alluvial Fans South of Carson River in Dayton Valley (eg Eldorado Canyon) in areas of current/planned future growth; 3) Consider listing flood impact studies regarding bridge alternatives in East Dayton Valley; 4) Any flood data needs in relation to water/ wastewater treatment plant?"
4	Discuss areas where flood risk data may be outdated	Flash flood potential Alluvial fan flooding	
5	Discuss any new flood risk projects you are considering:	Ramsay Canyon Study Special Improvement District for Storm Drainage that flows into Carson River along Carson River (design, construct, operate and maintain)	New studies and/or projects which may be identified by Dayton Valley ADMP and future ADMP's within the county to help reduce flood risk to communities within the county
6	Briefly describe your mitigation capabilities	Compliance with Title 12 (Flood Control) and work done by Dayton Conservancy District	
7	Briefly describe any hazard risk assessments your community has completed since the last Discovery	2012 Ramsey Canyon Study by Manhard Consulting of Highlands/Silver Springs	
8	Describe any current or future mitigation activities planned in your community	2017 Ramsay Canyon Study Title 15 – Low Impact Development Standards adoption Carson River Storm Water SID proposal	With so much open space in City, are there any studies / plan/ projects needed regarding trail's impacts during flood events? Is there language in policy's / ordinances to ensure trail infrastructure does not create flood hazards?
9	Do you have any high-water marks or photos from recent flood events?	Yes	Please provide on a flash drive at Discovery Meeting
10	Will you be providing any storm water or floodplain data generated since the last Discovery?	Yes	Please provide on a flash drive at Discovery Meeting
11	Has your community acquired any new aerial topography or LiDAR data since the last Discovery?	Yes	Yes, new LIDAR flown 9/2017 by USGS; will be available ~5/2018
12	Who should we contact for any community demographic data?	Planning department	
13	Has your community recently completed a hazard mitigation plan, and if so whom should we contact?	Emergency Manager	
14	Do you know of any other flood hazard mitigation data not previously listed?		
<i>PLEASE ADD ANY ADDITIONAL COMMENTS OR CONCERNS RELATIVE TO YOUR JURISDICTION:</i>			

APPENDIX D

DISCOVERY MEETINGS

1. August 15 Meeting
 - a. Notice
 - b. Agenda
 - c. Community Questionnaire
 - d. List of Attendees
 - e. Risk MAP Presentation
2. October 24 Meeting
 - a. Notice
 - b. Agenda
 - c. August Meeting Notes
 - d. List of Attendees/Sign-in sheet
 - e. Individual Jurisdiction Maps and Potential Mitigation Projects

11/10/2017

FEMA Discovery and Carson River Floodplain Management Plan Meeting Invite

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CWSD Meeting Invitation for Carson River FEMA Discovery and Floodplain Management Plan Updates



August 1, 2017

Greetings!

The Carson Water Subconservancy District invites you to attend a Carson River Coalition Floodplain and River Management Working Group meeting:

August 15, 2017

1.30 pm to 4.30 pm

Nevada Room at the Governor's Mansion

606 Mountain Street, Carson City, NV 89703

The meeting will cover all areas of the Carson River watershed from Alpine County, California, to Lahontan Reservoir and downstream through Churchill

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The bulk of this meeting, from **1:30 pm – 3:30 pm**, will be focused on a FEMA Discovery and Carson River Floodplain Management Plan Updates to discuss the Risk MAP Discovery process for the Carson River watershed. As part of FEMA's Risk Mapping, Assessment and Planning (Risk MAP) program, CWSD will be working with communities along the Carson River to enhance understanding of flood risk and mitigation efforts. Many of you participated in a similar effort in 2012 and understand the importance of identifying future restudies and projects.

Click this link for the [full invite with data request](#).

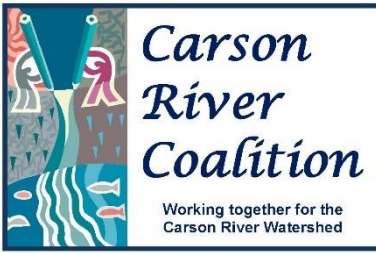
Click here for the [draft agenda](#).

Click here for more information on the [FEMA Discovery process](#).

We thank you for supporting this effort and encourage you to attend this important meeting. County officials, floodplain managers, planners, engineers, emergency managers, GIS staff and any other representative you deem appropriate are all invited, and we ask that you pass along a copy of this invitation to whomever should attend this meeting. The partnership between FEMA and all communities is vital to our success in identifying flood risks and needs that may exist. To learn more, please contact Brenda Hunt, our Watershed Program Manager, brenda@cwsd.org (775.887.9005). Your continued partnership is critical to the successful completion of these floodplain management planning efforts! We look forward to seeing you at the meeting.

Sincerely,
Ed James,
CWSD General Manager
edjames@cwsd.org
775.887.7450





Floodplain and River Management Working Group Agenda

Tuesday, August 15, 2017
1:30 PM –4:30 PM

Location: ***NOTICE CHANGE OF VENUE and MEETING DURATION!!!***
Nevada Room at the Governor's Mansion
606 Mountain Street. Carson City, NV 89703

Contact: Questions? Brenda Hunt, 887-9005, brenda@cwsd.org

1. Welcome
2. 1:30 –3:30 pm ***Draft Agenda FEMA Discovery and Floodplain Management Plan Update Meeting***
 - A. Project Overview of Discovery and Floodplain Management Plan Updates
 1. Purpose and Background
 2. Recent Flood Events
 3. Project Timeline
 - B. Present Potential Flood Risk Projects for Discovery Update
 1. Review existing projects
 2. Gather community feedback
 3. Discuss areas of growth;
 4. Discuss areas where flood risk data may be outdated
 5. Discuss potential new projects
 - C. Flood Risk Reduction
 1. Understand local mitigation capabilities, hazard risk assessments, and current or future mitigation activities
 - D. Prepare for Next Meeting
 1. Data request (Discovery Update):
 - i. Photos and high-water marks from recent floods
 - ii. Any storm water or floodplain activities since last Discovery
 - iii. LiDAR and aerial topography acquired since last Discovery
 - iv. Community demographics
 - v. Most recent hazard mitigation plans
 - vi. Any other flood hazard mitigation data
 2. Data request (Floodplain Mgmt. Plan Update)
 - i. TBD
 - E. Next Meeting Date

3. 3:30 -4:30 pm **Last meeting's unfinished business**

A. Floodplain Management Plan Suggested Actions update:

1. SA – 30

- i. Flood Awareness Week Update (Shane/Bunny)
- ii. Floodplains as Community Assets (Debbie) – Please Click the links below to view our four videos:

[Public Service Announcement \(PSA\) - Conserving the Carson River Floodplain as a Community Asset \(:30\)](#)

[Agriculture's a Good Fit for Conserving the Carson River Floodplain as a Community Asset \(4:31\)](#)

[A Case for Developers to Conserve the Carson River Floodplain as a Community Asset \(3:13\)](#)

[Our Officials in Conserving the Carson River Floodplain as a Community Asset \(4:19\)](#)

B. Flood Damage Field Trip (John Coburn)

- 1. Site Selection and Timing (August???)
- 2. Types of damages
 - i. Erosion/Channel Migration
 - ii. Structures
 - iii. Infrastructure/grade controls

C. Finalized Stewardship Plan Submitted (Brenda)

D. Other

4. Schedule Next Meeting

FEMA Discovery and Floodplain Management Plan Update Meeting – August 15, 2017
Carson River Watershed
Community Questionnaire

Community Name: _____

Present Potential Flood Risk Projects for Discovery Update

1. List any existing planned projects (2012 Discovery, 2008/2013 Regional Floodplain Management Plan) no longer being considered: _____

2. Provide any feedback regarding potential flood risk projects: _____

3. Discuss areas of growth in your community and state whether new flood hazard analyses is warranted for these areas: _____

4. Discuss areas where flood risk data may be outdated: _____

5. Discuss any new flood risk projects you are considering: _____

Flood Risk Reduction

6. Briefly describe your mitigation capabilities: _____

7. Briefly describe any hazard risk assessments your community has completed since the last Discovery: _____

8. Describe any current or future mitigation activities planned in your community: _____

Data Requests

9. Do you have any high-water marks or photos from recent flood events?

10. Will you be providing any storm water or floodplain data generated since the last Discovery?

11. Has your community acquired any new aerial topography or LiDAR data since the last Discovery? _____
12. Who should we contact for any community demographic data?

13. Has your community recently completed a hazard mitigation plan, and if so whom should we contact? _____
14. Do you know of any other flood hazard mitigation data not previously listed? _____

Please note any additional comments or concerns relative to your jurisdiction:

Thank you!

Carson River Watershed Discovery, Floodplain Management Plan Updates						
Attendees - August 15, 2017						
FirstName	LastName	Company	Department	Job Title	EmailAddress	BusinessPhone
Jeff	Anderson	Nevada NRCS Snow Survey		Water Supply Specialist	jeff.anderson@nv.usda.gov	775-857-8500 x152
Tim	Bardsley	National Weather Service-Reno		Senior	tim.bardsley@noaa.gov	775-673-8100 x228
Geoff	Brownell	Michael Baker Jr., Inc.			gbrownell@mbakercorp.com	
Craig	Burnside	Carson Valley Conservation District		Watershed Coordinator	craig.burnside@nv.nacdnet.net	775-782-9835
Kristine	Ceragioli	Army Corps of Engineers	Reno Regulatory Field Office	Senior Project Manager	Kristine.S.Hansen@usace.army.mil	775-784-5304
Katherine	Clancey	NV Div. of Water Resources		State Floodplain Mapping Coordinator	kclancey@water.nv.gov	775-684-2847
John	Cobourn	University of Nevada Cooperative Extension		Water Resource Specialist	cobournj@UNCE.unr.edu	775-339-0244
Preston	Denny	Churchill County		GIS	planning-gis@churchillcounty.org	
Steven	Endacott	City of Fallon		Emergency Management Director	endacottsteve@charter.net	775-427-5356
Brenda	Hunt	Carson Water Subconservancy District		Watershed Program Manager	brenda@cwsd.org	775-887-9005
Edwin	James	Carson Water Subconservancy District		General Manager	edjames@cwsd.org	775-887-7456
Michael	Johnson	Churchill County		Planning Director	planning-director@churchillcounty.org	775-423-7627
Steve	King			Attorney	kingmont@charter.net	775-427-5821
Steven	Lewis	University of Nevada Cooperative Extension		Extension Educator	lewisst@unce.unr.edu	(775) 782-9960
Debbie	Neddenriep	Carson Water Subconservancy District	Water Resource Specialist 2		debbie@cwsd.org	775-887-1260
Karin	Peternel	Michael Baker International			karin.peternel@mbakerintl.com	
Robert	Pyzel	Lyon County		Planner	rpyzel@lyon-county.org	
James	Shell	US Navy - Fallon NAS	Commanding Officer		James.shell@navy.mil	
Jeanmarie	Stone	NV Div. of Environmental Protection			jstone@ndep.nv.gov	
Mary Kay	Wagner	NV Div. of Environmental Protection	Bureau of Water Quality Planning		mkwagner@ndep.nv.gov	
Courtney	Walker	Douglas County	Public Works	Storm Water Program Manager	cwalker@douglasnv.us	775-782-6215
Zach	Wood	Alpine County			zach@pd.alpinecountycal.com	
Shane	Fryer	Carson Water Subconservancy District		Watershed Program Specialist	shane@cwsd.org	775-887-1260
Bryant	Smith	BLM	Sierra Front	Field Manager	bbsmith@blm.gov	775-885-6172
Barry	Wood	Fallon NAS	Emergency Management	Emergency Management Officer	barry.wood@navy.mil	775-426-3190
Leah	Hoover	DVCD		Administrative Assistant	lkniffen.dvcd@gmail.com	775-246-1999
Lyndsay	Boyer	Carson City	Open Space	Sr. Water Resource Specialist	lboyer@carson.org	775-283-7341
Dan	Stucky	Carson City	Public Works	City Engineer	dstucky@carson.org	
Anne	Knowles	Nevada Appeal		Reporter	aknowles@nevadaappeal.com	
Charles	Reno	Farr West Engineering	Lyon County	County Engineer	chuck@farrwestengineering.com	
Ken	Gray	Lyon County	BOCC		kgray@lyon-county.org	
Toni	Leffler	CWSD				



Discovery and Floodplain Management Plan Updates


Carson River Watershed

August 15, 2017



Introductions

- **Project Team**
 - Carson Water Subconservancy District
 - Michael Baker International
- **Local Community partners and officials**
 - Alpine, Churchill, Douglas, Lyon, Storey, Carson City
- **State of Nevada partners and officials**
 - NDEM, NDWR, NDEP,
- **Other Federal Agencies partner representatives**
 - FEMA, USGS, U.S. Navy, National Weather Service
- **Associations**
- **Other Stakeholders**
 - Washoe Tribe, Fallon Tribe,



2

Agenda

- **A. Project Overview**
 - Discovery Update
 - Floodplain Management Plan Update
- **B. Present Potential Flood Risk Projects for Discovery Update**
- **C. Flood Risk Discussion**
- **D. Prepare for Next Meeting**
 - Data Request – Discovery
 - Data Request – Floodplain Management Plan
- **E. Next Meeting Date**



3



Project Overview

- **Why are we here today?**
 - **Discovery Plan Update**
 - The Discovery of flood hazards and associated flood risk and mitigation activities
 - Data Collection
 - Stakeholder coordination
 - Meetings
 - **Floodplain Management Plan Update**
 - Continue to create a long-term vision and strategies for floodplain management to reduce flood damage impacts
- Understand the needs of communities in the watershed**
- Discuss flood risk
 - Balance local needs with FEMA's resources
 - Plan for possible flood risk projects



4



Discovery

- **Discovery helps determine the areas within your watershed where a flood risk study is needed**
- **During Discovery, we work together to:**
 - Review local flood risk and hazards
 - Understand local mitigation capabilities, hazard risk assessments, and current or future mitigation activities
 - Collect information about flooding history, development plans, daily operations, and stormwater and floodplain management activities



5



Purpose and Background

- **Discovery Report (2013)**
 - Developed the framework for dealing with flood risk in the Carson River Watershed. As flood risk projects have been completed over the last several years, the community must re-evaluate the flood risks in the watershed, identify prioritized and sequenced new projects
- **Process:**
 - Evaluate regulatory mapping, risk assessment, mitigation planning technical assistance, and outreach and communications assistance.
- **Six main activities:**
 - Watershed Stakeholder Coordination
 - Data Analysis
 - Discovery Meeting
 - Post-Meeting Coordination
 - Database Updates
 - Project Refinement.
- **Updated Discovery Report Due November, 2017**



6



Purpose and Background

- **Floodplain Management Plan (2008, 2013)**
- In 2008, CWSD and the various counties along the Carson River adopted the Carson River Regional Floodplain Management Plan (Plan).
 - Plan developed a long-term vision and strategies for floodplain management to reduce flood damage impacts, benefitted by a regional approach
- **Suggested Actions**
 - 38 Suggested Actions were reviewed and summarized on a county and watershed-wide basis.
 - Many of the projects and programs have or are being implemented; Continuing work needed to address flooding
- **Recent Events**
 - Alluvial fan and stormwater flooding events, extended snowmelt runoff, available storage capacity issues
- **Updated Draft Plan due August, 2018**



7



Potential Flood Risk Projects for Discovery Update

GROUP DISCUSSION

- Review existing projects
- Gather community feedback
- Discuss areas of growth
- Discuss areas where flood risk data may be outdated
- Discuss potential new projects



8



Flood Risk Reduction

GROUP DISCUSSION TO UNDERSTAND:

- Local mitigation capabilities
- Hazard risk assessments
- Current or future mitigation activities



9



Next Meeting – Data Request

DISCUSSION - COMMUNITY QUESTIONNAIRE

- Photos and high water marks from recent floods
- Storm water or floodplain activities since last Discovery (2012)
- LiDAR and aerial topography since last Discovery
- Community demographics
- Flood hazard mitigation plans
 - Alpine County – under revision
 - Carson City Hazard Mitigation Plan – 2016
 - Churchill County/City of Fallon Hazard Mitigation Plan (2012)
 - Douglas County Natural Hazard Mitigation Plan - 2013
 - Lyon County Multi-jurisdictional Hazard Mitigation Plan July 2013
- Any other flood hazard mitigation data



10



Peternel, Karin

From: Brenda Hunt <brenda@cwdsd.org>
Sent: Thursday, October 12, 2017 3:48 PM
To: Ann Bollinger (Abollinger@carson.org); Bob Bezek (Robert.Bezek@fema.dhs.gov); Bob Connor (bob@rskconsulting.biz); Brenda Hunt; Brian Peters (bpeters@alpinecountycal.gov); Bunny L. Bishop (bbishop@water.nv.gov); Charles Reno (chuck@farrwestengineering.com); Charlie Donohue (cdonohue@lands.nv.gov); Christy Sullivan (Christy.Sullivan@nv.nacdn.net); Courtney Walker (cwalker@douglasnv.us); Craig Burnside (craig.burnside@nv.nacdn.net); Dan Greytak (greytak@hotmail.com); Dan Kaffer (dkaffer@aol.com); Darwin Holyan (WT.WaterQA@washoetribe.us); Debbie Neddenriep; Duane Petite (dpetite@tnc.org); Ed James; Eric Simmons (eric.simmons@dhs.gov); Erik Nilssen (enilssen@douglasnv.us); Gavin Feiger (awg.gavin@gmail.com); Jack Dick; Jacques Etchegoyhen (jacques@legacylandandwater.com); Jeanmarie Stone (jstone@ndep.nv.gov); Jim Souba (jsouba@ci.fallon.nv.us); Joe Curtis (jcurtis@storeycounty.org); John Cobourn (cobournj@UNCE.unr.edu); Jon Paul Kiel (jpkie@ndep.nv.gov); Lyndsey Boyer (lboyer@carson.org); Margaret Engesser (Margaret.C.Engesser@usace.army.mil); Mary Crawley (mcrawley@lands.nv.gov); Mary Kay Wagner (mkwagner@ndep.nv.gov); Michael K. Johnson (planning-director@churchillcounty.org); Mike Heidemann; Mike Miller (mmiller@fallonnevada.gov); Mike Workman (mworkman@lyon-county.org); Mimi Moss (mmoss@douglasnv.us); Mitch Blum (mitchell.blum@hdrinc.com); Rich Wilkinson (richard.wilkinson@nv.nacdn.net); Rob Loveberg (rob.lovebergconsulting@gmail.com); Rob Pyzel (rpyzel@lyon-county.org); Robb Fellows (Rfellows@carson.org); Robert Holley (rholley.dvcd@yahoo.com); Sarah Green (awg.sarah@gmail.com); Shane Fryer; Sherman Swanson (sswanson@cabnr.unr.edu); Shyla Lemons (Slemons@carson.org); Steve Endacott; Steve Lewis (lewisst@unce.unr.edu); Susan E. Jamerson (SusanE.Jamerson@washoetribe.us); Todd Carlini (TCarlini@eastforkfire.org); Toni Leffler
Cc: Peternel, Karin; Brownell, Geoff
Subject: Next Floodplain and River Management Working Group, Oct. 24, 1-4pm
Attachments: 2017-10-24FRMWGFinal Agenda - FMP SAs.pdf; 8-15-17FRMWG mtg notes final.pdf

Hi all:

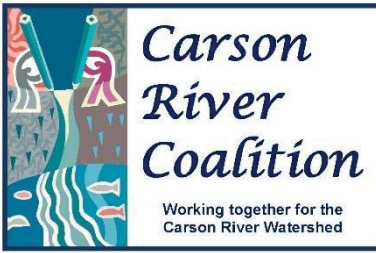
Here is the agenda for our next Discovery/Floodplain Management Plan Revision/Update combined with our Floodplain and River Management Working Group meeting scheduled for October 24, 2017, 1-4pm, Sierra Room, Carson City Community Center.

Also attached are the meeting notes from the Aug. 15th meeting.

If you have not already completed edits to the Discovery Process Data Sheets that were previously sent to you, please edit them and get them back to Debbie Neddenriep, debbie@cwdsd.org.

Brenda Hunt

Carson River Watershed Program Manager
Carson Water Subconservancy District
777 E. William Street, Suite #110A
Carson City, NV 89701
775.887.9005 Office
775.887.7457 Fax
brenda@cwdsd.org
www.cwdsd.org
[Sign-up for Carson River Coalition emails](#)



Floodplain and River Management Working Group Agenda

Tuesday, October 24, 2017

1:00 PM – 4:00 PM

Location: Sierra Room at Carson City Community Center
William Street, Carson City, NV 89703

Contact: Direct questions to Brenda Hunt, 887-9005, brenda@cwsd.org

1. Welcome

2. 1:00 – 3:00 pm **Agenda FEMA Discovery and Floodplain Management Plan Update Meeting**

A. Project Overview of Discovery and Floodplain Management Plan Updates

1. Purpose and Background
2. Recent Flood Events
3. Project Timeline

B. Present Findings for Potential Flood Risk Projects for Discovery Update

1. Review identified projects by jurisdiction (Carson City – Douglas County – Lyon County – Churchill County, Storey County, & Alpine County)
2. Gather additional community feedback

C. Table Top Map Review

1. Breakout Session to review maps by jurisdiction

D. Prepare for Next Meeting

1. Comment on Draft Discovery Report (due December 15, 2017)
2. Discuss Data Request (Floodplain Mgmt. Plan Update)

3. Next Floodplain Management Plan Revision/Update Meeting Date

4. 3:00-4:00 pm **CRC Floodplain & River Management Working Group - Regular Meeting:**

A. CWSD is the Governor's designated Clean Water Act Section 208 Planning Agency – Discuss Planning needs with County reps regarding use of watershed level planning funding.

B. Floodplain Management Plan Suggested Action Implementation (See Attached Table):

i. *Higher Regulatory Standards* SA-11 -13:

- ❖ Update on recent CWSD RFQ - Update Floodplain Ordinance Language for Alpine County, Douglas County, Carson City, and Lyon County

October 24, 2017 CRC Floodplain & River Management Working Group
 1:00 – 4:00PM *Sierra Room* – Carson City Community Center

- ii. *Flood Data Information and Maintenance SA-17:*
 - ❖ Update on recent CWSD RFQ - Request for Qualifications for Dayton Valley Area Drainage Master Plan
 - ❖ Update on Johnson Lane Area Drainage Master Plan study
- iii. *Floodplain and Flood Hazard Outreach and Education SA-33*
 - ❖ Update on meetings, website, media and planned events.
- iv. *Protect Floodplain Natural Functions and Values SA 1-10*
 - ❖ Determine next steps based on last meetings discussions (see meeting notes) and whether ideas can be incorporated into Floodplain Management Plan update.

C. Rotating Floodplain and River Management Working Group meeting with field trips – Y or N, next steps.

D. 3-minute Round Robin updates including:

- ❖ Carson Valley Floodplain Map – FEMA progress
- ❖ Jan/Feb 2017 damages and repair of grade control/diversion structures progress
- ❖ 319 awards and projects

5. Schedule Next Meeting

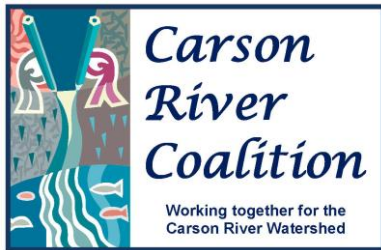
Table 4.7-1
Summary of Suggested Actions

Plan Element	Suggested Action	Responsible (or suggested responsible) Party	Existing or Potential Funding Source
Protect Floodplain Natural Functions and Values			
SA-1	Adopt Living River approach to retain river system in a more natural state that allows the river to access its floodplain. Recognize that not all areas of the river system can be allowed to migrate freely due to special designation (i.e., Superfund area) and/or existing infrastructure.	All entities	n/a
SA-2	Adopt a good neighbor floodplain management policy that recognizes that actions by one property owner can impact adjacent and downstream property owners.	All entities	n/a
SA-3	Floodplain and flood hazards should be considered with open space program objectives when selecting acquisition targets and establishing management strategies for open spaces.	Local and tribal governments, NGOs, CWSD	n/a
SA-4	Investigate areas where the implementation of stream zone buffers would provide multi-objective benefits for river system and downstream communities.	Local and tribal governments	n/a
SA-5	Plan for and mitigate cumulative effects of watershed urbanization.	All entities	n/a
SA-6	Manage development in special flood hazard areas and other flood hazard areas (those known flood hazard areas not included on most current FIRMs) to provide public safety and protect the natural functions and benefits of floodplain lands.	Local and tribal governments; CWSD	n/a
SA-7	Retain lands that provide floodplain storage and maintain or restore connection of river with floodplain through land acquisition, conservation easements, local open space programs, TDR and PDR Programs, and other protection methods.	Local and tribal governments, NGOs, landowners	Question 1; SNPLMA; NGOs; local governments
SA-8	Encourage the incorporation of low impact development principles into sub-division development proposals for floodplain lands to decrease run-off and minimize loss of floodplain storage capacity.	Local governments	n/a

Plan Element	Suggested Action	Responsible (or suggested responsible) Party	Existing or Potential Funding Source
SA-9	Identify and promote options for landowner incentive programs, such as floodplain leasing program and conservation easements that provide compensation to landowners providing ecosystem services.	Local & tribal governments, NGOs, CWSD, CRC, landowners	Federal, State and local sources, Question 1, SNPLMA
SA-10	Promote and utilize best management practices as a means of protecting riparian habitat.	All entities	n/a
Higher Regulatory Standards			
SA-11	Implement or enhance county ordinances that include floodplain protection as a purpose, account for the loss of floodplain storage volume, and mitigate losses through a variety of methods.	Local governments	n/a
SA-12	Investigate feasibility of implementing additional measures that go beyond minimum FMEA requirements.	Local governments	
SA-13	Develop model watershed floodplain management ordinance language that can be adopted by counties to provide watershed-wide consistency.	CWSD, CRC, local governments	n/a
Flood Data Information and Maintenance			
SA-14	Secure funding for and conduct watershed-wide unsteady state modeling to identify flood water storage requirements and to look at the cumulative effects of watershed development.	Local & state governments, CWSD	NDEP, CWSD, other local & state entities
SA-15	Support FEMA's Map Modernization Program and encourage FEMA to update FIRMs with current and future conditions. Significant verification of topography and other variables should be conducted prior to release of draft FIRMs.	Local governments FEMA CWSD	n/a
SA-16	CWSD continue to participate in FEMA's Cooperating Technical Partner Program.	CWSD, FEMA	n/a
SA-17	Strive for up-to-date and consistent data collection and maintenance to include updating of flood studies where necessary and conduct studies for significant water courses and alluvial fan areas that have not been analyzed. This data should be used to update FEMA maps and fill data gaps. Complete delineation of the floodway throughout river system and incorporate into FIRMs.	CWSD Local governments	Federal, state and local grant sources
SA-18	Flood studies and maps should be updated after significant flooding events.	Local governments	All grant sources

Plan Element	Suggested Action	Responsible (or suggested responsible) Party	Existing or Potential Funding Source
SA-19	Elevation Reference Marks (ERM) should be permanent monuments and updated on a regular basis.	Local governments	n/a
SA-20	ERMs should be in the same datum as base flood elevations on FIRMs or a datum that is readily convertible to FIRM datum. Move towards FEMA recommended NAVD 88 datum.	Local governments	n/a
SA-21	A master list of ERMs should be developed, maintained, and made available to interested parties.	Local governments; CWSD	n/a
SA-22	Photo-Monitoring program (on-the-ground and aerial) should be developed and coordinated on a watershed level to document flooding and flood hazards in a consistent matter.	CWSD	n/a
Channel Migration and Bank Erosion Monitoring			
SA-23	Known and projected hazard areas including channel migration hazards should continue to be documented and updated information should be incorporated into planning processes.	Conservation Districts, CWSD, NDEP, WNRC&D, FEMA, local & tribal governments	Federal, state and local resources
SA-24	LiDAR and/or aerial photography (on a watershed level) should be conducted on a 5-year basis, or as needed, to provide updated information on channel movement and floodplain condition.	CWSD, NDEP, CVCD, DVCD, WNRC&D, NGOs, BOR, local governments	Federal, state and local grant sources
SA-25	Establish building set-backs in flood hazard areas, where appropriate, to reduce severe hazards from channel migration.	Local and state entities	n/a
SA-26	Channel cross-sectional surveys should be conducted and well documented to track long term changes in river channel.	CWSD, conservation districts, WNRC&D	Federal, state and local grant sources
SA-27	Identify unstable stream banks and areas with high potential for erosion.	Conservation districts, WNRC&D, NDEP, CWSD	n/a
SA-28	Promote the use of non-structural, bio-engineering (soft-engineering utilizing natural materials) techniques in river restoration projects in combination with other proven methods.	All entities	n/a

Plan Element	Suggested Action	Responsible (or suggested responsible) Party	Existing or Potential Funding Source
SA-29	Update the 1996 Fluvial Geomorphic Assessment.	WNRC&D, CWSD, NDEP, conservation districts	Federal, state and local grant sources
Floodplain and Flood Hazard Outreach and Education			
SA-30	Develop watershed-wide outreach and education program about floodplain importance and flooding hazards.	CWSD, CRC	Federal, state and local grant sources
SA-31	Brochures should be developed for distribution on a watershed level with consistent messages and information for the general public.	CWSD, CRC	n/a
SA-32	CWSD website will provide information on the Regional Floodplain Management Plan and provide emergency contact information. Local governments and other entities can link to this website to increase distribution.	CWSD	n/a
SA-33	Annual Flood Awareness Week will be established with the objective of providing information about flooding and flood hazards to the general public.	CWSD, CRC, Local & tribal governments	n/a
SA-34	Special Events, River Work Days, and other outreach opportunities should be utilized to help raise awareness of flooding hazards and importance of floodplains.	CRC, WNRC&D and other local & tribal entities	Federal, state and local grant sources
Reduce Infrastructure Impacts			
SA-35	Investigate opportunities to remove existing restrictions, such as berms, to allow flood waters to access floodplain.	Local & tribal government organizations, landowners	Federal, state and local sources
SA-36	Limit the use of future management measures such as dams, levees, and floodwalls.	Local & tribal government organizations, landowners,	n/a
SA-37	Design future bridges and roads to protect floodplain, accommodate and not restrict changing river course, and minimize back up of flood water.	NDOT, local governments	Federal, state and local sources
SA-38	Investigate opportunities to enhance grade control structures	Local governments, CWSD	n/a



Floodplain & River Management Working Group
Meeting Notes
August 15, 2017
1:30 PM – 4:30 PM

Location: Nevada Room at the Governor's Mansion, 606 Mountain St., Carson City, NV 89703

Contact: Brenda Hunt, 887-9005

Attendees:

Mitch Blum, HDR	Brenda Hunt, CWSD
Lyndsey Boyer, Carson City Parks, Rec., & Open Space	Ed James, CWSD
Craig Burnside, Carson Valley Conservation District (CVCD)	Michael Johnson, Churchill County
Aly Cheney, Alpine Watershed Group	Toni Leffler, CWSD
John Cobourn, University of Nevada Cooperative Extension (UNCE)	Shyla Lemons, CCPW
Robb Fellows, Carson City Public Works (CCPW)	Steve Lewis, UNCE
Shane Fryer, Carson Water Subconservancy District (CWSD)	Brian Peters, Alpine County
Dan Greytak, private citizen	Duane Petite, The Nature Conservancy
Rob Holley, Dayton Valley Conservation District (CVCD)	Rob Pyzel, Lyon County
	Aaron Sever, The Nature Conservancy
	Jean Stone, NV Div. of Environmental Protection (NDEP)
	Sherman Swanson, University of Nevada-Reno
	Courtney Walker, Douglas County

1. Welcome and Introductions (5 min)
2. 1:30 – 3:30 p.m. FEMA Discovery and Floodplain Management Plan Update Meeting:
 - A. Project Overview of Discovery and Floodplain Management Plan Updates
 1. Michael Baker staff explained the purpose and background of meeting.
 - i. Gather information to do the Discovery Plan Update, the Discovery of flood hazards and associated flood risk and mitigation activities through data collection, stakeholder coordination, and meetings.
 - ii. Discuss the Floodplain Management Plan Update to continue to create a long-term vision and strategies for floodplain management to reduce flood damage impacts.
 - iii. Understand the needs of communities in the watershed by discussing flood risk, balance local needs with FEMA's resources, and plan for possible flood risk projects.
 2. Discussed Recent Flood Events including Alluvial fan and stormwater flooding and how they need to be integrated into Updated Discovery Plan and Floodplain Management Plan

3. The project timeline was described and the goal is to submit an updated Draft of the Floodplain Management Plan by August, 2018.

Meeting	Date
Discovery Kick-Off	August 15, 2017
Discovery Meeting Roll out draft discovery report	October 24, 2018 Comments due December 1, 2017
Discovery Final Meeting Final discovery report	December 12 – 15, 2017 or January 2 -5, 2018 Work with FRM WG to determine next meeting
RFMP Stakeholder Meeting	~ March 2018
RFMP Draft Summary Meeting	~ June 2018 – still work toward this.
Submit finalized draft of RFMP	~ August 2018

B. Present Potential Flood Risk Projects for Discovery Update

- i. Review existing projects – Johnson Lane Stormwater Drainage Study is now being done for the Area Drainage Master Plan (ADMP); Stephanie Way Detention Basin; Old Ruhenstroth Dam removal; both Carson City projects are still being considered.
- ii. Gathered Community Feedback (see Appendix A)

C. Prepare for Next Meeting

1. Working group members provided Data listed below for Discovery Update (See Appendix A for feedback results):
 - i. Photos and high-water marks from recent floods – **please send all photos to Michael Baker (if you haven't already).**
 1. Data can be submitted via DVD or other removable storage, or by file transfer protocol (ftp). Data can be mailed or hand delivered to the 777 E. William Street, #110A, Carson City, NV 89701, or sent electronically using the following link: <https://eftp.mbakerintl.com/>
 - ii. Any storm water or floodplain activities since last Discovery – Please explain those events
 - iii. LiDAR and aerial topography acquired since last Discovery
 - iv. Community demographics
 - v. Most recent hazard mitigation plans
 - vi. Any other flood hazard mitigation data
2. Working group members provided data to be used in the Floodplain Management Plan Update (see Appendix B)

3. 3:30 – 4:30 p.m. CRC FRM Meeting - finished business from 5/11/2017 (See Appendix C)

A. Floodplain Management Plan Suggested Actions update:

1. SA-30
 - i. Flood Awareness Week Update - Katie Clancey explained that Flood Awareness Week (FAW) for 2017 is Nov. 12-17. Events include:

1. November 12 Meadowood Mall Flood Awareness Week Kickoff (Public);
2. November 13 Educational Event for River Wranglers Work Day at Carson River (Private)
3. November 14 Douglas County Community Center (Public)
4. November 16 – Yerington Event (TBD)
5. November 17 – Elko Event
6. October – November 2017 Posters/ Handouts at (Cal – Ranch / Sportsman Warehouse) in Carson City - arranged by Robb Fellows
7. Next, Katie described other outreach activities outside of that week –
 - a. February 2017 - NDWR and NDEP went to Elementary Schools
 - b. Spring 2017 Safety Day, Douglas County
 - c. Spring 2017 Earth Day in Fallon
 - d. August 2 National Night Out – Carson City
 - e. October 7-8 Minden Air Show
 - f. October 7-8 Alpine Aspen Festival.

- ii. Debbie Neddenriep announced the Floodplains as Community Assets videos series were finalized. The next steps are to make them available on public access television, and to present them to counties and community groups. The videos were funded by a FEMA grant. Open floodplains have been an important CRC message. They are supporting conservation easements and ag producers who provide the service of keeping floodplains open. The videos underscore that our floodplains are nature’s flood protection and provide a multitude of watershed health benefits. Developing our floodplains increases flood damages and risks, whereas keeping them open, limits risk, saving money and potentially lives. Feedback on the videos was very positive. It was suggested we send the videos to our local television stations. The videos will be integrated into the Carson Watershed-Literacy Campaign.

B. Flood Damage Field Trip (John Cobourn) –

Several sites were selected as possible sites. Possible ideas on how to theme the field trips included basing them on types of damages (Erosion/Channel Migration; Structures; and Infrastructure/grade controls). It was suggested that the Floodplain and River Management meetings could be held in different locations and include a field trip to a specific location.

Group needs to discuss who will plan and organize field trips (See Appendix C for expanded notes).

- C. Finalized Stewardship Plan Submitted (Brenda) –** The Stewardship Plan is turned in to EPA and waiting for review and approval. Brenda invited questions and wants to make sure she has everyone’s projects listed in the Plan. She would like to set up a digital tracking program in the future. She will ask for annual summary project update sheets. Maps are to be updated.

- ~~**D. Other – Next year is the 20-year anniversary of the CRC, and we would like ideas for a**~~
celebration. Maybe a spring or fall party with music, perhaps at Silver Saddle Ranch with river

walks, a canoe trip, etc. Brewery Arts, Minden Centennial Park, TNC River Fork Ranch, and Dangberg are other possible venues.

Steve Lewis – Mitch Blum talked about how floodway delineation upstream from Genoa Lane is not feasible because of interaction between East and West Forks. Consider cost benefits of delineating the floodway farther upstream.

Vermont paper for keeping floodplains open and develop an incentive plan to reward those people accepting floodwaters on their property. Celebrate a living river concept. Come up with different goals for reach of the system.

Use Mitch's model to prioritize reaches that are in need of protection. Determine where the greatest flood potential is and prioritize to protect areas. Ed noted it was designed to meet FEMA's 100-year floodplain. We may be able to identify high velocity or high depth areas.

Diversions are accumulating sediment and need to accommodate sediment through structures to maintain the base level. Shane mentioned the Hwy 88 bridge with a high rock bar which is impeding sediment movement downstream. Look at passages from a sediment standpoint and a recreation standpoint and whether we can do something that can be done for both. Consider what could be the best method, perhaps different for each diversion. FEMA may help with redesign of public structures. It is in the Stewardship Plan to consider a sediment transport study feasibility.

Shane suggested inflatable dams which can be adjusted for various flows. Debbie asked if that would be a permit issue. Shane responded that it would probably require ACE and State Lands approval. Perhaps there could be a demonstration dam where a landowner is willing to have an inflatable dam.

Identify themes for various reaches, like living river. Rapid assessment of different river reaches needs to be updated; perhaps looking at this method. Living river in the context of a dichotomy of naturally moving and as a conveyance of water through populated areas. Protection and values of riparian area and environment, etc. Keep meander beltways that are as close to natural as we can keep it. Engineering with nature's goals, like the Carson City freeway interchange, rather than against nature.

4. Schedule next meeting – Discovery meeting on Oct. 24; location TBD. Floodplain & River Management WG meeting near then.

tl

SIGN IN SHEET
Carson River Watershed – Discovery Meeting
October 24, 2017

Name	Organization	Email/phone
Norm Harry	Washoe Tribe	Norman.harry@washoetribe.us
Louise Thompson	CWSD	watershedtech@cwsd.org
Kayla Meyer	NDWR	kmeyer@water.nv.gov
Katherine Clancey	NDWR	Kclancey@water.nv.gov
Robb Fellows	Carson City	Rfellows@carson.org
Mitch Blum	HDR	Mitchell.blum@hdrinc.com
Jeanne Ruefer	TetraTech	Jeanne.reufer@tetrattech.com
Rob Pyzel	Lyon County	Rpyzel@lyon-county.org
Michael Johnson	Churchill County	Planning-director@churchillcounty.org
Dean Patterson	Churchill County	Planning?as@churchillcounty.org
Steve Endacott	City of Fallon	sendacott@fallonnevada.com
Rob Loveberg	Consultant	Rob.lovebergconsulting@gmail.com
Brian Peters	Alpine County	bpeters@alpinecountyca.gov
Courtney Walker	Douglas County	cwalker@douglasnv.us
John Cobourn	UNCE	cobournj@unce.unr.edu
Nancy Hoffman		
Craig Burnside	CVSD	Craig.burnside@nv.nacdnet.net
Barry Wood	Fallon NAS	barry.wood@navy.mil
Brenda Hunt	CWSD	brenda@cwsd.org
Geoff Brownell	Michael Baker	gbrownell@mbakerintl.com
Deb Neddenriep	CWSD	debbie@cwsd.org
Ed James	CWSD	edjames@cws.org
Karin Peternel	Michael Baker	Karin.peternel@mbakerintl.com

SIGN IN SHEET
Carson River Watershed – Discovery Meeting
October 24, 2017

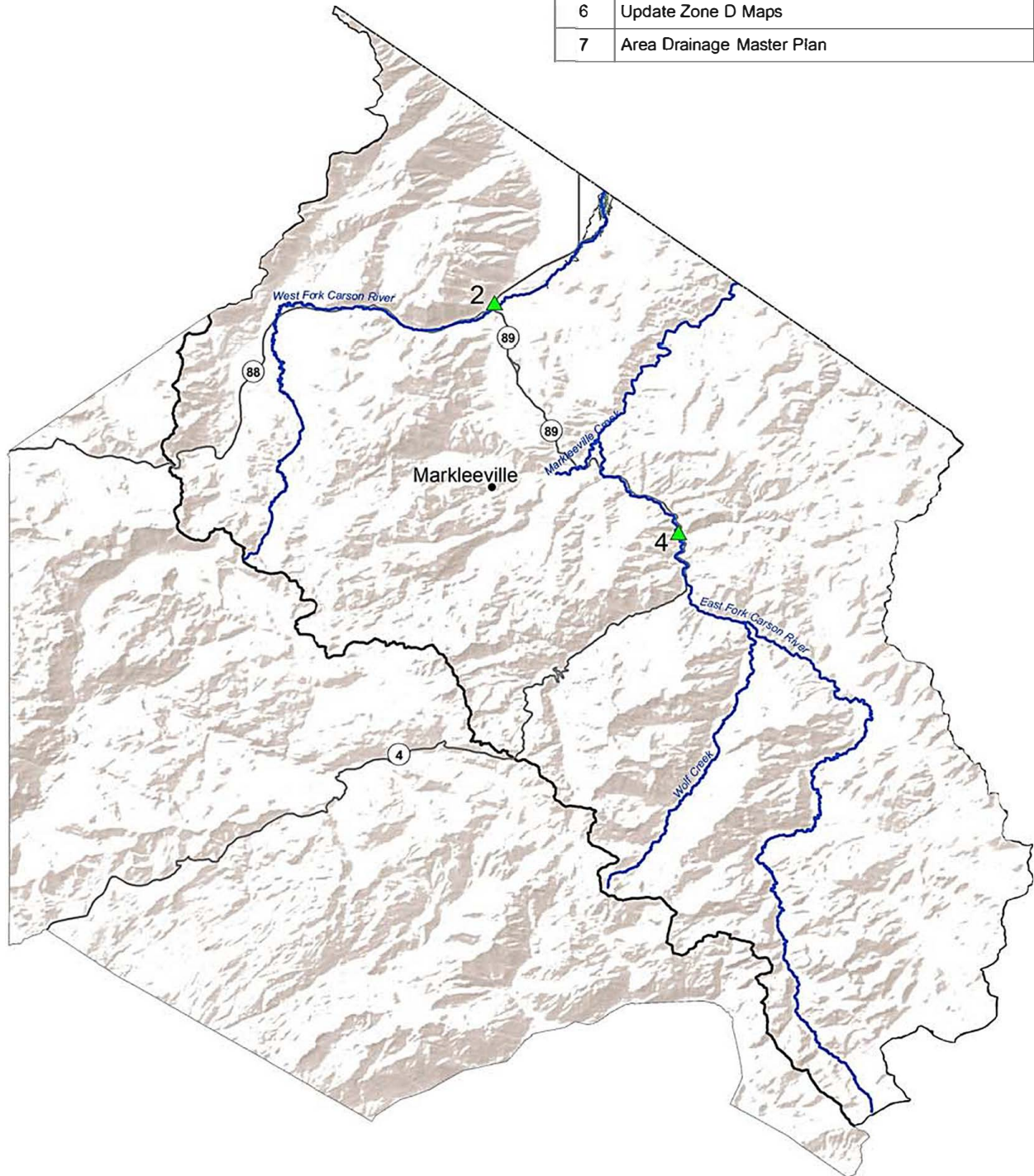
Name	Organization	Email/phone
Norm Harry	Washoe Tribe	Norman.Harry@washoetribe.us
Louise Thompson	CVSD	watershedtech@cvsd.org
Kayla Meyer	NDWR	kmeyer@water.nv.gov
Katherine Cline	NDWR	kcline@water.nv.gov
Robb Fellows	Carson City	RFellows@carson.org
Mitch Blum	HDR	mitchell.blum@hdrinc.com
Jeanne Ruetz	Tetra Tech	jeanne.ruetz@tetratech.com
✓ Rob Pyzel	Lyon County	rpyzel@lyon-county.org
Michael K Johnson	Churchill County	planning-director@churchillcounty.org
DEAN PATTERSON	" "	planning@ " " "
Star Endicott	City of Fallon	sendicott@fallonnevada.com
Rob Loveberg	Consultant	rob.lovebergconsulting@gmail.com
Brian Peters	Alpine Co.	bpeters@alpinecountyca.gov
Courtney Walker	Douglas	cwalker@douglasnv.us
JOHN COBURN	UNCE	COBURNJT@UNCE.UNR.EDU
Nancy Hoffman		
Graig Burnside	CVSD	
Berry	Fallon NAs	



0 4 8 Miles

Project Locations

Label	Project
	Markleeville Creek Floodplain Restoration
2	Woodfords/Highway 88 Bridge
3	Various Mitigation Projects for roads prone to flooding
4	State Highway 89/4 - known flood damage
5	Update Alpine County Hazard Mitigation Plan
6	Update Zone D Maps
7	Area Drainage Master Plan



NATIONAL FLOOD INSURANCE PROGRAM
Discovery Map: Flood Risk
Carson River Watershed
Alpine County



Discovery Report Release Date: 11/10/2017

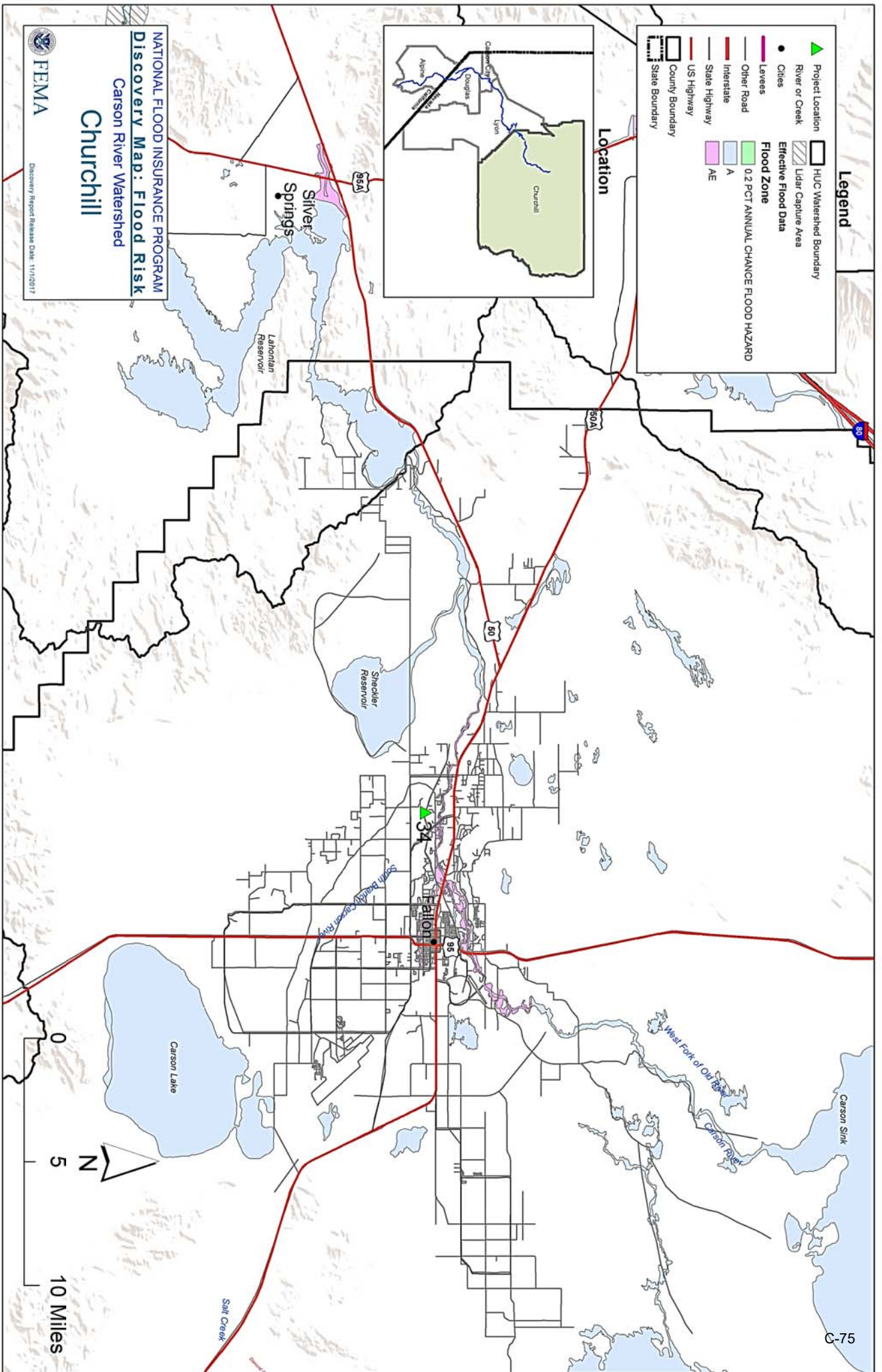
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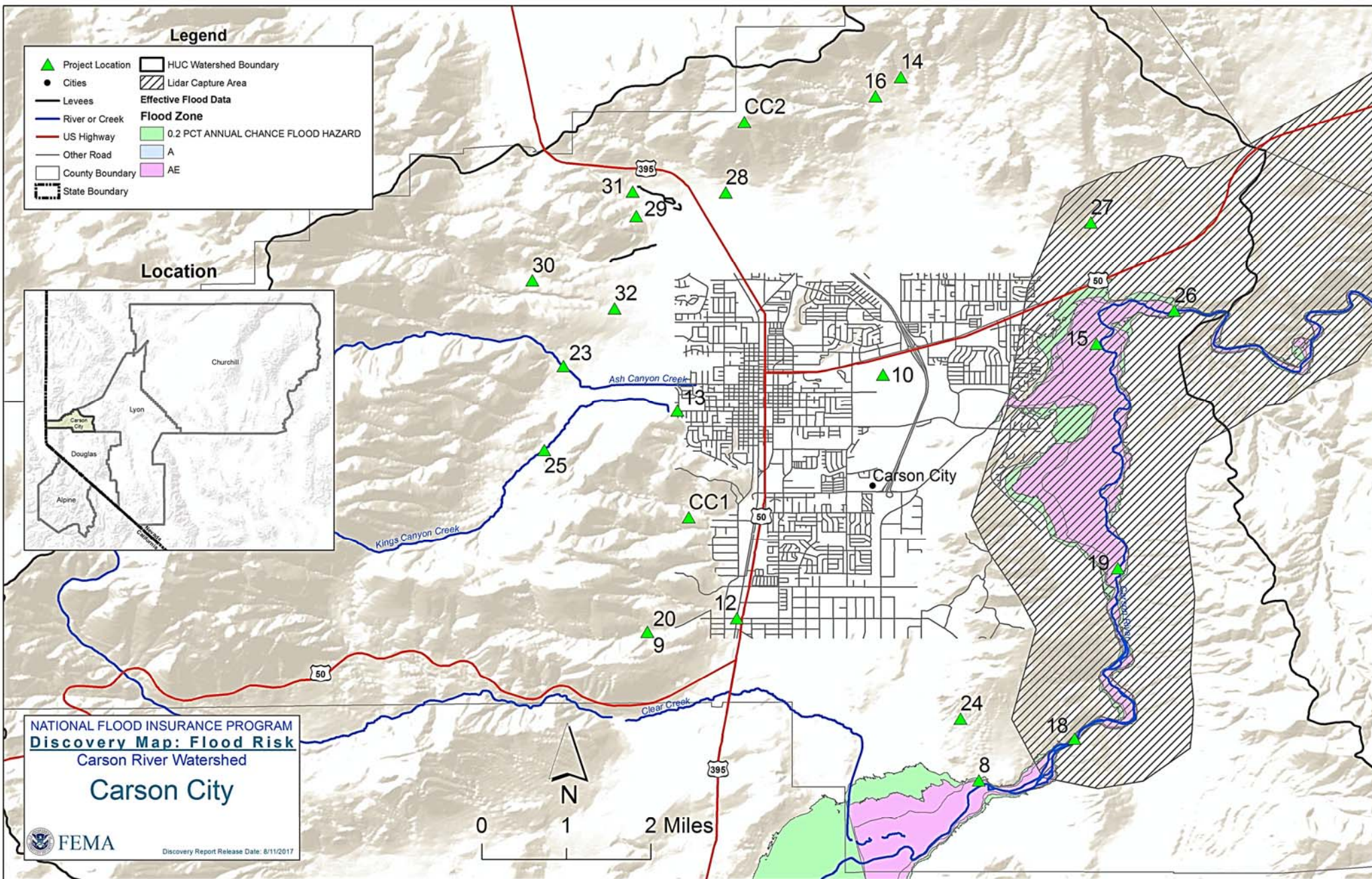


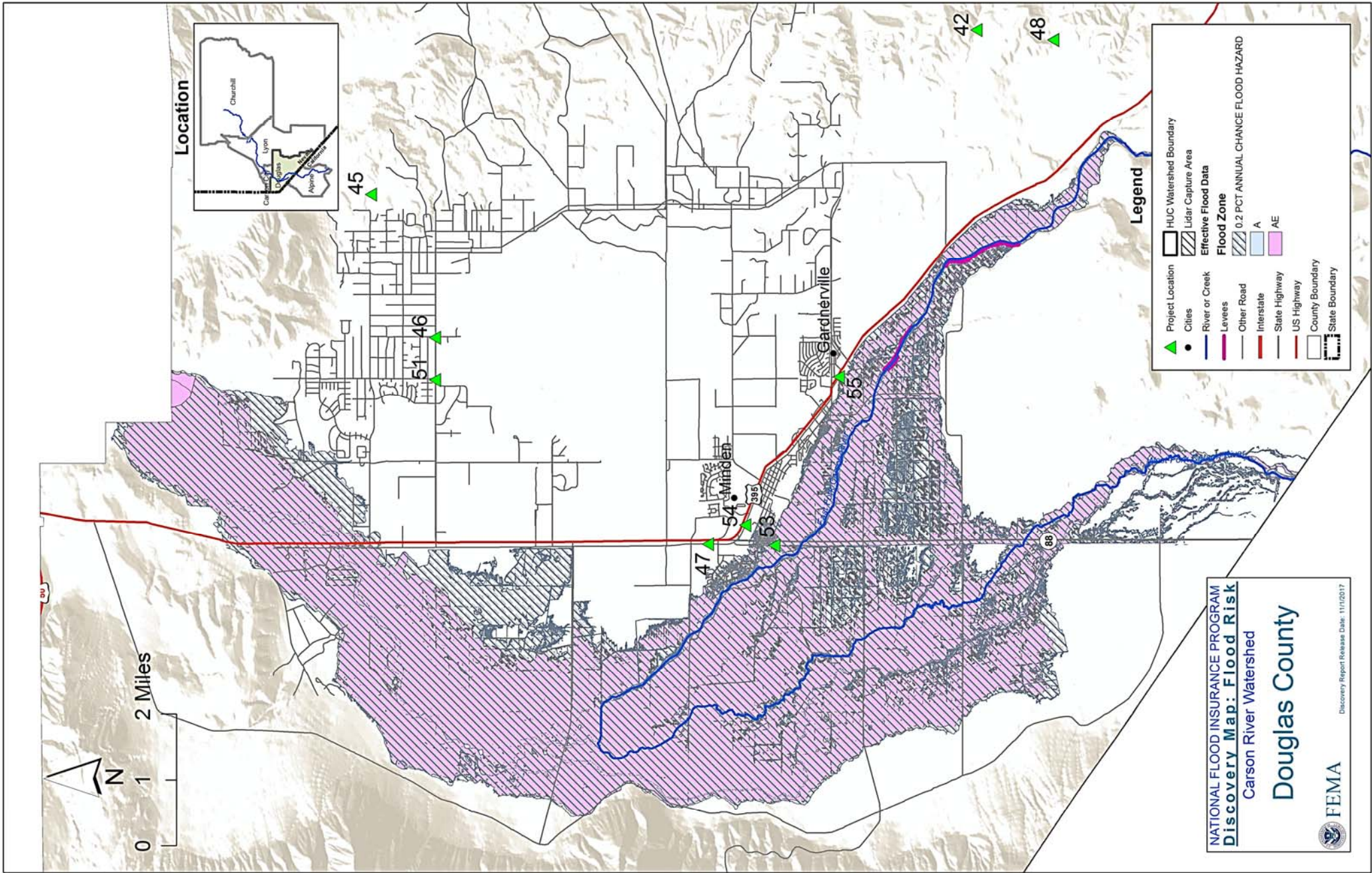
Legend

Project Location	HUC Watershed Boundary
Cities	Lidar Capture Area
River or Creek	Effective Flood Data
Levees	Flood Zone
State Highway	0.2 PCT ANNUAL CHANCE FLOOD HAZARD
County Boundary	A
State Boundary	AE

C-74





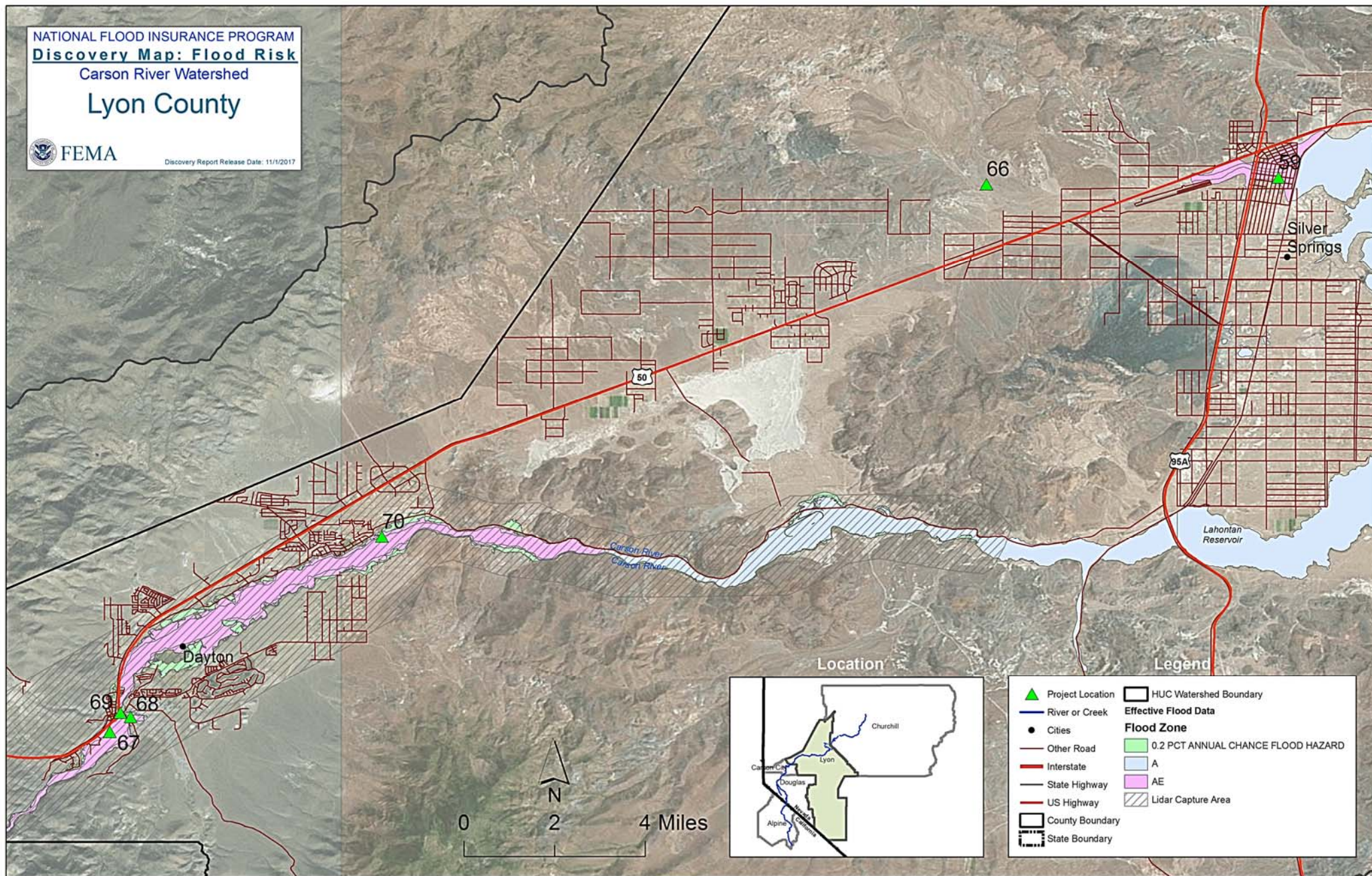


NATIONAL FLOOD INSURANCE PROGRAM
Discovery Map: Flood Risk
 Carson River Watershed
Lyon County



FEMA

Discovery Report Release Date: 11/1/2017



Location



Legend

Project Location	HUC Watershed Boundary
River or Creek	Effective Flood Data
Cities	Flood Zone
Other Road	0.2 PCT ANNUAL CHANCE FLOOD HAZARD
Interstate	AE
State Highway	Lidar Capture Area
US Highway	
County Boundary	
State Boundary	

APPENDIX E

POTENTIAL MITIGATION PROJECTS

Alpine County

Carson City

Churchill County

Douglas County

Lyon County

Community-wide

APPENDIX E

JURISDICTIONAL POTENTIAL MITIGATION PROJECTS

Alpine County					
NO.	PROJECT	COMMENTS	JUR. PRIORITY	HMP MITIGATION GOAL	LOCATION
1	Analysis of post-fire (Washington) flood mitigation; along Highway 89			Sec. 8, Goal	38.592 - 119.752
2	East Fork Carson River LiDAR			Sec. 8, Goal 2C	38.664772, - 119.707487
3	Erosion Zone Analysis	Between Markleeville and Wolf Creek			38.674587, - 119.736088
4	Flooding at Markleeville Creeks blocks Public Works Access to Lift Station; explore flood mitigation options			Sec. 8, Goal 7G?	38.698041, - 119.771424
5	Map Markleeville Creek Drainage			Sec. 8, Goal 2C	38.677836, - 119.794713
6	Markleeville Creek Floodplain Restoration				38.697998, - 119.777715
7	Markleeville Creek LiDAR			Sec. 8, Goal 2C	38.688665, - 119.786605
8	Potential Impact Analysis; Number & Location of residents with flood insurance as way to focus efforts.			Sec. 8, Goal 2A	
9	State Highway 89/4 - known flood damage				38.660574, - 119.726352
10	Update FIRM Panels?				
11	Various Mitigation Projects for roads prone to flooding				
12	Woodfords/Highway 88 Bridge - STPUD C-Line blowout			STPUD HMP Plan: Severe Storms Obj. #2: Minimize storm related damage from all types of severe storms that impact district facilities.	38.778781, - 119.821539

APPENDIX E

Carson City					
NO.	PROJECT	COMMENTS	JUR. PRIORITY	HMP MITIGATION GOAL	LOCATION
1	Goni Wash Area Drainage Master Plan (ADMP), drainage system improvements, maintenance costs		H	Sec. 8 Goals 1, 5, 7, 10	39.208362, -119.725276
2	King Street drainage/flood protection improvements and maintenance costs		H	Sec. 8, Goals 5, 7, 9	39.164020, -119.780888
3	Kings Canyon Area Drainage Master Plan (ADMP) and flood control facility		H	Sec. 8, Goals 1, 5, 7, 9	39.157260, -119.803691
4	South Carson Street storm drain system improvements	Associated with South Carson Street Improvements; should be implemented in 2019; will still need some funding so leave in	H	Sec. 8, Goals 5, 9	39.154540, -119.767018
5	South Carson Street/South Curry Street storm drain system improvements	Associated with South Carson Street Improvements; should be implemented in 2019; will still need some funding so leave in	H	Sec. 8, Goal 1	39.141992, -119.768288
6	Voltaire Canyon Channel and Drainage system improvements		H	Section 8, Goals 1,5	39.126091, -119.786021
7	Voltaire Canyon Floodplain Restudy/Remapping	Ongoing	H	Section 8, Goals 1, 5, 7, 9	39.126091, -119.786021
8	Ash Canyon Area Drainage Master Plan (ADMP) and flood control facility and maintenance costs		M	Section 8, Goals 1, 5, 7, 9	39.171675, -119.800376
9	Carson River Channel Clearing and Snagging - Flood Protection	Mainstem Carson River to New Empire	M	Sec. 8, Goal 1?	Ongoing
10	Clear Creek Area Drainage Master Plan, Restudy, maintenance costs	See polygon	M	Sec. 8, Goals 1, 5, 7, 9,	39.112716, -119.760239
11	Eagle Valley Golf Course A&B Area Drainage Master Plan (ADMP) and drainage system improvements	Restudy done; Floodplain just revised; should go into effect 10/26/2017;	M	Sec. 8, Goals 1, 5, 7, 9	39.188645, -119.713521
12	Eagle Valley Golf Course basin and piping improvements	what could mitigate the impacts	M	Sec. 8, Goals 5,7	39.196268, -119.710076
13	Goni Wash Sediment and Detention basins and maintenance costs	make a polygon	M	Sec. 8, Goals 5, 7, 10	39.221218, -119.742620
14	Areas Between Goni Wash & Eagle Valley Creek Area Drainage Master Plan	see polygon	M	Sec. 8, Goals 1, 5, 6?, 7,	39.211756, -119.767808
15	H&I Tributary ADMP and subsequent sediment transport/flood mitigation projects/costs		M	Sec. 8, Goals 1, 5, 7, 9	39.143396, -119.779450
16	New Empire Drainage System Improvement	Substandard drainage system; make polygon	M	Sec. 8, Goals 5, 8	39.178885, -119.724824
17	Prison Hill Area Drainage Master Plan, restudy and remapping, flood control facility		M	Sec. 8, Goals 1, 5, 7, 9	39.131249, -119.741044
18	East Silver Saddle Ranch and Sierra Vista Lane drainage improvements; Pinion Hills from Deer Run Bridge south to City boundary - Study	See Polygon of 19 and 26	L	Sec. 8, Goals 1, 5, 7, 9	39.138384, -119.700372

APPENDIX E

Carson City					
NO.	PROJECT	COMMENTS	JUR. PRIORITY	HMP MITIGATION GOAL	LOCATION
19	Forest Legacy Project Old Woods Ranch/Schulz Inv. Cons. Easements Project	Clear Creek (Carson River Tributary)	L	Sec. 8, Goals 2, 6?, 7	39.115067, -119.845845
20	Golden Eagle Lane (Flood Protection, Rehabilitation / Stabilization)	Multiple segments of the river on which projects are necessary	L	Sec. 8, Goals 1, 5, 7	39.107734, -119.712887
21	Saliman and Carson High drainage system improvements	Install another pipe south to Robinson will alleviate flooding by High School	L	Sec. 8, Goals 5, 9	39.170173, -119.745684

Churchill County					
NO.	PROJECT	COMMENTS	JUR. PRIORITY	HMP MITIGATION GOAL	LOCATION
1	Revised FIRM study for Churchill County and City of Fallon		1	Sec. 8, 6.1	
2	Flood Water control and mitigation study report from V-line weir to Carson Lake		2	Sec. 8, 6.1, 6.2	
3	Study to evaluate the Newlands Project infrastructure to increase flood water diversions to Stillwater NWR		2	Sec. 8, 6.1, 6.3	
4	Carson River watershed floodplain model update		3	Sec. 8, 6.1	
5	FIRM impact study of a levee along Casey or Bottom Roads		4	Sec. 8, 6.1, 6.3	39.469347, -118.853610
6	Inundation maps/stormwater area drainage master plan below Lahontan		5	Sec. 8, 6.1	
7	Improve flood control/release from VW to Carson Lake to reduce impact to US Navy Bravo 16 (Fallon NAS Comment)		Follow up	Sec. 8, 6.4, 6.7	

APPENDIX E

Douglas County					
NO.	PROJECT	COMMENTS	JUR. PRIORITY	HMP MITIGATION GOAL	LOCATION
1	Pinenut Wash attenuation study	Check status with Erik and Mimi; Lands Bill	H	Sec. 8, Goal 5	38.907443, - 119.665535
2	Zone A BFE unknown restudies (Carson River PMR – almost complete)			Sec. 8, Goal 4	
3	Studies of other washes and sloughs		L		
5	Johnson Lane Area Drainage Master Plan	In progress; June 2018	H	Sec. 8, Goal 10	39.026845, - 119.733462
6	Martin Slough (NDOT)	In progress	H		38.966682, - 119.779105
7	Smelter Creek Flood Control Facility (detention basin)	Design completed; CBA needed revision. Needs to be re-submitted to FEMA for HMA funding	M	Sec. 8, Goal 5	38.890555, - 119.667741
8	Floodplain ordinances update	Larger efforts to streamline changes, permits; include protocols/procedures to update model. Dovetail with Rob Loveberg's work	M	Sec. 8, Goal 12~	
9	ADMPs for other areas in the County	Alpine View Estates, Jacks Valley, Indian Hills; wildcat subdivisions where drainage is piecemealed	L	Sec. 8, Goal 4	
10	Projects as a result of Johnson Lane ADMP including Stephanie Way Flood Control Facility		H	Sec. 8, Goal 10	39.026887, - 119.742770
11	Carson River Floodplain re-mapping	IN FEMA Review	H		
12	SR88 Culvert expansion Cottonwood Slough	In process; acquiring ROW through NDOT.	H	Sec. 8, Goal 6	38.952034, - 119.779415
13	Countywide Stormwater master plan (Genoa, Minden, Gardnerville)	Add Tribal areas	L	Sec. 8, Goal 4	38.958451, - 119.774839
14	Buckeye Creek Wash Study	May be zone A	L	Sec. 8, Goal 3	38.937797, - 119.742127
15	Tracking between forks outside of floodway	Procedure for doing this in Dougals County	H		
16	Washoe Tribe - 395/Dresslerville - Indian Creek Bridge	Have been funded through BIA to fix/modify infrastructure. Flooding affects Tribal road	L		
17	Bank Stabilization project	90% Design - needs \$340,000; \$100,000 already received through EPA funding	M		
18	Carson River clearing and snagging projects	Proactive infrastructure/river maintenance and replacement	M		
19	Washoe Tribe - Storm water plans/updates				
20	LID	Design criteria, procedures, ordinances	M		

APPENDIX E

LYON COUNTY					
NO.	PROJECT	COMMENTS	JUR. PRIORITY	HMP MITIGATION GOAL	LOCATION
1	River Road Project		M	Sec. 7, Table 7-1, #1	
2	Superfund Site resolution		L		
3	Silver Springs/Ramsay Canyon Remapping	Study sent to FEMA for review; need planning study for improvements, possibly part of NDOT project	H	Sec. 7, Table 7-2 Item 17; Sec. 7, Table 7-1, #1	39.407934, -119.217702
4	TDR, incentivize floodplain protection deer run to New Empire to Lahontan		M	Sec. 7, Table 7-2 Item 3, 15; Sec. 7, Table 7-1, #1	
5	Bafford Lane Bridge Flood control	follow up	L	Sec. 7, Table 7-2 Item 15 (?); Sec. 7, Table 7-1, #1	39.511443, -118.744486
6	Phase 2 re-vegetation Fort Churchill State Park (Houghman Howard Diversion to Bucklands Station)	follow up	M	Sec. 7, Table 7-2 Item ?	
7	Phase 3 re-vegetation (Bucklands Station to Lahontan Res)	follow up	M	Sec. 7, Table 7-2 Item ?	
8	Title 15 - LID standard adoption		H	Sec. 7, Table 7-2 Item 1?	
9	Special Improvement District for Storm Drainage that flows into Carson River along Carson River (design, construct, operate and maintain); ADMP for Highway 50 Corridor from Moundhouse through Silver Springs (future growth)		H	Sec. 7, Table 7-1, #1	39.405824, -119.310962
10	Alluvial Fan ADMP for areas south of river in Dayton Valley (Eldorado Canyon); future growth		H	Sec. 7, Table 7-1, #1	39.235343, -119.584410
11	Bridge alternatives in East Dayton Valley	Flood impact and alignment study needed as a result of development pressure in area	M	Sec. 7, Table 7-2 Item 3, 15, 17; Sec. 7, Table 7-1, #1	39.236731, -119.587636
12	Wastewater treatment plant - any flood issues?	Pond in floodplain, needs mitigation	L	Sec. 7, Table 7-2 Item 15, 17?; Sec. 7, Table 7-1, #1	39.293079, -119.504058

APPENDIX E

COMMUNITY-WIDE		
NO.	PROJECT	COMMENTS (10/15/2017)
1	Early warning system to install gages to include a tipping bucket and reverse 911.	System is operational in Carson City with warnings issued by National Weather Service; however, gages are old, may be better systems now. Still very relevant.
2	Floodplain preservation (easements/open areas).	Floodplain and flood hazards should be considered with open space program objectives when selecting acquisition targets and establishing management strategies for open spaces. Still very relevant.
3	Develop Build Wisely! Codes	Implement or enhance county ordinances that include floodplain protection as a purpose, account for the loss of floodplain storage volume, and mitigate losses through a variety of methods. Floodplain ordinance update with Rob Loveberg an ongoing aspect of this.
4	Public awareness (Flood Awareness Week, etc.)	Ongoing, examples of which are as follows: <ul style="list-style-type: none"> • Develop watershed-wide outreach and education program about floodplain importance and flooding hazards. • Brochures should be developed for distribution on a watershed level with consistent messages and information for the general public. • Annual Flood Awareness Week will be established with the objective of providing information about flooding and flood hazards to the general public. • Special Events, River Work Days, and other outreach opportunities should be utilized to help raise awareness of flooding hazards and importance of floodplains.
5	Elevation Reference Marks (ERM) should be permanent monuments and updated on a regular basis.	ERMs should be in the same datum as base flood elevations on FIRMs or a datum that is readily convertible to FIRM datum. Move towards FEMA recommended NAVD 88 datum. A master list of ERMs should be developed, maintained, and made available to interested parties. A gap analysis may need to be conducted. Douglas County needs updates, other jurisdictions as well. This is especially important since this round of discovery will implement alluvial fan plans, so even more important to understand gaps for those reference marks.
6	DFIRM updated procedure	Updating digital flood maps. Support FEMA's Map Modernization Program and encourage FEMA to update FIRMs with current and future conditions. Significant verification of topography and other variables should be conducted prior to release of draft FIRMs.
7	Flood hazard mitigation procedures and understanding how each community has been developing it.	Establish building set-backs in flood hazard areas, where appropriate, to reduce severe hazards from channel migration.
8	Photo monitoring	Photo-Monitoring program (on-the-ground and aerial) should be developed and coordinated on a watershed level to document flooding and flood hazards in a consistent matter. Important to have on record photos of past floods; pictures to see how system reacts. It will react differently now than it did in 1955 for example, as a result of growth, etc. Consider format or venue to submit anecdotal evidence, pictures. "Report a Flood". Churchill flew lots of aerals during flooding; they have hundreds of pictures in a dropbox. Need a database/procedure to submit pictures.
9	LiDAR and/or aerial photography (on a watershed level) should be conducted on a 5-year basis, or as needed, to provide updated information on channel movement and floodplain condition.	Explore potential for UAS technology of floodplain mapping.

APPENDIX E

10	Hazard areas - investigate areas for establishment of setbacks and buffer zones in highly hazardous areas.	Retain lands that provide floodplain storage and maintain or restore connection of river with floodplain through land acquisition, conservation easements, local open space programs, TDR and PDR Programs, and other protection methods. This is ongoing with ordinance planning.
11	Infrastructure design/replacement-coordinate with NDOT and local jurisdictions to ensure infrastructure compatible/consistent with RFMP	Ongoing.
12	Groundwater quality impacts - evaluation of groundwater impact due to flooding	Ongoing; still sampling
13	Fluvial geomorphic assessment update (RFMP update 2013)	Very relevant; last done in 1996. New projects: put together a rapid response simulation model. River forecast constantly changing during an event, Following up on that, they found really limited number of forecast sites. Only 3 on Carson River that are reforecasting sites.
14	Sediment transport study	Still relevant. Impacts on water quality; impact flood hazards if changing invert elevation of river. Lateral migration, scour at bridges.
15	Leviathan mine monitoring. There were spills from ponds during winter. Beaver ponds were removed that caused heavy metals build up; water quality issues.	Some misconceptions about the extent of spills. Public outreach to address concerns if necessary.

APPENDIX F

DISCOVERY MAP

[illegible]

County	Status	Effective Date
Alameda County	Unknown	11/19/1987
Contra Costa	Effective	12/25/2018
Chico County	Effective	9/24/2008
Douglas County	Effective	6/15/2016
Los Angeles	Effective	10/20/2018
San Diego	Effective	4/23/2009

Community	OID	Population
Aljone County	06003	1,071
Carlson City	320001	54,741
Churchill County	320030 320002	24,296
Douglas County	320006	48,020
Espey County	320025 320034 320014	53,179
Reynolds County	320036	5,602

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